Coyote Creek Watershed Council Meetings

Coyote Creek Watershed Management Plan

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US Army Corps of Engineers

Coyote Creek Watershed Management Plan

Public Meeting #1 Session 1

May 11, 2005
2:00 pm – 4:00 pm
1 Civic Center Circle
Brea, California 92821

Meeting Summary

List of Attendees:

Alex Waite, City of La Mirada
Alvin Cruz, County of Los Angeles Department of Public Works
Beatrice Mosacchia, City of Brea
Ben Ericson, City of Brea
Brigid Baty, Metropolitan Water District
Chris Reimer, City of Brea
Christian Alarcon, Los Angeles County Sanitation District
Claire Schlotterbeck, Hills for Everyone
Dan Bigger, County of Orange
Dennis Eschon, City of Long Beach
Dennis Papilion, URS
Dominic Lazzaretto, City of La Palma
Eileen Takata, Orange County Watershed & Coastal Resources
Erik Larsen, URS Corporation
Gary LaForge, City of Seal Beach
Gary Neely, Assemblymember Bob Huff
George Cardenas, City of Aneheim
Greg Gauthier, Southern California Wetlands Recovery Project
Greg Lugar, U.S. Army Corp of Engineers
Grieg Asher, City of Artesia
Jack Kudron, City of Anaheim
Jane Beesley, Rivers and Mountains Conservancy
Jeff Maisch, Aera Energy
Jeff Miller, La Habra Vital Community Task Force
Jerry Burke, County of Los Angeles
Jessica Cawthron, Orange County Supervisor Chris Norby
Jim Hutchison, U.S. Army Corps of Engineers
Jim Meyer, Trails4All
John Arnau, County of Orange, Integrated Waste Management

Kathie DeRobbio, City of Brea
Kavita Mehta, URS
Kevin Frey, City of Brea
Kevin Martin, URS
Krista Sloniowski, U.S. Army Corp of Engineers
Matt Gordon, C2HMHILL
Paul Kuykendell, City of Lakewood
Keith Linker, City of Anaheim
Randy McDaniel, City of Fullerton
Robert Dale, La Habra Vital Community Task Force
Scott Jakubowski, County of Orange
Scott Lynch, C2HMHILL
Shriley Birosik, Regional Water Quality Control Board – Los Angeles
Susan Palomares, City of Cerritos
Vinh Tran, County of Orange

On May 11, 2005 Orange County, in partnership with the United States Army Corp of Engineers (Corps), Los Angeles District, held two public scoping meetings for the Coyote Creek Watershed Management Plan at 2:00 – 4:00 pm and 6:00 – 8:00 pm, at the Brea Civic Center located at 1 Civic Center Circle, Brea, California 92821. The purpose of these meetings was to raise issues or concerns in advance of preparing the Coyote Creek Watershed Management Plan. The following are notes from the first meeting held at 2:00 pm.

The meeting started with the introductions of the project team and meeting attendees. Dennis Papilion of URS introduced the concept of the Coyote Creek Watershed Council. This Council would consist of voluntary members from partnering agencies, stakeholder agencies, and representatives of the general public. The Council would meet every two to three months. Dennis also explained the watershed planning process to the audience.

Eileen Takata from the County of Orange, Watershed & Coastal Resources Division and Project Manager for the Coyote Creek Watershed Management Plan (WMP) talked about roles of various team members and how the team will perform their roles. Eileen provided an overview of the plan itself.

Krista Sloniowski (Study Manager for the project) from the Corps talked about their separate but related Coyote Creek-Lower San Gabriel River Watershed Feasibility Study process and the different stages involved in the study process. The process has nine steps from F-1 to F-9, including a future Environmental Impact Statement (EIS). This WMP dovetails with the Corps study process. The WMP is currently in the F-2 and F-3 stage, which includes public scoping, and existing conditions assessment. The WMP process will continue until early 2007 with analyses and management recommendations. The WMP will be completed before the Corps completes their entire Feasibility Study process. The broader Corps Study will probably continue beyond early 2007.

Eileen then talked about the County of Orange, Resources & Development Management Department and its mission. The Watershed & Coastal Resources Division is five years old, and focuses on protection of coastal resources and water, through implementing programs based on a watershed approach. The Division's approach is to promote multiple objective plans, projects, and policies. Example projects include management of urban runoff, erosion and sedimentation management, increase of recreational opportunities, facilitation of stakeholder processes, and development of watershed management plans. The total cost of developing the WMP will be $430,000 plus in-kind services and support from partners and stakeholders. The final product will be a Watershed Management Plan, which is a component of Corps Feasibility Study.

INPUT FROM PUBLIC

1. Communicating the Process: Keep this a positive process – lack of communication could contribute to negativity amongst stakeholders. Efforts need to be put into keeping this a positive process and negative comments should be avoided. Monitoring of what is included in presentations and what is said in public meetings is important.

2. Agency Participation: Federal Agencies such as the Department of Defense (DOD) and the Department of the Navy should be involved in the process, as they are one of the major stakeholders operating large amounts of non-developed lands. Regional agencies such as SCAG should also be involved. Local governments and cities should be involved in the process.

3. A portion of the City of Chino Hills is part of the Coyote Creek Watershed and, therefore, the County of San Bernardino and the City of Chino Hills should be involved.

4. How does this WMP relate to the management plans of local cities?
    - The purpose of the plan is not to supercede local government authority, but to provide guidance on future management activities such as projects, policy collaboration, data collection, and economic development.
    - Plan development is collaborative process.
    - Clarification that the WMP is not a regulatory document.

5. City of Industry is one of the largest landowners and is in litigation. They cannot participate until the legal process is concluded.

6. Would the end result of this process be construction of projects or a document like an EIS? Would there be construction of wetlands?
    - This plan will identify the opportunities and feasibility of future projects that may lead to improved the conditions in the watershed.
    - Corps response – The document would provide tools and techniques, alternative plans, goals and policies, and implementation programs.

- The document would undergo several review processes seeking input from the public and the agencies/stakeholders.
- In the future, a completed Watershed Feasibility Study, of which this Coyote Creek-San Gabriel River Watershed Management Plan is a component, will be presented to Congress for funding.

7. City of Long Beach:
    - Habitat restoration
    - Water restoration
    - Water quality
    - Impact on the ocean
    - Trail system
    - Run-off from the 605 freeway – 605 freeway and waterway crossings need improvements
    - Bridge crossing - bicycle connections over San Gabriel River-Coyote Creek for recreation

8. City of Brea:
    - There is a lot of work that has already been accomplished. The plan so far has not taken into consideration work done by the cities in Orange County (NPDES – DAMP Co-permittee collaboration).
    - Create a priority list of areas that can be converted to constructed wetlands.
    - There have been areas identified and prioritized by the co-permittees in Orange County for restoration and watershed improvement projects. These areas will be used to identify the opportunities for improved conditions in the WMP and will be presented at the end of the process. Work done to date will be dovetailed with the WMP to augment efforts and not recreate them.
    - Cities objectives would meet the County objectives from a permitting standpoint.

9. City of La Habra Vital Community Task Force:
    - Documents-related information availability:
        - Would the presentations and maps be available online and available to public? Eventually, yes.
        - Who should be contacted for corrections? Eileen Takata.
        - Example Watershed Management Plans include Domiguez and Ballona, Rio Hondo, Arroyo Seco. Domiguez and Ballona are the good watershed management plans prepared by Los Angeles County Department of Public Works, available at www.ladpw.org.
        - www.ocwatersheds.com also has watershed plans, including the Newport Bay Watershed Management Plan.

    - Ground water pollution is a big issue in La Habra. Are ground water issues being looked at in this plan? Yes.

- How many days of beach closures are caused by upper watershed cities producing pollution? This will be addressed.
- Recreation:
  - What is the condition of the bike lane through La Habra? Where does it end? Can we address it in the plan?
  - La Habra incurred expenses for a bike lane.
  - Plan pedestrian crosswalks, equestrian crosswalks, trails, and access.
  - Equestrian and bike lane development should be considered for recreation.
  - City of La Habra has been given a permit to extend the bike trail from Hillsbourgh.
  - Safety is a huge issue and that is why gates are currently locked to limit access.
- Storm water and urban runoff –storm drains go into many areas affecting the water quality.
  - Upgrade channels
  - Need to meet state water quality standards
  - Water quality permitting for storm drains has been changed. Automotive areas are suspected to drain directly to the channel. (City of La Habra staff noted that this is not the case and that the issue is being addressed.)
  - There should be filters or something added to remove the oil from contaminated water before it enters the channel and travels to the beaches.
  - Policies and plans can only go so far, there has to be way to implement for success.
  - Areas need to be retrofitted to remove concrete, reduce erosion, reduce discharges from automotive areas etc. Management Plan needs to show where key areas are and address how to eliminate them.
  - There may be too many storm drain filters to retrofit. Permit requirements are in place to have new construction to install storm drain filters etc.
  - Who has the jurisdiction over Coyote Creek if someone sees the water bodies being polluted? County of Orange and County of Los Angeles. Is there a hotline? In Orange County, to report water pollution problems call (714) 567-6363, or go to www.ocwatersheds.com. In Los Angeles County, call 1-888-CLEAN-LA or go to www.888cleanLA.com.

10. Aera Energy:
    - EIR will be out in the Fall 2005.
    - Oil fields in the area are being redeveloped to housing uses.
    - Operation plan is in development. Work should be coordinated with these groups.
    - There are about 3000 acres of land of which about 1500 acres will be put into open space.

- Remediation of oil operations will be done.
- Wildlife corridors, open space, and recreation are being considered in the master plan.

11. Additional stakeholders to invite:
    - Puente Hills Habitat Authority
    - Whittier La Habra Open Space Coalition

12. Would the attendees list be on the website posted along with the presentations? Yes, a list of stakeholders will be on the website.

13. Will the study be looking at daylighting some portions of the streams? Yes.

14. Alternative/Creative Financing:
    - Can creative financing be looked at for the cities?
    - Possibility of using redevelopment funds
    - Orange County Supervisor Chris Norby has expressed interest in using redevelopment funds
    - Could there be a Watershed Management Authority?
    - Supervisor Norby's representative was present and is looking at the feasibility of a Watershed Authority. Redevelopment funds cannot currently be used for operations. (Note, there is a Watershed Conservation Authority, a Joint Powers Agreement Between Los Angeles County Department of Public Works and Rivers and Mountains Conservancy for the San Gabriel River Watershed.)

15. Los Angeles Regional Water Quality Control Board: Watershed characterization is very difficult – it should start as soon as possible. Watershed characterization needs to be done with agencies that have data and GIS layers. (For e.g. Compton Creek examined land use by neighborhoods which worked well. It located hotspots for trash and creek problems were at a more refined scale.) People who have information should be included to make sure we use the existing information to the best of the plan.

16. Mercury contamination: Mercury is a very serious problem within the watershed. Metal oxides dissolve into the groundwater. Water quality should be evaluated to address mercury and the human health hazard.

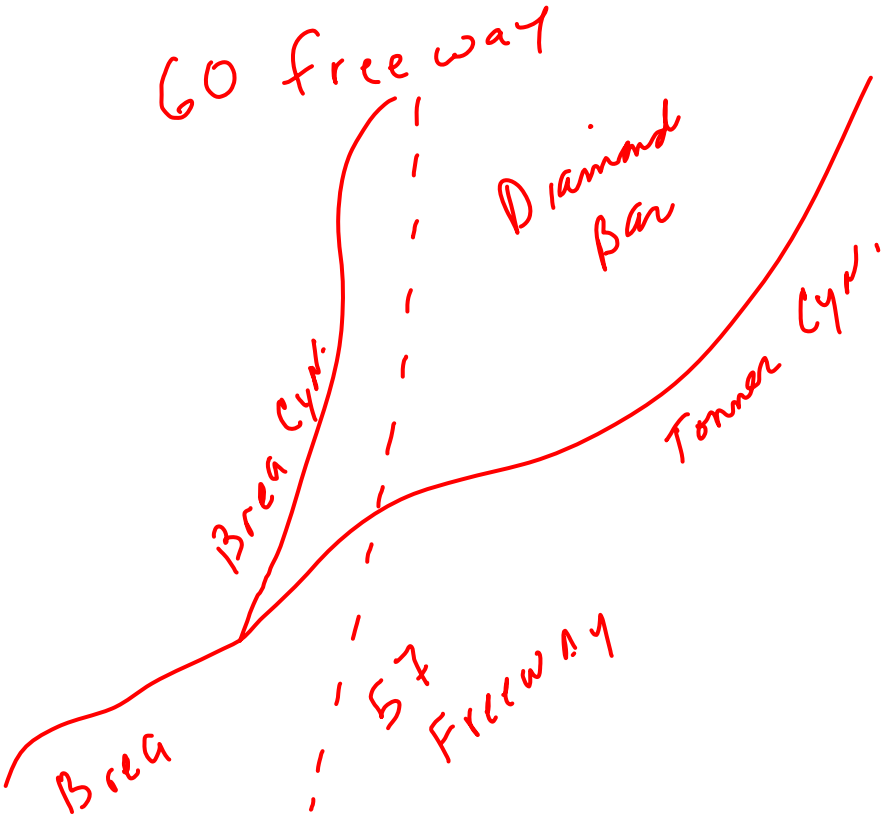
17. Scope and breadth of the WMP would go well beyond the local agencies
    - Partnership with Navy and federal agencies
    - Soils survey

18. National Park Service-San Gabriel River Watershed Special Resources Study:
    - Would City of Brea participate?
    - La Habra voted to not participate

- Study area includes only the northern half of the Coyote Creek Watershed.

19. The Corps may partner with other agencies to perform work on ecosystem restoration and flood control projects. Ecosystem restoration may include mercury contamination or water quality issues.

20. The last aerial is incorrectly labeled. The canyon in which the 57 freeway lies is Brea Canyon. It was labeled as Tonner Canyon. Tonner Canyon runs to the east: northeast from the confluence of Brea canyon and Tonner Canyon.



Additional Stakeholder Input:
Hills for Everyone
Assemblymember Bob Huff
La Habra Vital Community Task Force

Coyote Creek Watershed Management Plan

Public Meeting #1 Session 2

May 11, 2005
6:00 pm – 8:00 pm
1 Civic Center Circle
Brea, California 92821

Meeting Summary

List of Attendees:
Andrea Gullo, Puente Hills Landfill Native Habitat Preservation Authority
Angela Lindstrom Friends of Coyote Hills
Dennis Papilion, URS
Eileen Takata, County of Orange Watershed & Coastal Resources
Jeff Maisch, Aera Energy
Kavita Mehta, URS
Kevin Martin, URS
Krista Sloniowski, Army Corps of Engineers
Matt Gordon, CH2MHILL
Rick Thomas, Legacy Collaborative
Scott Lynch, CH2MHILL
Sonia Nasser, County of Orange Watershed & Coastal Resources
Timothy Jones, Los Angeles County Fish and Game Commission

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agencies, and representatives of the general public. The Council would meet every two to three months. Dennis also explained the watershed planning process to the audience.

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INPUT FROM PUBLIC

1. Enhance recreational facilities.

2. Trash Issue in Seal Beach Area: What kind of trash control or educational efforts would go on in this area? There is a trash problem on the San Gabriel River. We need to look at reduction programs that will clean this river up so there is no TMDL put in the water-body. There is a trash task force that could evaluate this watershed management plan for trash reduction issues.

3. Bikeways: Bikeway opportunities should be evaluated for the Coyote Creek area. Bikeways in La Habra, Buena Park – 3 miles west of Rosecrans. There are two sides to Coyote Creek, one has a bikeway, the other does not.

4. Trails: An upcoming trails meeting at the La Habra Community Center on Tuesday, May 17th at 7 pm. The trails issues should be evaluated.

5. **Puente Hills Landfill Native Habitat Preservation Authority**: How would the Plan affect the open space around the watershed and the management that is being done to preserve and improve areas of value? How will this affect my area? Would there be open space for restoration in landfill areas?

6. Wildlife movement corridors should be evaluated.

7. Will the plan be evaluating individual homes and how they affect the watershed?

8. Opportunities for pilot projects - water purveyors

9. What does this study entail, what will be the end product? One product includes implementation programs. Would the end product identify who would be the owner of the programs – who would be the responsible party? Would it provide opportunities for partnerships? Try to define an "owner" for the projects that you come up with in the plan. At least identify the parties that might participate.

10. Tonner Canyon is a good open space area. It has a Boy Scout Camp and it has been acquired by the City of Industry. The City of Diamond Bar wants to put a highway through Tonner Canyon to reduce the pressure on the highway that goes through the City.

11. Educational Programs: There should be an educational program for community leaders on how important watershed management is. There is no clear connection between watershed management and other aspects of the human environment.

12. Invite the Watershed Council members to the meetings with elected officials to back up the efforts of the plan.

13. North Orange County – land of Friends of Coyote Hills - habitat for several endangered species, trails for hikers, bikers, educational resources, and educational hub.

14. **Friends of Coyote Hills:** The Coyote Hills for natural reserve and wildlife area. It is currently owned by Chevron and slated for 750 homes. The developer plans to fill a wetlands area, grade the drainage features. Look at this area for possible acquisition so there are no losses of habitat. There are a lot of amenities so there are no needs for encroachment into the area. There are trails through the area already.

15. Need to evaluate the implications of wetland construction on the environment that exists. Are there affects from constructed wetland in the long term due to increased species presence and the subsequent need of vector control to limit undesirable species?

16. Find out where and when the Puente Hills restoration group meets and attend those meetings.

17. Wildlife: There is not enough wildlife and too many diseased fish. Need to address this issue of wildlife habitat.

18. **LA County Fish & Game Commission:**
    - Social/Environmental Justice issue
    - North Orange County demographics shows that it is more ethnic
    - Very less open space/parks
    - Conservation projects would be very important in this part of the County
    - Would affect the habitat
    - Look at it as an acquisition/habitat project
    - Recreational riding arena needs to be considered
    - Identify all educational centers

US Army Corps of Engineers

Coyote Creek Watershed Management Plan

Coyote Creek Watershed Council Meeting #2

July 14, 2005
2:00 pm – 5:00 pm

Fullerton City Hall
303 West Commonwealth
Fullerton CA 92823

Meeting Summary

List of Attendees (alphabetical order by first name):

Alvin Cruz, County of Los Angeles, Department of Public Works
Andrea Gullo, Puente Hills Landfill Habitat Preservation Authority
Angela Lindstrom, Friends of Coyote Hills
Beatrice Mosacchia, City of Brea
Brian Kelly, City of Buena Park
Christian Alarcon, Los Angeles County Sanitation District
Clay Rumbaoa, City of Norwalk
Clint Granath, Forest Lawn Memorial Park
Delfino Consunji, City of La Habra
Denny Papilion, URS Corporation
Dominic Lazzaretto, City of La Palma
Donald Graf, Berryman & Heniger
Eddie dela Torre, City of Placentia
Eileen Takata, County of Orange, Watershed & Coastal Resources Division
Gary Neely, Assembly Member Bob Huff
Greg Gauthier, Southern California Wetlands Recovery Project
Jack Kudron, City of Anaheim
Jane Beesley, Rivers and Mountains Conservancy
Javier Peraza, City of Diamond Bar
Jeff Maisch, Aera Energy – Fee Lands
Jeff Miller, La Habra Vital Community Task Force
Jim Meyer, Trails4All
John Arnau, County of Orange, Integrated Waste Management Department
John Ballast, City of Industry
John Balobeck, County of Orange

Kavita Mehta, URS Corporation
Krista Sloniowski, US Army Corps of Engineers
Larry McKenney, County of Orange, Watershed & Coastal Resources Division
Mark Adelson, Santa Ana Regional Water Quality Control Board
Matt Gordon, CH2M HILL
Mike McConoha, City of Placentia
Mike O'Grady, City of Cerritos
Misty Cota, City of La Mirada
Nadeem Majaj, County of Orange
Raymond Hiemstria, Orange County Coastkeeper
Rick Thomas, California Resources Connections
Robert Dale, La Habra Vital Community Task Force
Sara Bavan, County of Orange
Sarina Morales-Choate, City of Santa Fe Springs
Scott Lynch, CH2M HILL
Shirley Birosik, Los Angeles Regional Water Quality Control Board
Vincent Gin, County of Orange, Watershed & Coastal Resources Division
William Boehmke

On July 14, 2005 the County of Orange, in partnership with the United States Army Corp of Engineers (Corps), Los Angeles District, held the Coyote Creek Watershed Management Council Meeting at 2.00 – 5.00 pm at the Fullerton City Hall located at 303 W Commonwealth Avenue, California. The purpose of this meeting was to present progress of the Coyote Creek Watershed Management Plan development and to solicit input from the Coyote Creek Watershed Council and the public. The following are notes from this meeting.

Welcome and Introductions

Eileen Takata of the County of Orange, Watershed & Coastal Resources Division and Project Manager for this project started the meeting with welcome and introductions to participants. Agenda was reviewed.

Project Review

Eileen gave an overall review of the watershed management plan (WMP), including the purpose, current status, and participants. As part of study, the WMP will incorporate existing plans and policies by the stakeholders. Eileen requested that agencies and organizations provide this information and feedback to the study team. A project schedule providing specific areas for public involvement and input was provided.

Corps Planning Process

Krista Sloniowski from the US Army Corps of Engineers and Study Manager for this project discussed the ACOE process and decision-making criteria and processes.

County Planning Process

Eileen gave a brief discussion on Orange County's planning process approach to watershed management.

Summary of Issues/Feedback

Denny Papilion from URS Corporation (consultants to the County) led discussion on issues and reiterated the desire to continue discussion of the previous and any new issues and incorporating them into the WMP.

The participants were asked to specifically provide input on issues related to cities:

- Q- Has the 303(d) list been considered as part of this WMP?

  A- Yes, these, as well as other regulatory requirements will be considered as part of the WMP.

- Coyote Creek is being studied currently right now for a Trash TMDL. The cities are currently working to address the trash problem and towards avoiding an imposed trash TMDL.

- Q- Do we have city general plans?

  A- Yes, the study team is in the process of collecting these plans and will be in touch with those who have not been contacted over the next few weeks. Ideally, the study team would like to meet with a group of cities (3 to 4 at one time to both save time and money) and to have dialogue on comments, issues, specific project ideas, etc.

- Q- Will those discussions be shared as meeting notes?

  A- Yes.

- Q- Krista S/ACOE – Want to ask how cities are incorporating stormwater quality control, BMPs, etc. as part of their planning/development approval processes.

  A- The general plan is typically updated regularly to incorporate these items.

- It was noted that no one from the City of Fullerton was present at the meeting. The City's NPDES consultant was present at the meeting. The Study team is using multiple methods to communicate with cities in order to retrieve input from all cities within the watershed.

- Q- Will we address the recreational and the water quality issues at the confluence of the Coyote Creek at the San Gabriel River?

  A. Yes, these will be considered as part of the WMP. Bike trails and water quality were noted as being particularly critical issues, especially as the cost of implementing TMDLs is related to this.

- TMDLs and the Board's approach to addressing them: Typically, it is the cities that are required to implement the TMDL after one is adopted. For cities to avoid a TMDL, a voluntary effort can be made to help improve the water quality, and this is why a watershed management plan and implementation can be beneficial to cities. This can also result in a cost savings to cities.

- Q- City of La Habra had previously been fined for washing grease/oil into the waterways of Coyote Creek: How should this have been better handled to avoid this in the future?

A- Hopefully this will be handled quicker under the current NPDES permit process, of which the City is a part of under the county-wide permit. The County is the lead permitee and if not enforced at the County level, then the RWQCB can be brought in. There are other ways to report violators, including a phone hot line and a website.

City of La Habra: Stated that the City has not purposely dumped these constituents and has been addressing these issues over the past several years. The City has spent ¾ to 1 million on retrofit and compliance efforts.

- Denny – One of the problems that cities have is how to enforce these issues. There are mechanisms available, and one of the objectives of this WMP is to help address these types of issues to identify means to improve the watershed, including enforcement, policy changes, etc.
- Q- Do we have a dataset complete enough to establish a habitat restoration plan?

  A- This is not known at this time. This WMP is going to address all the data we would like to collect, we can collect, and what gaps exist.

  Krista/ACOE – If at the end of this phase, it is identified that additional data is needed in order to implement this WMP, then that data would be collected as part of a future phase. It was discussed that the lack of data will not inhibit the progress of the WMP and any data gaps identified that are critical to implementation would be addressed in subsequent phases.
- Q- Is there water quality/environmental data available? How much? How do we know how much we need?

  A- OC Health Care Agency – may have data on beach closure information and is on their website (ocbeachinfo.com). Fish advisories and health data are produced by the state. There may be a lot more data available or not available as well. It was discussed that the amount and type of data that may be needed was something that should be considered in conjunction with the goals and objectives of the WMP.
- Q- Would CDFG be a part of the process?

  A- CA Department of Fish and game invited to these meetings. CDFG has been very understaffed, so there participation in these meetings can be slimmer than anyone else.

Draft Goals and Objectives/Feedback

Denny led a discussion on the draft goals and objectives that the study team developed as part of a visioning meeting. These were also developed in conjunction with the first stakeholder meeting.

Denny asked what other goals/objectives did we want to include:

- From previous discussion: Water quality.
- Need ask how projects or improvements to the watershed may impact health and/or water quality issues. Examples include creating habitat for mosquitoes. The County

of San Diego recently held a workshop to address these issues. Caltrans has also had to address these issues as part of its stormwater quality program.

    - Include projects that provide WNV
    - Establish disease corridor

- Q- Are there 3 documents as part of this project?

  A- Yes, but only the WMP will be completed in the next 2 years. The feasibility and EIR/EIS are scheduled to be started, but completion would not be for several years and is subject to funding availability.

- Q- What is the public input process?

  A- Public input will be done throughout the process.

- Q - Will we be looking at water well issues?

  A- Yes, water supply is something that will be discussed as part of the WMP and it's interaction with other aspects of the WMP. Particular issue: Concerned with a particular analysis being done on groundwater supply in this area.

- One way to address the water quality concerns of the creeks would be to infiltrate the runoff to capture it into the groundwater. In particular the Brea and Fullerton Dams could be good locations to capture and infiltrate the runoff. The operation agencies have resisted this saying the soil will not infiltrate the water, but he thought that this obstacle be overcome by removing portions of the clay layer.

    - There are lot of engineering, geologic issues related to infiltration and percolation, there are certain performance criteria, create vector related issues. Natural habitat – fishes will eat mosquitoes.

- Q- Will we be researching groundwater quality and quantity?

  A- The WMP does not represent all the data, this would still be work in progress.

Existing Conditions Overview/Feedback

Matt Gordon from CH2M Hill (consultants to the County) led the presentation on the existing conditions within the watershed.

Note: Peak elevation of Coyote Hills is 601 feet above sea level.

- Firestone Boyscout camp is in Tonner Canyon and was recently purchased by the City of Industry. The cities of Industry and Diamond Bar have plans for this area.
- Project ID Form - interface with the cities, developers, to identify projects that could be included in the process.
- Project ID form can be posted digitally on the website. This file can also be e-mailed to anyone who requests.
- Study team is looking for input from the stakeholders on proposed/planned projects that should be included into the WMP. These projects include watershed enhancement projects as well as development projects that could include

enhancement projects or have an impact on the watershed. The project ID form was handed out to all participants.

Questions/Discussion

- Q- How important is citizen/public participation? How was this meeting announced? Is this council subject to the Brown Act?

  A- E-mail to all known agencies/cities was sent out at the start of this project. A meeting notice for the first meeting was done via newspaper, which was very expensive. Bob suggested that a press release be made. Consider doing a press release regarding future studies and meetings. Another approach would be to outreach to cities and to do presentations during their public meeting/council meetings. It is important to help educate and outreach to the public.
- Consider doing press releases for free, either by getting a local paper to do an article, or also to engage some of the stakeholders or others who could help distribute the message/announcements to the public.
- There should be more citizen participation. A citizen rep. from each community would be an ideal way to meet this need.
- A motion was passed to form a sub-committee to develop a citizen participation plan.
- A discussion ensued regarding the formality of the Watershed Council. It was agreed that this would be discussed at the next meeting.

Next Steps

- Looking for input from stakeholders on planned projects. The next meeting will be to begin discussing the potential projects identified by the stakeholders as well as those to be identified via GIS analysis.
- The next meeting will be held in the first or second week of September at a location and date to be determined.

Action Items

- Orange County to post the following items on the www.ocwatersheds.com website sometime next week (week of July 18, 2005):
  - May 11 and July 14 meeting powerpoint presentations
  - May 11 and July 14 meeting summary's
  - Project Identification Form (investigate making it a digital form)
- Prepare a list of acronyms that could be continuously updated
  - **TMDL** – Total Maximum Daily Load
  - **CCWMP or WMP** – Coyote Creek Watershed Management Plan. This is the project title, and will be the name of the final report due out in early 2007.

Coyote Creek Watershed Management Plan

Coyote Creek Watershed Council Meeting #3

September 8, 2005
1:30 pm – 4:30 pm

Anaheim Downtown Community Center
General Assembly Room
250 East Center Street
Anaheim, CA 92805

Meeting Summary

Alex Waite, City of La Mirada
Alvin Cruz, LACDPW
Antonio Sandoval, City of Anaheim
Beatrice Musacchia, City of Brea
Carlos Jaramillo, City of La Habra
Christian Alacorn, Los Angeles County Sanitation District
Claire Schlotterbeck, Hills for Everyone
Clint Granath, Forest Lawn Memorial Parks
Dan Bigger, County of Orange
Dave Woefel, Santa Ana Region 8, Regional Water Quality Control Board
Delfino Consunji, City of La Habra
Dennis Eschon, City of Long Beach
Denny Bean, Friends of Coyote Hills
Dominic Lazzeretto, City of La Palma
Gary Neely, Assemblymember Bob Huff's Office
George Yin, City of Industry City Attorney Office
Heather Sowers, City of Fullerton
Jane Beesley, Rivers and Mountains Conservancy
Javier Peraza, City of Diamond Bar
Jeff Maisch, Aera Energy-Fee Lands
Jeff Miller, La Habra Vital Community Task Force
Jim Meyer, Trails4All
Kathie DeRobbio, City of Brea
Marcella Gilchrist, Orange County Coast Keeper
Misty Cota, City of La Mirada
Richard Hairmann, MWH Global
Richard Mayer, City of Anaheim
Robert Dale, La Habra Vital Community Task Force
Scott Stakey
Shirley Birosik, Los Angeles Region 4 Water Quality Control Board

Welcome & Introductions

- Introduction of the project team and the attendees
- This is the third Coyote Creek Watershed Council (CCWC) Meeting
- New item in the agenda: Who's Who in the Watershed – a speaker series to facilitate presentations of agencies within the watershed.

Stakeholder Presentations – Who's Who In the Watershed?

- San Gabriel & Lower Los Angeles Rivers & Mountains Conservancy – Jane Beesley
- Puente Hills Landfill Native Habitat Preservation Authority – Andrea Gullo, Executive Director

Watershed Management Plan (WMP) Progress Report

Overview of WMP Products & Schedule

The team is preparing the Existing Conditions Technical Memo and has almost completed work on this memo.

Input on WMP Goals & Objectives

Goal

- What does "living lightly" mean?
  Krista: It is in context of the impacts, i.e., development would be light in terms of the impacts.
- Define "living lightly"

Mission Statement

- Addition of the word "sustainable" before "economic." The final version to read: "Develop an integrative Watershed Management Plan that provides a comprehensive framework for balancing natural resource management with *sustainable* economic development by designing with nature and building effective partnerships."

- Why is the word "economic development" used - would there be any creation of retail?
  Eileen: The term is used broadly. There would not be any generation of commercial projects, but the WMP will broadly improve economic development.

- Use of the word "protect" natural resources vs. "manage."
  - Add "effectively manage and protect watershed resource" in the mission statement.
  - Maybe it should be "manage, protect, enhance, restore"
  - Would adding "protection" limit the mission statement to the function of protection?
  - It is generally accepted that management includes protection

    - Includes a definition of management – which would clarify what management means
    - Look to Dominguez WMP for Mission Statement guidance.
- "Watershed Management" should it be changed to "watershed protection?"
    - Protection is used at other appropriate places
    - Protection is a sub-set of management

- Who would decide whether the changes would be accepted in the goals and objectives or not? How do we decide if a comment should be included or not? Eileen: Eileen will collect the comments and then changes will be presented to the project team, funders, etc. and then decisions will be made.

- The revised statement will be presented at the next meeting.

Input on Land Goals and Objectives
- Change "economic development" to "economic justice"
- What about "Economic Justice"?
    - A point was made that Economic Development is included in the Mission Statement.
    - Look to RMC "Common Ground" or revisit existing WMP's for ideas on "Economic Development".
- Individual would like the words "respect for private property rights" included.
    - If private property rights are included then other property rights (government lands, board lands, etc.) also need to be included.

Input on Water Goals and Objectives
- What about landfills seeping into the groundwater
- Address toxics entering the watershed
- There are three landfills within the watershed
- Is anyone determining water quality in the watershed? Dave: Landfills are under permit from the regional boards, so they monitor water quality.
- What is the role of the regional boards?
- Protection of wetlands

Input on People Goals and Objectives
- Citizen participation
    - Should we add "Citizen Participation" or "Citizen Stewardship" as a G&O?
    - Increase citizen participation in the watershed
    - There should be an objective for citizen participation/stewardship
- Environmental Justice
    - How would you measure Environmental Justice (EJ) in this process?
    - What are the parameters?
    - How does EJ affect the watershed?
    - Would you look at high-density areas and evaluate?

- Eileen: Many of the funding sources evaluate whether EJ is addressed or not.
- Stewardship: Increasing the role environment plays in peoples lives
- Define Environmental Justice
- Also add "economic justice" in addition to "environmental justice"

Input on Technical Memo: Summary of Existing Conditions Data

Water Resources

- There are 36 special districts within the watershed and half of them are water districts. Are all of those included?
- A point was made that there are many outside sources of water – water is imported from out of state or out of country; drinking water/bottled water comes from many different sources: Arrowhead, Canada, etc. A distinction should be made between sources of water by different uses.
    - Water for irrigation comes from the sewage system
    - Recycled water and recharged of water cuts down on the use of water
    - Look at water resources by where it comes from, what is it used for, and which uses are relevant for us.

We Want Your Input –Who/What Are We Missing?

- City of La Mirada not on the distribution list
- Link the contaminants that flow down
- There is probably a large portion of the watershed that is not monitored for water quality
- More efforts to put the word out about these meetings – school district newsletters, local newspaper.
- Should Caltrans be aware of what is happening within the watershed?
  Eileen: They are included on the distribution list
- Include
    - City of Industry
    - Tres Romanos Conservation Authority
    - Three-Valley Municipal Water District
- Long Beach – Independent water departments should be on the list.

Coyote Creek Watershed Council Updates

- July 14, 2005 Meeting Notes
- Citizen Sub-Committee Proposal – Robert Dale, La Habra Vital Community Task Force
- Roundtable of Announcements
    - Saturday September 17th is a trails cleanup day. More information on www.ocparks.com; www.ocwatershed.org; trails4all.org
    - OCTA is planning on widening I-5 over Fullerton Creek Channel.
    - Trails4all received a grant from the RMC for a bikeway study. This project is a subset of the Coyote Creek project.

- Future Presentations? Eileen asked for ideas on agencies/topics for future presentations.
- Next meeting – tentatively on November 10. Looking for hosts/venues for this meeting.

Adjourn

The meeting was adjourned at approximately 4:30pm.

US Army Corps of Engineers

Coyote Creek Watershed Management Plan

Coyote Creek Watershed Council Meeting #4

November 10, 2005
1:30 pm – 4:30 pm

Whittier City Hall

City Council Chambers

13230 Penn Street, 2nd Floor
Whittier, CA 90602

Meeting Summary

List of Attendees (alphabetical order by first name):

On November 10, 2005 the County of Orange, in partnership with the United States Army Corp of Engineers (Corps), Los Angeles District, held the Coyote Creek Watershed Management Council Meeting at 1.30 – 4.30 pm at the Whittier City Hall located at 13230 Penn Street, Whittier, California. The purpose of this meeting was to present progress of the Coyote Creek Watershed Management Plan development and to solicit input from the Coyote Creek Watershed Council and the public. The following are notes from this meeting.

Welcome and Introductions

Eileen Takata of the County of Orange, Watershed & Coastal Resources Division and Project Manager for this project started the meeting with welcome and introductions to participants. Agenda was reviewed.

Project Review

Eileen provided an overall review of the Watershed Management Plan (WMP), including the purpose, current status, geographic extent, and team organization. A project schedule providing current status and the specific areas for public involvement and input were provided.

Questions and Comments:

- Is the study area same as the watershed?
- Can the County provide copies of the maps?
- Would the project material be posted on the website?

Stakeholder Presentations – Who's Who In the Watershed?

Aera Energy Puente Hills Project – Jeff Maisch, Aera Energy

Aera Energy presented the Aera Master Planned Community project, which affects nearly 3,000 acres near the point where the SR-57 Freeway crosses from Los Angeles County into Orange County. The proposed community is adjacent to the communities of Rowland Heights, La Habra Heights, Diamond Bar and Brea. Ninety percent of the property is in unincorporated Los Angeles County, with 10 percent of the project located in unincorporated Orange County. The property has hosted oilfield operations and cattle grazing for more than a century but, with oil production declining, Aera is seeking to redevelop the property for open space uses, commercial uses, and up to 3,600 residential dwellings. As proposed, development would occur on about half of the acreage with the other half being devoted primarily to natural open space uses. The area now being used for oil extraction would be cleaned up and restored as a wildlife movement corridor to provide connectivity between existing dedicated open spaces to the northwest and southeast of the property. Aera is also proposing a golf course use on about 150 acres within this 600 - 700 acre area.

Aera's planning effort incorporates water quality basins and other hydrology design features. Three named creeks exist on the property and contribute to the Coyote Creek Watershed. The headwaters of Coyote Creek occur on the west end of the site, where it

will be preserved in its present condition. Upper Brea Creek enters the Aera property east of the freeway from a concrete channel carrying urban runoff from Diamond Bar. Stabilization measures are being considered where the creek is deeply incised and eroding, and a bridge crossing is required, but the creek will otherwise be left largely undisturbed. The project also provides a significant opportunity to restore a portion of lower Berry Creek that has been disturbed by oil operations over the years. Located within the wildlife movement corridor, the stream course would be restored by removing road crossings and oil pipelines, and riparian habitats would be restored by removing invasive plants and replacing them with native species.

Questions and Comments:

- The plans for the property match the Coyote Creek WMP objectives, i.e., sustainable development.
- Is there any intent to restore nuclear waste sites?
  Response: The General Administration Office owns these sites and Aera would not be able to do anything with those sites.
- Does land like this have value in the market?
- What is the status of you negotiations with the wild life corridor?
  Response: Aera has been in discussion with them but has not made a firm offer.
- City of La Habra coalition coordinating to acquire the property.
- Oil production: How long oil production will continue?
  Response: Aera is not drilling anymore at the site they are just producing oil from the existing reserves.
- What is involved in these remediations?
  Response: Aera would undertake extensive remediation including bio-remediation.
- Where is the intersection with harbor blvd? Is it north or south of the underpass? Where would be the access for this site?
- Have Aera looked at post-development flows?
  Response: Hydrology would be covered as part of the EIR.
- Are there any historically significant features at the site?

San Gabriel River Corridor Master Plan – Danny Bobadillo and Alvin Cruz, Los Angeles County Department of Public Works

Los Angeles County Department of Public Works presented on watershed management in Los Angeles County and the San Gabriel River Master Plan. The Watershed Management Division in Los Angeles County began as providing flood control and water conservation to protect life and property in LA County. Flood control is utilized by open channels, underground storm drains and catch basins. The Watershed Management Division is also concerned with water conservation by capturing storm water runoff in order to recharge groundwater in 27 groundwater recharge areas. Watershed management has been successful in solving the problem of devastating floods and mudflows for the millions of people that live in the Los Angeles County Basin. Currently, the Watershed Management Division is involved in River Master Plans (for the LA River, San Gabriel River and the Santa Clara River), water quality monitoring, and testing structural BMPs.

The County also presented on the San Gabriel River Master Plan (SGRMP). The planning team members are the County of Los Angeles departments of Public Works, Parks and Recreation, Regional Planning, the Rivers and Mountains Conservancy and the National Park Service. The drainage area for the San Gabriel River watershed is 640 square miles. Approximately 27 miles of the San Gabriel River is soft bottom while the following 10 miles is covered in concrete. The SGRMP Vision and Goals involves Habitat, Open Space, Recreation, Flood Protection and Water Quality. The Master Plan will include 134 corridor projects, connection to adjacent projects, five concept design studies, funding strategy, design guidelines and the environmental impact report. Coyote Creek projects in the SGRMP will include the Coyote & Carbon Creeks Watershed Management Plan, the Coyote Creek Bike Trail Enhancements, the Coyote Creek Debris Boom, The Los Alamitos Channel Treatment Wetland and the proposed Confluence Bridge. The Master Plan is due to be completed in December 2005.

Questions and Comments:

- What was your citizen participation program?
  Response: Stakeholder meetings
- What was the County's position on removing the concrete bed in the City of Long Beach?
  Response: City of Long Beach undertook a study for taking-off concrete from the river bed; the study is not completed yet.
- Does Master Plan impact development projects around the cities?
  Response: The stakeholder process helped in resolving the conflicts. Also, majority of the corridor is within the County's ownership.
- All projects in this study are in the Coyote Creek study area, so those could be included in Coyote Creek WMP.

Watershed Management Plan Progress Report

Revised Goals & Objectives – Final Review

Eileen presented revised vision, mission statement, goals, and objectives for the project. The goals and objectives were revised based on the input received from the stakeholders in the previous meetings held in May, July and September of 2005. More changes were suggested on the goals and objectives during the November meeting. Based on the input received during the meeting the goals and objectives for the project would be finalized.

Polling… Which Are Your Top 5 Objectives?

At the end of the presentation of the goals and objectives the audience were asked to provide prioritize the goals and objectives. Five markers were provided to each audience to place them against the objectives they consider most important for the watershed. The results of the polling are summarized in the table below:

Goals and Objectives Polling Results: November 10, 2005 Public Meeting. Whittier City Hall

Goal	Objective		Total Votes	% of Total
Land	L-1	Habitat	12	10%
	L-2	Recreation	9	8%
	L-3	Open Space	12	10%
	L-4	Economic Development	7	6%
	L-5	Mobility	3	3%
			43	***36%***
Water	W-1	Water Supply	4	3%
	W-2	Impervious Surfaces	3	3%
	W-3	Water Quality	7	6%
	W-4	Flood/ Sediments	5	4%
	W-5	Wetland Protection	6	5%
			25	***21%***
People	P-1	Aesthetics	4	3%
	P-2	Education and Outreach	6	5%
	P-3	Environmental Justice	5	4%
	P-4	Health & Safety	3	3%
	P-5	Citizen Participation and Stewardship	2	2%
			20	***17%***
Management	M-1	Organization	4	3%
	M-2	Collaboration	11	9%
	M-3	Communication	5	4%
	M-4	Multiple Objective Projects	11	9%
			31	***26%***
TOTAL			**119**	**100%**

Opportunities and Constraints Technical Memo

Draft Technical Memo Outline

Eileen presented an outline for the Opportunities and Constraints Technical Memo. The Planning Team is currently working on this memo.

Summary of Issues and Watershed Questions

Eileen provided an overview of the issues within the watershed and raised questions that the Planning Team is looking to answer. The issues were summarized from the input provided by the stakeholders in the previous meetings and also from the Planning Team Visioning Meeting conducted at the beginning of the project.

Spatial Analysis Process

James Gorham of CH2M Hill presented the analysis of spatial opportunities and constraints within the watershed. He explained the analysis process which would include

1st order, 2nd order, and 3rd order mapping of opportunities and constraints for each issue area and provided a few examples of the analysis.

Questions and Comments:

- A question was raised regarding the availability of bike plan and bike trail maps. This would help in determining where the gaps are with these layers.
  Response: The extent of the data layers available with the LACMTA and the OCTA is not known at this time. It is not known how detailed the team can get with this analysis. The LACMTA developed a layer for bike trails; it is not known if a similar layer is available with OCTA; a gap analysis would be useful.
- A comment was made that the team should collect as much data as possible. OCTA had collected trails data from all the cities, so availability of this data should be checked with OCTA.
- Is OC is going to be the keeper of this data? Would it be possible to enhance this data when it becomes available?
  Response: Possibly, watershed stewards will be the keepers of this data.
- Gary Neely commented on the availability of data with the water districts within the watershed (data on aquifer restoration).

Plan and Policy Overview

Kavita Mehta of URS Corporation presented the plans and policy analysis framework for the watershed. She outlined the analysis process and presented a few examples for identifying plan and policy opportunities and constraints. Plan and policy analysis would include review of relevant elements of the general plans for the cities and the counties, watershed management restoration and urban water management plans, water quality plans, habitat, natural communities and species conservation plans, and pertinent transportation plans.

Questions and Comments:

- What would be the result of plan and policy analysis? How would the recommendations be implemented within cities and counties? Is there any enforcement authority?
- Coyote Creek Watershed Management Plan would be an advisory document. The plan would not be enforced. Recommendations of this Plan would be in the form of model policies and BMPs which could become part of the cities and counties general plans. The cities and counties can include these recommendations in the general plans when their general plans are revised and updated.
- Multi-modal transportation should be included as one of the objectives and multi-modal plans of the three counties should be reviewed. Lynne Goldsmith is contact at the LACMTA
- The Missing Middle report by Dr. Wayne Spencer should be reviewed.

Next Steps

- Next meeting will be January 2006 and the one after that in March.

Coyote Creek Watershed Management Plan

Coyote Creek Watershed Council Meeting #5

February 9, 2006; 1:30 pm – 4:30 pm

La Mirada City Hall, Meeting Room B

13700 La Mirada Boulevard; La Mirada, CA 90638

Meeting Summary

List of Attendees:

Angela Lindstrom, Friends of Coyote Hills
Beatrice Musacchia, City of La Habra
Belinda Faustinos, Rivers & Mountains Conservancy
Brian Diaz, Recupero & Associates
Brian Melanephy, City of Placentia
Brigid Baty, Metropolitan Water District
Christina Davis, Pacific Coast Homes/Laer Assoc.
Dave Mochizuki, City of Whittier
Denny Bean, Friends of Coyote Hills
Eileen Takata, County of Orange
Gary LaForge, AEI-CASC Engineering
Gary Neely, Assemblymember Bob Huff
Gonzalo Vazquez, City of Cypress
Greg Gauthier, Wetlands Recovery Project
Helen Higgens, Friends of Coyote Hills
Jane Beesley, Rivers & Mountains Conservancy
Jason Lambert, US Army Corps of Engineers
Jim Meyer, Trails4All
Juan Villalobos, URS
Kavita Mehta, URS
Maggie Le, City of Brea
Mark Horne, EIP Associates
Marvin DeCarlo, City of Artesia
Matt Benjamin, LA County Bicycle Coalition
Matthew Gordon, CH2M HILL
Mike O'Grady, City of Cerritos
Misty Cota, City of La Mirada
Richard Boon, County of Orange
Sarina Morales-Choate, City of Santa Fe Springs
Shirley Birosik, LA Regional Water Quality Control Board
Victor Bordas, LA County Dept. of Public Works
Yolanda Summerhill, Jones & Mayer
Zehava Purim-Adimor, OC Coastkeeper

On February 9, 2006 the County of Orange, in partnership with the United States Army Corp of Engineers (Corps), Los Angeles District, held the Coyote Creek Watershed Management Council Meeting at 1.30 – 4.30 pm at the La Mirada City Hall located at 13700 La Mirada Boulevard, La Mirada, California. The purpose of this meeting was to present progress of the Coyote Creek Watershed Management Plan development and to solicit input from the Coyote Creek Watershed Council and the public. The following are notes from this meeting.

I. Welcome and Introductions

Eileen Takata of the County of Orange, Watershed & Coastal Resources Division and Project Manager for this project started the meeting with welcome and introductions to participants. Agenda was reviewed.

a) Project Review

Eileen provided an overall review of the Watershed Management Plan (WMP), including the purpose, current status, geographic extent, and team organization. A project schedule providing current status and the specific areas for public involvement and input were provided.

II. Stakeholder Presentations – Who's Who In the Watershed?

a) Greater Los Angeles Region Integrated Water Management Plan – Hector Bordas, Los Angeles County Department of Public Works & Belinda Faustinos, Rivers & Mountains Conservancy

Hector Bordas and Belinda Faustinos presented the Greater Los Angeles Integrated Water Resources Management Plan (IRWMP) currently being developed by the Los Angeles County Department of Public Works. This complex planning effort will result in a plan that identifies the region's top priority water resource projects, for potential Proposition 50, Chapter 8 funding. The IRWMP will be completed by December 2006.

Because the planning area is so large, five sub-regions have been designated to separately develop their priorities. The Coyote Creek Watershed is within the Lower Los Angeles & San Gabriel River Watershed sub-region. Stakeholders for these sub-regions meet at least once a month. Each sub-region has representatives on the Leadership Committee, which meet together to coordinate throughout the region.

Eileen explained that the Coyote Plan will dovetail with the IRWMP by sharing project lists. She will submit the project list from the Coyote Creek Watershed Management Plan for inclusion in the LA IRWMP. For those who want to submit projects individually, the LA IRWMP will have a Project Form on their website in April.

b) Orange County's Drainage Area Master Management Plan, 2004-2005 Performance Effectiveness Assessment & North County Dry Weather Monitoring Program – Richard Boon, County of Orange

(To be summarized)

- Matrices used by Orange County Storm Water Program
- Model for Coyote Creek to use for analysis

III. Cal Poly Pomona – 606 Studio Study & Survey

Cal Poly Pomona graduate landscape architecture student Jessica Bagwell provided a brief overview of their project, a Green Development plan for the Coyote Creek Watershed. This project is being developed for the County of Orange, through a grant from the Rivers and Mountains Conservancy as part of the Watershed Management Plan. Jessica handed out a short survey which would assist her team in formulating their project. The questions pertained to the knowledge or acceptance of green development practices.

IV. Watershed Management Plan Progress Report

a) Revised Goals & Objectives – Final Review

Eileen presented the final goals and objectives for the Coyote Creek Watershed Management Plan. These goals and objectives were finalized after soliciting extensive input from the Coyote Creek Watershed Council in the previous meetings. Draft goals and policies were first presented to the stakeholders in July, 2005 and input was sought to refine them in the subsequent meetings.

In November 2005 stakeholder meeting, a poll was conducted to prioritize the goals and objectives. The results of the polling were shared with the stakeholders in this meeting and are summarized in the table below:

Goals and Objectives Polling Results: November 10, 2005 Public Meeting. Whittier City Hall

Goal	Objective		Total Votes	% of Total
Land	L-1	Habitat	12	10%
	L-2	Recreation	9	8%
	L-3	Open Space	12	10%
	L-4	Economic Development	7	6%
	L-5	Mobility	3	3%
			43	***36%***
Water	W-1	Water Supply	4	3%
	W-2	Impervious Surfaces	3	3%
	W-3	Water Quality	7	6%
	W-4	Flood/ Sediments	5	4%
	W-5	Wetland Protection	6	5%
			25	***21%***
People	P-1	Aesthetics	4	3%
	P-2	Education and Outreach	6	5%
	P-3	Environmental Justice	5	4%
	P-4	Health & Safety	3	3%
	P-5	Citizen Participation and Stewardship	2	2%
			20	***17%***
Management	M-1	Organization	4	3%
	M-2	Collaboration	11	9%
	M-3	Communication	5	4%
	M-4	Multiple Objective Projects	11	9%
			31	***26%***
TOTAL			**119**	**100%**

b) Distribution of Existing Conditions/ Who's Who Technical Memo

The Existing Conditions Technical Memo was distributed for stakeholder review. Stakeholders were asked to provide feedback on the memo by February 28, 2006.

c) Draft Watershed Management Plan Outline

Eileen presented the following draft outline for the Watershed Management Plan:

Acknowledgements

1. **Introduction**
   - 1.1. Purpose
   - 1.2. Study Authority
   - 1.3. Study Scope
2. **Issues/Health of the Watershed**
3. **Vision, Goals, Objectives, and Policies**

3.1. Vision
3.2. Mission
3.3. Goals and Objectives

4. Management Framework

4.1. Roles and Responsibilities
4.2. Agency Understandings and Agreements
4.3. Funding Opportunities

5. Implementation Strategies

5.1. Consensus on a Selected Plan
5.2. Recommendation of a Final WMP
5.3. Recommended Plans, Programs, Policies, Partnerships, and Projects ("5 Ps")

Appendices

Appendix A: Stakeholder Participation

A.1.1. Stakeholder Involvement Process
A.1.1. Coyote Creek Watershed Management Council Meetings
A.1.2. Stakeholder Interviews

Appendix B: Existing Conditions Technical Memo

Appendix C: Opportunities and Constraints Technical Memo

Appendix D: Management Framework/Implementation Technical Memo

Appendix E: Cal Poly - Pomona Study

d) Opportunities and Constraints Technical Memo Update

Spatial Analysis of Opportunities and Constraints

Matthew Gordon from CH2M Hill presented the analysis of spatial opportunities and constraints within the watershed. He explained the analysis process which includes 1st order, 2nd order, and 3rd order mapping of opportunities and constraints for each issue area. Matt presented opportunities analysis for Habitat, Recreation, and Economic Development objective for Land Goal; and Water Supply and Water Quality objective for Water goal.

Plan and Policy Opportunities Analysis

Kavita Mehta of URS Corporation presented the plans and policy opportunities analysis for the watershed. She outlined the analysis process and presented plan and policy opportunities and constraints analysis by each goal and objective. Kavita explained the mandatory and optional general plan elements presented the elements reviewed for each general plan.

V. 5 P's Workshop (Projects, Programs, Plans, Policies & Partnerships)

In the second part of the meeting, a workshop was organized to seek input on the projects, programs, plans, policies, and partnerships for the watershed. The stakeholders were divided into three groups of approximately 10 persons and to facilitate a more involved discussion. See Handout.

Next Steps

- Next meeting will be on April 13, 2006. Location TBD

Coyote Creek Watershed Management Plan

Coyote Creek Watershed Council Meeting #6

April 13, 2006

La Habra Veteran's Hall located at 209 N Orange Street, La Habra

1:30 pm – 4:30 pm

Meeting Summary

Attendees:

Alex Waite, City of La Mirada
Alvin Cruz, LA Co. Dept. of Public Works
Andy DasSlva, City of Seal Beach
Angela Lindstrom, Friends of Coyote Hills
Antonio Sandoval, City of Anaheim
Beatrice Musacchia, City of La Habra
Brian Diaz, Recupero & Associates
Chafik Mouradi, City of La Habra
Chino Consunji, City of Norwalk
Chris Reimer, City of Brea
Christian Alarcon, LA Co. Sanitation District
Dave Woelfel, Santa Ana Regional Water Quality Control Board
David Sanchez, City of Cypress
Don Means, Chevron Land Development
Eileen Takata, County of Orange
Gary Neely, Assemblymember Bob Huff
George Yin, Burke, Williams & Sorensen
Greg Gauthier, Wetlands Recovery Project/CA Coastal Conservancy
Helen Higgens, Friends of Coyote Hills
James Gorham, CH2M Hill
Jane Beesley, Rivers & Mountains Conservancy
Jean Watt, Friends of HBP, WRP
Jim Meyer, Trails4All
Jim Pugliese, Chevron Land Development
Jon Vivanti, U.S. Army Corps of Engineers
Joshua Hoover, OC Coastkeeper
Chris Chavez, URS
Kavita Mehta, URS
Maggie Le, City of Brea
Misty Cota, City of La Mirada
Rich Sanders, City of Chino Hills
Rose Espinoza, City of La Habra
Shirley Birosik, LA Regional Water Quality Control Board
Steve Masura, City of Santa Fe Springs
Yolanda Summerhill, Jones & Mayer

On April 13, 2006 the County of Orange, in partnership with the United States Army Corp of Engineers (Corps), Los Angeles District, held the sixth meeting of the Coyote Creek Watershed Management Council. The purpose of this meeting was to present progress of the Coyote Creek Watershed Management Plan development and to solicit input from the Coyote Creek Watershed Council and the public. The following is a summary of this meeting.

Welcome & Self-Introductions

Eileen Takata of the County of Orange, Watershed & Coastal Resources Division and Project Manager for this project started the meeting with welcome and introductions to participants. Agenda was reviewed. Eileen recognized and welcomed Rose Espinosa, Councilmember, City of La Habra and thanked Beatrice Musacchia, NPDES Coordinator from City of La Habra, who sponsored and help coordinate the meeting. All participants introduced themselves in turn.

Eileen provided an overview of the Coyote Creek Watershed Management Plan (WMP) project, including the purpose, current status, geographic extent, and team organization. A project schedule providing current status and the specific areas for public involvement and input were provided.

Stakeholder Presentations – Who's Who In the Watershed?

"West Coyote Hills, A Park and Nature Preserve for Now and the Future"

Angela Lindstrom from Friends of Coyote Hills presented their vision of the setting aside all 510 acres of West Coyote Hills as a Park and Nature Preserve. A case was made for the need for open space and recreational access for North Orange County that is already highly urbanized and heavily developed. This swatch of open land and habitat is one of the last remaining fragments in the surrounding area. It is the desire of the Friends to have the purchased through existing grant programs and not be partially developed for additional housing. The negative impacts of the proposed development to 'quality of life' of the region were noted, alongside, loss of habitat as the main reasons against the proposed development project. A question was raised about whether the property has been appraised. Because the site was not accessible, the answer was no. However, the possibility was raised of creating a park for surrounding cities.

"Coyote Creek Watershed and West Coyote Hills: Coordination of Development with Natural Resource Protection"

Jim Pugliese of Chevron Land/Pacific Coast Homes provided an overview of the planned development for the West Coyote Hills. This new community would include 760 new homes, a retail village, 6 acre neighborhood park and funding for schools while preserving ridgelines and canyon features of the site. The plan for the 510-acre open space parcel proposes a fully-funded Preserve of 352 acres, which includes the existing 72-acre Robert E. Ward Nature Preserve. In addition, there will be five vista parks, 8-miles of trails and an interpretive nature center. West Coyote Hills has been designed to balance the issues of nature and economic development through careful planning and

partnering with various interest groups. Design elements were compared side-by-side with the goals and objectives of the Watershed Management Plan.

There was a discussion period, with Jim and Don Means of Chevron providing responses to questions and comments.
Q: Have there been any negotiations with Friends of Coyote Hills for acquisition of the property? A: No. Not proposed in a formal sense.
Q: What is the long term cost for saving open space? Please expand on component of plan for endowment of maintenance of nature preserve and how it extends into the long term. A: It is a requirement of FWS to include a sufficient amount of money for the preserve from perpetual cash flow through the NPV (net present value) of a fund that is invested for maintenance of the preserve. Maintaining long-term funding for trails and habitat, managed by a yet-to-be determined conservancy, has been proposed to the City.
Q: Is the development going to be a gated community? A: PCH does not currently plan to gate the community, however, this is ultimately up to the builders. The main road to the project is a public road. Individual neighborhoods may or may not be gated.
Q: Will landscaping use reclaimed water? A: There is currently no requirement by the City for the use of reclaimed water, however PCH is continuing to evaluate this as a possibility.
Q: Does EIR discuss modification of the wildlife preserve? A: Yes, as it relates to habitat.
Q: What standards are used? A: City of Fullerton standards.
Q: Does any oil production continue on the site? A: No. Production has ceased. There are no current plans to renew operations. It is not economically feasible.
Q: Will there be any development on the ridgelines? A: As called for in the City's General Plan, the property's highest points will be preserved as key vista parks. In addition, the three dominant ridgelines east of Gilbert Street will also be preserved. Along Euclid Street, homes are set into (i.e., in front of) the hillside, not on the ridge. In those instances when homes are located on ridgelines, all development would be consistent with the City's General Plan and hillside grading requirements.
Q: Other Chevron developments in the area didn't set aside open space, why is this project providing open space? A: PCH attempts to respond to the requirements of the City and their planning criteria. For example, the City of La Habra wanted a golf facility within the adjacent West Ridge community. Coyote Hills is under the jurisdiction of the City of Fullerton. This project is setting aside double the open space of what their general plan calls for.
Q: Are the oil wells to be re-mediated? A: All oil wells on site have been abandoned per California Division of Oil and Gas criteria. It is being evaluated as to whether additional work will be necessary to allow homes to be be built near abandoned wells.

A comment was made about fragmentation as an issue. The project doesn't connect to any wildlife corridors, only within the local area. Angela responded that the Coyote Hills is on the Pacific Flyway which could be used for migrating birds.

Related Planning Efforts

Corps of Engineers Feasibility Study Update

John Vivanti from the Corps was introduced as the new study manager from the Army Corps of Engineers. The current FY06 funding level was noted to be $350, 000. The

Los Cerritos Wetlands Restoration, Rossmoor/Los Alamitos Basin Retention Basins regional BMP was explored as one of the potential priority project areas for the Watershed.

Cal Poly Pomona - Green Development Project Update: "Stage of Precision" Opportunities Analysis

Claire Goode and Jessica Bagwell, Landscape Architecture Graduate Students from Cal Poly Pomona Masters Program presented an update of their study to date. The emphasis of their study is to provide design and policy guidelines along with a cost benefit analysis for cities and developers to foster green redevelopment. This follows a survey they conducted of watershed stakeholders back in February 2006. The students presented a vision and the opportunity to view redevelopment in a new light. To employ the mechanisms of redevelopment to change from a singular based infrastructure system to a multi-purpose system that rebuilds/restores natural systems back into the urban matrix. The region benefits both economically and in its 'quality of life.'

Q: What are some examples of green redevelopment? A: Focusing on connections of green spaces. For example, a tree canopy can lead to a children's play area and habitat for wildlife.
Q: Will the document be completed by the summer, how can we obtain it? A: Eileen responded that eventually the document will be posted on the Orange County website. Documents have to be ADA compatible. Should be up online towards the end of summer. The students are tackling lots of issues.
Q: Will it be available on CD? A. Yes. Orange County will have 50 hardcopies and may print more. CD's will be available.
Q: Is 'Green Roots' part of the recommendations? A: Yes. Should be in the document. One person suggested that everyone look to the Inland Empire Utilities facility in Chino as a model for green development. The students have in fact seen this project, which CH2M Hill has worked on.
Q: Will the City of La Habra accept some of your recommendations? A: No agreements have been made. We are in communication with the planning department. This is a hypothetical study.

Watershed Management Plan Progress Report

Eileen provided an overview of products and the schedule. Input is still needed for Opportunities and Constraints TM. The project is to be finished by the end of the year then handed to the Corps of Engineers to keep the Feasibility Study going.

Stakeholder input on the 5 P's (Projects, Programs, Plans, Policies & Partnerships) was obtained in the February 9th meeting. These opportunities were categorized by Upper Watershed, Middle Watershed, Lower Watershed and Watershed-wide. A short project description and project lead was listed when available. This list represents a first step in identifying all project opportunities for the Watershed Plan. A list of the projects identified will be sent out for participants review and comments/corrections.

The following entities/programs/lists provided additional project sources: RMC; LA IRWMP; San Gabriel River Master Plan; OC – BMP Retrofit Study; SCCWRP Riparian Mapping; Wetlands Recovery Project Work Plan; Cities & Counties CIP's.

High Potential Multi-Objective Project Areas (GIS Analysis)

James Gorham of CH2M Hill presented a series of GIS maps depicting a spatial analysis of the Coyote Creek Watershed. Criteria and data for six key opportunities models were presented, including: Habitat Preservation, Riparian Enhancement, Passive Park Development, Watershed Connectivity, Onsite and Infiltration Basins and Treatment Wetlands. The Land and Water goals and objectives formed the basis for the maps and investigation. Composite maps were generated, overlaying multiple objectives, to identify high potential project areas within the watershed.

Q: General Habitat Preservation Opportunities show highest quality habitats that can be acquired but by whom? A: We're not determining that right now. We'll identify leads for project concepts in final technical memo.
Q: How do we know property can be acquired? A: Model includes areas of continuity.
Q: How do we know the area is not already being preserved? A: Park boundaries are one way to determine. Once land is designated as a park, it is unlikely to be turned into housing. Some areas set aside space for biodiversity. We will show current conditions as of today, and we are aware of privately owned spaces. We will show them side-by-side in the report. We are presenting conditions right now.
Q: Who is the client? A: Orange County
Q: Is the priority acquisition map available? A: Map is currently in draft form and perhaps available in one month. Draft will be available to the council perhaps by August.

It was noted that discussion is currently taking place between environmentalists and OCTA regarding Measure M transportation funding becoming available for project mitigation. Instead of piecemeal mitigation, programmatic mitigation may be included.

Policy Recommendations

Kavita Mehta of URS presented a sample set of recommended policies. Some of the policies are already in use and being implemented such as water quality BMPs in Orange County General Plans. The Water Element was specifically identified as a component that should be included in every future General Plan update as it is a key and integral and non-optional element the function of the watershed.

The intent of the recommended policies included in the Watershed Management Plan is to provide Cities and Counties with a viable set of watershed-based guidelines or principles to consider for inclusion into their General Plans. As implementation is key it is further encouraged that Cities and Counties will embrace these policies into their everyday activities – including new capital and maintenance operations. Alone the watershed plan has no implementation authority, integrated with existing policies of the Cities and Counties it becomes a positive model for the future of the watershed.

These recommendations are not meant to be a new layer of policies but are intended to work with, supplement and strengthen existing policies, goals and objectives while encompassing the overarching goals and objectives of the Coyote Creek Watershed. To facilitate the creation of a Watershed Management Plan and Framework that improves the physical, human and natural condition of the region through a multi-system, multi-layered land use planning approach. Discussion took place with input on proposed policies.

Habitat. *POLICY 3: The City shall protect canyons and floodplains.*

Q: Protect canyons and floodplains, does that imply cities build on ridgelines? A: Not necessarily, that's a narrow view of the policy concept.

Recreation. *POLICY 4: The City shall work with school districts, public agencies, and other organizations to establish agreements for the joint use of recreation and open space facilities.* Schools are reluctant to share recreational facilities because of the cost of park upkeep and maintenance. Artificial turf costs $2million for a soccer field. Turf park use must be limited because heavy use deteriorates the field and turns it to dirt. Policy 5 takes precedence – meeting park and recreation needs in the community and county.

Open Space. Cities are too strapped to provide the open space. Maintenance and cost of open space are difficult for cities. Encourage cities to participate in regional open space planning efforts and create a plan. Perhaps an open space conference needs to happen.

Economic Development. Language on 'Green Redevelopment' from the Cal Poly study could be incorporated into the Plan. Ahwahnee Principles for Low Impact Development were also mentioned as possible strategies to include.

Mobility. Encourage more coordination within and between agencies. Open space policies should be integrated with circulation and infrastructure element.

Water Supply. *POLICY 4: The City shall require the use of drought tolerant landscapes in all development projects.* Drought tolerant landscapes are difficult for cities to support because citizens like more lush landscapes. City of Las Vegas is paying for residents to exchange their turf for drought tolerant landscapes. Shouldn't 'drought tolerant' read 'native' landscapes? There is lack of education about native species. The policy could read "City shall consider" or "City shall encourage"… Drought tolerant landscapes may not be appropriate for all sites.

Impervious Surfaces. WQMP is requiring this. WQMP should be included. Orange County is requiring new development to incorporate impervious surfaces. It is difficult for a city to enforce once policy is established. Education of land owners needs to happen. LA County SUSMP requirements were mentioned, which requires first flush capture.

Education and Outreach. *POLICY 3: The City shall work with school districts to incorporate watershed curriculum.* Add water use and savings, conservation education for kids.

Environmental Justice. Ethnic populations are always changing. How can we plan for cultural diversity? Park plan updates are difficult to implement because of changing demographics. Increasingly, EJ will be more common amongst general plans as State guidelines call for it. Demographics change quicker than general plan updates. Cities should develop a 5-year strategic plan that takes into consideration changing demographics. Check in annually. Performance objectives and policies are fuzzy, there is no performance check. Performance Metrics should be developed for all policies.

There were no comments for policies related to Water Quality, Flood Protection, Health and Aesthetics.

Management Framework

A comment was made about citizen participation, which was a good thing but not really happening. Regarding being organized, it is difficult for cities to get feds to cooperate

with city; competing interests. Regional revenue mechanisms and cost share. Lobby new bond measure. Suggestion on funding: “Destruction of open space through land fill will be mitigated by special fees for general fund to purchase open space.” There were no comments on other topics of Collaboration and Communication and Multiple-Objective Projects.

Coyote Creek Watershed Council Updates

No updates. Next meeting date is tentatively scheduled for June 15, 2006.

Adjourn

The meeting was adjourned at approximately 4:30pm.

August 10, 2006

Coyote Creek Watershed Management Plan

Coyote Creek Watershed Council Meeting #7

Cypress Community Center, Arts and Crafts Room
5700 Orange Avenue, Cypress, CA 90630

Meeting Summary

Attendees:

Akbar, Sharifian, County of Orange
Alex Waite, City of La Mirada
Alvin Cruz, LA Co. Dept. of Public Works
Anna Mendiola, City of Long Beach
Beatrice Musacchia, City of La Habra
Brian Diaz, Recupero & Associates
Chris Reimer, City of Brea
Clarann Levakis, El Dorado Audubon Society
Claire Schlotterbeck, Hills of Everyone
Clint Granath, Forest Lawn Memorial Parks
Crispin Wong, Fuscoe Engineering Inc.
Dave Woelfel, Santa Ana Regional Water Quality Control Board
Debbie Enos, County of Orange
Denny Bean, Friends of Coyote Hills
Don Means, Chevron Land Development
Don Schulz, Surfrider Foundation
Doug Brodowski, City of Buena Park

Eileen Takata, County of Orange
Gary Neely, Assemblymember Bob Huff
George Yin, Burke, Williams & Sorensen
Greg Gauthier, Wetlands Recovery Project/CA Coastal Conservancy
Gonzalo Vazquez, City of Cypress
Jane Beesley, Rivers & Mountains Conservancy
Jan Sandgren, Withers and Sandgren
Jim Meyer, Trails4All
Jim Pugliese, Chevron Land Development
Jon Vivanti, U.S. Army Corps of Engineers
Chris Chavez, URS
Kavita Mehta, URS
Maggie Le, City of Brea
Mike O'Grady, City of Cerritos
Sarina Morales-Choate, City of Santa Fe Springs
Sean Mattock, City of Brea

On August 10, 2006 the County of Orange, in partnership with the United States Army Corp of Engineers (Corps), Los Angeles District, held the sixth meeting of the Coyote Creek Watershed Management Council. The purpose of this meeting was to present progress of the Coyote Creek Watershed Management Plan development and to solicit input from the Coyote Creek Watershed Council and the public. The following is a summary of this meeting.

Welcome & Self-Introductions

Eileen Takata of the County of Orange, Watershed & Coastal Resources Division and Project Manager for this project started the meeting with welcome and introductions to participants. Eileen extends thanks to Gonzalo Vazquez from City of Cypress for providing the space for our meeting. The agenda was reviewed and featured presentations began.

Stakeholder Presentations – Who's Who In the Watershed?

"Los Cerritos Wetlands Restoration Vision" Don May, Mary Parcell and Tim Anderson, California Earth Corps

An overview of the project was presented with special attention given to the recent acquisition of 66 acres known as the Bryant property. The goal of the project is restore the estuary including the Bixby, Bryant and Hellman properties and to return full tidal flushing to the entire area. Interface and final disposition and of the nearby power plants remains a long term concern and potential opportunity/constraint of the project site. The project is made up of three phases and encompasses 547 acres of land. It is noted that if you are going to attempt to restore the watershed you really should start with the estuary. It is believed by restoring the health and function of the estuary as a nursery the local sport fishing industry will be a major beneficiary.

"Coyote Creek Improvements (Park)" Jan Sandgren, Withers Sandgren

Jan Sandgren, provided an overview of concepts for a 6.6 acre passive park alongside Los Alamitos Creek which drains into the O.C. Flood Control Basin. Potential constraints that will need to be mitigated include a SCE utilities easement and an underground oil pipeline. One design concept proposes the relocation of the oil pipe line away from the Los Alamitos Creek to allow for widening of the creek (from 14' to 80') along its length and under the proposed SCE easement road. Several interesting connections are located near this site including a recent trail and bridge addition that connects the adjacent school grounds with the river trail. The site can also serve as a part of the 'treatment train' of the regional water quality efforts being proposed for the region and a part of the greater Confluence to Coast proposal.

"El Dorado Regional Park Wetlands Feasibility Study" Anna Mendiola, City of Long Beach

Anna Mendiola provided a brief overview of the project and the community process. The main fear that had to be alleviated with nearby residents worries regarding any misconceptions they had with the changes being proposed and flood protection. The main goals of the project are to improve water quality, reduce reliance on potable water for the lakes, increase habitat and provide for additional recreational space and education.

Three conceptual plans were presented. Option 1 represented a conceptual plan that provided improved water treatment and function for the lakes and associated stream system within the park. Option 2 expanded option 1 with the addition of constructed wetlands component and an increased riparian edge. Option 3 expands further, including the edge of the San Gabriel River and increases capacity and improve water

quality of the system as a whole. It was noted during the question and answer period that treatment wetlands don't always provide habitat.

Related Planning Efforts

LADPW Projects Update

Mickey Chaudrey was introduced as the new Watershed Manager for LADPW.

LA IRWMP Update

Terry, L.A. Department of Public Works, provided an overview update of the recent involvement with IRWMP. At the workshop three scenarios were presented and comments taken. The next workshop will be held on October 25, 2006.

Corps of Engineers Feasibility Study Update

John Vivanti discussed recent Corps Engineering Circulars including planning in a collaborative environment. Main Missions are: flood control, navigation and restoration. Emphasis on building partnerships, packaging multi-purpose projects to better position funding opportunities with the U.S. Government.

An example would be Corps+ EPA= Los Cerritos Wetland

"Confluence to Coast" Regional BMP/Ecosystem Restoration Project

This project was introduced as an integral link in the dry/wet weather water quality treatment train along the San Gabriel River and Coyote Creek. The project also provides key linkages in both trails and habitat. By addressing TDMLs and showing potential for reducing dependence on California State Water Project resources opens up opportunities for CalFed Grant Funds. The project can be seen as a win, win for cities, habitat and communities.

Watershed Management Plan Progress Report

Overview of Products & Schedule

- An overview of the project and schedule was presented. The team is in the middle of finishing up the Opportunities and Constraints Technical Memo and forging forward with the Management Framework TM.

What is a Watershed Management Plan?

- One definition of the WMP as a strategic plan for the integrated management of resources through the strategic coordination of land use, water, and energy resources in a watershed to achieve a desired outcome within a geographic area
- From Plan to Implementation with special emphasis on the soft activities such as policies, partnerships, plans and programs, in addition to projects that make up the 5P's. And the need to explore alternative governance structures.

Why do we need a Watershed Management Plan?

- A brief overview of facts and stats for Orange County, marketing of the OC and the hidden underbelly. The WMP mission is to strengthen Orange County by developing regional management strategies to preserve, protect

and enhance coastal resources and surface waters throughout Orange County.

- The purpose is to address underlying causes of watershed problems, link local land use to regional issues, provide regional planning framework, identify opportunities for regional watershed restoration and explore mechanisms for long-term resource management efficiency.

Building a Case for Green Infrastructure

- What the region is facing today, from contaminants to water runoff as waste, heat island hot spots, landscapes designed for autos and not people, health issues and inadequate access to parks and other recreational and open spaces.

City Toolbox for Green Infrastructure

General Plans

- A matrix and GIS maps provided a glimpse into how and where city General Plans are addressing the main goals of the WMP of Land, Water, People and Management.

Municipal planning tools

- An overview of tools available to municipalities to use in the implementation of the WMP strategy through the use of ordinances, planning laws, building, subdivision and zoning ordinances geared toward green infrastructure and WMP goal attainment.

Recommendations included using and strengthening LEED's as a site development green infrastructure tool.

- Making mandatory the water element in all California General Plans
- Pursue environmental justice and sustainable design overlays for the region.

What Can Green Infrastructure Look Like?

- Communities, local and regional governments are no longer simply resorting to conventional approaches but are looking to the future and are beginning to shift to a system wide 'green infrastructure' approach to planning and land use. Addressing:
- Stormwater management, water quality improvement, habitat conservation, greenways and trails and more livable communities.
- The time is now as the urban built environment is beginning to transform to a denser and more multi-functional living model. Scarcity of land and resources places more demands on municipalities to be creative and forward looking in their policies.
- The US Department of Agriculture, Forestry Division published a Watershed Design Manual this year. Data, policies, design recommendations within the manual promote the transition towards watershed management plans, benefits of increasing the urban tree canopy and real world implementation strategies and design tools.
- Real World implementation of WMP's and green infrastructure retrofitting into already built urban environments are springing up all over the country. Case study implementation of green principles were sited from Kansas City and Portland. Including artful stormwater management, curb cuts into planters to reduce runoff and encourage cleansing and infiltration, exposing process and education the public
- A win, win – Green infrastructure as both effective and aesthetic.

How Do We Implement Green Infrastructure? (Group Discussion)

What are the obstacles?

- Finding a receptive audience that has the power to implement. Planners and city council members are the ultimate key to success. Have to find ways to engage and enlighten. Speak their language and in a manner that plan will be heard and acted upon to meet the goals of the Plan.
- Economics is a major driver for cities. Support policies and concepts with the cost benefit of transitioning to Green Infrastructure.
- Need an assessment and strategy/hydrologic model for lower San Gabriel River. Encourage Corps to include this lower section into their existing stormwater management data program for the upper river study.

Where are the opportunities?

- Take the WMP and Green Infrastructure message on a speaking tour and speaker bureaus. Target public through media, school age children through schools. Attend conferences and present ideas to planners and others.
- Promote the retrofit existing infrastructure during regular maintenance and daily operations cycles.
- Sell Green Infrastructure transition using real world examples of implementation. Apply a cost benefit analysis – this may need to be accomplished under a future project/program.
- Position projects to be win, win. Solve resource and pollution issues, gain access to State and Federal funds and improve quality of life.
- Encourage grass-root movements by area citizens and groups. Consider using the 'Huntington Beach' model.
- Where to start campaign and education process. Target League of California Cities and California APA conferences – pitch the switch to green infrastructure.

What will success look like?

- Cost Benefit analysis and use of performance metrics which will be a part of the next stakeholder meeting.
- Potential future project – take a sample city and retrofit it with a green infrastructure and analyze the cost benefit through a series of models.

Check-in - How are we doing?

Coyote Creek Watershed Council Updates

April 13, 2006 Meeting Notes
Roundtable of Announcements
Next Meeting, September 14, 2006 (location TBD)

Adjourn

The meeting was adjourned at approximately 4:30pm.

US Army Corps of Engineers

October 18, 2006

Coyote Creek Watershed Management Plan

Coyote Creek Watershed Council Meeting #8

La Bonita Room, La Habra Community Center
101 W. La Habra Blvd, La Habra, CA 90631

Meeting Summary

Attendees:

October 18, 2006 the County of Orange, in partnership with the United States Army Corp of Engineers (Corps), Los Angeles District, held the Eighth meeting of the Coyote Creek Watershed Management Council. The purpose of this meeting was to present progress of the Coyote Creek Watershed Management Plan development and to solicit input from the Coyote Creek Watershed Council and the public. The following is a summary of this meeting.

Welcome & Self-Introductions

Eileen Takata of the County of Orange, Watershed & Coastal Resources Division and Project Manager for this project started the meeting with welcome and introductions to participants. Eileen extends thanks to Beatrice Musacchia from the City of La Habra for providing the space for our meeting. The agenda was reviewed and featured presentations began.

Stakeholder Presentations – Who's Who In the Watershed?

"Seeing Green: Grounds for a Renewed Urban Infrastructure" Claire Goode, EPT Design
An overview of the project

Los Angeles Integrated Regional Water Management Plan (IRWMP) Update
Krista Sloniowski, Brown & Caldwell

The IRWMP is a strategic integration of water resources efforts throughout the Los Angeles County region, including a small portion of Orange County. The plan can be found at www.lawaterplan.org. Projects could be added via the website until October 31, 2006 for inclusion in the draft IRWMP due out later this year. There will be a Regional Workshop at Metropolitan Water District October 25, 2006 at 9am.

Watershed Management Plan Progress Report

Overview of Products & Schedule – Eileen Takata, County of Orange

Habitat Master Plan – Verna Jigour, Verna Jigour and Associates

- Focal species and habitat needs
- Educated neighborhoods – need to keep people from introducing exotic invasive species
- Cactus wren – artificial nesting structure ?
- Identify focal species and habitat needs done
- Next prioritization
- Potential to host sensitive/generalist species
- Habitat linkage
- Invasive control

- Proximity to schools
- Known opportunity for community stewardship
- Next Steps: prioritize key habitats, integrate results to draft master plan
- Question about Missing Middle not addressed; connectivity extends beyond watershed boundaries; Missing Middle critical to key habitats
- James: group perspective, expansive habitat undeveloped; suitable for habitats; might be leaving out big chunk of habitat; wildlife corridor identified as critical; aggressive process of acquisition
- Verna: Missing Middle has been well-addressed; not much holes/gaps in coverage
- Question: short timeline; no opportunity to interact with larger San Gabriel watershed; float out to Habitat Panel to review and look at premises, need to get out quickly
- Habitat preservation; encompass land acquisition; similar grazing easements – work with landowners to preserve open space
- Land exchanges – i.e. Tustin/El Toro; if done early enough, work with government land and work out exchange to preserve high quality habitat. El Toro sold, not given away.
- Look at project areas, identify potential projects subset
- Question: in-channel treatment system, not able to do? Treatment system not allowed in channels; need to treat before get to channel. In Los Angeles, no in-channel treatment. Treat summer low flows, not flood.
- Watershed connectivity, composite model: habitat parks, watershed-wide, infiltration parks (passive use and infiltration), potential treatment
- Steps ahead: before potential projects, need to conduct site research, field visits and identify land owners, give project recommendations

Priority Project Opportunities – *James Gorham, CH2M Hill*

- Plan benefits, funding opportunities, grants
- User guides, checklist target infrastructure, planners and developers
- Roadshow, how to implement
- Toolkit
- Strategic Framework fed into criteria for success
- IRWP plan meet state guidelines, eligible for near future funding

Green Redevelopment Project Templates – *Debbie Enos, County of Orange*

- Provided an overview the project templates that can be used as a working model or tool for developers, municipalities and anyone interested in "what can I do" to improve the health of the watershed.
- Project opportunities are boundless, with real opportunities to effect not only new construction but also as a means for redesign and retrofit projects within the watershed.
- Described what the different templates may focus on including green streets, park creation, parking lot aquifers, schoolyard conversions, 'go native' plantings and green homes.
- The templates can compliment other tools already in use including user guides, BMP's and checklists. They also may serve as a means of evaluation in the future.

Watershed Management Plan Outline and Overview – *Eileen Takata*

- Overview of process, 3 tech memos
- Baseline conditions (Cal Poly, Verna)
- Opportunities and Constraints (TM2)
- Management Framework (TM3)
- Key implementation
- General plan policies, master plan; not regional context in mind
- New projects evaluated each city, plan adoption by each city
- Hot spots: multipurpose, high priority projects
- Additional habitat opportunities
- Chevron 2/3 open space available
- Management strategies
- Funding
- Evaluation: project v. no project based on maps
- Snapshot
- Performance criteria Prop 50

Project Opportunities Workshop (Break-out Groups)

There were three break-out groups that were provided a large-scale full-color map and project lists to work with. The basic instructions were to review current projects and add new ones, establish decision criteria, prioritize the top 3-5 projects, identify potential funding sources/partnerships and strategies for implementation, then report back to entire group. Not every group accomplished all of these tasks, but each group did have extensive discussions on project opportunities and some added new projects to the maps.

The group which included biologists, speakers Verna and James, along with CCWC stakeholders agreed on the need to retain as much of Puente Hills as possible in order to sustain existing local and regional biological diversity, and that habitat restoration is applicable to all potential sites; discussed the Puente-Chino Hills connector area as at least

partially conserved, with additional conservation/restoration measures a high priority; a participant expressed particular concern over water quality in La Mirada Creek and we discussed the apparent availability of some open spaces adjacent the channel in that area.

Another group developed criteria and prioritized their projects. The criteria were based on sites that have multi-objective land use opportunities, provide habitat connectivity, and sites that affect water quality downstream. Those resulted project areas that included multiple projects were ranked as: 1) Chino Hills/Puente Hills/Tonner Canyon; 2) Los Alamitos/Cypress/Seal Beach; 3) Cerritos/Buena Park/La Palma; 4) La Mirada/Fullerton; and 5) Whittier/La Habra Heights.

Another group discussed refinements to the project list. Additions to the project list include a trail for Brea Canyon being developed by the City of Diamond Bar. Discussions on other trails and open space opportunities took place, including in the lower watershed. Clarification on the two Coyote Hills Open Space project alternatives was made. One is with development (350 acres of open space), one is without development (580 acres). There were no priorities of projects from this group.

Coyote Creek Watershed Council Updates

Next meeting information was not available at this time.

Adjourn

The meeting was adjourned at approximately 4:30pm.

November 30, 2006

Coyote Creek Watershed Management Plan

Coyote Creek Watershed Council Meeting #9

Brea City Hall, Community Room B
Civic & Cultural Center, 2nd floor
1 Civic Center Circle, Brea

Meeting Summary

On November 30, 2006 the County of Orange, in partnership with the United States Army Corp of Engineers (Corps), Los Angeles District, held the Eighth meeting of the Coyote Creek Watershed Management Council. The purpose of this meeting was to present progress of the Coyote Creek Watershed Management Plan development and to solicit input from the Coyote Creek Watershed Council and the public. The following is a summary of this meeting.

Welcome & Self-Introductions

Eileen Takata of the County of Orange, Watershed & Coastal Resources Division and Project Manager for this project started the meeting with welcome and introductions to participants. Eileen extends thanks to the City of Brea for providing the space for our meeting. The agenda was reviewed and featured presentations began.

Stakeholder Presentations – Who's Who In the Watershed?

Sustainable Travelways – "Green Streets" Policies for El Toro's Great Park/Heritage Fields Projects Pat Fuscoe, Fuscoe Engineering

Walk-through Draft Watershed Management Plan Eileen Takata, County of Orange

A draft outline of the Coyote Creek Watershed Management Plan was presented to the stakeholders. The main chapters include: E*xecutive Summary;* Introduction; Strategic Framework; Plan Development; Key Implementation Strategies; Conclusion and Next Steps; Green Infrastructure Resources; and Appendices. The content represents the combined work of the project team and input received from stakeholders over the duration of the project.

Watershed Management Plan Progress Report

a. Overview of Products & Schedule – Eileen Takata

The project effort is winding down with a draft of the WMP scheduled to be made available by January 2007 for review and comment.

b. General Plan Policies – Kavita Mehta, URS

Proposed strategies for policies consistent with the CCWMP goals and objects were presented and recommended to be considered for adoption in each of the watersheds 22 municipality General Plans during the next update for plans older than 5 years. For recent plans it is suggested that the policies are considered for ????. The proposed policies represent policies already adopted by a city or multiple cities within the watershed or represent Ahwahnee smart growth principles. Where gaps were found the project team developed suggested policy strategies based on principles currently in use in other regions of the nation.

Policy strategies were categorized by the following General Plan categories: Land Use, Infrastructure, Circulation, Open Space, Conservation, and Safety.

c. Project – No Project Analysis –Chris Chavez, URS

Using CEQA environmental impact criteria the benefits that would be dervived over time by the implementation of the CCWMP were compared to the state of the watershed that would exist if no plan or implementation were undertaken or maintaining the status quo.

The benefits of the Plan implementation include improvements in access to the open space, parks and recreational opportunities, quality and quantity of habitat preserved for future generations and wildlife corridors protected. Improvements in water supply, quality, delisting of TMDL's and associated cost savings, reduction in channel, single system stormwater infrastructure systems and cost savings achieved by conversion to green infrastructure principles. Riparian and wetland restoration results in greater quantity and diversity of aquatic and avian species within the watershed. Overall, the watershed through implementation of the CCWMP meets its vision, goals and objectives.

A no project scenario results in a status quo situation with continued unhealthy watershed practices remaining the norm, water quality and supply remains a concern and costs rise as TMDL compliance continues with no end in site. Habitat and open space is lost to development and wildlife movement and populations are impacted. Overall access to quality parks, trails, and transit alternatives remains unequally distributed within the watershed.

d. Green Infrastructure Site Design Guidelines –
Debbie Enos, County of Orange

Eight Green Infrastructure Site Guideline templates intended for use as a quick reference tool in support of low impact development and green infrastructure were summarized as to their content. The templates are modeled after CASQA stormwater BMP handbook. Each Site Design Guideline will include a description, approach, design considerations, suitable applications, case study and references and are consistent with leading industry publications such as Green Visions (RMC) and Common Ground (RMC) in addition to DAMP and CASQA. There is the opportunity that these guidelines will be sent through a technical review for possible adoption as future BMP's.

e. Project Opportunities – Eileen Takata

Next Steps Discussion

Coyote Creek Watershed Council Updates
Next meeting tentatively schedule in January 2007. (Date and time TBD)

Adjourn
The meeting was adjourned at approximately 4:30pm.

March 27, 2007
Coyote Creek Watershed Management Plan

Coyote Creek Watershed Council Meeting #10

La Mirada Resource Center (Meeting Rooms 1 and 2)
13710 La Mirada Blvd., La Mirada, CA 90638

Connie Barnes	City of La Mirada
Denny Bean	Friends of Coyote Hills
Jane Beesley	RMC
Shirley Birosik	LA Region 4 WQCB
Chino Consunji	City of Norwalk
Misty Cota	City of La Mirada
Brian Diaz	Recupero and Associates, Inc.
Debbie Enos	RDMD
Jim Donovan	National Park Service
Helen Higgins	Friends of Coyote Hills
Sonia Jacques	Trust for Public Land
Larry McKenney	County of Orange
Kavita Mehta	URS Corporation
Brian Melanephy	City of Placentia
Gary Neely	Assemblymember Bob Huff
Chris Reimer	City of Brea
Glenn Robertson	RWQCB – 8
Annika Santalahti	City of La Habra
Mary Anne Skorpanich	County of Orange
Yolanda Summerhill	Jones & Mayer
Marilyn Thoms	County of Orange
Phan Trung	City of Fullerton
Linda Tsoi	Los Angeles County, Watershed Management Division
Dave Woelfel	Santa Ana Region 8, RWQC

Meeting Summary

On March 27, 2007 the County of Orange, in partnership with the United States Army Corp of Engineers (Corps), Los Angeles District, held the Tenth meeting of the Coyote Creek Watershed Management Council. The purpose of this meeting was to present the Final Coyote Creek Watershed Management Plan to the Coyote Creek Watershed Council and the public. The following is a summary of this meeting.

I. Welcome & Self-Introductions

Eileen Takata of the County of Orange, Watershed & Coastal Resources Division and Project Manager for this project started the meeting with welcome and introductions to participants. Eileen extends thanks to the City of La Mirada for providing the space and refreshments for the meeting. The agenda was reviewed and featured presentations began.

II. Walk-through of the Final Watershed Management Plan

Eileen Takata, County of Orange

Eileen was introduced and thanked by Mary Anne Skorpanich, Assistant Director and Marilyn Thoms, Watershed Manager for her efforts on completing the Coyote Creek Watershed Plan and her service to the department and the watershed council. It was reaffirmed in the opening statements that Eileen had accepted a new position as Executive Policy Advisor to Pat Bates, Supervisor, 5th District. This transition along with the completion of the Watershed Management Plan will necessitate a realignment of the Coyote Creek Watershed Council. Several opportunities were suggested with the final disposition of the group left to be determined at a future date. There was a general consensus in favor of continuing to meet, on a quarterly or less basis so not to lose the momentum gathered during the creation of the plan. Further discussions on this point concluded the meeting.

Eileen first thanked everyone for their participation and hard work in completing the Plan. She introduced the council members to the front cover and then presented the main features of the Final Coyote Creek Watershed Management Plan, these included an Ex*ecutive Summary;* Introduction; Strategic Framework; Plan Development; Key Implementation Strategies; Conclusion and Next Steps; Green Infrastructure Resources; and Appendices. The content represents the combined work of the project team and input received from stakeholders over the duration of the project. She described what the Plan was and what it wasn't.

- Framework for improved watershed management; Not a regulatory document
- Tool for planners within public works or development context; Not a thorough technical assessment of water quality, flood control or water supply infrastructure
- Plan implementation is voluntary; No enforcement entity behind plan
- Provides suggestions for land use policies; Does not dictate land use
- Shows both development & habitat protection alternatives, sometimes in the same location; Does not prioritize between alternatives
- Promotes ecosystem restoration; Does not prescribe specific actions

---

Next the purpose of the Coyote Creek Watershed Council meetings were outlined and included in the appendices was a Who's Who of the Watershed Technical Memo. The future role of the council was to be determined and noting the need for an on-going

process to update the documents, which was described as a “living plan”. A list of participants was acknowledged.

The process of the developing the Watershed Plan was outlined and described the participation of not only stakeholders but also professional consultants, funding agencies and a team of Landscape Architecture Graduate students from California Polytechnic State University, Pomona.

Green Infrastructure Sheets were reintroduced and were noted that to be most effective they should be technically vetted so they can become actual BMP policy for the region. Management Strategies were summarized noting there beginnings incorporating concepts from Newport Beach Watershed Management Plan. The strategies suggest opportunities to better coordinate and manage watershed resources. While varying levels of coordination and cooperation is already on-going in the region the need still exists for further joint and regional planning efforts, including the great need for stewards to champion the vision, goals and objectives of the Coyote Creek Management Plan. Other strategies included the suggestion for the creation of a watershed foundation that could help spearhead grants, obtain funding and drive projects outlined in the project and key implementation strategies section of the Plan.

The final part of the presentation involved an overview of the expected outcomes of the Coyote Creek Watershed Management Plan if it were to be implemented and what may happen if it were not. These two scenarios were laid out before the council identifying how the plans implementation can lead to the Healthier Future Vision. That by implementing green infrastructure principles, by implementing the plans and programs identified in the document, by developing sensitively, embracing low impact development principles, value habitat, open space and natural resources including treating stormwater as a resource rather than a waste product that the future of the region would indeed be healthier and more vibrant. It was up to all of us to ensure that the vision of the watershed was attained.

The presentation concluded and the floor was then opened up to questions.

It was mentioned that Fullerton was currently involved in the early stages of updating their General Plan and that it would be beneficial if the Plan was presented to cities in the process of updating or prior to. It was also suggested that Orange County can provide an independent voice/role to the public, voicing regional perspectives and concepts outlined in the plan during the General Plan Process.

Several questions related to the future of the plan, the council and the Army Corps feasibility study. Completion of the Arm y Corps study is currently undetermined as the program did not obtain further funding from Congress. There may be funds that were able to be rolled over, but their disposition is not certain at this time. This activity may

give further cause to continue Council meetings. A potential alternative is for the County to provide some support in the area of hydrology for example. These options will have to be further examined, as both the corps and the county are hindered by funding constraints.

Opportunities for continuing to meet as a group were further discussed. An option to meet as part of the San Gabriel Watershed Council was tabled and received positive feedback from those in attendance. It was suggested that Orange County impacts might be able to be tabled at this forum once a quarter or as the need arises. Meetings were most desired to ensure that projects would be implemented. Orange County noted that there would need to be a city sponsor as a partner to pursue implementations.

Opportunities for project implementations were discussed. There is a potential to included up to three high priority projects to be listed on the State Water Boards SEP list. Other potential funding sources include the Integrated Regional Water Management Plan (IRWMP) which is a means for local entities to apply for state bond funds for capital projects. Other website sources for more information and opportunities are LASGRWC.org; LAWaterPlan.org; RMC.ca.gov; SCWRP.org.

Lastly the meeting ended with a call for champions to present the Plan to local governments, agencies, planners, etc. With 22 cities in the watershed the most effective means to get the message out is not by one person, or one entity but by the stakeholders taking an active role in educating those in their own backyards.

III. Adjourn

The meeting was adjourned at approximately 5:00pm.

APPENDIX B

Existing Conditions Technical Memo

Coyote Creek Watershed Management Plan

12/05/06

Prepared By:

CH2M HILL
3 Hutton Centre Drive, Suite 200
Santa Ana, CA 92707

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Summary of Existing Conditions Data
Coyote Creek Watershed Management Plan

PREPARED BY: CH2M HILL

DATE: December 5, 2005

1.0 Introduction and Purpose

This summary of existing conditions data encompasses Coyote Creek and Los Alamitos Watersheds, which are tributaries to the San Gabriel River. The Study Area, which includes Coyote Creek and Los Alamitos Watersheds, is shown in Figure 1-1. Existing conditions data are described using available data and reports. These include local, state, and federal planning documents and applicable assessment documents relevant to the Study Area. Additionally, to support this review of existing conditions data, a Geographic Information System (GIS) database was developed by the County of Orange Resources and Development Management Department, Watershed and Coastal Resources Division.

The Study Area is located primarily in Orange County and Los Angeles County, with a small extent in San Bernardino County. The Study Area drains approximately 165 square miles of densely urbanized residential, commercial, and industrial development, along with some areas of open space and natural lands. The general direction of flow is from northeast to southwest.

The purpose of this technical memorandum is to provide understanding of the existing social and physical conditions of the Study Area and to establish a basis for identifying potential project opportunities.

This technical memorandum consists of the following sections and appendixes:

1.0 Introduction
2.0 Physical Resources
- 2.01 Land Use and People
- 2.02 Climate and Air Resources
- 2.03 Geologic Resources
- 2.04 Water Resources
- 2.05 Water Quality
- 2.06 Biological Resources
- 2.07 Historic and Cultural Resources

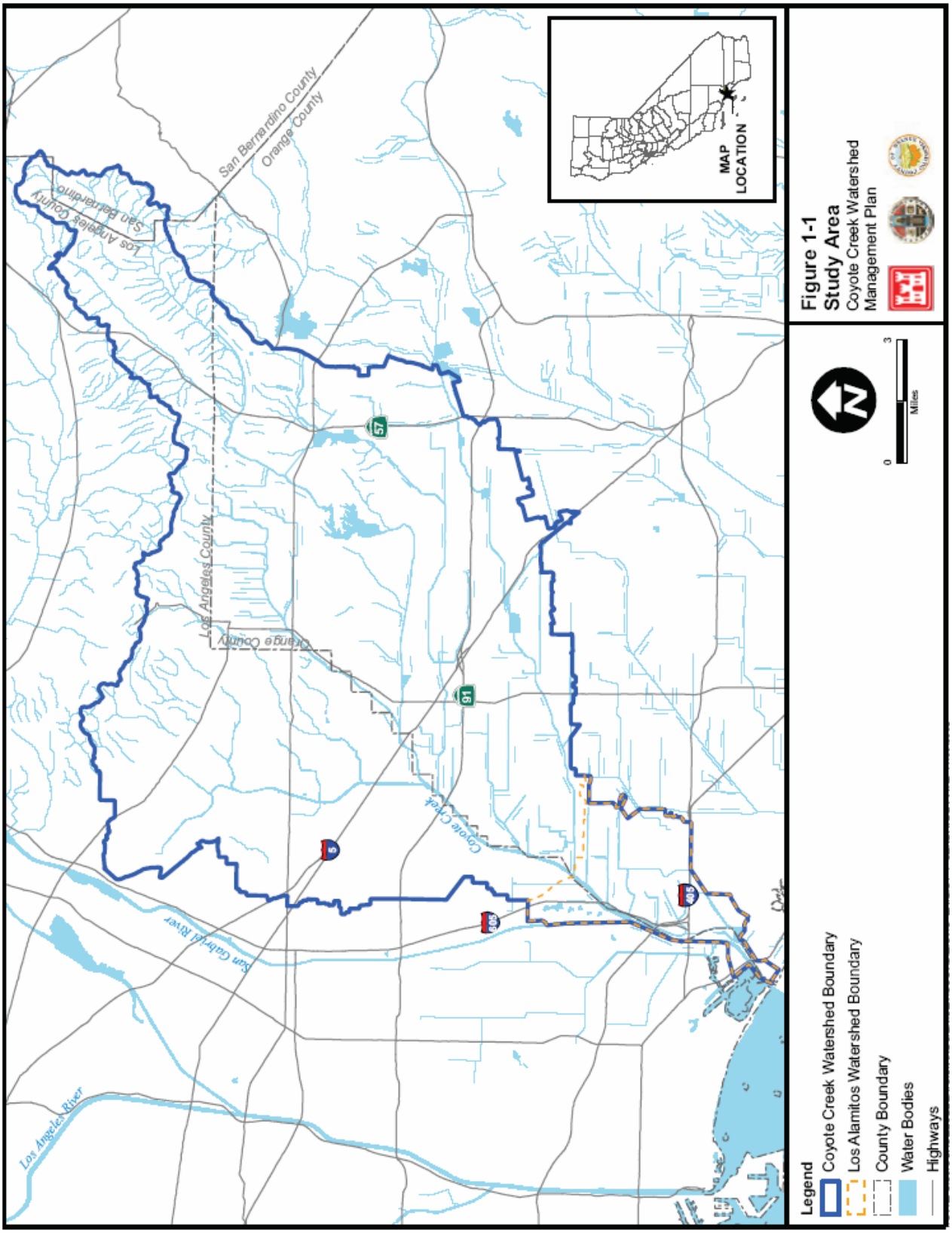
3.0 Data Gaps
- 3.01 Spatial Data
- 3.02 Planning and Assessment Documents

4.0 Bibliography

Attachment A Sensitive and Special-Status Species

This technical memorandum includes the following figures:

Figure Number	Figure Title
1-1	Study Area
2-1	Land Use Types
2-2	Existing Parks
2-3	Trails and Bikeways
2-4	Population Density
2-5	Average Annual Rainfall of Study Area
2-6	Geology, Soils, and Seismology of Study Area
2-7	Major Creeks and Channels
2-8	Subwatersheds
2-9	Groundwater Basins
2-10	Resource Management Areas
2-11	Impaired Waterways – 303(d)
2-12	Existing Vegetation
2-13	Rare Plants, Animals, and Native Communities


San Bernardino County
Orange County
Los Angeles County
San Bernardino County
Los Angeles County
Orange County
Coyote Creek
San Gabriel River
Los Angeles River
MAP LOCATION
Legend
Coyote Creek Watershed Boundary
Los Alamitos Watershed Boundary
County Boundary
Water Bodies
Highways
0
3
Miles
Figure 1-1
Study Area
Coyote Creek Watershed Management Plan

2.0 Physical Resources

The region within the Study Area is geographically diverse. This is true, specifically, in terms of its land use and people, climate and air resources, geologic resources, water supply, water quality, biological resources, and historic and cultural resources. Additionally, development and urbanization during the latter part of the twentieth century has had a considerable impact on these physical resources.

This section presents information related to the physical resources of the Study Area. This information will support identification of potential project opportunities within the watershed as part of the watershed planning process.

2.01 Land Use and People

The Study Area is home to approximately 1 million people. It is highly urbanized with developed areas accounting for 84 percent of its land use. The highest density Residential areas occur in the central and lower reaches of the Study Area. Industrial and Commercial areas are also more prevalent in these areas. Recreational areas are limited; and most Open Space areas are concentrated in the upper reaches of the Study Area, resulting in minimal Open Space throughout its central and lower reaches.

This section characterizes the land use types and people of the Study Area.

2.01.01 Land Use Types

Land use types within the Study Area have been broadly grouped into seven categories. These land use types include: Residential, Open Space, Transportation/Utility, Commercial, Industrial, Institutional, and Recreational.

Table 2-1 identifies the land use types of the Study Area. Figure 2-1 shows the land use types of the Study Area.

TABLE 2-1
Land Use of Study Area

Land Use	Percent of Study Area
Residential	46
Open Space	14
Transportation/Utility	13
Commercial	10
Industrial	10
Institutional	5
Recreational	2

Source: County of Orange Geomatics Land Information System Division. Los Angeles Department of Public Works

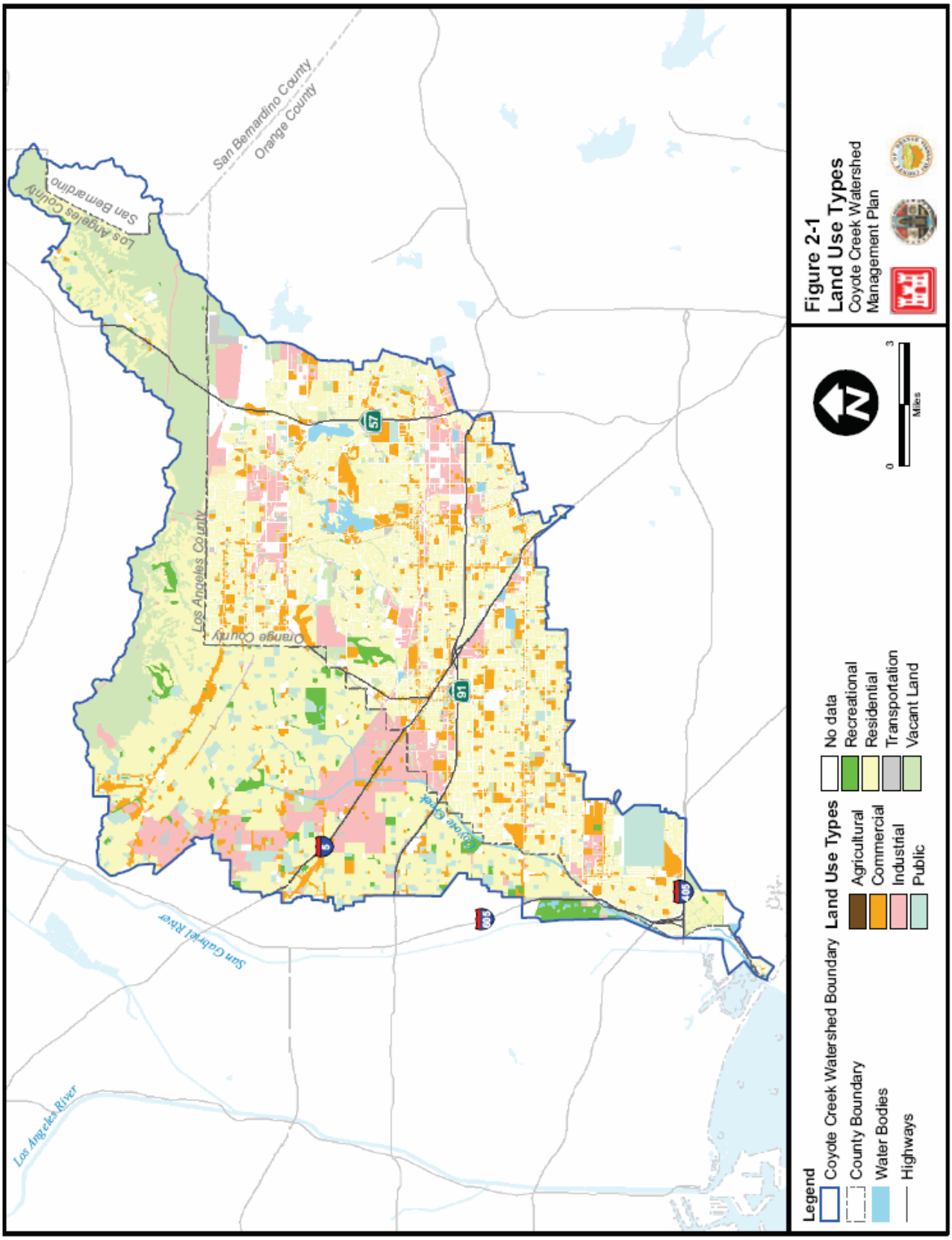


Figure 2-1
Land Use Types
Coyote Creek Watershed Management Plan

Several land use types are further described below.

Transportation

Transportation is comprised of freeways, roads, streets, parking lots, and truck and bus terminals. Several major highways traverse the Study Area. These include, Interstate (I)-605, I-405, I-5, State Route (SR)-22, SR-91, SR-57, SR-72, SR-90, and SR-39. A major railroad corridor traverses the Study Area generally traveling along a northwest to southeast orientation. Many additional railroad lines traverse the Study Area.

Utility

Utility land uses comprise electrical power and gas production and storage facilities; communication and transmission facilities; and improved waterways, water storage facilities, and conveyance pipelines. The Study Area includes a broad network of power transmission line and water and wastewater infrastructure corridors.

Open Space

Open Space consists of open and/or undeveloped land. There are several major open space areas in the Study Area. Specifically, these include Puente Hills, Chino Hills, Coyote Hills, and Los Cerritos Wetlands.

Aera Energy owns approximately 3,000 acres of undeveloped land in the Puente Hills. This includes areas that extend from Harbor Boulevard on the west, to east of the SR-57 in the lower part of Tonner Canyon. The City of Industry owns approximately 5,700 acres of undeveloped land that encompasses parts of the lower, middle, and upper parts of Tonner Canyon.

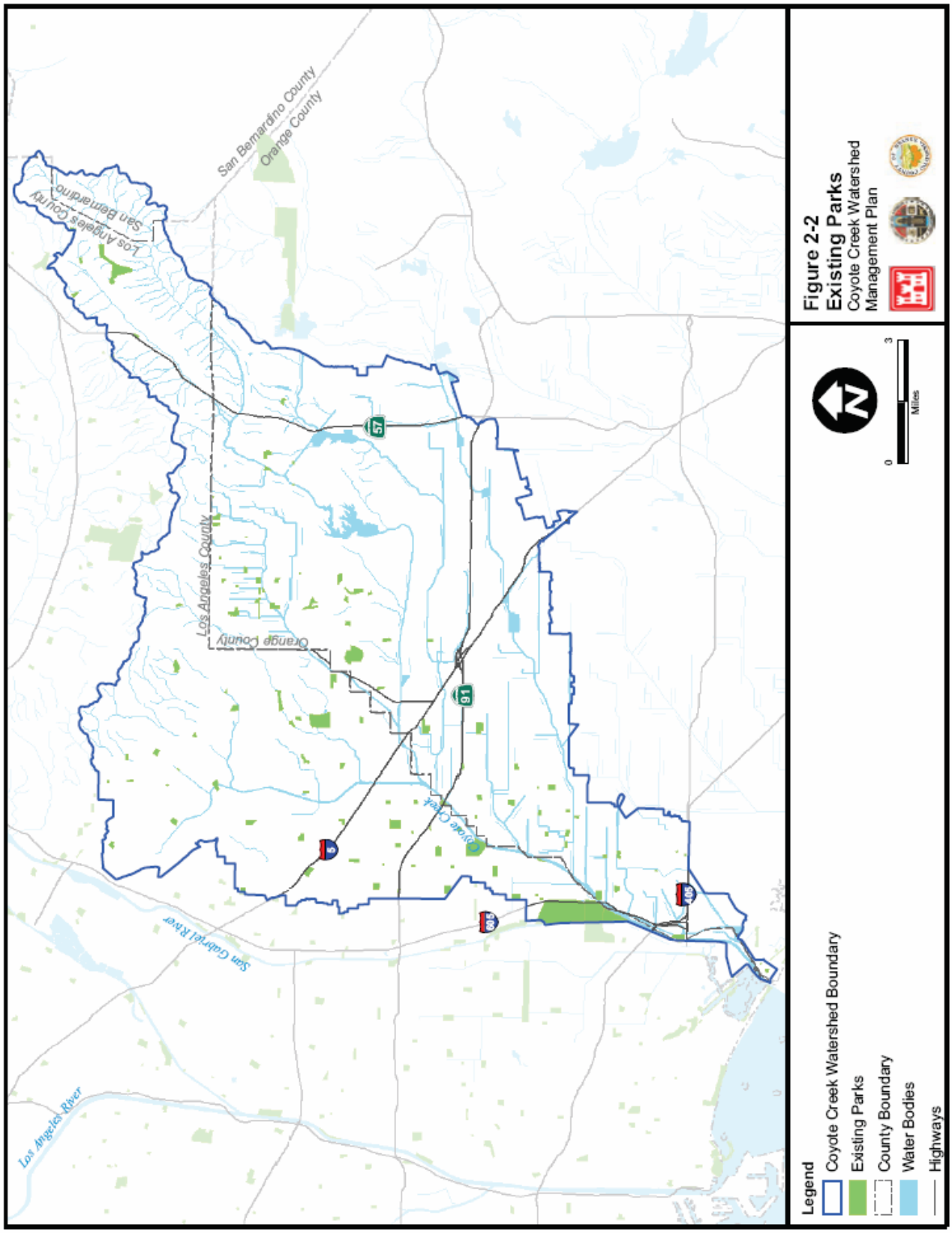
Recreational

Recreational includes developed and undeveloped regional/local parks and recreational areas, and golf courses. Undeveloped land identified under the Open Space land use category can offer recreational opportunities not captured as a Recreational land use. The Study Area contains many local community parks that provide vital recreational opportunities for this densely urbanized region (see Figure 2-2). In addition, there are several regional parks within the Study Area, which are identified in Table 2-2.

TABLE 2-2
Regional Parks within the Study Area

Name	Location	County
Clark Regional Park	8800 Rosecrans Ave. Buena Park, CA 90621	Orange
Craig Regional Park	3300 State College Blvd. Fullerton, CA 92835	Orange
Cerritos Regional Park	19800 Bloomfield Ave. Cerritos, CA 90703	Los Angeles
La Mirada Regional Park	15105 Alicante Road La Mirada, CA 90638	Los Angeles
El Dorado Regional Park	7550 E. Spring St. Long Beach, CA 90815	Los Angeles

The Study Area also contains several bikeways. These include the San Gabriel River bikeway, Coyote Creek bikeway, and Tonner Hills bikeway (see Figure 2-3).


San Bernardino County
Orange County
Los Angeles County
San Bernardino
Los Angeles County
Orange County
Coyote Creek
San Gabriel River
Los Angeles River
5
91
605
405
Legend
Coyote Creek Watershed Boundary
Existing Parks
County Boundary
Water Bodies
Highways
0
3
Miles
Figure 2-2
Existing Parks
Coyote Creek Watershed
Management Plan

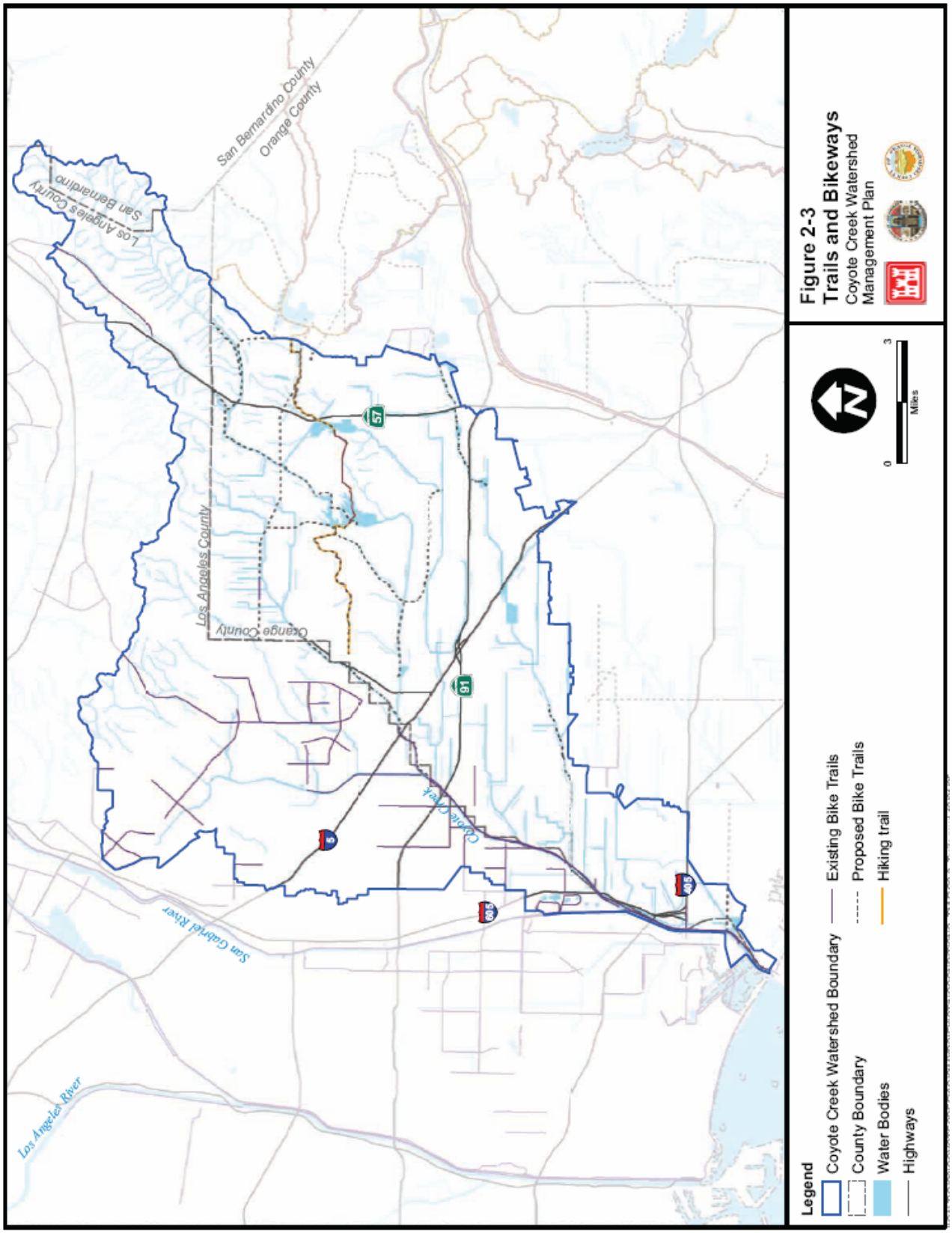


Figure 2-3
Trails and Bikeways
Coyote Creek Watershed Management Plan

The San Gabriel River bikeway extends north along the San Gabriel River from the Pacific Ocean. Just past the San Gabriel River/Coyote Creek confluence, the San Gabriel River bikeway exits the Study Area and continues north along the San Gabriel River. The Coyote Creek bikeway extends northeast along the Coyote Creek from its confluence with the San Gabriel River. A bridge is located at the confluence that marks its branch to the northeast along Coyote Creek. The Coyote Creek bikeway extends to Cerritos Regional Park, where it terminates. An ongoing study is currently looking at a possible bikeway linkage along Coyote Creek from the San Gabriel River confluence to the City of La Habra.

Industrial/Commercial

Industrial land uses comprise chemical and cement processing, manufacturing operations, maintenance yards, warehousing, and solid waste and waste disposal facilities. Commercial areas comprise office buildings, shopping and retail centers, strip developments, and storage and open space. Potential hazardous areas are primarily limited to industrial areas.

The California Department of Toxic Substance Control (DTSC) maintains information on properties in California where hazardous substances have been released, or where potential for a release exists. Table 2-3 shows properties within or adjacent to the Study Area that were identified by the DTSC for hazardous substances.

TABLE 2-3
Hazardous Sites within or Adjacent to the Study Area

DTSC Site ID	Site Name	Address	County	Status
19290306	Angeles Chemical Company Inc.	8915 Sorenses Ave. Santa Fe Springs, CA 90670	Los Angeles	Active Site
19490024	General Disposal	12605 Marquardt Ave. Santa Fe Springs, CA 90670	Los Angeles	Certified
19280440	McKesson Chemical Company	9005 Sorenses Ave. Santa Fe Springs, CA 90670	Los Angeles	Active Site
12980515	Neville Chemical Company	12800 Imperial Hwy. Santa Fe Springs, CA 90670	Los Angeles	Active Site
12980436	Omega Chemical Corporation	12504 Whittier Blvd. Whittier, CA 90602	Los Angeles	Active Site
19990017	Stankovich I	14014 Gracebee Ave. Norwalk, CA 90650	Los Angeles	Certified
19990018	Stankovich II	12601 Bloomfield Ave. Santa Fe Springs, CA 90670	Los Angeles	Certified
19290245	Walker Properties	Bloomfield Ave. and Lakeland Rd. Santa Fe Springs, CA 90670	Los Angeles	Certified
19340728	Washington Plating Inc.	7060 Elmer Ave. Whittier, CA 90602	Los Angeles	Potential Site
19490194	Waste Disposal Inc.	12731 Los Nietos Rd. Santa Fe Springs, CA 90670	Los Angeles	Active Site
30290001	McColl	Rosecrans and Sunny Ridge Fullerton, CA 92633	Orange	Active Site
30970001	NWS Seal Beach	Seal Beach Blvd. and Westminster Seal Beach, CA 90740	Orange	Active Site

Source: California Department of Toxic Substance Control www.dtsc.ca.gov

Institutional

Institutional land uses are comprised of colleges and universities, trade schools and professional training facilities, special care and convalescent hospitals, hospitals and medical facilities, public/private schools and nursery and day care centers, churches and religions facilities, government offices and municipal services, and correctional facilities. Within the lower reaches of the watershed are the Seal Beach Naval Weapons Station and the Los Alamitos Armed Forces Reserve Center. Colleges and universities in the Study Area include Cypress College, Cerritos College, Fullerton College, Biola University, and California State University Fullerton.

2.01.02 People

The population density of the Study Area is shown in Figure 2-4, and the percent density breakdown is provided in Table 2-4. (Low density areas shown in Figure 2-4 many times do not reflect actual use; commercial and industrial use shown in Figure 2-1 appear in Figure 2-4 to be low-density areas.)

TABLE 2-4
Population Density of Study Area

Persons per Square Mile	Percent of Study Area
0 – 2,000	42
2,000 – 5,000	14
5,000 – 10,000	23
10,000 – 20,000	17
20,000 – 30,000	3
> 30,000	1

Source: California Spatial Information Library

The population of the Study Area is moderately dense with approximately 44 percent of it being greater than 5,000 persons per square mile.

The Study Area includes a broad range of ethnicities, with the dominant ethnicities being White and Hispanic. Combined these two ethnicities comprise approximately 75 percent of the Study Area. Table 2-5 shows the percent ethnicity of the Study Area by cities.

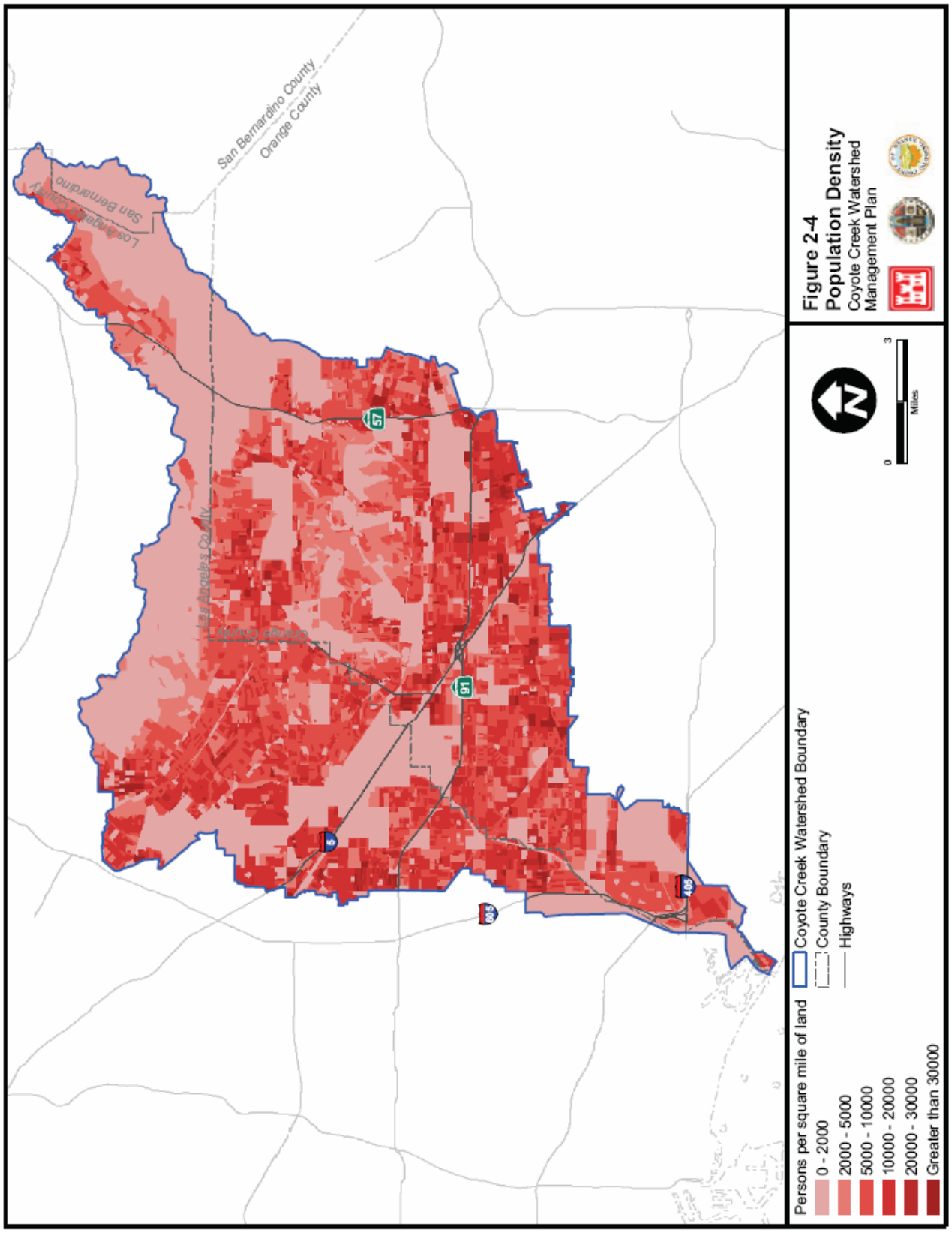

San Bernardino County
Orange County
Los Angeles County
San Bernardino
Los Angeles County
Orange County
57
91
5
605
Persons per square mile of land
0 - 2000
2000 - 5000
5000 - 10000
10000 - 20000
20000 - 30000
Greater than 30000
Coyote Creek Watershed Boundary
County Boundary
Highways
0
3
Miles
Figure 2-4
Population Density
Coyote Creek Watershed
Management Plan

TABLE 2-5
Percent Ethnicity of the Study Area by Cities

City	Hispanic	White	African American	Native American	Asian	Native Hawaiian	Some Other Race	Two Or More Races
Anaheim	46.76	35.85	2.42	0.32	11.87	0.39	0.14	2.26
Artesia	38.29	27.25	3.36	0.38	27.23	0.43	0.20	2.87
Brea	20.35	66.48	1.16	0.31	8.99	0.20	0.16	2.35
Buena Park	33.50	38.18	3.61	0.40	20.87	0.46	0.20	2.79
Cerritos	10.39	21.44	6.58	0.15	58.24	0.17	0.20	2.83
Chino Hills	25.68	43.79	5.35	0.29	21.82	0.11	0.21	2.74
Cypress	15.65	57.11	2.71	0.38	20.69	0.35	0.24	2.87
Diamond Bar	18.46	31.04	4.66	0.17	42.50	0.11	0.18	2.87
Fullerton	30.17	48.74	2.12	0.32	15.98	0.20	0.19	2.28
Hawaiian Gardens	73.53	10.80	4.20	0.47	8.68	0.62	0.11	1.60
La Habra	49.04	41.37	1.37	0.32	5.82	0.15	0.16	1.77
La Habra Heights	13.64	63.64	1.16	0.11	18.24	0.07	0.25	2.91
La Mirada	33.47	47.15	1.82	0.29	14.75	0.22	0.26	2.04
La Palma	11.27	36.29	4.52	0.24	44.61	0.28	0.23	2.56
Lakewood	22.78	52.40	7.14	0.33	13.29	0.56	0.22	3.28
Long Beach	35.77	33.13	14.48	0.38	11.90	1.17	0.22	2.94
Los Alamitos	16.02	67.93	3.10	0.27	9.45	0.30	0.16	2.77
Norwalk	62.89	18.95	4.38	0.45	11.35	0.33	0.13	1.52
Placentia	31.10	53.71	1.60	0.38	11.02	0.14	0.13	1.92
Santa Fe Springs	71.38	19.23	3.70	0.45	3.74	0.17	0.09	1.24
Seal Beach	6.43	84.33	1.36	0.22	5.64	0.15	0.09	1.77
Whittier	55.89	37.61	1.00	0.41	3.14	0.11	0.14	1.71
Total	36.89	38.35	6.10	0.34	15.15	0.52	0.18	2.47

Source: www.scag.ca.gov/census/excel/EthnicitybyCity.xls

Note: The Study Area includes parts, but not all, of some of the cities. However, the data included in this table are representative of each entire city.

Table 2-6 shows the percent of various age groups and gender of the Study Area by cities.

TABLE 2-6
Percent of Various Age Groups and Gender of the Study Area by Cities

City	65 and Older	Under 18	Percent Male	Percent Female
Anaheim	8.16	29.29	50.02	49.98
Artesia	12.36	26.37	50.13	49.87
Brea	11.36	25.27	48.79	51.21
Buena Park	9.33	28.71	49.56	50.44
Cerritos	9.65	24.21	48.66	51.34
Chino Hills	4.23	32.31	49.72	50.28
Cypress	10.55	26.48	48.70	51.30
Diamond Bar	7.48	26.58	48.97	51.03
Fullerton	11.33	24.33	49.42	50.58
Hawaiian Gardens	6.18	35.68	51.19	48.81
La Habra	10.79	28.47	49.27	50.73
La Habra Heights	14.88	24.19	49.77	50.23
La Mirada	13.81	25.69	48.27	51.73
La Palma	10.22	23.47	48.85	51.15
Lakewood	11.86	27.05	48.42	51.58
Long Beach	9.08	28.48	49.12	50.88
Los Alamitos	14.77	24.84	47.38	52.62
Norwalk	9.01	31.03	49.48	50.52
Placentia	9.06	26.33	49.56	50.44
Santa Fe Springs	12.81	27.36	50.03	19.97
Seal Beach	37.54	13.16	43.93	56.07
Whittier	12.53	27.18	48.62	51.38
Total	9.91	27.82	49.23	50.77

Source: www.scag.ca.gov/census/excel/County_and_P_38_es_Inc_Only.xls

Note: The Study Area includes parts, but not all, of some of the cities. However, the data included in this table are representative of each entire city.

2.02 Climate and Air Resources

Climatic conditions and air resources (and other physical resources) of the Study Area are directly connected. Specifically, climate affects visibility, air quality, and air pollutant dispersion, which subsequently affects health and quality of life for the population within the Study Area. This section details climate and air resources, and their relationship, within the Study Area.

The Study Area is located in the South Coast Air Basin (SCAB), which is bound by the Pacific Ocean on the west and south and the San Gabriel, San Bernardino, and San Jacinto mountains to the north and east. It includes all of Orange County and the nondesert portions of Los Angeles, Riverside, and San Bernardino Counties. The SCAB has a Mediterranean climate that is characterized by warm summers and mild winters. A climate station is located at the Long Beach Airport, which is near the lower extent of the Study Area. Table 2-7 shows the monthly average temperature and precipitation recorded at the Long Beach climate station.

TABLE 2-7
Average Monthly Temperature (°F) and Precipitation (Inches) in Long Beach (1958 to 2004)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature	66.9	67.3	68.4	71.8	73.6	77.1	82.4	84.0	82.4	78.1	72.0	67.2	74.3
Average Min. Temperature	45.5	47.3	49.7	52.3	56.7	60.2	63.6	64.9	62.9	58.0	50.3	45.2	54.7
Average Total Precipitation	2.56	2.87	1.96	0.70	0.20	0.07	0.02	0.07	0.20	0.39	1.28	1.66	11.99

Source: Western Regional Climate Center, wrcc@dri.edu

As shown in Table 2-7, average maximum temperatures range from 66.9 degrees Fahrenheit (°F) to 84.0 °F; and average minimum temperatures range from 45.2 °F to 64.9 °F.

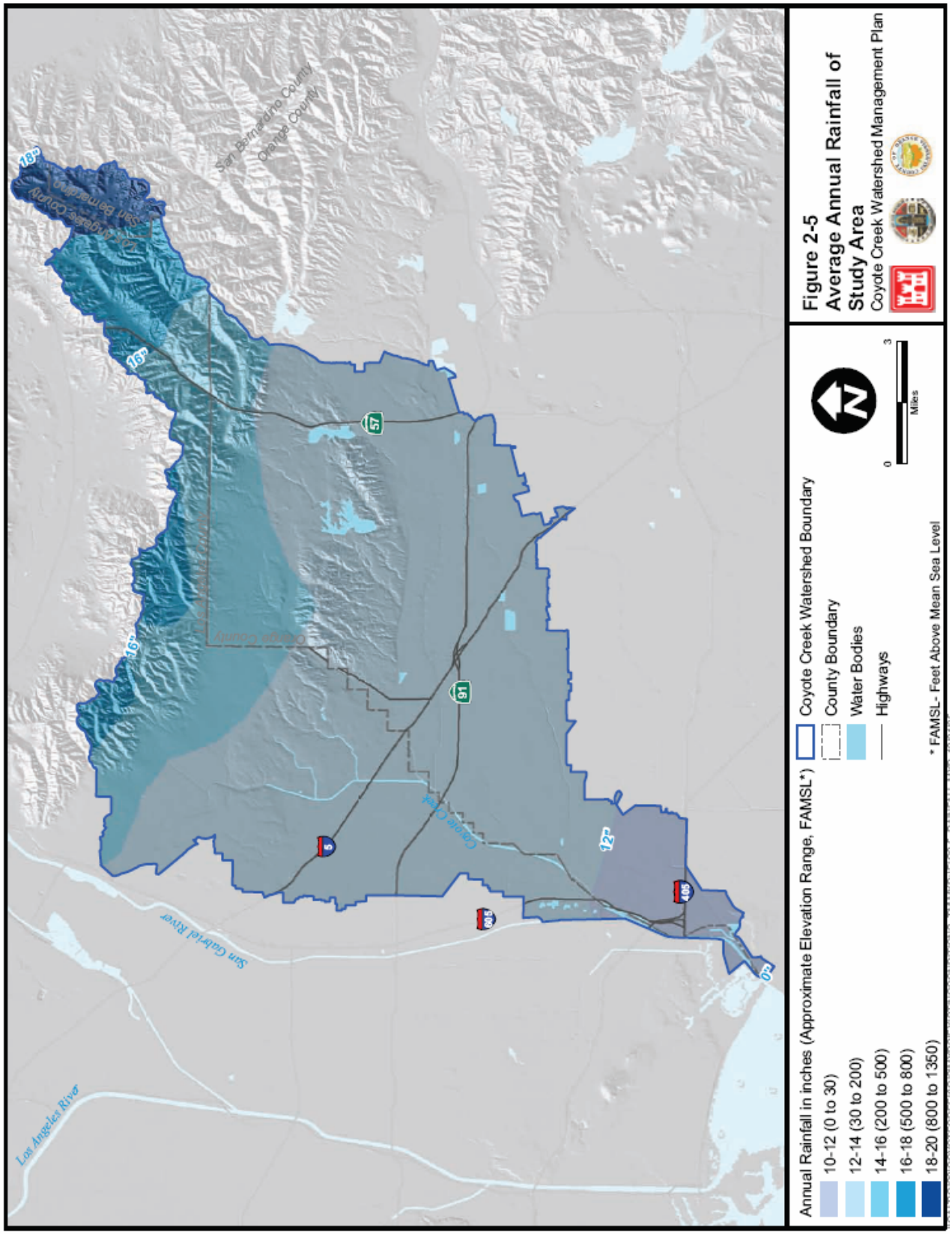
Precipitation cycles are fundamental to managing physical resources within the Study Area. These cycles are critical conditions to stormwater management and flood protection, water quality, and biological resources. In referring to Table 2-7, it is evident that more than 90 percent of the rainfall occurs between November and April. The average annual rainfall of the Study Area is shown in Figure 2-5, and the percent average annual rainfall breakdown is provided in Table 2-8.

TABLE 2-8
Average Annual Rainfall of Study Area

Average Annual Rainfall	Percent of Study Area	Elevation Range (ft.)
10 – 12 inches	5	0 to 30
12 – 14 inches	64	30 – 200
14 – 16 inches	20	200 – 500
16 – 18 inches	8	500 – 800
18 – 20 inches	3	800 – 1,350

Source: California Department of Forestry

Although the climate of the SCAB is characterized as semiarid, the air near the land surface is moist on most days because of the presence of a marine layer. Humidity restricts visibility in the SCAB, in part because the conversion of sulfur dioxide to sulfates is heightened in air with high relative humidity, such as a marine layer. The annual relative humidity is 71 percent along the coast and 50 percent inland (Los Angeles County Department of Public Works, 2005).


San Bernardino County
Orange County
Los Angeles County
San Bernardino
Orange County
18"
16"
16"
12"
0"
57
91
5
605
405
Coyote Creek
San Gabriel River
Los Angeles River
Annual Rainfall in inches (Approximate Elevation Range, FAMSL*)
10-12 (0 to 30)
12-14 (30 to 200)
14-16 (200 to 500)
16-18 (500 to 800)
18-20 (800 to 1350)
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
* FAMSL- Feet Above Mean Sea Level
0
3
Miles
Figure 2-5
Average Annual Rainfall of Study Area
Coyote Creek Watershed Management Plan

About three-quarters of available sunshine are received in the SCAB, and the remaining one-quarter is absorbed by clouds (Los Angeles County Department of Public Works, 2005). The ultraviolet part of this abundant radiation is a key factor in photochemical reactions that generate smog.

The direction and speed of wind determine horizontal dispersion and transport of air pollutants. During the late autumn to early spring rainy season, the SCAB is subject to wind flows associated with storms moving through the region from the northwest. During the dry season, which coincides with the months of maximum photochemical smog concentrations, the typical wind flow is a daytime onshore breeze and a nighttime offshore drainage wind.

The SCAB is characterized by persistent temperature inversion in the atmospheric layers near the surface of the earth, which limit the vertical mixing of pollutants. Normally, the temperature of an atmosphere decreases with altitude. However, when the temperature of the atmosphere increases with altitude, the phenomenon is termed an inversion. Temperature inversion traps pollutants, allowing for increased pollutant concentration near the surface.

The meteorological and climate characteristics of the SCAB, including light winds, abundant sunlight, and low vertical mixing, make the Study Area conducive to the accumulation of air pollutants. Table 2-9 identifies exceedances of National and State Ambient Air Quality Standards, based on air quality monitoring data that are representative of the Study Area. Data are for the years 2000 through 2002, which are the most recent data available, and are for ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter less than 10 micrometers in aerodynamic diameter (PM_{10}), particulate matter less than 2.5 micrometers in aerodynamic diameters ($PM_{2.5}$), sulfate, and lead (Pb).

These data indicate that the Study Area is in compliance with both federal and state air quality standards for CO, NO_2, SO_2, and Pb. The Study Area exceeded the federal ozone standard one time in 3 years and the state ozone standard several times each year; it exceeded the state standard for PM_{10} between 5 and 12 days per year; it exceeded the federal standard for $PM_{2.5}$ on a limited basis; and it exceeded the state sulfate standard once in 3 years. It is also evident from the data that there were more frequent ozone exceedances in the northern parts of the Study Area, where the Puente and Chino Hills trap pollutants and do not allowing horizontal dispersion.

2.03 Geologic Resources

This section characterizes the geologic resources of the Study Area and discusses topography, geology and soils, and seismology. The setting and influence of these geologic resources affects land use opportunities. Most importantly, areas in the northern and eastern part of the Study Area have permeable aquifer materials that can accept groundwater recharge, while areas in the southern and western part of the Study Area have an impermeable aquitard that limits the potential for groundwater recharge. This review of geologic resources characterizes the topography, geology and soils, and seismology of the Study Area and will assist in making informed land use and resource management decisions.

TABLE 2-9
Air Quality Standard Exceedances for the Study Area (2000 – 2002)

Pollutant	Number of Days of Federal/State Standards Were Exceeded (Federal/State)					
	South Coastal Los Angeles County			North Orange County		
	2000	2001	2002	2000	2001	2002
Carbon Monoxide (CO)	0/0	0/0	0/0	0/0	0/0	0/0
Ozone (O_3)[1]	0/3	0/0	0/0	1/8	0/4	0/3
Nitrogen Dioxide (NO_2)	0/0	0/0	0/0	0/0	0/0	0/0
Sulfur Dioxide (SO_2)	0/0	0/0	0/0	--	--	0/0
Particulate Matter less than 10 microns in diameter (PM_{10})[2]	0/12(21)	0/10(17)	0/5(8.6)	--	--	--
Particulate Matter less than 2.5 microns in diameter ($PM_{2.5}$)[3]	4(1.3)/*	1(0.3)/*	0/*	--	--	--
Sulfate	**/1	**/0	**/0	--	--	--
Lead (Pb)[4]	0/0	0/0	0/0	--	--	--

Source: SCAQMD www.aqmd.gov.
-- Pollutant not monitored.
* State standard for $PM_{2.5}$ became effective on July 5, 2003, and did not exist at the time of this data set.
** No federal sulfate standard exists.
1. Federal 1-hour standard considered.
2. PM_{10} samples were collected every 6 days; percentage of days exceeding standard shown in parenthesis.
3. $PM_{2.5}$ samples collected every 3 days; percentage of days exceeding standard shown in parenthesis.
4. Lead federal standard is monthly average; state standard is quarterly average.

2.03.01 Topography

The Study Area topography is generally comprised of uplift (or hill) areas in the northern and northeastern part of its reach and a low-lying and relatively flat coastal plain that gently slopes from the base of the hills to the south and west. The topography of the Study Area ranges from roughly at sea level to approximately 1,700 feet. The primary topographic features of the Study Area include the Puente and Chino Hills, Coyote Hills, and the Coastal Plain.

The Puente and Chino Hills make up the northern part of the California Peninsular Ranges geomorphic province. The Peninsular Range is characterized by a series of northwest- to southeast-oriented valleys, hills, and mountains separated by faults associated with and parallel to the San Andreas fault system. The Puente and Chino Hills are an inland topographical feature separating the San Gabriel Valley to the north and the coastal plain to the south. The Puente and Chino Hills are crossed by Brea, Tonner, Carbon, and Telegraph Canyons. These major canyons and smaller intervening ones dissect the upland area and provide drainage to the southwest (Department of Conservation, 2001). The Puente Hills has several peaks above 1,000 feet in elevation. The elevation of the Chino Hills peaks at approximately 1,700 feet.

The Coyote Hills are located primarily in the City of Fullerton and are part of a chain of low hills that extend from the City of Yorba Linda on the east to Santa Fe Springs on the west. The natural topography has been altered significantly by oil field activities. These alterations generally consist of graded roads, well pads, canyon fills, and steep cuts into natural slopes. The elevation of the Coyote Hills peaks at approximately 600 feet.

The Los Angeles/Orange County coastal plain is bounded on the north and east by the Santa Monica Mountains and the Puente Hills, on the south by the San Joaquin Hills, and on the west by the Pacific Ocean. The surface of the Coastal Plain is relatively flat and gently slopes from the base of the hills to the south and west. However, several low-lying hills are formed along the Newport Inglewood Uplift (see Figure 2-6).

2.03.02 Geology and Soils

The geology and soils of the Puente and Chino Hills consist of exposed rocks that are primarily sandstone, siltstone, and conglomerate of marine origin that belong to the Pliocene Fernando Formation and the late Miocene Puente Formation (see Figure 2-6). Table 2-10 identifies the surficial geology of the Study Area.

TABLE 2-10
Surficial Geology of Study Area

Surficial Geology	Percent of Study Area
Miocene	1
Pliocene	5
Quaternary Alluvium	80

Source: Natural Resources Conservation Service

The rocks exposed in the Coyote Hills are dominantly marine and/or nonmarine clay, silt, and sand deposits that comprise the Pleistocene La Habra, Coyote Hills, and San Pedro formations. The lowlands between the Puente and Coyote Hills generally consist of gentle to moderately sloping alleviated surfaces. Surficial sediments consist of a series of older Quaternary alluvial fan deposits along the southern margin of the Puente Hills and a series of younger Quaternary alluvial fan deposits along the southern margin of the Coyote Hills. The geology and soils of the coastal plain range from Pleistocene to Holocene aged alluvium deposits. The Pleistocene marine terrace deposits have an overlying cover of older alluvium dense silty sands. The Holocene deposits include alluvial soft sand, silt, silty sand, and clay (Department of Conservation, 2001).

Areas in the north central and eastern part of the Study Area have permeable aquifer materials that can accept groundwater recharge, while areas in the southern and western part of the Study Area have an impermeable aquitard that limits the potential for groundwater recharge. Thus, opportunities for increasing groundwater recharge would be limited to parts of the Study Area where permeable aquifer materials are present, generally in the north central and eastern areas (see Section 2.04.03 for discussion of groundwater resources).

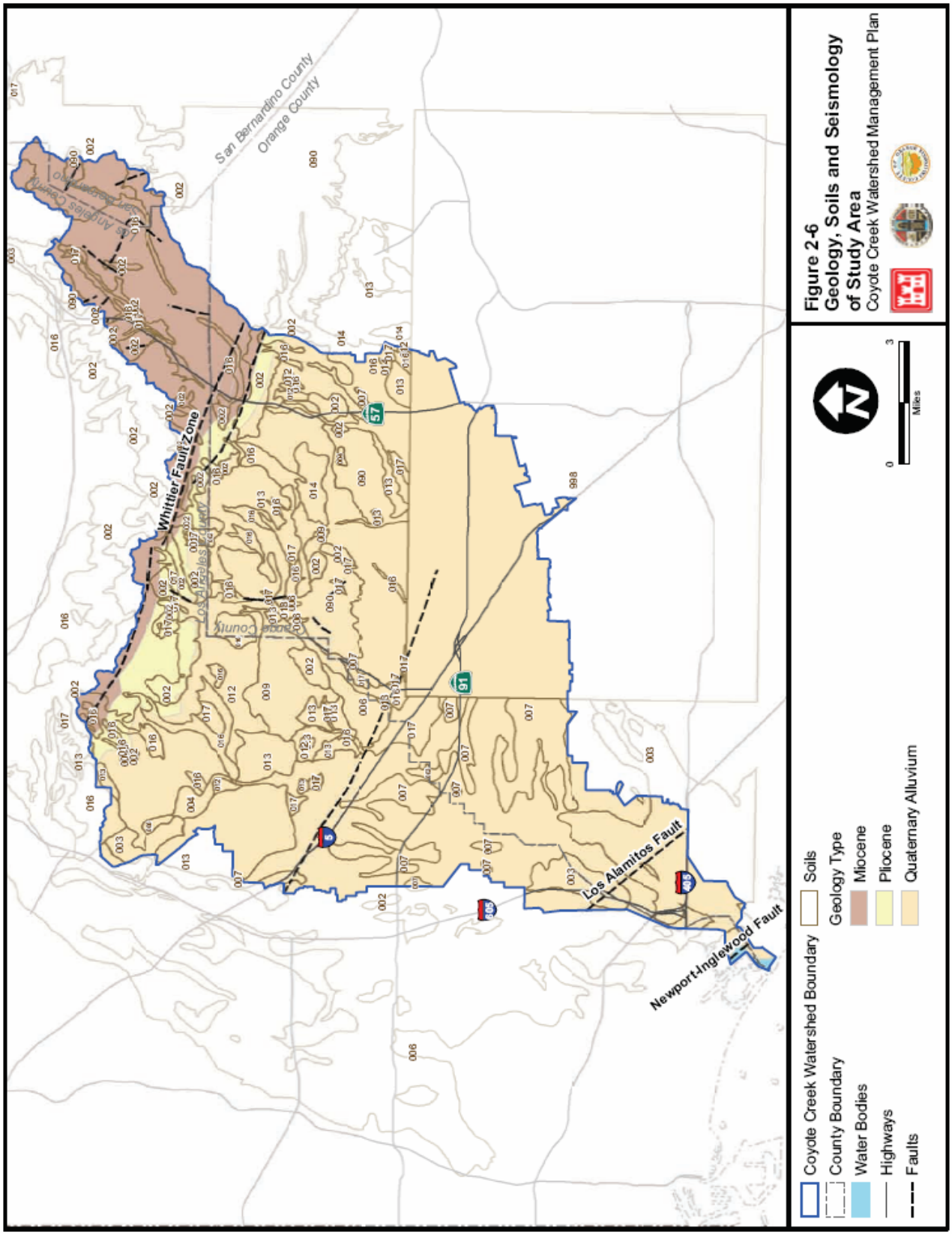


Figure 2-6
Geology, Soils and Seismology of Study Area
Coyote Creek Watershed Management Plan

2.03.03 Seismology

The Study Area is penetrated by several faults, including Los Alamitos, Newport-Inglewood, and Whittier Elsinore (see Figure 2-2). The Los Alamitos fault is indistinct and extends approximately 6.8 miles. The Newport Inglewood fault is a right lateral strike slip fault with a slip rate of 0.6 millimeter per year (mm/yr) and is approximately 47 miles. The Newport Inglewood fault has a probable Richter scale magnitude between 6.0 and 7.4. The Whittier Elsinore fault is a right lateral strike slip fault with a northeastern dip and an estimated slip rate between 2.5 and 3.0 mm/yr, and is approximately 25 miles. The Whittier Elsinore fault is considered capable of producing an earthquake with a Richter scale magnitude between 6.0 and 7.2.

The greatest concentration of local seismic events within the Study Area has resulted from activity on the Newport Inglewood fault and the Whittier Elsinore fault (Los Angeles County Department of Public Works, 2005).

2.04 Water Resources

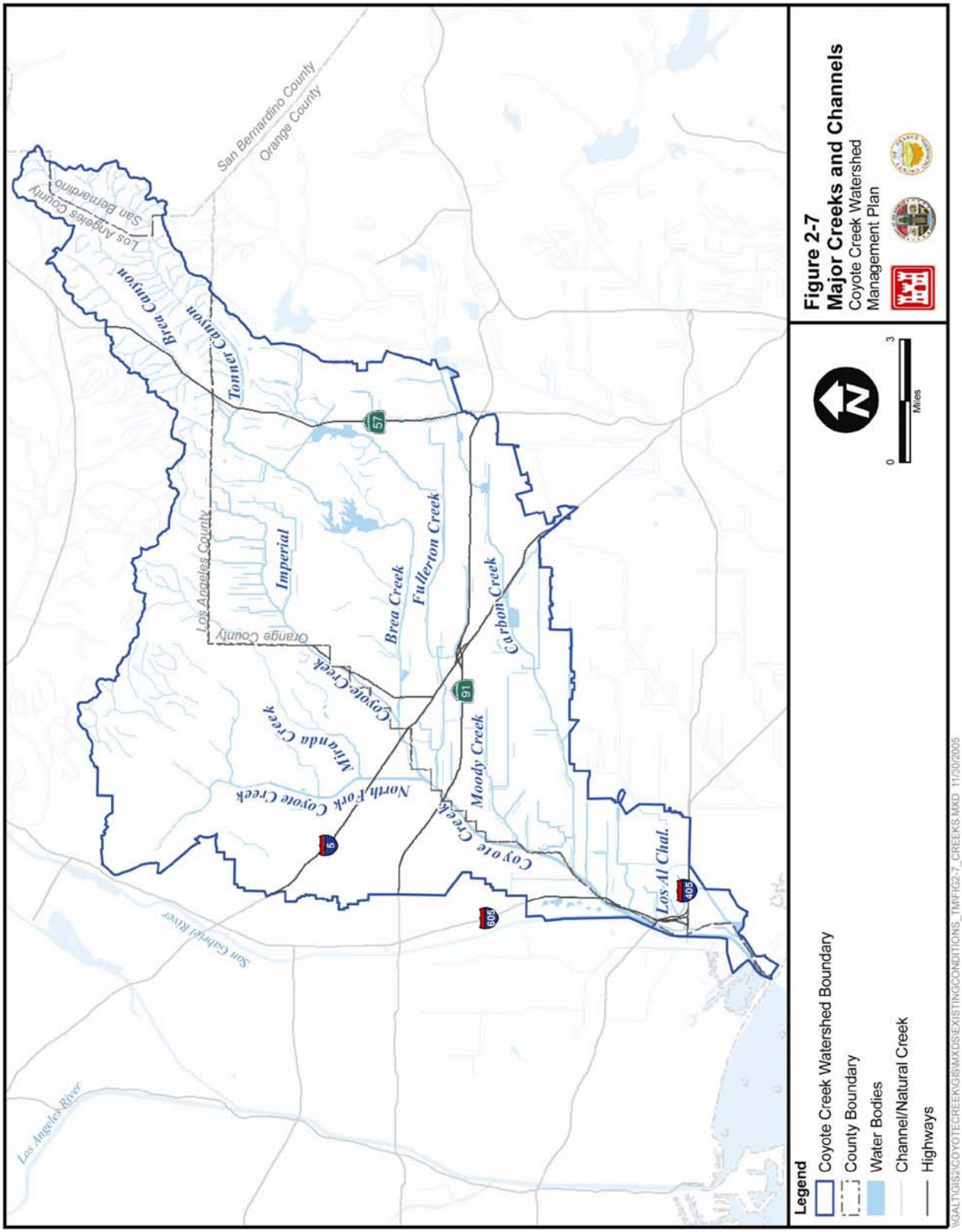
The Study Area includes several major creeks and channels, including two major dams and an underlying groundwater basin. Additionally, the Study Area is supplied by local and imported water sources; and wastewater is treated by several wastewater treatment facilities. This section characterizes the water resources of the Study Area and discusses surface water features and groundwater features. It is anticipated a hydrology and hydraulics assessment would be completed by the United States Army Corps of Engineers.

Water resources are important because they supply drinking water and provide for habitat and many recreational opportunities within the watershed. The Study Area is highly urbanized in its lower areas and has been increasingly developed in its upper reaches. Consequently, the large engineered channels that comprise the lower watershed receive dry-weather flow from several sources, including water reclamation plant discharges and nonpoint source runoff from developed landscape and hardscape. Additionally, the Study Area spans part of an underlying groundwater basin that has been regionally divided into three groundwater basins for management purposes.

2.04.01 Surface Water Features

The major creeks and channels of the Study Area include Coyote Creek, Coyote Creek–North Fork, Brea Creek, Fullerton Creek, Carbon Creek, Moody Creek, and Los Alamitos Channel (see Figure 2-7). Table 2-11 identifies the length of the major creeks and channels within the Study Area.

Brea and Fullerton Dams are within the Study Area and have been constructed primarily for flood control purposes. To assist in watershed planning, the Study Area has been divided into five major subwatersheds. The subwatersheds include Coyote Creek/Brea Creek, Coyote Creek–North Fork, Fullerton Creek, Carbon Creek, and Los Alamitos (see Figure 2-8).


Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Channel/Natural Creek
Highways
0
3
Miles
Figure 2-7
Major Creeks and Channels
Coyote Creek Watershed
Management Plan
San Bernardino County
Orange County
Los Angeles County
San Bernardino
Los Angeles County
Brea Canyon
Tonner Canyon
Imperial
Brea Creek
Fullerton Creek
Carbon Creek
Coyote Creek
Miranda Creek
North Fork Coyote Creek
Moody Creek
Coyote Creek
Los Al Chal.
Los Angeles River
San Gabriel River
57
91
5
605
405

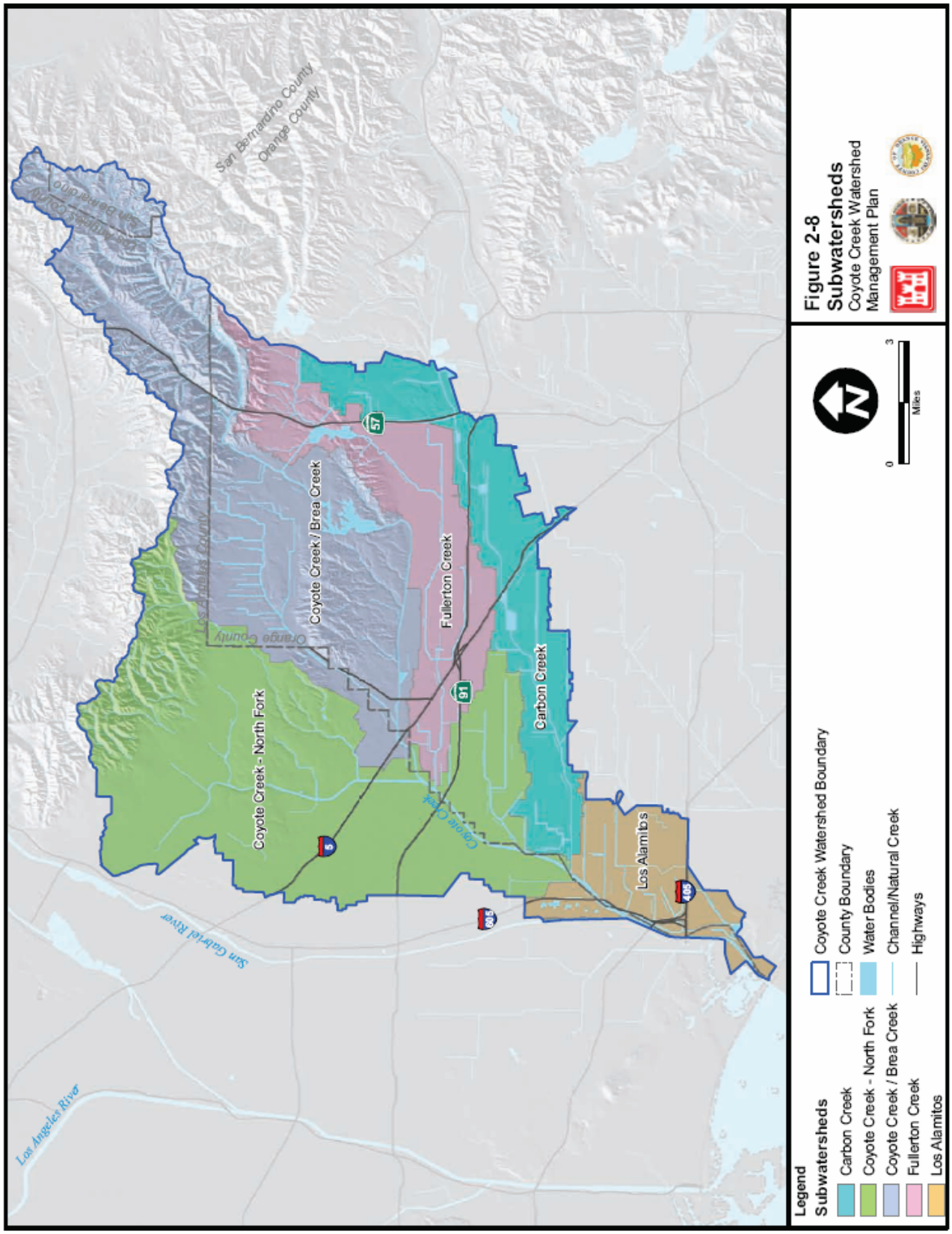

Los Angeles River
San Gabriel River
Coyote Creek - North Fork
Coyote Creek / Brea Creek
Fullerton Creek
Carbon Creek
Los Alamitos
Coyote Creek
Orange County
Los Angeles County
San Bernardino County
Orange County
Legend
Subwatersheds
Carbon Creek
Coyote Creek - North Fork
Coyote Creek / Brea Creek
Fullerton Creek
Los Alamitos
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Channel/Natural Creek
Highways
0
3
Miles
Figure 2-8
Subwatersheds
Coyote Creek Watershed
Management Plan

TABLE 2-11
Approximate Length of Major Creeks and Channels

Major Creek/Channel	Approximate Length (in miles)
Coyote Creek	15.8
Coyote Creek–North Fork	8.3
Brea Creek	9.8
Fullerton Creek	13.2
Carbon Creek	12.8
Moody Creek	3.7
Los Alamitos Channel	1.5

Source: County of Orange, Geomatics Land Information System Division and County of Los Angeles, Department of Public Works

Coyote Creek/Brea Creek

Creek Structure

Within the City of La Habra, the Coyote Creek transitions from a concrete-lined, trapezoidal channel to an earthen bottom channel near Oeste Park. South of Oeste Park, Coyote Creek is a composite channel for several miles before transitioning back to a concrete-lined, trapezoidal channel at the northeast boundary of the City of La Mirada. Between the City of La Mirada and the confluence with the Lower San Gabriel River, Coyote Creek is a trapezoidal channel lined with concrete both on the sides and the bottom. The Lower San Gabriel River, between the Pacific Ocean and just south of the Coyote Creek confluence, has an earthen bottom and riprap banks.

Flows from the eastern extent of the Puente Hills drain into Brea Creek in the City of Diamond Bar, where it consists of a trapezoidal channel lined with concrete. Also, in this upper reach, Brea Creek receives flows from the Tonner Canyon Channel. Brea Creek extends as a concrete channel into the City of Brea, where it transitions to a composite channel before flowing into the Brea City Golf Course and subsequently the Fullerton Golf Course. The golf courses also function as spreading basins during flood events. From there, Brea Creek flows into Brea Dam, which is owned and operated by the United States Army Corps of Engineers (USACE) for flood control. Below Brea Dam, Brea Creek consists of a concrete-lined channel that flows south part way through the City of Fullerton, where it curves to the west. Brea Creek remains a concrete trapezoidal channel and extends west through the City of Buena Park, where it flows into Coyote Creek.

Flow

The Los Angeles County Department of Public Works monitors flow in Coyote Creek at Spring Street in the City of Long Beach. Table 2-12 includes the monthly flow of Coyote Creek at Spring Street in cubic feet per second (cfs) for water year October 2003 to September 2004.

TABLE 2-12
Monthly Flow of Coyote Creek in Cubic Feet per Second at Spring Street for Water Year October 2003 to September 2004

Month	Daily Max	Daily Min	Daily Mean	Monthly Total
October	89	20	50.8	1,576
November	414	6.3	100	3,002
December	895	10	72.2	2,238
January	274	17	50.2	1,557
February	3,340	22	302	8,745
March	881	23	77.9	2,415
April	514	18	60.0	1,800
May	44	15	27.8	861
June	39	17	28.2	845
July	31	18	24.0	745
August	34	22	27.2	843
September	40	21	29.2	876

Source: Los Angeles County Department of Public Works

Capacity

The Brea Canyon Channel Project Report (County of Orange, 1991) analyzed the potential for flooding from Brea Creek. Specifically, it found that under the influence of a 100-year discharge of 12,400 cfs, the existing channel experiences subcritical flow regime from the confluence of Brea Creek and Tonner Canyon Channel down to the Brea City Golf Course just south of Imperial Highway. Table 2-13 shows the reaches of Brea Creek and their corresponding capacities and percent of 100-year storm capacity.

TABLE 2-13
Brea Creek Reaches, Capacity, and Percent of 100-Year Storm Capacity

Reach	Capacity (cfs)	Percent of 100-Year Storm Capacity
Golf Course	12,400	100
City Park	12,400	100
Imperial Highway Crossing	5,300	43
Imperial Highway to Railroad	4,700	38
Railroad Crossing	7,800	63
Railroad to Lambert Road	12,400	100
Lambert Road Crossing	5,085	41
Lambert Road to 600’ upstream	4,700	40
600’ Upstream of Lambert to Central Avenue	7,700	65

TABLE 2-13
Brea Creek Reaches, Capacity, and Percent of 100-Year Storm Capacity

Reach	Capacity (cfs)	Percent of 100-Year Storm Capacity
Central Ave. Crossing	3,00	25
Central Ave. North – 1,500 ft.	3,800	32
Through the Oil Field	Unimproved	--
First Brea Blvd. Bridge	2,000	17
2nd Brea Blvd. Bridge	8,500	72
3rd Brea Blvd. Bridge	7,000	59
Tonner Canyon Crossing	7,050	100
CalTrans Channel	7,050	100

Source: County of Orange, 1991.

Coyote Creek–North Fork

Creek Structure

Coyote Creek–North Fork drains south through the City of Whittier and into Coyote Creek in the City of Cerritos. Coyote Creek–North Fork is primarily a concrete-lined, trapezoidal channel. Several tributaries flow into Coyote Creek–North Fork. The dominant tributary is Mirada Creek, which drains southwest from the west Puente Hills through parts of La Habra Heights, Whittier, and La Mirada before its confluence with Coyote Creek–North Fork in the City of Cerritos. Moody Creek is a concrete-lined, trapezoidal channel that drains southwest through the City of Cypress and into Coyote Creek.

Fullerton Creek

Creek Structure

Fullerton Creek flows southwest into the northeast part of the City of Fullerton and into Fullerton Dam. Fullerton Dam is owned and operated by the USACE for flood control. Above Fullerton Dam, Fullerton Creek is primarily an earthen channel. Below Fullerton Dam, Fullerton Creek is first an earthen channel and then transitions to a concrete channel, which flows southwest through the southeast part of the City of Fullerton. Here, Fullerton Creek curves west and continues to flow west through the Cities of Buena Park and La Palma where it flows into Coyote Creek.

Flow

The County of Orange Resources and Development Management Department monitors flow in Fullerton Creek at Richman Avenue in the City of Fullerton. Table 2-14 includes the monthly flow of Fullerton Creek at Richman Avenue in cfs for water year July 2003 to June 2004.

TABLE 2-14
Monthly Flow of Fullerton Creek in Cubic Feet per Second at Richman Avenue for Water Year July 2003 to June 2004

Month	Daily Max	Daily Min	Daily Mean	Monthly Total
July	2.1	0.7	0.9	26.6
August	0.8	0.5	0.6	18.8
September	0.8	0.4	0.5	15.8
October	26.0	0.2	1.2	37.9
November	97.7	0.2	5.4	163.4
December	68.6	0.5	3.3	102.1
January	4.6	0.3	0.7	22.6
February	380.0	0.3	38.9	1,129.3
March	71.1	0.8	5.2	160.3
April	88.2	0.6	4.3	129.8
May	1.0	0.6	0.9	26.5
June	0.9	0.8	0.8	24.4

Source: County of Orange Resources Development and Management Department.

Carbon Creek

Creek Structure

Near the northern border of the City of Anaheim, the Carbon Canyon Channel branches off Carbon Creek and drains to the Santa Ana River on the south (County of Orange, 1989). All the flows above Carbon Canyon Dam, and released from Carbon Canyon Dam, drain to Carbon Canyon Channel and the Santa Ana River, which is outside the Study Area.

The part of Carbon Creek that is within the Study Area, below where it is isolated from flow from Carbon Canyon Dam, generally drains west through the City of Anaheim, City of Cypress, and the City of Los Alamitos, where it flows into Coyote Creek. Along its western extent, Carbon Creek is comprised of areas of concrete, composite, earthen, and rock (riprap) channel. Carbon Creek was constructed in the late 1950s as a 25-year frequency storm capacity facility. The areas adjacent to Carbon Creek are primarily fully developed with a variety of residential, commercial, and industrial uses.

Los Alamitos

Creek Structure

Los Alamitos Channel is concrete lined and flows southwest from the City of Los Alamitos into Seal Beach. Flows from Los Alamitos Channel ultimately drain to the Los Alamitos Retarding Basin located south of Westminster Avenue. Water in the retarding basin is periodically pumped into the San Gabriel River, just north of the Pacific Ocean terminus.

2.04.02 Flood Protection and Areas of Potential Flooding

Flood protection is designed to contain and control runoff to prevent flooding. The creeks and channels of the Study Area were vulnerable to flooding in their natural condition. This

was due to a number of factors, including the intensity of winter storms, the unstable nature of the riverbeds, and erodability of the stream banks. While large floods were infrequent, the magnitude of their destruction was sometimes devastating.

A major flood in 1914 led to the establishment of the Los Angeles County Flood Control District. Shortly after, in 1927, the Orange County Flood Control District was established. A second major flood in 1938 led to the USACE involvement in regional flood control. Over the next several decades, many large dams and an intricate network of flood control channels were constructed in the Study Area. As noted above, Brea Dam and Fullerton Dam are USACE facilities that are operated for the purpose of flood protection. In addition to dams and flood control channels, flood control facilities include storm drains, pump stations, and retention basins.

The creeks and channels of the Study Area are a major component of the flood protection system and serve to capture, direct, and regulate flow into retention basins and the ocean. Areas of potential flooding result from storm flows that overwhelm the capacity of flood control facilities. For this reason, areas adjacent to confluence zones, storm drains, and pump station are generally areas of potential flooding during heavy storm events.

In recent years, several areas of flooding have occurred in the middle and lower reaches of the Study Area. This includes: areas along Brea Creek and Fullerton Creek between Beach Boulevard and Dale Street in the City of Buena Park; areas along Fullerton Creek between Woods Avenue and Harbor Boulevard in the City of Fullerton; areas along Carbon Creek between Crescent Avenue and West Street in the City of Anaheim; at Cypress Pump Station and at Crescent Avenue and Moody Creek in the City of Cypress; at Los Alamitos Channel and Westminster Avenue in the City of Seal Beach; and at storm drains located at Kempton Drive and Katella Avenue in the City of Los Alamitos and at Montecito Drive in the City of Seal Beach.

2.04.03 Groundwater Features

The Study Area is composed primarily of deep layers of marine sediments and eroded sediments washed down from the surrounding mountains. In some areas, these sediments are over 30,000 feet thick. This geology has allowed for the storage of water in underground basins, or aquifers (San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy, 2001). Water enters the groundwater basins through percolation of surface water through the soil. This occurs naturally where infiltration is possible, and in spreading basins that have been constructed throughout the region. Floodwaters are channeled into these spreading basins to retain the water and allow it to percolate into the groundwater tables below.

The Study Area spans part of an underlying groundwater basin that has been regionally divided into three groundwater basins, or management zones, for management purposes. These include the Central Basin, the Orange County Management Zone, and the La Habra Management Zone (see Figure 2-9). The capacity and annual production and recharge of these groundwater basins are shown in Table 2-14.

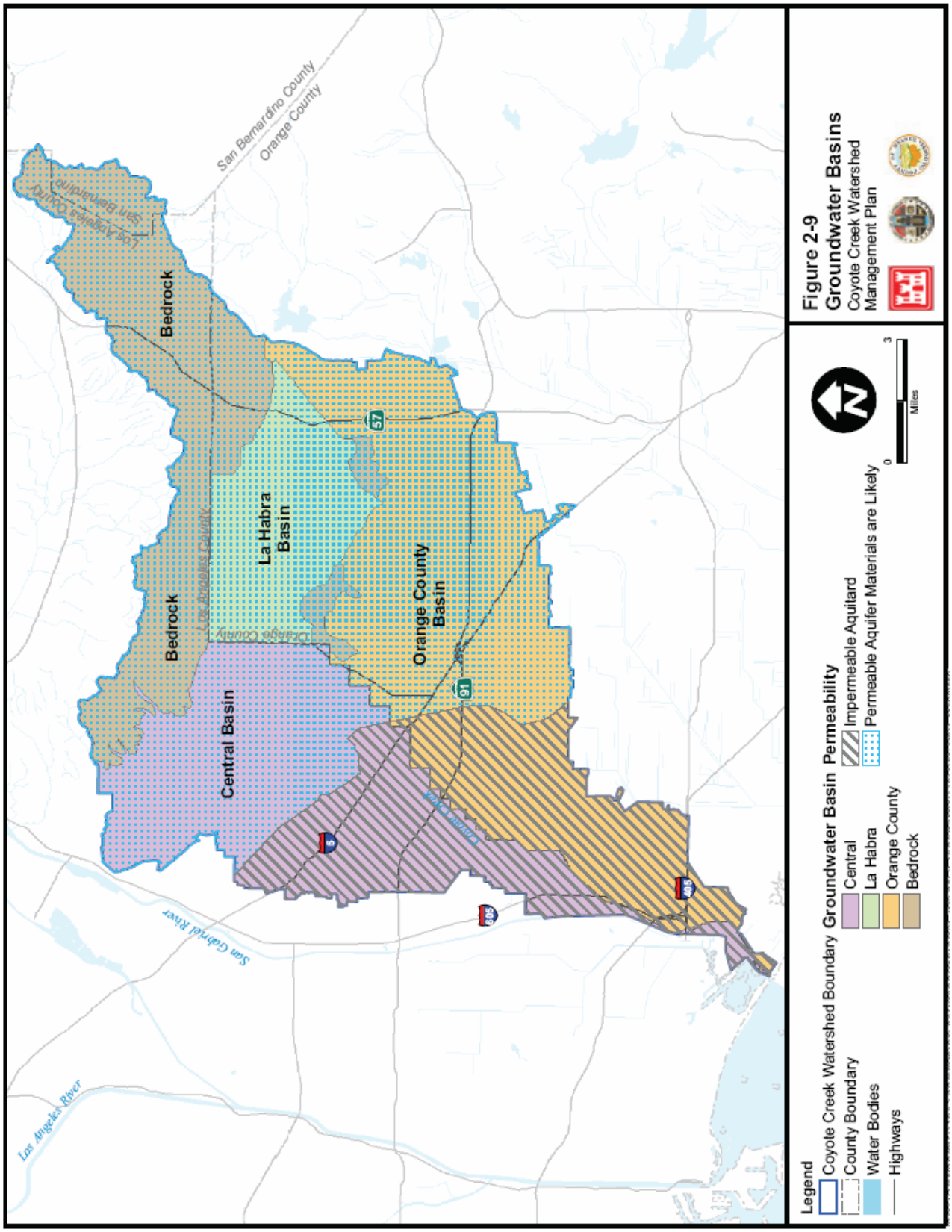

Bedrock
Bedrock
Central Basin
La Habra Basin
Orange County Basin
San Bernardino County
Orange County
Los Angeles County
San Bernardino
Los Angeles County
Orange County
San Gabriel River
Los Angeles River
Santa Ana River
57
91
5
605
605
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Groundwater Basin
Central
La Habra
Orange County
Bedrock
Permeability
Impermeable Aquitard
Permeable Aquifer Materials are Likely
0
3
Miles
Figure 2-9
Groundwater Basins
Coyote Creek Watershed
Management Plan

TABLE 2-14
Capacity and Annual Inflow and Extraction of Groundwater Basins

Groundwater Basin[1]	Surface Area (acres)	Estimated Total Capacity (acre-foot)	Annual Production (acre-foot)[2]	Annual Recharge (acre-foot)[1]
Central Basin	177,000	13,800,000	204,335	122,638
Orange County	224,000	38,000,000	342,823	258,413

[1] Data not available for La Habra Management Zone
[2] For 1998 water year.
Source: California Department of Water Resources. Groundwater Bulletin 1998.

Central Basin

The Central Basin is bounded on the north by a surface divide called the La Brea high, and on the north east and east by the Elysian, Repetto, Merced, and Puente Hills. The southeast boundary between Central Basin and Orange County Groundwater Basin roughly follows Coyote Creek. The southwest boundary is formed by the Newport Inglewood fault system and Newport Inglewood uplift. Throughout the Central Basin, groundwater occurs in Holocene and Pleistocene age sediments at relatively shallow depths. Historically, groundwater flow in the Central Basin has been from recharge areas in the northeast part of the basin, toward the Pacific Ocean on the southwest. However, pumping has lowered the water level in the Central Basin; and the water levels are about equal on both sides of the Newport Inglewood uplift, decreasing subsurface outflow to the West Coast Basin (DWR, 2004).

Orange County Management Zone

The Orange County Management Zone is bounded by consolidated rocks exposed on the north in the Puente and Chino Hills, on the east in the Santa Ana Mountains, and on the south in the San Joaquin Hills. The Orange County Management Zone is further bound by the Pacific Ocean on the southwest and by the La Habra Management Zone on the northwest. The Orange County Management Zone is dominated by a structural depression containing a thick accumulation of freshwater-bearing interbedded marine and continental sand, silt, and clay deposits. The sediments containing easily recoverable fresh water extend to about 2,000 feet in depth. Historically, groundwater flow was generally toward the ocean in the southwest; but modern pumping has caused water levels to drop below sea level inland of the Newport Inglewood fault zone. The trough-shaped depression encourages sea water to migrate inland, contaminating groundwater supply. Strategic lines of wells in the Alamitos and Talbert Gaps inject imported and reclaimed water to create a sea water intrusion barrier (DWR, 2004).

La Habra Management Zone

The La Habra Management Zone is bound by a topographic divide on the south that extends north from the Coyote Hills to the Los Angeles County line on the north and west. Its aquifer system has an average thickness of about 800 feet and consists mostly of sand, gravel, and conglomerate with some silt and clay beds.

2.04.04 Water Supply

The Study Area is supplied by local and imported water sources. Local water sources include rainfall, local streams and rivers, and groundwater. Potable water is supplied by local groundwater and imported water from both the Colorado River and the California State Water Project. Colorado River water is conveyed to the Study Area by the Colorado

River Aqueduct, and the State Water project conveys water from the Sacramento Bay Delta to the California Aqueduct. Imported water is also used as a source for replenishing local groundwater basins.

2.04.05 Wastewater

Wastewater produced within the Study Area is treated by four wastewater treatment plants. These include the Los Coyotes Water Reclamation Plant, Long Beach Water Reclamation Plant, and the Orange County Sanitation District Reclamation Plant No. 1 and Treatment Plant No. 2.

Los Coyotes Water Reclamation Plant

The Los Coyotes Water Reclamation Plant is located in the City of Cerritos and is owned and operated by the County Sanitation Districts of Los Angeles. The Los Coyotes Water Reclamation Plant provides primary, secondary, and tertiary treatment for 37 million gallons per day (mgd) of wastewater. The plant serves a population of approximately 370,000 people. Over 5 million gallons per day of the purified water is reused at over 200 reuse sites. These include irrigation of schools, golf courses, parks, nurseries, and greenbelts; and industrial use at local companies for carpet dying and concrete mixing. Some of these users are situated in the Study Area, including the City of Cerritos.

The following cities are located within the Study Area and are served by the Los Coyotes Water Reclamation Plant: Artesia, Cerritos, La Habra Heights, La Mirada, Norwalk, Santa Fe Springs, and Whittier.

Long Beach Water Reclamation Plant

Long Beach Water Reclamation Plant is located in the City of Long Beach and is owned and operated by the County Sanitation Districts of Los Angeles. The Long Beach Water Reclamation Plant provides primary, secondary, and tertiary treatment for 25 mgd of wastewater. The plant serves a population of approximately 250,000 people. Almost 5 mgd of the purified water is reused at over 40 reuse sites. These include irrigation of schools, golf courses, parks, and greenbelts; and for repressurization of oil-bearing strata.

The following cities are located within the Study Area and are served by the Long Beach Water Reclamation Plant: Artesia, Cerritos, Hawaiian Gardens, La Mirada, Lakewood, and Long Beach.

Reclamation Plant No. 1

Reclamation Plant No. 1 is located in the City of Fountain Valley and is owned and operated by the Orange County Sanitation District. Reclamation Plant 1 receives average daily wastewater flows of 87 million gallons. While Reclamation Plant No. 1 is located outside the Study Area, it provides wastewater treatment services to cities within the Study Area, including Anaheim, Brea, Fullerton, and Placentia.

Treatment Plant No. 2

Treatment Plant No. 2 is located in the City of Huntington Beach and is owned and operated by the Orange County Sanitation District. Treatment Plant No. 2 receives average daily wastewater flows of 151 million gallons. While Treatment Plant No. 2 is located outside the Study Area, it provides wastewater treatment services to cities within the Study Area, including Anaheim, Buena Park, Cypress, Fullerton, La Habra, La Palma, Los Alamitos, and Seal Beach.

2.05 Water Quality

This section characterizes the water quality of the Study Area and discusses surface water quality, major dischargers, and groundwater quality. Water quality is important because it directly affects human health, habitat, and recreational opportunities, which can influence the quality of life of the Study Area.

Parts of the Study Area are within the jurisdiction of the Los Angeles Regional Water Quality Control Board (RWQCB) and parts of the Study Area are within the jurisdiction of the Santa Ana RWQCB (see Figure 2-10). Both the Los Angeles and Santa Ana RWQCBs have Water Quality Control Plans, commonly referred to as Basin Plans. Specifically, Basin Plans designate beneficial uses, set narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses, and describe implementation programs to protect all waters in the region.

2.05.01 Surface Water Quality

Designated Beneficial Uses

Beneficial uses are designated for water bodies in the Basin Plans. Subsequently, appropriate water quality objectives can be established; and programs that maintain or enhance water quality can be implemented to ensure protection of beneficial uses.
Eight beneficial uses have been designated for Coyote Creek by the Los Angeles RWQCB, and five beneficial uses have been designated for Coyote Creek by the Santa Ana RWQCB. Beneficial uses for Coyote Creek are identified in Table 2-15.

TABLE 2-15
Beneficial Uses of Coyote Creek

Code	Beneficial Use	Status of Use
	Los Angeles RWQCB	
MUN	Municipal and Domestic Supply	Potential[1]
IND	Industrial Service Supply	Potential
PROC	Industrial Process Supply	Potential
REC1	Water Contact Recreation	Potential
REC2	Noncontact Water Recreation	Intermittent
WARM	Warm Freshwater Habitat	Potential
WILD	Wildlife Habitat	Potential
RARE	Rare, Threatened, or Endangered Species	Existing
	Santa Ana RWQCB	
MUN	Municipal and Domestic Supply	Present or Potential
REC1	Water Contact Recreation	Present or Potential
REC2	Noncontact Water Recreation	Present or Potential
WARM	Warm Freshwater Habitat	Present or Potential
WILD	Wildlife Habitat	Present or Potential

[1] Designated under SB 88-63 and RB 89-03, may be considered for exemption at a later date
Source: Los Angeles and Santa Ana Regional Water Quality Control Boards

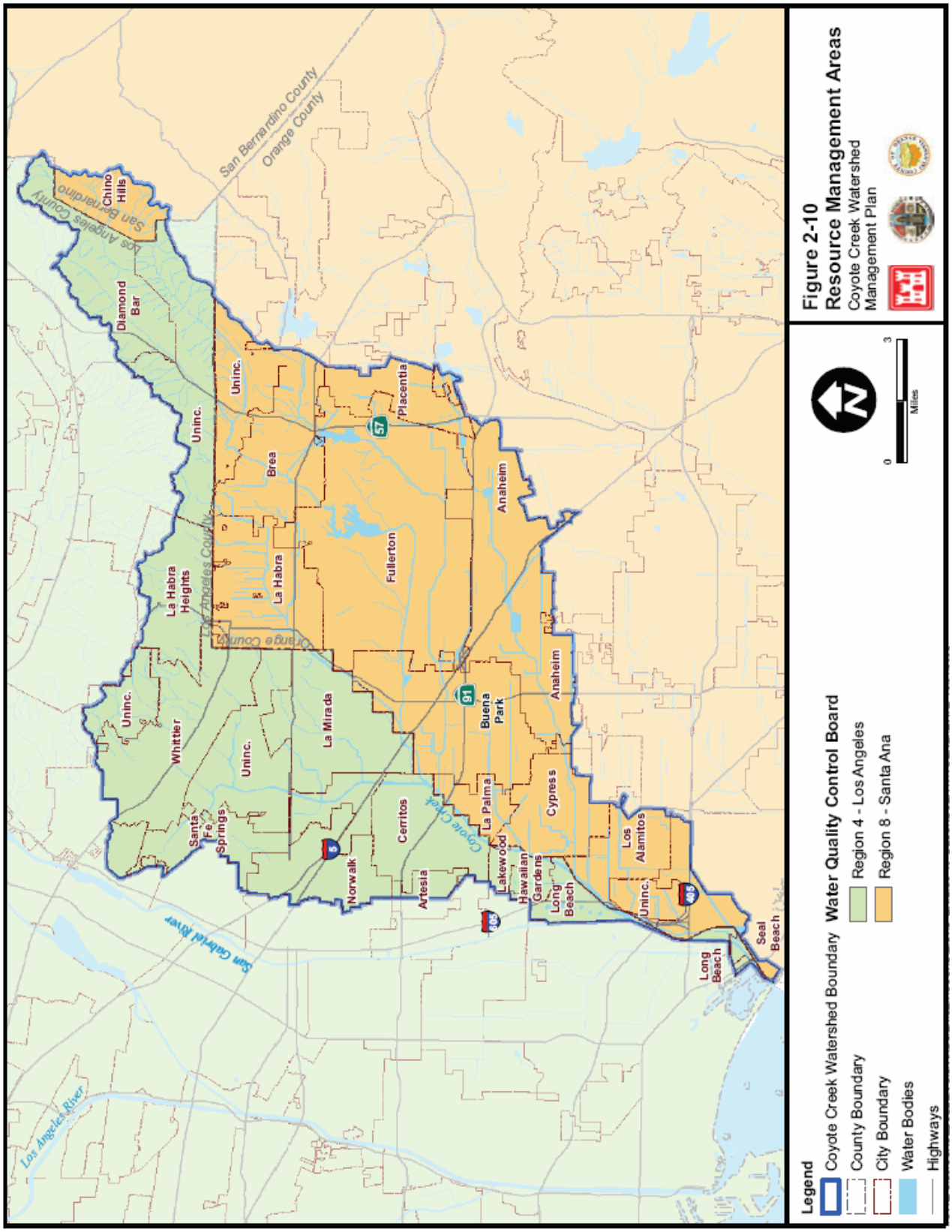


Figure 2-10
Resource Management Areas
Coyote Creek Watershed Management Plan
Legend
Coyote Creek Watershed Boundary
County Boundary
City Boundary
Water Bodies
Highways
Water Quality Control Board
Region 4 - Los Angeles
Region 8 - Santa Ana
0
3
Miles
San Bernardino County
Orange County
Los Angeles County
San Bernardino County
Los Angeles River
San Gabriel River
Coyote Creek
Chino Hills
Diamond Bar
Uninc.
Uninc.
Brea
Placentia
Anaheim
La Habra Heights
La Habra
Fullerton
Uninc.
Whittier
Uninc.
La Mirada
Buena Park
Anaheim
Santa Fe Springs
Cerritos
La Palma
Cypress
Norwalk
Artesia
Lakewood
Hawaiian Gardens
Long Beach
Los Alamitos
Uninc.
Long Beach
Seal Beach
5
91
57
605
405

Impaired Water – Section 303(d)

Section 303(d) of the Federal Clean Water Act calls for the listing of impaired waters. Impaired waters are those waters that do not meet the water quality standards that have been set for them. The Study Area includes one impaired water listed in the 303(d) list by the Los Angeles RWQCB. Specifically, this consists of a 13-mile segment of Coyote Creek, and is shown in Figure 2-11. Pollutants listed in the 303(d) list for Coyote Creek are identified in Table 2-16.

TABLE 2-16
Coyote Creek 303(d) List

Pollutant/Stressor	Potential Source	Total Maximum Daily Load Priority	Estimated Size Affected (miles)
Abnormal Fish Histology	Nonpoint/Point Source	Medium	13
Algae	Nonpoint/Point Source	High	13
Copper, Dissolved	Nonpoint Source	Low	13
High Coliform Count	Nonpoint/Point Source	High	13
Lead, Dissolved	Nonpoint Source	Low	13
Selenium, Total	Nonpoint Source	Low	13
Toxicity	Point Source	Medium	13
Zinc, Dissolved	Nonpoint Source	Low	13

Source: 2002 Clean Water Act Section 303(d) List of Water Quality Limited Segment. Los Angeles Regional Water Quality Control Board. Approved by USEPA July 2003.

Water Quality Monitoring

The County of Los Angeles Department of Public Works monitors stormwater quality in Coyote Creek. Samples are collected near Spring Street on Coyote Creek, north of its confluence with the San Gabriel River. Table 2-17 includes water quality summary data of stormwater monitoring of Coyote Creek between 1994 and 2000.

TABLE 2-17
Water Quality Summary Data for Coyote Creek 1994 – 2000

Constituent	Detection Limit	Units	No. of Samples	No. of Nondetections	Percent Detections	Mean	Median
Miscellaneous Constituents							
Cyanide	0.01	mg/L	2	1	50	S.I.D.	S.I.D.
TPH	1	mg/L	7	2	71	2.1	1.0
Oil and Grease	1	mg/L	7	2	71	2.5	2.1
Total Phenols	0.1	mg/L	6	6	0	S.I.D.	S.I.D.
Indicator Bacteria							
Total Coliform	20	MPN/100 mL	7	1	86	4,765,716	1,600,000
Fecal Coliform	20	MPN/100 mL	7	0	100	2,892,714	900,000
Ratio Fecal Coliform/Total Coliform			0	0	S.I.D.	S.I.D.	S.I.D.
Fecal Streptococcus	20	MPN/100 mL	7	1	86	471,859	240,000
Fecal Enterococcus	20	MPN/100 mL	6	1	83	396,335	175,000

TABLE 2-17
Water Quality Summary Data for Coyote Creek 1994 – 2000

Constituent	Detection Limit	Units	No. of Samples	No. of Nondetections	Percent Detections	Mean	Median
General Minerals							
Ammonia	0.1	mg/L	44	11	75	0.85	0.42
Calcium	1.0	mg/L	40	0	100	33	28
Magnesium	1.0	mg/L	40	0	100	10.2	7.5
Potassium	1.0	mg/L	44	0	100	4.1	4.0
Sodium	1.0	mg/L	40	0	100	45	30
Bicarbonate	2.0	mg/L	45	0	100	83	71
Carbonate	2.0	mg/L	45	45	0	S.I.D.	S.I.D.
Chloride	2.0	mg/L	45	0	100	39	28
Fluoride	0.1	mg/L	45	10	78	0.23	0.19
Nitrate	0.1	mg/L	45	1	98	6.9	5.0
Sulfate	0.1	mg/L	45	0	100	77	47
Alkalinity	4.0	mg/L	45	0	100	78	67
Hardness	2.0	mg/L	40	0	100	126	105
COD	5	mg/L	36	1	97	81	55
pH	0-14		45	0	100	7.4	7.4
Specific Conductance	1.0	umhos/cm	44	0	100	468	352
Total Dissolved Solids	2.0	mg/L	39	0	100	288	194
Turbidity	0.1	NTU	45	0	100	97	64
Total Suspended Solids	2.0	mg/L	40	0	100	303	196
Volatile Suspended Solids	1.0	mg/hr	45	0	100	60	44
MBAS	0.05	mg/L	35	14	60	0.09	0.07
Total Organic Carbon	1.0	mg/L	43	0	100	12	10
BOD	2.0	mg/L	40	0	100	24	20
Nutrients							
Dissolved Phosphorus	0.05	mg/L	43	2	95	0.26	0.20
Total Phosphorus	0.05	mg/L	43	0	100	0.40	0.28
NH3-N	0.1	mg/L	43	12	72	0.70	0.33
Nitrate-N	0.1	mg/L	39	1	97	1.4	1.0
Nitrite-N	0.1	mg/L	45	2	96	0.20	0.10
TKN	0.1	mg/L	40	0	100	3.5	2.2
Metals							
Dissolved Aluminum	100	µg/L	40	24	40	466	50
Total Aluminum	100	µg/L	40	3	93	1257	419
Dissolved Antimony	5	µg/L	36	36	0	S.I.D.	S.I.D.
Total Antimony	5	µg/L	36	36	0	S.I.D.	S.I.D.
Dissolved Arsenic	5	µg/L	36	35	3	S.I.D.	S.I.D.
Total Arsenic	5	µg/L	36	34	6	S.I.D.	S.I.D.
Dissolved Barium	10	µg/L	36	4	89	48	41

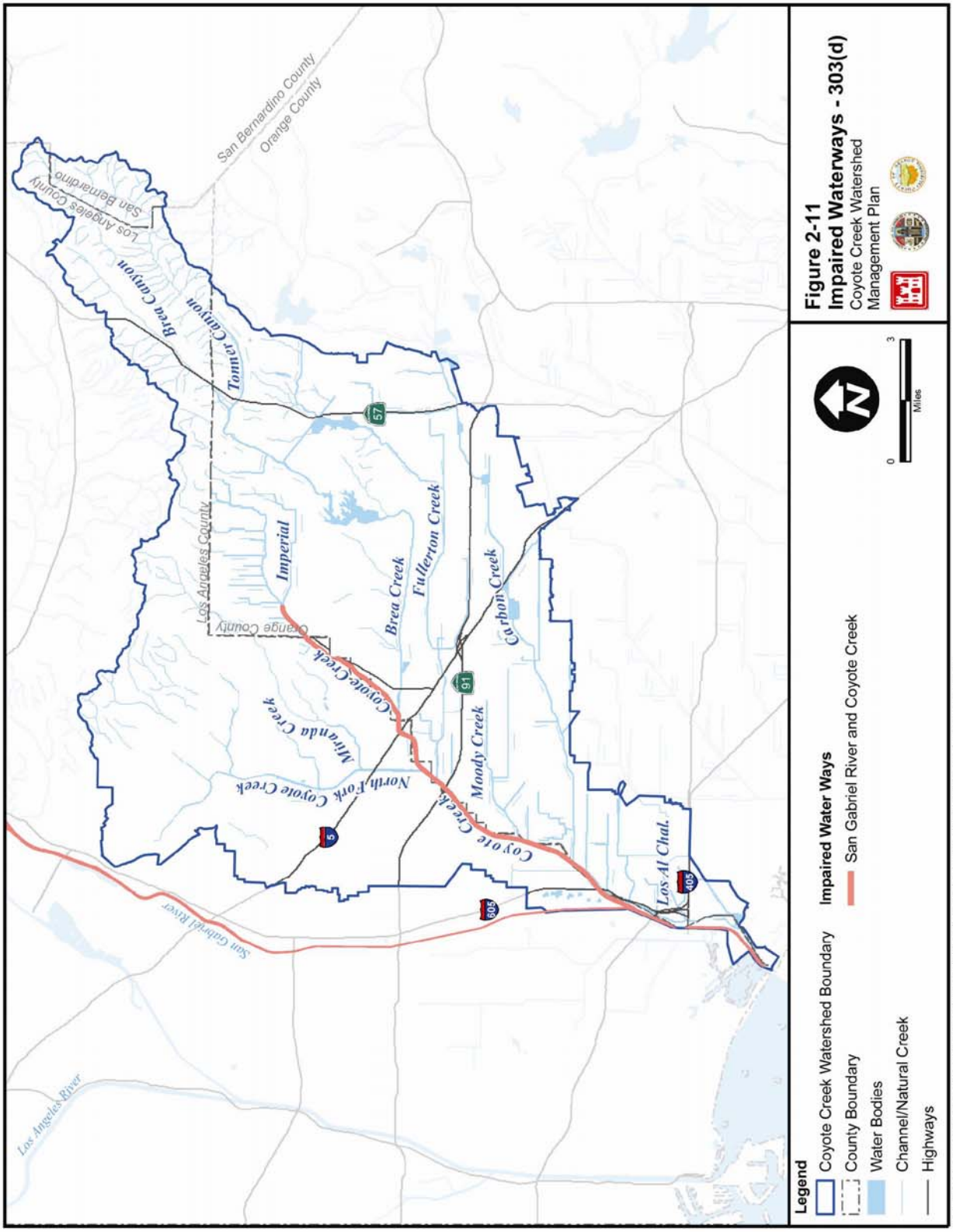
TABLE 2-17
Water Quality Summary Data for Coyote Creek 1994 – 2000

Constituent	Detection Limit	Units	No. of Samples	No. of Nondetections	Percent Detections	Mean	Median
Total Barium	10	µg/L	36	4	89	72	49
Dissolved Beryllium	1	µg/L	36	36	0	S.I.D.	S.I.D.
Total Beryllium	1	µg/L	36	36	0	S.I.D.	S.I.D.
Dissolved Boron	100	µg/L	36	5	86	179	162
Total Boron	100	µg/L	36	4	89	231	225
Dissolved Cadmium	1	µg/L	36	34	6	S.I.D.	S.I.D.
Total Cadmium	1	µg/L	36	31	14	S.I.D.	S.I.D.
Dissolved Chromium	5	µg/L	36	33	8	S.I.D.	S.I.D.
Total Chromium	5	µg/L	36	26	28	6.6	2.5
Dissolved Chromium +6	10	µg/L	40	40	0	S.I.D.	S.I.D.
Total Chromium +6	10	µg/L	40	40	0	S.I.D.	S.I.D.
Dissolved Copper	5	µg/L	36	13	64	13	6.5
Total Copper	5	µg/L	36	1	97	21	14
Dissolved Iron	100	µg/L	45	19	58	780	168
Total Iron	100	µg/L	45	2	96	3,801	830
Dissolved Lead	5	µg/L	36	30	17	S.I.D	S.I.D
Total Lead	5	µg/L	36	26	28	11	2.5
Dissolved Manganese	100	µg/L	26	26	0	S.I.D.	S.I.D.
Total Manganese	100	µg/L	26	21	19	S.I.D.	S.I.D.
Dissolved Mercury	1	µg/L	45	45	0	S.I.D.	S.I.D.
Total Mercury	1	µg/L	45	45	0	S.I.D.	S.I.D.
Dissolved Nickel	5	µg/L	36	28	22	4.2	2.5
Nickel	5	µg/L	36	18	50	7.5	3.8
Dissolved Selenium	5	µg/L	45	45	0	S.I.D.	S.I.D.
Total Selenium	5	µg/L	45	40	11	S.I.D.	S.I.D.
Dissolved Silver	1	µg/L	36	36	0	S.I.D.	S.I.D.
Total Silver	1	µg/L	36	35	3	S.I.D.	S.I.D.
Dissolved Thallium	5	µg/L	36	36	0	S.I.D.	S.I.D.
Total Thallium	5	µg/L	36	36	0	S.I.D.	S.I.D.
Dissolved Zinc	50	µg/L	45	3434	24	76	25
Total Zinc	50	µg/L	45	15	67	125	69
SVOCs							
Bis(2-ethylhexy)phthalate	1	µg/L	1	1	0	S.I.D.	S.I.D.
PAHs	0.05	µg/L	1	1	0	S.I.D.	S.I.D.
Acenaphthene	0.05	µg/L	1	1	0	S.I.D.	S.I.D.
Acenaphthylene	0.05	µg/L	1	1	0	S.I.D.	S.I.D.
Antracene	0.1	µg/L	1	1	0	S.I.D.	S.I.D.
Benzo(a)anthracene	0.1	µg/L	1	1	0	S.I.D.	S.I.D.

TABLE 2-17
Water Quality Summary Data for Coyote Creek 1994 – 2000

Constituent	Detection Limit	Units	No. of Samples	No. of Nondetections	Percent Detections	Mean	Median
Benzo(a)pyrene	0.1	µg/L	1	1	0	S.I.D.	S.I.D.
Benzo(b)fluoranthene	0.1	µg/L	1	1	0	S.I.D.	S.I.D.
Benzo(k)fluoranthene	0.1	µg/L	1	1	0	S.I.D.	S.I.D.
Chrysene	0.1	µg/L	1	1	0	S.I.D.	S.I.D.
Dibenz(a,h)anthracene	0.1	µg/L	1	1	0	S.I.D.	S.I.D.
Fluoranthene	0.1	µg/L	1	1	0	S.I.D.	S.I.D.
Fluorine	0.1	µg/L	1	1	0	S.I.D.	S.I.D.
Indeno (1,2,3-cd)pyrene	0.1	µg/L	1	1	0	S.I.D.	S.I.D.
Naphthalene	0.05	µg/L	1	1	0	S.I.D.	S.I.D.
Phenanthrene	0.05	µg/L	1	1	0	S.I.D.	S.I.D.
Pyrene	0.05	µg/L	1	1	0	S.I.D.	S.I.D.
All other SVOCs	0.05-5.0	µg/L	23	23	0	S.I.D.	S.I.D.
Pesticides							
Organochlorine Pesticides & PCBs	0.05-1.0	µg/L	29	19	0	S.I.D.	S.I.D.
Carbofuran	5	µg/L	39	39	0	S.I.D.	S.I.D.
Glyphosate	25	µg/L	26	25	4	S.I.D.	S.I.D.
Organ-Phosphate Pesticides							
Diazinon	0.01	µg/L	36	30	17	S.I.D.	S.I.D.
Chlorpyrifos	0.05	µg/L	36	36	0	S.I.D.	S.I.D.
N- and P- Containing Pesticides							
Thiobencarb	1	µg/L	36	6	6	S.I.D.	S.I.D.
All other N- and P-Pesticides	1.0-2.0	µg/L	41	0	0	S.I.D.	S.I.D.
Phenoxyacetic Acid Herbicides							
2,4-D	10	µg/L	17	0	0	S.I.D.	S.I.D.
2,4,5-TP	1	µg/L	17	0	0	S.I.D.	S.I.D.
Bentazon	2	µg/L	17	0	0	S.I.D.	S.I.D.

S.I.D: Statistically Invalid Data, not enough data above detection limit collected.
mg/L = milligrams per liter
mL = milliliter
NTU = nephelometric turbidity unit
µg/L = micrograms per liter
Note: Detection limits have changed throughout the monitoring process. Only data matching current detection limit are displayed in this table.
Source: County of Los Angeles Department of Public Works www.ladpw.org/wmd/npdes/9400_tbl_list.cfm


San Bernardino County
Orange County
Los Angeles County
San Bernardino
Brea Canyon
Tonner Canyon
Imperial
Los Angeles County
Orange County
Brea Creek
Fullerton Creek
Carbon Creek
Coyote Creek
Mihranda Creek
North Fork Coyote Creek
Moody Creek
Coyote Creek
Los Al Chal.
San Gabriel River
Los Angeles River
57
91
5
605
405
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Channel/Natural Creek
Highways
Impaired Water Ways
San Gabriel River and Coyote Creek
0
3
Miles
Figure 2-11
Impaired Waterways - 303(d)
Coyote Creek Watershed
Management Plan
\\GALT\GIS2\COYOTECREEK\GIS\MXDS\EXISTINGCONDITIONS_TM\FIG2-11_IMPAIREDWATERWAYS.MXD 11/30/2005

2.05.02 Major Discharges

The Long Beach Water Reclamation Plant (WRP) is operated by the LACSD and provides primary, secondary, and tertiary treatment and disinfection of municipal wastewater. The Long Beach WRP discharges treated wastewater to Coyote Creek just north of the confluence with the San Gabriel River. Table 2-18 shows the Long Beach WRP capacity and the amount of water treated and reused during fiscal year 2000–2001.

TABLE 2-18
Long Beach Water Reclamation Plant Discharges to Coyote Creek

Capacity (mgd)	Amount Treated and Reused (Fiscal Year 2000–2001)			Primary Types of Reuse
	Type	mgd	AFY	
25	Treated	20	22,900	Irrigation and Industrial
	Reused	4	4,300	
	Discharged	16	18,600	

Source: Los Angeles County Sanitation District, 2001

There are two power plants that discharge cooling water into the San Gabriel River Estuary (LASGRWC, 2001). The Alamitos Generating Station, owned by AES Corporation, is permitted to discharge about 1,250 mgd. The Los Angeles Department of Water and Power's Haynes Generating Station is permitted to discharge about 1,000 mgd of water (Trim, 2001; LARWQCB, 2003). In addition, there are numerous storm drains operated by the Counties and other municipalities that discharge urban runoff into the major creeks and channels of the watershed.

2.05.03 Groundwater Quality

Beneficial uses are designated for groundwater basins in the Basin Plans. Subsequently, appropriate water quality objectives can be established; and programs that maintain or enhance water quality can be implemented to ensure protection of beneficial uses.
Four beneficial uses have been designated for the Central Basin by the Los Angeles RWQCB. Additionally, four beneficial uses have been designated for the Orange County Management Zone; and two beneficial uses have been designated for the La Habra Management Zone by the Santa Ana RWQCB. Beneficial uses of groundwater basins within the Study Area are identified in Table 2-19.

TABLE 2-19
Beneficial Uses of Groundwater Basins within the Study Area

Code	Beneficial Use	Status of Use
	Central Basin - Los Angeles RWQCB	
MUN	Municipal and Domestic Supply	Existing
IND	Industrial Service Supply	Existing
PROC	Industrial Process Supply	Existing
AGR	Agricultural Supply	Existing
	Orange County Management Zone - Santa Ana RWQCB	
MUN	Municipal and Domestic Supply	Present or Potential

TABLE 2-19
Beneficial Uses of Groundwater Basins within the Study Area

Code	Beneficial Use	Status of Use
IND	Industrial Service Supply	Present or Potential
PROC	Industrial Process Supply	Present or Potential
AGR	Agricultural Supply	Present or Potential
La Habra Management Zone - Santa Ana RWQCB		
MUN	Municipal and Domestic Supply	Present or Potential
AGR	Agricultural Supply	Present or Potential

Source: Los Angeles and Santa Ana Regional Water Quality Control Boards

2.06 Biological Resources

This section characterizes the biological resources of the Study Area and discusses existing habitats and background, upland and urban habitat, significant ecological areas, natural and urban riparian habitat and wetlands, and sensitive species. Figures present available spatial data from the U.S. Forest Service, California Natural Diversity Data Base, and other sources. These data are appropriate for providing an initial characterization of biological resources, which are their intended purpose. Field verification, which is beyond the scope of this study, would be necessary to develop a refined and more accurate data set.

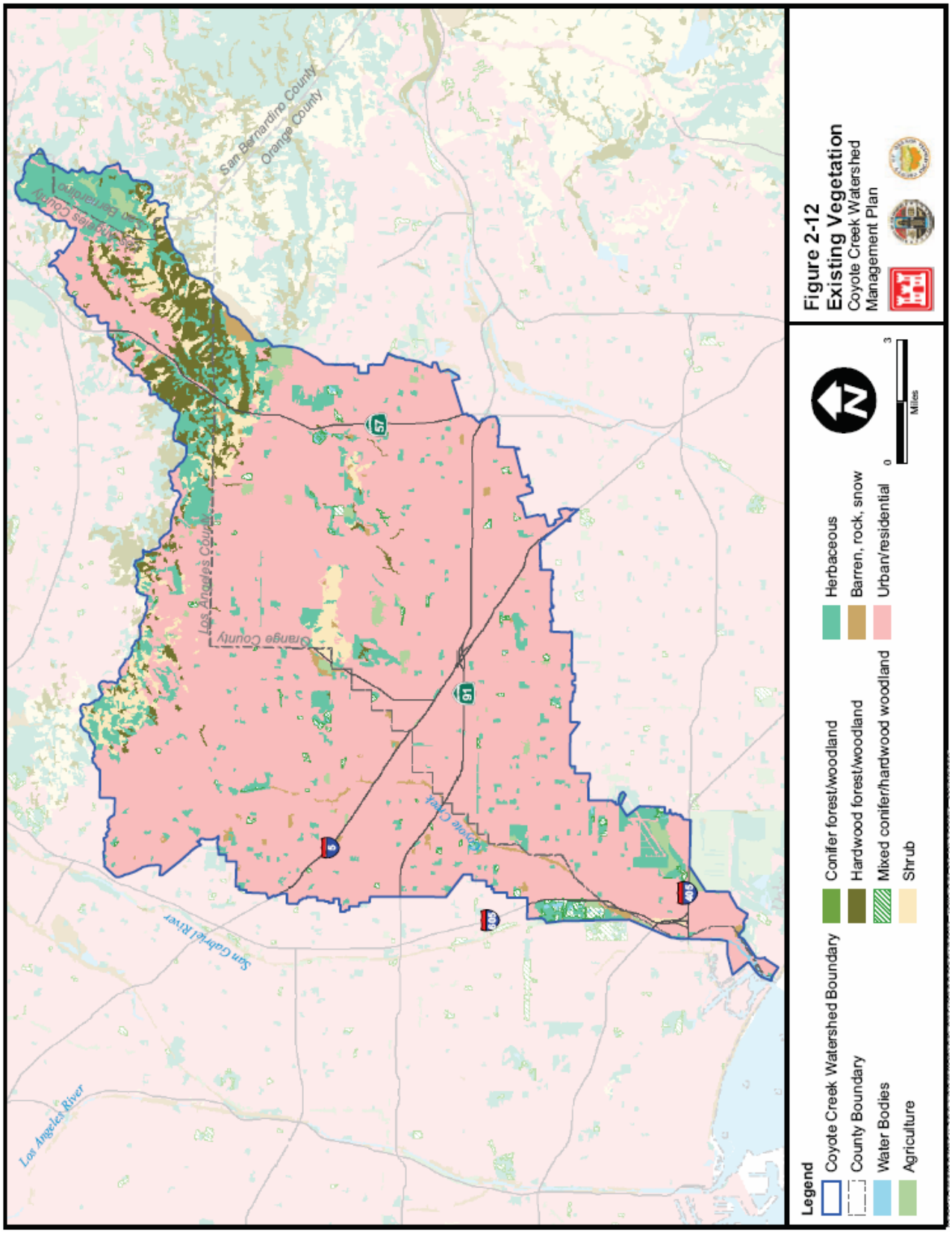
2.06.01 Existing Habitats and Background

The approximately 165-square-mile Study Area is composed predominantly of densely urbanized residential, commercial, and industrial development. Drainage channels generally consist of concrete-lined or otherwise armored conveyance facilities with limited aquatic or riparian (streamside) habitat. Wildlife habitat within urbanized, developed areas is limited to landscaped parks and golf courses, residential neighborhoods, transportation corridors, and flood control channels. Existing habitats and vegetation are shown in Figure 2-12.

Within the watershed, however, some areas of open space and natural lands persist. These areas include some relatively natural stream channels with intact riparian vegetation and diverse aquatic habitat, and open hillsides with remnant historic native plant communities. Within the Study Area, this includes areas of coastal sage scrub, coast live oak woodland, native grasslands, coastal dunes and salt marsh, California walnut woodlands, and riparian woodlands. These habitats support a variety of native wildlife, including native birds, fish, mammals, reptiles, and amphibians. The most extensive remnant habitats occur in the northern portion of the Study Area, including natural, open space in Tonner Canyon, Brea Canyon, Carbon Canyon, and open areas extending west to the Whittier Hills.

Invasive species are found throughout the watershed. An “invasive species” is a plant or animal species not native to the watershed that may be deleterious to native species by out-competing them for resources or predating on or parasitizing native species. Invasive species are generally introduced by human activity, and are more likely to colonize areas that have been disrupted by grading or soil excavations, non-native landscaping, grazing, hydrologic interruption, or other types of disturbance. Common invasive plant species within the

watershed include annual grasses such as rip-gut brome (*Bromus rigidus*), wild oat (*Avena fatua*), and others, that dominate grasslands even in relatively natural landscapes; and "ruderal" (weedy plants growing on disturbed ground) plants including wild radish (*Raphanus sativa*), Russian thistle (*Salsola tragus*), or mustard (*Brassica campestris*).


San Bernardino County
Orange County
Los Angeles County
Orange County
Los Angeles County
San Bernardino County
Coyote Creek
San Gabriel River
Los Angeles River
57
91
5
605
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Agriculture
Conifer forest/woodland
Hardwood forest/woodland
Mixed conifer/hardwood woodland
Shrub
Herbaceous
Barren, rock, snow
Urban/residential
0
3
Miles
Figure 2-12
Existing Vegetation
Coyote Creek Watershed
Management Plan

Other invasive plants may include castor bean (*Ricinus communis*), broom (*Spartium* sp.), and pampas grass (*Cortaderia sellanoa*). Invasive plants in riparian areas include giant reed (*Arundo donax*) and Shamel's ash (*Fraxinus* sp.).

Common invasive wildlife species include European starling (*Sturna vulgaris*), bullfrog (*Rana catesbeiana*), and brown-headed cowbird (*Molothrus ater*), which parasitizes native bird species by laying eggs in other birds' nests. In addition, domestic or feral animals including dogs and cats may have negative impacts on native wildlife species by preying on native wildlife, disrupting breeding activities, or transmitting diseases. The effects of invasive or non-native animals on native species are generally more pronounced where residential areas abut natural wildland areas.

Larger, more intact habitats generally support a greater number and diversity of native species, including species with "special-status" designation by state or federal wildlife agencies. Special-status species include those (1) listed or proposed for listing by state or federal agencies as rare, threatened, or endangered; (2) federal Species of Concern or state Species of Special Concern; (3) species listed by the California Native Plant Society (CNPS) with a designation of Category 2 (indicating species that are rare or endangered in California but more common elsewhere) or 1B (indicating species that are rare or endangered in California and elsewhere). Status designations for listed species are included in Attachment A of this document. Smaller or "fragmented" areas of habitat support fewer species. Intact habitats may be further characterized as "cores," "patches," or "corridors." Core habitat is large, contiguous habitat areas that support large populations of wide-ranging predatory species, like mountain lion (*Felis concolor*) or golden eagle (*Aquila chrysaetos*). Patches of habitat may be smaller areas capable of supporting some native species, but generally not the larger, wide-ranging species except for transitory use. Corridors represent generally linear areas of continuous habitat that lack major impediments to wildlife movement along the natural water course (e.g., large roadways) and that are used by wildlife for daily or seasonal movements. Patches can better support wildlife populations when connected together by corridors or connected to core habitat areas by corridors. Although a reservoir or other development in upper reaches of Tonner Canyon might not greatly affect corridor function, any development in middle and especially lower Tonner Canyon could have severe impacts on corridor function. (Spencer, 2005).

A continuous stretch of habitat extends from the Santa Ana Mountains in the east and the Whittier Hills in the west, which includes the Chino Hills State Park, Carbon Canyon, Tonner Canyon, portions of Brea Canyon, Powder Canyon, and the San Miguel area. This area has been identified as a contiguous wildlife corridor consisting of a network of cores, "subcores," and patches generally connected and passable by wildlife based on professional opinion and scholarly literature (Spencer, 2005; Bahrami et al., 1997; Noonan and Swift, 1994; County of Los Angeles, 2005). Direct field study of wildlife movement in the identified areas is recommended. The presence of such wide-ranging and area-dependent species, such as mountain lion in habitats as far west as Whittier Hills, has generally been attributed to the continuity of this corridor; and wildlife crossings present by fortuitous or intentional design in major highways across the corridor (Spenger, 1994; Spencer, 2005; Noss et al., 1997). Significant obstructions, however, do exist in some locations (Robertson et al., 1994; Lyren, 2001); and proposals for land development seriously jeopardize the continuity of this corridor (Spencer, 2005).

As native habitats become isolated by urban development, species abundance and diversity decline. Large or higher-order predatory species typically begin to disappear when home range size or energy requirements cannot be met by the smaller fragmented habitat patch. Edge effects from adjacent urban development, which include increased pressure from invasive or domestic species, may further affect plant communities and habitat or directly affect wildlife. In addition, the smaller populations of wildlife associated with fragmented habitat are subjected to greater stochastic (random) or genetic pressures than larger populations (so called "island" effects; see MacArthur and Wilson, 1967; Noss et al., 1997), and are more prone to localized extinctions. These effects have been directly observed on populations of wildlife within the Study Area; and species abundance and diversity generally decline when comparing the larger, more intact or connected patches with the smaller, more isolated ones (Spencer, 2005).

For example, Scott and Cooper (1999) found increased bird species richness in sample points east of Powder Canyon compared to sample points west of Powder Canyon during a sampling effort of the entire open space corridor from Chino Hills on the east to Whittier Hills on the west. Goldberg (1994) reports depauperate herpetofauna (reptiles and amphibians) in the Whittier Hills, dominated by one species, western fence lizard (*Sceloporus occidentalis*), with only two common amphibians, Pacific chorus frog (*Pseudacris regilla*) and slender salamander (*Batrachoseps attenuatus*). By contrast, moving east along the Puente–Chino Corridor, additional species are documented, including rare species like San Diego horned lizard and western spadefoot (*Spea hammondii*) (Fretz, 1994; Spencer, 2005). A portion of the increased diversity of native species from west to east can be explained by habitat type and quality; however, some of the diversity is best explained by the extent of habitat fragmentation and isolation (Scott and Cooper 1999; Spencer, 2005). Bahrami et al. (1997) identified patches of high-quality habitat throughout the length of the corridor, but the extent of these patches was much greater in the eastern portions of the corridor. Even in the eastern portion of this corridor, however, where habitat is more extensive, many species of reptiles and amphibians are apparently in decline, or present in very small numbers (Stewart et al., 1994).

2.06.02 Terrestrial and Urban Habitat

The primary terrestrial and urban habitats are described below.

Puente-Chino Hills

Tonner and Brea Canyons

The Tonner and Brea Canyons area is located in the northeast portion of the watershed, and represents a large area of relatively natural land bounded on the west by the SR-57, and on the north, east, and south by the limits of the watershed Study Area. It includes most of Tonner Canyon and the eastern slopes of Brea Canyon. While portions of Brea Canyon are developed, most of Tonner Canyon is undeveloped. In the lower portion of Tonner Canyon, some oil extraction activity has historically occurred. The upper portion is contained within the Firestone Scout Reservation and is undeveloped. Tonner Canyon is bounded on the west by the undeveloped Carbon Canyon and the Chino Hills State Park, providing extensive wildlife connectivity with large, undeveloped tracts, and eventually to the core area of the Santa Ana Mountains by way of the Coal Canyon Wildlife Underpass. This area has been identified as a part of the Puente-Chino Hills Wildlife Corridor (Spencer, 2005; Hills For

Everyone, 2005; Cal Poly Pomona, 1997), a wildlife movement corridor that extends from the Santa Ana Mountains on the east to the Whittier Hills in the west.

Because of the intact habitat and continuity with other extensive intact habitats, Tonner and Brea Canyons support a large diversity of native wildlife. Numerous wildlife surveys have been conducted in this area and are reported in Spencer (2005). The area supports the western-most population of the San Diego horned lizard within the Study Area (Spencer, 2005), and has been identified as a conservation priority for birds (Cooper, 2000) because it supports regionally rare or declining species, including greater roadrunners (*Geococcyx californianus*), coastal cactus wren, California gnatcatcher, golden eagle, and burrowing owl (*Athene cunicularia*). Mountain lions are thought to forage this far west from core habitats to the east. Bobcat, mule deer, coyote, and other species have been recorded using the area and crossing to the Aera Energy area to the west under the SR-57 at the Tonner Canyon Bridge in lower Tonner Canyon (Haas, 2000). Status designations for the above listed species are included in Attachment A of this document.

Aera Energy Property

This area of natural land is bounded by SR-57 and Harbor Boulevard, north of the City of Brea and south of the City of Industry. It includes portions of the western slopes of Brea Canyon and other drainages, which were historically used for oil extraction and cattle grazing. About 4.5 square miles of habitat are present within this area, including one of the largest California walnut woodland in Southern California (475 acres). The area also supports coastal sage scrub, coast live oak woodlands, annual grasslands, and sycamore and willow riparian woodlands. The parcel has historically been grazed, which is thought to have degraded some habitats, and hampered regeneration of the walnut woodland (Spencer, 2005). About half of the approximately 3,000-acre property is proposed for development (Aera Master Planned Community).

The Aera Energy Property habitat patch has documented use by bobcat, coyote, deer, and is thought to be used by mountain lion (Spencer, 2005). In addition, the parcel has relatively high avian biodiversity, supporting rare species including golden eagle, loggerhead shrike, grasshopper sparrow, white-tailed kite (*Elanus leucurus*), greater roadrunner, and California gnatcatcher; and it has been identified as a high conservation concern for birds (Spencer, 2005). While the Aera Energy Property has not been open for sampling by most studies, the presence and movement of target species have been confirmed by biologists who have sampled the area. The property is especially important to grassland birds (Spencer, 2005), but riparian areas and oak woodlands have high avian abundance and diversity (Ingersoll et al., 1994). The area has reduced diversity and abundance of herpetofauna from historic conditions (e.g., San Diego horned lizard is absent, among others; and populations of native species are down). Limiting grazing and restoring native habitat could result in increases in abundance, distribution, and richness of native herps (Fretz, 1994).

Harbor Boulevard, which bounds this area to the west, has been identified as a significant hindrance to wildlife movement (Robertson et al., 1994; Spencer, 2005). The roadway is wide, with heavy traffic. Wildlife was apparently funneled by landscape features to a narrow stretch of roadway, where a high incidence of road kill has been reported. A wildlife underpass structure was put in service in June 2006, and provides for wildlife movement through the Aera Energy Property to adjacent open space areas.

Puente Hills Corridor

Open space west of the Aera Energy parcel includes the Powder Canyon area, Schabarum Regional Park, and the San Miguel Canyon area. Portions of these areas that drain to the south are within the Study Area, while north-facing slopes are generally out of the watershed. Although much smaller and more constrained, these areas do provide important habitat linkage between Whittier Hills to the west and the larger open space areas to the east. Habitat present within these areas includes open grasslands, shrublands, and woodlands.

Haas (2000) has reported use by bobcat, deer, and coyotes, although in lower frequency than in more extensive habitat stands to the west and to the east. In addition, there are higher numbers of domestic dogs, cats, striped skunk (*Mephitus mephitus*), and raccoon (*Procyon lotor*), which are indicative of disturbed areas with fewer large predators such as coyote and bobcat. Scott and Cooper (1999) reported a higher number of birds in this portion of the corridor that are adapted to urban environments, and fewer wildland-dependent birds.

Constraints to wildlife movement within this portion of the corridor include Hacienda Boulevard, which has relatively steep cuts and slopes, and no reliably used crossing structures (Spencer, 2005). Wildlife crossings are reported, however; and roadkill frequency is apparently high. Colima Road is also a potential wildlife movement constraint. There are a number of reported at-grade crossings with moderate road kill levels (Spencer, 2005). The Colima Service Tunnel is an effective undercrossing at the southern edge of the habitat area and is reported to be used by coyotes, deer, and bobcat.

Whittier Hills

The Whittier Hills area supports more extensive habitat than the limited areas just east of it. This area includes Turnbull Canyon, Sycamore Canyon, the Rio Hondo Wildlife Area, and other natural lands. This area supports chaparral, coastal sage scrub, oak woodlands, riparian woodlands, and grasslands.

The Whittier Hills area has been documented as supporting significant biological resources, in spite of its location at the western terminus of the range of connected wildlands. It evidently has a relatively large population of deer, coyotes, and bobcat; and lions have been documented to use the area from recent deer and goat kills as well as scat (Spencer, 2005). The herpetofauna have been reported as relatively depauperate (Goldberg, 1994), although it has more herps than the areas immediately to the east (Spencer, 2005). Rare birds have been documented in the Whittier Hills, although generally in fewer numbers than the larger areas in the eastern portion of the corridor (Scott and Cooper, 1999). Rare bird species recorded include yellow-breasted chat (*Icteria virens*), yellow warbler (*Dendroica petechia*), loggerhead shrike, and Southern California rufuos-crowned sparrow (*Aimophila ruficeps canescens*).

Urban Habitat

Urban wildlife habitat is present throughout the Study Area in landscaped parks and golf courses, residential neighborhoods, transportation corridors, flood control channels, vacant lots, and in commercial or industrial areas. Wildlife associated with these communities consists of a mix of native and non-native species that have adapted to the developed landscape. This may include bird species such as house sparrow (*Passer domesticus*), rock dove (*Columba livia*), California towhee (*Pipilo crissalis*), northern mockingbird (*Mimus*

polyglottos), black phoebe (*Sayornis nigricans*), or northern oriole (*Icterus galbula*); and mammal species including Virginia opossum (*Didelphis virginiana*) or striped skunk (*Mephitus mephitus*). Reptile and amphibian species diversity in developed areas is generally very low, but may include western fence lizard or Pacific chorus frog. Native plant or intact animal communities are generally lacking in these developed areas; and invasive, exotic plant and animal species are common.

West Coyote Hills and Robert E. Ward Nature Preserve

This patch of natural land and open space is just under 600 acres in size, and is located in the City of Fullerton, bounded by Rosecrans Avenue on the south, Beach Boulevard on the west, Euclid Boulevard on the east, and the City of La Habra on the north. Portions of the site have been used for oil extraction since the early 1900s. Significant amounts of native habitat are present including coastal sage scrub, southern cactus scrub, coyote bush scrub, chaparral, and riparian communities including mulefat scrub and southern willow scrub (Unknown Author, 2003). Additional degraded habitat is present including ruderal fields and annual grassland. A housing development is currently proposed for portions of the site.

Sensitive wildlife present onsite includes coastal cactus wren (*Campylorhynchus brunneicapillus couesi*), Cooper's hawk (*Accipiter cooperi*), California gnatcatcher (*Polioptila californica*), loggerhead shrike (*Lanius ludovicianus*), Bell's sage sparrow (*Amphispiza bellii*), and California horned lark (*Eremophila alpesetris acttia*) (Unknown Author, 2003). Sensitive reptiles, amphibians, and mammals are generally absent. Species that historically occurred in the region, but are currently either not present on the site or present in numbers too low to consistently detect, include bobcat (*Lynx rufus*), mule deer (*Odocoileus hemionus*), San Diego horned lizard (*Phrynosoma coronatum blainvillei*), western spadefoot, and least Bell's vireo (*Vireo bellii pusillus*). The site is isolated from other wildlife habitats by surrounding developed land uses.

2.06.03 Significant Ecological Areas

Significant Ecological Areas (SEA) were established in 1976 by Los Angeles County to designate areas with sensitive environmental conditions and/or resources. The County developed the concept in conjunction with adopting the original County General Plan, and SEAs are defined and delineated in conjunction with Land Use and Open Space Elements for the County General Plan. The County of Los Angeles Department of Regional Planning is currently updating the SEA portion of the General Plan. The County of Orange has not adopted an SEA designation.

Rio Hondo College Wildlife Sanctuary

This 80-acre preserve at the western edge of the Whittier Hills contains relatively undisturbed coastal sage scrub, chaparral, oak woodland, and riparian woodland. It is used regularly by staff and students from Rio Hondo College, and vertebrate use has been documented for many years. Over 100 species of resident vertebrates have been documented on the site (County of Los Angeles, 2005). A narrow corridor connects it to other native habitats in the region between existing developed areas at a landfill site and the Rose Hills Cemetery.

Puente Hills

This extensive SEA encompasses the undeveloped portions of the Puente Hills from Whittier Narrows Dam Recreation Area on the west to the Los Angeles County line on the

east where the Puente Hills transition to the Chino Hills. It includes the areas previously described including Sycamore Canyon, Turnbull Canyon, Powder Canyon, Brea Canyon, and Tonner Canyon. The SEA includes the extensive regional habitats, as well as interconnecting habitats that are marginal or sparsely developed, in recognition of the importance of maintaining exchange of plant and animal populations between the Puente Hills, the Chino Hills, and the Santa Ana Mountains (County of Los Angeles, 2005).

2.06.04 Natural and Urban Riparian Habitat and Wetlands

Water conveyance channels throughout the Study Area consist of a mix of concrete-lined channels, composite channels, rock or riprap-lined channels, earthen-lined channels, and natural watercourses. In addition, Orange County Flood Control District flood detention basins are present in some locations in the watershed. Natural watercourses are generally limited to tributaries in the upper portion of the watershed, including upper Coyote Creek (main fork) in the Puente Hills, upper North Fork Coyote Creek in Whittier Hills, Mirada Creek above La Habra Heights, Brea Creek in Brea Canyon, and Tonner Creek in Tonner Canyon.

Natural Riparian Habitat

Natural stream courses within the Study Area support riparian vegetation, including trees, shrubs, and herbaceous vegetation adapted to growing in the cool, moist environments adjacent to perennial or intermittent water. This includes California sycamore (*Platanus racemosa*) woodlands, willow (*Salix* sp.) woodlands, and live oak (*Quercus agrifolia*) woodlands. Understory vegetation includes mulefat (*Baccharis salicifolia*), coyote bush (*B. pilularis*), and other shrubs and herbaceous vegetation. These areas are important ecologically because they support a number of rare or sensitive species; provide wildlife movement corridors; provide flood attenuation; and provide water quality enhancement, among other benefits.

Urban Riparian Habitat

In addition to natural channels, some water courses within the Study Area have loose riprap or composite banks, earthen bottoms, or other substrates that support limited wetland vegetation. This includes portions of Carbon Creek, which supports limited herbaceous emergent vegetation on the sides of the channel, and tidally-influenced Los Cerritos Channel, which supports limited emergent and submergent wetland vegetation.

Los Cerritos Wetlands

The Los Cerritos Wetlands consists of approximately 129 acres in five parcels along the lower San Gabriel River in Long Beach, bound by Pacific Coast Highway to the southwest, the Los Cerritos Channel to the northwest, and the San Gabriel River and Haynes Channel to the east. Portions of this wetland area are within the Study Area. This wetland complex was part of the historic greater Los Cerritos wetland complex at the mouth of the San Gabriel River, a 2,400-acre wetland that included Alamitos Bay, extended north along the coast, and extended east to the location of the current U.S. Naval Weapons Station in Seal Beach. Oil and gas extraction began onsite in the 1920s; and construction of port facilities, urban development, landfill construction, and other development eliminated most of the historic wetland area, and degraded the majority of the remaining wetlands (CERES, 2005).

Currently, the portion of the current site on the east side of the Los Cerritos Channel is a fully functioning salt marsh. Other areas of the wetland are degraded and include ongoing oil extraction sites, extraction wells for groundwater barrier facilities, flood control structures, and landfills. The salt marsh is connected to the ocean by way of Marine Stadium and Alamitos Bay. The tidal prism extends up Los Cerritos Channel past the salt marsh approximately 0.5 mile. The marsh areas in other areas of the site are nontidal due to flood control levees. Culverts through the levees are designed to allow rain water and runoff out of the marshes, but both brackish and saltwater seep into the marsh through the culverts (CERES, 2005).

The current wetland complex includes about 95.2 acres of subtidal habitat (principally the Los Cerritos Channel adjacent to the wetlands), 7.6 acres of intertidal mudflats, 19.2 acres of salt marsh, and 17.7 acres of diked salt marsh (CERES, 2005). Salt marsh areas are dominated by pickleweed (*Salicornia* spp.), with saltgrass (*Distichlis spicata*), glasswort (*Salicornia subterminalis*), sea lavender (*Limonium* sp.), saltwort (*Batis maritima*), salt cedar (*Tamarisk* sp.), and cordgrass (*Spartina patens*). Diked salt marsh areas are dominated by alkali bulrush (*Scirpus maritimus*), cattail (*Typha latifolia*), saltgrass, bulrush (*Scirpus* sp.), and brass buttons (*Cotula coronopifolia*).

Aquatic surveys of the complex were conducted in the 1990s. Dominant fish species using the complex included topsmelt (*Atherinops affinis*), northern anchovy (*Engraulis mordax*), slough anchovy (*Anchoa duodecim*), shiner surfperch (*Cymatogaster aggregata*), California killifish (*Fundulus parvipinnis*), and sailfin molly (*Poecilia latipinna*). Sensitive bird species were documented during bird surveys in the 1980s. Species included Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), California least tern (*Sterna antillarum browni*), osprey (*Pandion haliaetus*), long-billed curlew (*Numenius americanus*), and California gull (*Larus californicus*). In addition, the salt marsh skipper (*Panoquina errans*), a sensitive butterfly species, was reported in 1995.

2.06.05 Sensitive Species

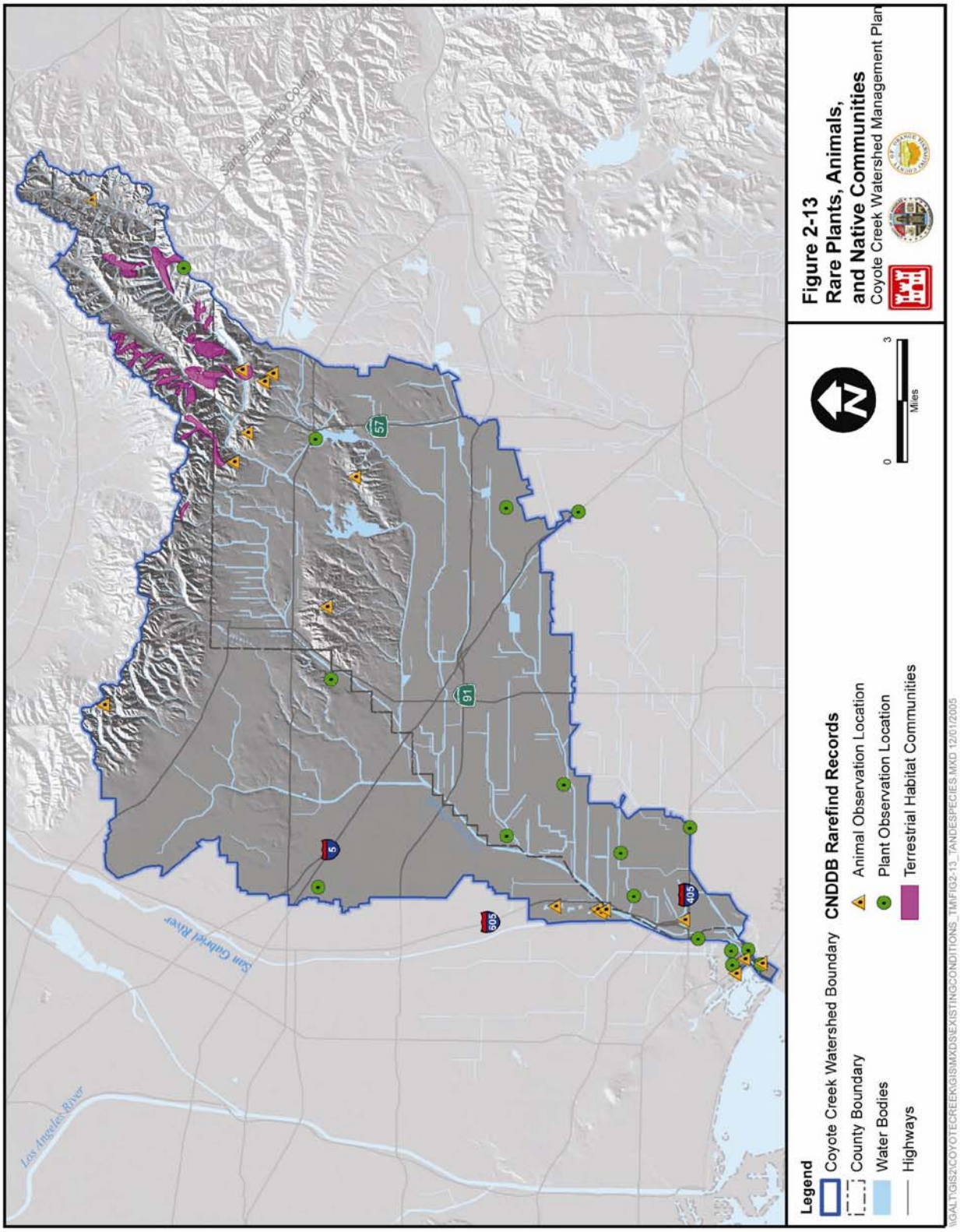
Attachment A provides a list of sensitive and special-status species with potential to occur within the Study Area. Listed are species with potential habitat in natural areas within the Study Area, and/or those that have been documented to occur within the Study Area. Attachment A indicates potential or actual occurrence by natural area and are shown in Figure 2-13.

2.07 Historic and Cultural Resources

This section characterizes the historic and cultural resources of the Study Area and discusses human habitation, settlement, and development; and cultural resources.

The first recorded inhabitants of the Study Area were the Gabrielinos, hunter-gatherers who were first present approximately 500 years B.C. In 1771, the Spanish established San Gabriel mission and instituted an agrarian society centered around ranching and agriculture. The mission period ended in 1834 with the secularization of mission lands. The Rancho period followed and was characterized by individual land acquisition of large tracts of land for ranching purposes. The Rancho period started to fade around 1848, following the acquisition of California by the United States (California State Polytechnic University Pomona, June 2000).

Agriculture become the next dominant land use in the Study Area, with extensive cultivation of citrus fruits, wine grapes, and walnuts. The Southern Pacific Railroad constructed the first rail line to the region in the late 1870s; and the Santa Fe Railroad established a line in 1886, initiating a real estate and population boom. As settlement increased, flooding became problematic. A major flood in 1914 led to the establishment of the Los Angeles County Flood Control District. A second major flood in 1938 led the USACE involvement in regional flood control. Over the next several decades, many large dams and an intricate network of flood control channels were constructed in the Study Area. Major freeway construction began decades ago, further expanding the Study Area for settlement. This brought about the urban period that characterizes the Study Area today. Over the last 30 years, the Study Area has experienced significant residential, industrial, and commercial development (California State Polytechnic University Pomona, June 2000).


Los Angeles River
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County Boundary
Water Bodies
Highways
CNDDB Rarefind Records
Animal Observation Location
Plant Observation Location
Terrestrial Habitat Communities
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Figure 2-13
Rare Plants, Animals,
and Native Communities
Coyote Creek Watershed Management Plan
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3.0 Data Gaps

There are many challenges to finding meaningful and complete data for a geographical region the size of the Study Area. One reason is that the Study Area is comprised of three counties, 22 cities, and several jurisdictional management areas. This, in particular, causes data gaps and limitations due to the range of potential sources. Additionally, it limits the practicability of obtaining and reviewing all pertinent planning and assessment documents. The purpose of this section is to identify data gaps that were encountered during this summary of existing conditions data.

3.01 Spatial Data

GIS was identified as an appropriate tool for managing and analyzing spatial data. GIS is a layer-based system of geo-referenced spatial information. GIS can manage large amounts of information and look at geographic relationships of that information. It is especially appropriate for evaluating watershed because it is scaleable. Specifically, it can be queried or analyzed from a local or regional perspective.

Data obtained for this technical memorandum were reviewed for value to the watershed management plan. This consisted of evaluating coverages for obvious missing data (both spatial and attribute), data resolution, projection errors, and erroneous data. Standard data problems or limitations in spatial GIS data can take many forms and include the following.

1. Data Incomplete. This can include missing parts of the spatial or attribute data. Because of the broad Study Area and its many jurisdictions, coverages were often merged from multiple individual sets of data. Data within individual data sets were sometimes missing, or entire data sets were missing or unavailable.

2. Data Inaccurate. This may include data that are outdated. In this regard, conditions can change since the data were compiled. This can also include data that were from inadequate sources, or data that lacked sufficient quality control.

3. Registration or Projection Problems. Data that are poorly registered to known geographic points or that have projection problems do not overlay correctly with other data layers. In this regard, data that are poorly registered or data with projection problems show an offset from other data. This presents many problems with geographic illustration and in query and analysis.

4. Data Resolution. Data developed at different scales may appear dramatically different when compared. This is the result of many factors, such as the degree of difference in scale, the data type, and the minimum mapping unit (i.e., the smallest area accurately mapped in the data). Small-scale data (i.e., data covering large geographic areas but not detailed close up) may be very general compared to large-scale data (i.e., data covering small geographic with detail close up). Small-scale data may look inaccurate when compared with large-scale data; however, it may still be suitable for regional analysis. Note that that different data scales are appropriate for different objectives.

5. Data Unavailability. Given the expense of developing or securing GIS data sources, unavailability of data is a common challenge in creating a GIS. In some cases, data are proprietary and can be obtained at cost. In other cases, data useful for a GIS have not been developed; or the data are in a format that is incompatible, and conversion is not practical.

Table 3-1 presents the GIS data gaps encountered in developing the GIS database.

TABLE 3-1
GIS Data Gaps

Data Gap	Comments
Channel flow (perennial, intermittent, urban low-flow)	Unavailable.
Channel location and type (e.g., soft-bottom, concrete, piped, riprap, natural)	Channel type incomplete.
Proposed development	May be able to acquire for certain areas only.
Economic conditions	Data available for a fee.
Flood risk or undersized channels	No existing data in GIS format.
Land Management Status	Preserved status or potential for development.
Land Cover	Additional detail recommended.
Soil types	Detailed data limited to Orange County.
Zoning	Not available digitally.

3.02 Planning and Assessment Documents

GIS is not suitable for all data relevant to the Study Area. Often, important data are captured within the text or drawings of planning and assessment documents. For this reason, numerous planning and assessment documents were reviewed to compile this summary of existing conditions data. However, an exhaustive review of all planning and assessment documents was beyond the extent of this effort. In this regard, data gaps identified herein do not necessarily represent information that does not exist. Rather, identified data gaps require further review of planning and assessment documents to cull specific information.

Table 3-2 presents the data gaps encountered in reviewing the planning and assessment documents.

TABLE 3-2
Planning and Assessment Document Data Gaps

Data Gap	Comments
Coyote Creek Capacity	Review as-builts for Coyote Creek Channel: Drawing#: A01-101-1 through A01-999-999
Brea Creek Flow	Request from RDMD did not include; may be able to acquire
Coyote Creek–North Fork Flow and Capacity	May be able to acquire from LACDPW
Fullerton Creek Capacity	Review as-builts for Fullerton Creek Channel: Drawing#: A03-101-1 through A03-709-1
Carbon Creek Flow and Capacity	Review as-builts for Carbon Creek Channel: Drawing#: B01-101-3A through B01-701-8A; may be able to acquire flow from RDMD
Moody Creek Flow and Capacity	Review as-builts for Moody Creek Channel: Drawing#: B02-103-1A through B02-701-4A; may be able to acquire flow from RDMD
Los Alamitos Channel Flow and Capacity	May be able to acquire flow from RDMD

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Attachment A
Sensitive and Special-Status Species

Scientific Name	Common Name	Federal Status	State Status	CDFG Status	CNPS Status	Documented Occurrence	General Habitat and Location	Specific Habitat Requirements
Amphibians								
Taricha torosa torosa	Coast Range newt	--	--	SC		X3	COASTAL DRAINAGES FROM MENDOCINO COUNTY TO SAN DIEGO COUNTY.	LIVES IN TERRESTRIAL HABITATS & WILL MIGRATE OVER 1 KM TO BREED IN PONDS, RESERVOIRS & SLOW MOVING STREAMS.
Bufo californicus	arroyo toad	FE	--	SC			SEMI-ARID REGIONS NEAR WASHES OR INTERMITTENT STREAMS, INCLUDING VALLEY-FOOTHILL AND DESERT RIPARIAN, DESERT WASH, ETC.	RIVERS WITH SANDY BANKS, WILLOWS, COTTONWOODS, AND SYCAMORES; LOOSE, GRAVELLY AREAS OF STREAMS IN DRIER PARTS OF RANGE.
Scaphiopus hammondii	western spadefoot	SC	--	SC		X1	OCCURS PRIMARILY IN GRASSLAND HABITATS, BUT CAN BE FOUND IN VALLEY-FOOTHILL HARDWOOD WOODLANDS.	VERNAL POOLS ARE ESSENTIAL FOR BREEDING AND EGG-LAYING.
Rana aurora draytonii	California red-legged frog	FT	--	SC			LOWLANDS & FOOTHILLS IN OR NEAR PERMANENT SOURCES OF DEEP WATER WITH DENSE, SHRUBBY OR EMERGENT RIPARIAN VEGETATION.	REQUIRES 11-20 WEEKS OF PERMANENT WATER FOR LARVAL DEVELOPMENT. MUST HAVE ACCESS TO ESTIVATION HABITAT.

Birds

Aechmophorus occidentalis	western grebe	--	--		X3	SUMMER: BREEDING COLONIES ON CERTAIN LAKES, CHIEFLY AT HIGH ALTITUDES IN NORTHEASTERN PLATEAU REGION.	LAKES WHERE COLONIES NEST CHARACTERIZED BY FAIR DEPTH OF OPEN WATER, ADEQUATE FISH FAUNA, AND GROWTH OF RUSHES/TULES.
Pelecanus erythrorhynchos	American white pelican	--	--	SC		(NESTING COLONY) COLONIAL NESTER ON LARGE INTERIOR LAKES.	NESTS ON LARGE LAKES, PROVIDING SAFE ROOSTING AND BREEDING PLACES IN THE FORM OF WELL-SEQUESTERED ISLETS.
Pelecanus occidentalis californicus	California brown pelican	FE	SE		X3	(NESTING COLONY) COLONIAL NESTER ON COASTAL ISLANDS JUST OUTSIDE THE SURF LINE. (ROOKERY SITE)	NESTS ON COASTAL ISLANDS OF SMALL TO MODERATE SIZE WHICH AFFORD IMMUNITY FROM ATTACK BY GROUND-DWELLING PREDATORS.
Phalacrocorax auritus	double-crested cormorant	--	--	SC	X2	COLONIAL NESTER ON COASTAL CLIFFS, OFFSHORE ISLANDS, & ALONG LAKE MARGINS IN THE INTERIOR OF THE STATE.	NESTS ALONG COAST ON SEQUESTERED ISLETS, USUALLY ON GROUND WITH SLOPING SURFACE, OR IN TALL TREES ALONG LAKE MARGINS.
Botaurus lentiginosus	American bittern	SC	--			FRESHWATER AND SLIGHTLY BRACKISH MARSHES. ALSO IN COASTAL SALTMARSHES.	DENSE REED BEDS.
Ixobrychus exilis	least bittern	SC	--	SC		COLONIAL NESTER IN MARSHLANDS AND BORDERS OF PONDS AND RESERVOIRS WHICH PROVIDE AMPLE COVER.	NESTS USUALLY PLACED LOW IN TULES, OVER WATER.

Ardea herodias	great blue heron	--	--		X1	(ROOKERY) COLONIAL NESTER IN TALL TREES, CLIFFSIDES, AND SEQUESTERED SPOTS ON MARSHES.	ROOKERY SITES IN CLOSE PROXIMITY TO FORAGING AREAS: MARSHES, LAKE MARGINS, TIDE-FLATS, RIVERS AND STREAMS, WET MEADOWS.
Ardea alba	great egret	--	--		X2	(ROOKERY) COLONIAL NESTER IN LARGE TREES.	ROOKERY SITES LOCATED NEAR MARSHES, TIDE-FLATS, IRRIGATED PASTURES, AND MARGINS OF RIVERS AND LAKES.
Egretta thula	snowy egret	SC	--		X2	(ROOKERY) COLONIAL NESTER, WITH NEST SITES SITUATED IN PROTECTED BEDS OF DENSE TULES.	ROOKERY SITES SITUATED CLOSE TO FORAGING AREAS: MARSHES, TIDAL-FLATS, STREAMS, WET MEADOWS, AND BORDERS OF LAKES.
Egretta rufescens	reddish egret	--	--				
Nycticorax nycticorax	black-crowned night heron	--	--		X2	(ROOKERY) COLONIAL NESTER, USUALLY IN TREES, OCCASIONALLY IN TULE PATCHES.	ROOKERY SITES LOCATED ADJACENT TO FORAGING AREAS: LAKE MARGINS, MUD-BORDERED BAYS, MARSHY SPOTS.
Plegadis chihi	white-faced ibis	SC	--	SC		(ROOKERY SITE) SHALLOW FRESH-WATER MARSH.	DENSE TULE THICKETS FOR NESTING INTERSPERSED WITH AREAS OF SHALLOW WATER FOR FORAGING.
Pandion haliaetus	osprey	--	--	SC	X2	(NESTING) OCEAN SHORE, BAYS, FRESH-WATER LAKES, AND LARGER STREAMS.	LARGE NESTS BUILT IN TREE-TOPS WITHIN 15 MILES OF GOOD FISH-PRODUCING BODY OF WATER.

Elanus leucurus	white-tailed kite	SC	--		X2	(NESTING) ROLLING FOOTHILLS/VALLEY MARGINS W/SCATTERED OAKS & RIVER BOTTOMLANDS OR MARSHES NEXT TO DECIDUOUS WOODLAND	OPEN GRASSLANDS, MEADOWS, OR MARSHES FOR FORAGING CLOSE TO ISOLATED, DENSE-TOPPED TREES FOR NESTING AND PERCHING.
Circus cyaneus	northern harrier	--	--	SC	X2	(NESTING) COASTAL SALT & FRESH-WATER MARSH. NEST & FORAGE IN GRASSLANDS, FROM SALT GRASS IN DESERT SINK TO MTN CIENAGAS.	NESTS ON GROUND IN SHRUBBY VEGETATION, USUALLY AT MARSH EDGE; NEST BUILT OF A LARGE MOUND OF STICKS IN WET AREAS.
Accipiter striatus	sharp-shinned hawk	--	--	SC	X2	(NESTING) PONDEROSA PINE, BLACK OAK, RIPARIAN DECIDUOUS, MIXED CONIFER & JEFFREY PINE HABITATS. PREFERS RIPARIAN AREAS.	NORTH-FACING SLOPES, WITH PLUCKING PERCHES ARE CRITICAL REQUIREMENTS. NESTS USUALLY WITHIN 275 FT OF WATER.
Accipiter cooperii	Cooper's hawk	--	--	SC	X2	(NESTING) WOODLAND, CHIEFLY OF OPEN, INTERRUPTED OR MARGINAL TYPE.	NEST SITES MAINLY IN RIPARIAN GROWTHS OF DECIDUOUS TREES, AS IN CANYON BOTTOMS ON RIVER FLOOD-PLAINS; ALSO, LIVE OAKS.
Buteo swainsoni	Swainson's hawk	SC	ST			(NESTING) BREEDS IN STANDS WITH FEW TREES IN JUNIPER-SAGE FLATS, RIPARIAN AREAS AND IN OAK SAVANNAH.	REQUIRES ADJACENT SUITABLE FORAGING AREAS SUCH AS GRASSLANDS, OR ALFALFA OR GRAIN FIELDS SUPPORTING RODENT POPULATIONS.

Aquila chrysaetos	golden eagle	--	--	SC	X2	(NESTING & WINTERING) ROLLING FOOTHILLS MOUNTAIN AREAS, SAGE-JUNIPER FLATS, DESERT.	CLIFF-WALLED CANYONS PROVIDE NESTING HABITAT IN MOST PARTS OF RANGE; ALSO, LARGE TREES IN OPEN AREAS.
Falco columbarius	merlin	--	--	SC	X3	(WINTERING) SEACOAST, TIDAL ESTUARIES, OPEN WOODLANDS, SAVANNAHS, EDGES OF GRASSLANDS & DESERTS, FARMS & RANCHES.	CLUMPS OF TREES OR WINDBREAKS ARE REQUIRED FOR ROOSTING IN OPEN COUNTRY.
Falco mexicanus	prairie falcon	--	--	SC	X2	(NESTING) INHABITS DRY, OPEN TERRAIN, EITHER LEVEL OR HILLY.	BREEDING SITES LOCATED ON CLIFFS. FORAGES FAR AFIELD, EVEN TO MARSHLANDS AND OCEAN SHORES.
Laterallus jamaicensis coturniculus	California black rail	SC	ST			MAINLY INHABITS SALT-MARSHES BORDERING LARGER BAYS.	OCCURS IN TIDAL SALT MARSH HEAVILY GROWN TO PICKLEWEED; ALSO IN FRESH-WATER AND BRACKISH MARSHES, ALL AT LOW ELEVATION.
Rallus longirostris levipes	light-footed clapper rail	FE	SE		X1	FOUND IN SALT MARSHES TRAVERSED BY TIDAL SLOUGHS, WHERE CORDGRASS AND PICKLEWEED ARE THE DOMINANT VEGETATION.	REQUIRE DENSE GROWTH OF EITHER PICKLEWEED OR CORDGRASS FOR NESTING OR ESCAPE COVER; FEEDS ON MOLLUSCS AND CRUSTACEANS.
Rallus longirostris obsoletus	California clapper rail	FE	SE			SALT-WATER & BRACKISH MARSHES TRAVERSED BY TIDAL SLOUGHS IN THE VICINITY OF SAN FRANCISCO BAY.	ASSOCIATED WITH ABUNDANT GROWTHS OF PICKLEWEED, BUT FEEDS AWAY FROM COVER ON INVERTEBRATES FROM MUD-BOTTOMED SLOUGHS.

Charadrius alexandrinus nivosus	western snowy plover	FT	--	SC	X1	(NESTING) FEDERAL LISTING APPLIES ONLY TO THE PACIFIC COASTAL POPULATION. (WINTERING) SHORT GRASSLANDS, FRESHLY PLOWED FIELDS, NEWLY SPROUTING GRAIN FIELDS, & SOMETIMES SOD FARMS	SANDY BEACHES, SALT POND LEVEES & SHORES OF LARGE ALKALI LAKES. NEEDS SANDY, GRAVELLY OR FRIABLE SOILS FOR NESTING. SHORT VEGETATION, BARE GROUND & FLAT TOPOGRAPHY. PREFER GRAZED AREAS & AREAS WITH BURROWING RODENTS.
Charadrius montanus	mountain plover	PT	--	SC			
Numenius americanus	long-billed curlew	SC	--	SC	X2	(NESTING) BREEDS IN UPLAND SHORTGRASS PRAIRIES & WET MEADOWS IN NORTHEASTERN CALIFORNIA.	HABITATS ON GRAVELLY SOILS AND GENTLY ROLLING TERRAIN ARE FAVORED OVER OTHERS.
Larus californicus	California gull	--	--	SC	X2	(NESTING COLONY) LITTORAL WATERS, SANDY BEACHES, WATERS & SHORELINES OF BAYS, TIDAL MUD-FLATS, MARSHES, LAKES, ETC.	COLONIAL NESTER ON ISLETS IN LARGE INTERIOR LAKES, EITHER FRESH OR STRONGLY ALKALINE.
Sterna caspia	Caspian tern	--	--			(NESTING COLONY) NESTS IN SMALL COLONIES INLAND AND ALONG THE COAST.	INLAND FRESH-WATER LAKES AND MARSHES; ALSO, BRACKISH OR SALT WATERS OF ESTUARIES AND BAYS.

Sterna forsteri	Forster's tern	--	--			(NESTING COLONY) NESTS ON SALT-POND LEVEES & ISLANDS IN LAKES, SALT PONDS, LAGOONS, BAYS. NESTS < 330 FT FROM OPEN WATER	ISOLATION OF COLONY IS IMPORTANT FOR PROTECTION. NEED ABANDONED PILINGS, LOW BOARDWAKS OR EXPOSED BEACHES FOR ROOSTING.
Sterna antillarum browni	California least tern	FE	SE		X1	(NESTING COLONY) NESTS ALONG THE COAST FROM SAN FRANCISCO BAY SOUTH TO NORTHERN BAJA CALIFORNIA.	COLONIAL BREEDER ON BARE OR SPARSELY VEGETATED, FLAT SUBSTRATES: SAND BEACHES, ALKALI FLATS, LAND FILLS, OR PAVED AREAS.
Rynchops niger	black skimmer	--	--	SC	X1	(NESTING COLONY) NESTS ALONG THE NORTH & SOUTH ENDS OF THE SALTON SEA; ALSO, ON SALT POND DIKES OF SOUTH SAN DIEGO BAY.	NESTS ON GRAVEL BARS, LOW ISLETS, AND SANDY BEACHES, IN UNVEGETATED SITES. NESTING COLONIES USUALLY LESS THAN 200 PAIRS.
Athene cunicularia	burrowing owl	SC	--	SC	X1	(BURROW SITES) OPEN, DRY ANNUAL OR PERENIAL GRASSLANDS, DESERTS & SCRUBLANDS CHARACTERIZED BY LOW-GROWING VEGETATION.	SUBTERRANEAN NESTER, DEPENDENT UPON BURROWING MAMMALS, MOST NOTABLY, THE CALIFORNIA GROUND SQUIRREL.
Strix occidentalis occidentalis	California spotted owl	SC	--	SC		MIXED CONIFER FOREST, OFTEN WITH AN UNDERSTORY OF BLACK OAKS & OTHER DECIDUOUS HARDWOODS. CANOPY CLOSURE >40%.	MOST OFTEN FOUND IN DEEP-SHADED CANYONS, ON NORTH-FACING SLOPES, AND WITHIN 300 METERS OF WATER.

Asio otus	long-eared owl	--	--	SC	X1	(NESTING) RIPARIAN BOTTOMLANDS GROWN TO TALL WILLOWS & COTTONWOODS; ALSO, BELTS OF LIVE OAK PARALLELING STREAM COURSES.	REQUIRE ADJACENT OPEN LAND PRODUCTIVE OF MICE AND THE PRESENCE OF OLD NESTS OF CROWS, HAWKS, OR MAGPIES FOR BREEDING.
Asio flammeus	short-eared owl	--	--	SC		(NESTING) FOUND IN SWAMP LANDS, BOTH FRESH AND SALT; LOWLAND MEADOWS; IRRIGATED ALFALFA FIELDS.	TULE PATCHES/TALL GRASS NEEDED FOR NESTING/DAYTIME SECLUSION. NESTS ON DRY GROUND IN DEPRESSION CONCEALED IN VEGETATION.
Empidonax traillii extimus	southwestern willow flycatcher	FE	--			(NESTING) RIPARIAN WOODLANDS IN SOUTHERN CALIFORNIA.	
Eremophila alpestris actia	California horned lark	--	--	SC	X2	COASTAL REGIONS, CHIEFLY FROM SONOMA CO. TO SAN DIEGO CO. ALSO MAIN PART OF SAN JOAQUIN VALLEY & EAST TO FOOTHILLS.	SHORT-GRASS PRAIRIE, "BALD" HILLS, MOUNTAIN MEADOWS, OPEN COASTAL PLAINS, FALLOW GRAIN FIELDS, ALKALI FLATS.
Campylorhynchus brunneicapillus couesi	coastal cactus wren	--	--	SC	X1	SOUTHERN CALIFORNIA COASTAL SAGE SCRUB.	WRENS REQUIRE TALL OPUNTIA CACTUS FOR NESTING AND ROOSTING.
Polioptila californica	coastal California gnatcatcher	FT	--	SC	X1	OBLIGATE, PERMANENT RESIDENT OF COASTAL SAGE SCRUB BELOW 2500 FT IN SOUTHERN CALIFORNIA.	LOW, COASTAL SAGE SCRUB IN ARID WASHES, ON MESAS & SLOPES. NOT ALL AREAS CLASSIFIED AS COASTAL SAGE SCRUB ARE OCCUPIED.

Lanius ludovicianus	loggerhead shrike	SC	--	SC	X2	(NESTING) BROKEN WOODLANDS, SAVANNAH, PINYON-JUNIPER, JOSHUA TREE, & RIPARIAN WOODLANDS, DESERT OASES, SCRUB & WASHES.	PREFERS OPEN COUNTRY FOR HUNTING, WITH PERCHES FOR SCANNING, AND FAIRLY DENSE SHRUBS AND BRUSH FOR NESTING.
Vireo bellii pusillus	least bell's vireo	FE	SE		X1	(NESTING) SUMMER RESIDENT OF SOUTHERN CALIF IN LOW RIPARIAN IN VICINITY OF WATER OR IN DRY RIVER BOTTOMS; BELOW 2000 FT.	NESTS PLACED ALONG MARGINS OF BUSHES OR ON TWIGS PROJECTING INTO PATHWAYS, USUALLY WILLOW, BACCHARIS, MESQUITE.
Dendroica petechia brewsteri	yellow warbler	--	--	SC	X2	(NESTING) RIPARIAN PLANT ASSOCIATIONS. PREFERS WILLOWS, COTTONWOODS, ASPENS, SYCAMORES, & ALDERS FOR NESTING & FORAGING.	ALSO NESTS IN MONTANE SHRUBBERY IN OPEN CONIFER FORESTS.
Agelaius tricolor	tricolored blackbird	FC	--	SC	X2	(NESTING COLONY) HIGHLY COLONIAL SPECIES, MOST NUMBEROUS IN CENTRAL VALLEY & VICINITY. LARGELY ENDEMIC TO CALIFORNIA.	REQUIRES OPEN WATER, PROTECTED NESTING SUBSTRATE, & FORAGING AREA WITH INSECT PREY WITHIN A FEW KM OF THE COLONY.
Icteria virens	yellow-breasted chat	--	--	SC	X1	(NESTING) SUMMER RESIDENT; INHABITS RIPARIAN THICKETS OF WILLOW & OTHER BRUSHY TANGLES NEAR WATERCOURSES.	NESTS IN LOW, DENSE RIPARIAN, CONSISTING OF WILLOW, BLACKBERRY, WILD GRAPE; FORAGE AND NEST W/IN 10 FT OF GROUND.

Aimophila ruficeps canescens	southern California rufous-crowned sparrow	--	--	SC	X1	RESIDENT IN SOUTHERN CALIFORNIA COASTAL SAGE SCRUB AND SPARSE MIXED CHAPARRAL.	FREQUENTS RELATIVELY STEEP, OFTEN ROCKY HILLSIDES WITH GRASS & FORB PATCHES.
Amphispiza belli belli	Bell's sage sparrow	SC	--	SC	X2	(NESTING) NESTS IN CHAPARRAL DOMINATED BY FAIRLY DENSE STANDS OF CHAMISE. FOUND IN COASTAL SAGE SCRUB IN SOUTH OF RANGE.	NEST LOCATED ON THE GROUND BENEATH A SHRUB OR IN A SHRUB 6-18 INCHES ABOVE GROUND. TERRITORIES ABOUT 50 YDS APART.
Passerculus sandwichensis beldingi	Belding's savannah sparrow	--	SE		X1	INHABITS COASTAL SALT MARSHES, FROM SANTA BARBARA SOUTH THROUGH SAN DIEGO COUNTY.	NESTS IN SALICORNIA ON AND ABOUT MARGINS OF TIDAL FLATS.
Ammodramus savannarum	grasshopper sparrow	--	--		X2	(NESTING) DENSE GRASSLANDS ON ROLLING HILLS, LOWLAND PLAINS, IN VALLEYS & ON HILLSIDES ON LOWER MOUNTAIN SLOPES.	FAVORS NATIVE GRASSLANDS WITH A MIX OF GRASSES, FORBS & SCATTERED SHRUBS. LOOSELY COLONIAL WHEN NESTING.
Fish							
Oncorhynchus mykiss irideus	southern steelhead - southern California esu	FE	--	SC		FED LISTING REFERS TO POPS FROM SANTA MARIA RIVER SOUTH TO SOUTHERN EXTENT OF RANGE (SAN MATEO CREEK IN SAN DIEGO CO.)	SOUTHERN STEELHEAD LIKELY HAVE GREATER PHYSIOLOGICAL TOLERANCES TO WARMER WATER & MORE VARIABLE CONDITIONS.
Gila orcutti	arroyo chub	--	--	SC		LOS ANGELES BASIN SOUTH COASTAL STREAMS.	SLOW WATER STREAM SECTIONS WITH MUD OR SAND BOTTOMS. FEED HEAVILY ON AQUATIC VEGETATION & ASSOCIATED INVERTEBRATES.

Catostomus santaanae	Santa Ana sucker	FT	--	SC	X1	ENDEMIC TO LOS ANGELES BASIN SOUTH COASTAL STREAMS.	HABITAT GENERALISTS, BUT PREFER SAND-RUBBLE-BOULDER BOTTOMS, COOL, CLEAR WATER, & ALGAE.
Eucyclogobius newberryi	tidewater goby	FE	--	SC		BRACKISH WATER HABITATS ALONG THE CALIF COAST FROM AGUA HEDIONDA LAGOON, SAN DIEGO CO. TO THE MOUTH OF THE SMITH RIVER.	FOUND IN SHALLOW LAGOONS AND LOWER STREAM REACHES, THEY NEED FAIRLY STILL BUT NOT STAGNANT WATER & HIGH OXYGEN LEVELS.
Mammals							
Sorex ornatus salicornicus	southern California saltmarsh shrew	--	--	SC		COASTAL MARSHES IN LOS ANGELES, ORANGE AND VENTURA COUNTIES.	REQUIRES DENSE VEGETATION AND WOODY DEBRIS FOR COVER.
Macrotus californicus	California leaf-nosed bat	--	--	SC		DESERT RIPARIAN, DESERT WASH, DESERT SCRUB, DESERT SUCCULENT SCRUB, ALKALI SCRUB AND PALM OASIS HABITATS.	NEEDS ROCKY, RUGGED TERRAIN WITH MINES OR CAVES FOR ROOSTING.
Choeronycteris mexicana	Mexican long-tongued bat	--	--	SC		OCCASIONALLY FOUND IN SAN DIEGO CO. WHICH IS ON THE PERIPHERY OF THEIR RANGE.	FEEDS ON NECTAR & POLLEN OF NIGHT-BLOOMING SUCCULENTS. ROOSTS IN RELATIVELY WELL-LIT CAVES, & IN & AROUND BUILDINGS.
Myotis lucifugus occultus	occult little brown bat	--	--	SC		LOWLANDS OF THE COLORADO RIVER AND ADJACENT MOUNTAIN RANGES.	NEED ROOSTING AREAS IN TREE HOLLOWS, ROCK CREVICES, UNDER BRIDGES ETC.
Myotis yumanensis	Yuma myotis	SC	--			OPTIMAL HAABITATS ARE OPEN FORESTS AND WOODLANDS WITH SOURCES OF WATER OVER WHICH TO FEED.	DISTRIBUTION IS CLOSELY TIED TO BODIES OF WATER. MATERNITY COLONIES IN CAVES, MINES, BUILDINGS OR CREVICES.

Myotis velifer	cave myotis	--	--	SC	LOWLANDS OF THE COLORADO RIVER AND ADJACENT MOUNTAIN RANGES.	REQUIRE CAVES OR MINES FOR ROOSTING.
Myotis evotis	long-eared myotis	SC	--		FOUND IN ALL BRUSH, WOODLAND & FOREST HABITATS FROM SEA LEVEL TO ABOUT 9000 FT. PREFERS CONIFEROUS WOODLANDS & FORESTS.	NURSERY COLONIES IN BUILDINGS, CREVICES, SPACES UNDER BARK, & SNAGS. CAVES USED PRIMARILY AS NIGHT ROOSTS.
Myotis thysanodes	fringed myotis	SC	--		IN A WIDE VARIETY OF HABITATS, OPTIMAL HABITATS ARE PINYON-JUNIPER, VALLEY FOOTHILL HARDWOOD & HARDWOOD-CONIFER.	USES CAVES, MINES, BUILDINGS OR CREVICES FOR MATERNITY COLONIES AND ROOSTS.
Myotis volans	long-legged myotis	SC	--		MOST COMMON IN WOODLAND & FOREST HABITATS ABOVE 4000 FT. TREES ARE IMPORTANT DAY ROOSTS, CAVES & MINES ARE NIGHT ROOSTS.	NURSERY COLONIES USUALLY UNDER BARK OR IN HOLLOW TREES, BUT OCCASIONALLY IN CREVICES OR BUILDINGS.
Myotis ciliolabrum	small-footed myotis	SC	--			
Lasiurus blossevillii	western red bat	--	--			

Antrozous pallidus	pallid bat	--	--	SC	X1	DESERTS, GRASSLANDS, SHRUBLANDS, WOODLANDS & FORESTS. MOST COMMON IN OPEN, DRY HABITATS WITH ROCKY AREAS FOR ROOSTING.	ROOSTS MUST PROTECT BATS FROM HIGH TEMPERATURES. VERY SENSITIVE TO DISTURBANCE OF ROOSTING SITES.
Eumops perotis californicus	western mastiff bat	SC	--	SC		MANY OPEN, SEMI-ARID TO ARID HABITATS, INCLUDING CONIFER & DECIDUOUS WOODLANDS, COASTAL SCRUB, GRASSLANDS, CHAPARRAL ETC	ROOSTS IN CREVICES IN CLIFF FACES, HIGH BUILDINGS, TREES & TUNNELS.
Nyctinomops femorasaccus	pocketed free-tailed bat	--	--	SC		VARIETY OF ARID AREAS IN SO. CAL.--PINE-JUNIPER WOODLANDS, DESERT SCRUB, PALM OASIS, DESERT WASH, DESERT RIPARIAN, ETC.	ROCKY AREAS WITH HIGH CLIFFS.
Nyctinomops macrotis	big free -tailed bat	--	--	SC		LOW-LYING ARID AREAS IN SOUTHERN CALIFORNIA.	NEED HIGH CLIFFS OR ROCKY OUTCROPS.
Lepus californicus bennettii	San Diego black-tailed jackrabbit	--	--	SC		INTERMEDIATE CANOPY STAGES OF SHRUB HABITATS & OPEN SHRUB / HERBACEOUS & TREE / HERBACEOUS EDGES.	COASTAL SAGE SCRUB HABITATS IN SOUTHERN CALIFORNIA.

Perognathus longimembris brevinasus	Los Angeles pocket mouse	--	--	SC		LOWER ELEVATION GRASSLANDS & COASTAL SAGE COMMUNITIES IN THE LOS ANGELES BASIN	OPEN GROUND WITH FINE SANDY SOILS. MAY NOT DIG EXTENSIVE BURROWS, HIDING UNDER WEEDS & DEAD LEAVES INSTEAD.
Perognathus longimembris pacificus	Pacific pocket mouse	FE	--	SC		INHABITS THE NARROW COASTAL PLAINS FROM THE MEXICAN BORDER NORTH TO EL SEGUNDO, LOS ANGELES CO.	SEEMS TO PREFER SOILS OF FINE ALLUVIAL SANDS NEAR THE OCEAN, BUT MUCH REMAINS TO BE LEARNED.
Neotoma lepida intermedia	San Diego desert woodrat	--	--	SC	X3	COASTAL SOUTHERN CALIFORNIA FROM SAN DIEGO COUNTY TO SAN LUIS OBISPO COUNTY.	MODERATE TO DENSE CANOPIES PREFERRED. THEY ARE PARTICULARLY ABUNDANT IN ROCK OUTCROPS & ROCKY CLIFFS & SLOPES.
Taxidea taxus	American badger	--	--			MOST ABUNDANT IN DRIER OPEN STAGES OF MOST SHRUB, FOREST, AND HERBACEOUS HABITATS, WITH FRIABLE SOILS.	NEED SUFFICIENT FOOD, FRIABLE SOILS & OPEN, UNCULTIVATED GROUND. PREY ON BURROWING RODENTS. DIG BURROWS.
Puma concolor	mountain lion	--	--	FP	X2	WIDERANGING, CHAPARRAL, OPEN GRASSLAND, WOODLANDS, DESERTS	DENSE BOTTOMLAND VEGETATION, ALSO FOUND IN ADJACENT, ROCKY UPLANDS, SCRUB, WOODLAND.
Reptiles							
Clemmys marmorata pallida	southwestern pond turtle	SC	--	SC	X2	INHABITS PERMANENT OR NEARLY PERMANENT BODIES OF WATER IN MANY HABITAT TYPES; BELOW 6000 FT ELEV.	REQUIRE BASKING SITES SUCH AS PARTIALLY SUBMERGED LOGS, VEGETATION MATS, OR OPEN MUD BANKS. NEED SUITABLE NESTING SITES.

Lampropeltis zonata parvirubra	San Bernardino mountain kingsnake	--	--	SC		BIGCONE SPRUCE &CHAPARAL AT LOWER ELEV. BLACK OAK, INCENSE CEDAR, JEFFREY PINE & PONDEROSA PINE AT HIGHER ELEVATIONS.	WELL LIT CANYONS WITH ROCKY OUTCROPS OR ROCKY TALUS
Anniella pulchra pulchra	silvery legless lizard	SC	--	SC		SANDY OR LOOSE LOAMY SOILS UNDER SPARSE VEGETATION.	SOIL MOISTURE IS ESSENTIAL. THEY PREFER SOILS WITH A HIGH MOISTURE CONTENT.
Phrynosoma coronatum blainvillei	San Diego horned lizard	--	--	SC	X1	INHABITS COASTAL SAGE SCRUB AND CHAPARRAL IN ARID AND SEMI-ARID CLIMATE CONDIT	PREFERS FRIABLE, ROCKY, OR SHALLOW SANDY SOILS.
Cnemidophorus hyperythrus	orange-throated whiptail	--	--	SC	X1	INHABITS LOW-ELEVATION COASTAL SCRUB, CHAPARRAL, AND VALLEY-FOOTHILL HARDWOOD HABITATS.	PREFERS WASHES & OTHER SANDY AREAS WITH PATCHES OF BRUSH & ROCKS. PERENNIAL PLANTS NECESSARY FOR ITS MAJOR FOOD-TERMITES
Aspidoscelis tigris stejnegeri	coastal western whiptail	--	--		X1	FOUND IN DESERTS & SEMIARID AREAS WITH SPARSE VEGETATION AND OPEN AREAS. ALSO FOUND IN WOODLAND & RIPARIAN AREAS.	GROUND MAY BE FIRM SOIL, SANDY, OR ROCKY.
Charina trivirgata	rosy boa	SC	--		X1	DESERT & CHAPARRAL FROM THE COAST TO THE MOJAVE & COLORADO DESERTS. PREFERS MODERATE TO DENSE VEGETATION & ROCKY COVER.	HABITATS WITH A MIX OF BRUSHY COVER & ROCKY SOIL SUCH AS COASTAL CANYONS & HILLSIDES, DESERT CANYONS, WASHES & MOUNTAINS

Diadophis punctatus modestus	San Bernardino ringneck snake	--	--			MOST COMMON IN OPEN, RELATIVELY ROCKY AREAS. OFTEN IN SOMEWHAT MOIST MICROHABITATS NEAR INTERMITTENT STREAMS.	AVOIDS MOVING THROUGH OPEN OR BARREN AREAS BY RESTRICTING MOVEMENTS TO AREAS OF SURFACE LITTER OR HERBACEOUS VEG.
Salvadora hexalepis virgultea	coast patch-nosed snake	--	--	SC	X1	BRUSHY OR SHRUBBY VEGETATION IN COASTAL SOUTHERN CALIFORNIA.	REQUIRE SMALL MAMMAL BURROWS FOR REFUGE AND OVERWINTERING SITES.
Thamnophis hammondii	two-striped garter snake	--	--	SC		COASTAL CALIFORNIA FROM VICINITY OF SALINAS TO NORTHWEST BAJA CALIFORNIA. FROM SEA TO ABOUT 7,000 FT ELEVATION.	HIGHLY AQUATIC, FOUND IN OR NEAR PERMANENT FRESH WATER. OFTEN ALONG STREAMS WITH ROCKY BEDS AND RIPARIAN GROWTH.
Crotalus exsul	northern red-diamond rattlesnake	--	--	SC	X1	CHAPARRRAL, WOODLAND, GRASSLAND, & DESERT AREAS FROM COASTAL SAN DIEGO COUNTY TO THE EASTERN SLOPES OF THE MOUNTAINS.	OCCURS IN ROCKY AREAS & DENSE VEGETATION. NEEDS RODENT BURROWS, CRACKS IN ROCKS OR SURFACE COVER OBJECTS.
Invertebrates							
Cicindela hirticollis gravida	sandy beach tiger beetle	SC	--		X1	INHABITS AREAS ADJACENT TO NON-BRACKISH WATER ALONG THE COAST OF CALIFORNIA FROM SAN FRANCISCO BAY TO NORTHERN MEXICO.	CLEAN, DRY, LIGHT-COLORED SAND IN THE UPPER ZONE. SUBTERRANEAN LARVAE PREFER MOIST SAND NOT AFFECTED BY WAVE ACTION.
Panoquina errans	wandering (=saltmarsh) skipper	--	--		X1	SOUTHERN CALIFORNIA COASTAL SALT MARSHES.	REQUIRES MOIST SALTGRASS FOR LARVAL DEVELOPMENT.

Danaus plexippus	monarch butterfly	--	--		X1	WINTER ROOST SITES EXTEND ALONG THE COAST FROM NORTHERN MENDOCINO TO BAJA CALIFORNIA, MEXICO.	ROOSTS LOCATED IN WIND-PROTECTED TREE GROVES (EUCALYPTUS, MONTEREY PINE, CYPRESS), WITH NECTAR AND WATER SOURCES NEARBY.
Trigonoscuta dorothea dorothea	Dorothy's El Segundo Dune weevil	--	--		X1	COASTAL SAND DUNES IN LOS ANGELES COUNTY.	
Tryonia imitator	mimic tryonia (=California brackishwater snail)	--	--		X1	INHABITS COASTAL LAGOONS, ESTUARIES AND SALT MARSHES, FROM SONOMA COUNTY SOUTH TO SAN DIEGO COUNTY.	FOUND ONLY IN PERMANENTLY SUBMERGED AREAS IN A VARIETY OF SEDIMENT TYPES; ABLE TO WITHSTAND A WIDE RANGE OF SALINITIES.
Plants							
Helianthus nuttallii ssp. parishii	Los Angeles sunflower	--	--	1A	X1	MARSHES AND SWAMPS (COASTAL SALT AND FRESHWATER). HISTORICAL FROM SOUTHERN CALIFORNIA.	5-1675M.
Centromadia parryi ssp. australis	southern tarplant	--	--	1B	X1	MARSHES AND SWAMPS (MARGINS), VALLEY AND FOOTHILL GRASSLAND, VERNAL POOLS. FROM SOUTHERN CALIFORNIA AND BAJA CALIF.	OFTEN IN DISTURBED SITES NEAR THE COAST; ALSO IN ALKALINE SOILS SOMETIMES WITH SALTGRASS; ALSO VERNAL POOLS. 0-425M.

Centromadia pungens ssp. laevis	smooth tarplant	--	--	1B		VALLEY AND FOOTHILL GRASSLAND, CHENOPOD SCRUB, MEADOWS, PLAYAS, RIPARIAN WOODLAND.	ALKALI MEADOW, ALKALI SCRUB; ALSO IN DISTURBED PLACES. 0-480M.
Lasthenia glabrata ssp. coulteri	Coulter's goldfields	--	--	1B	X1	COASTAL SALT MARSHES, PLAYAS, VALLEY AND FOOTHILL GRASSLAND, VERNAL POOLS.	USUALLY FOUND ON ALKALINE SOILS IN PLAYAS, SINKS, AND GRASSLANDS. 1-1400M.
Pentachaeta lyonii	Lyon's pentachaeta	FE	SE	1B		CHAPARRAL, VALLEY AND FOOTHILL GRASSLAND.	EDGES OF CLEARINGS IN CHAP., USUALLY AT THE ECOTONE BTWN GRASSLAND AND CHAPARRAL OR EDGES OF FIREBREAKS. 30-630M.
Berberis nevinii	Nevin's barberry	FE	SE	1B		CHAPARRAL, CISMONTANE WOODLAND, COASTAL SCRUB, RIPARIAN SCRUB.	ON STEEP, N-FACING SLOPES OR IN LOW GRADE SANDY WASHES. 290-1575M.
Harpagonella palmeri	Palmer's grapplinghook	--	--	4		CHAPARRAL, COASTAL SCRUB, VALLEY AND FOOTHILL GRASSLAND.	CLAY SOILS; OPEN GRASSY AREAS W/IN SHRUBLAND. 15-830M.
Caulanthus simulans	Payson's jewel-flower	--	--	4		CHAPARRAL, COASTAL SCRUB. ONLY KNOWN FROM RIVERSIDE AND SAN DIEGO COUNTIES.	FREQUENTLY IN BURNED AREAS, OR IN DISTURBED SITES SUCH AS STREAMBEDS; ALSO ON ROCKY, STEEP SLOPES. 90-2200M.
Caulanthus stenocarpus	slender-pod jewel-flower	--	SR			CHAPARRAL. OFTEN IN RECENT BURNS.	THIS SPECIES WAS LUMPED W/C. HETEROPHYLLUS HETEROPHYLLUS IN THE JEPSON MANUAL, A COMMON TAXON. IT IS CA-RARE IN TITLE 14

Dithyrea maritima	beach spectaclepod	SC	ST	1B	COASTAL DUNES, COASTAL SCRUB. FORMERLY MORE WIDESPREAD IN COASTAL HABITATS IN SO. CALIF.	SEA SHORES, ON SAND DUNES, AND SANDY PLACES NEAR THE SHORE. 3-50M.
Erysimum ammophilum	coast wallflower	SC	--	1B	CHAPARRAL (MARITIME), COASTAL DUNES, COASTAL SCRUB.	SANDY OPENINGS. 0-130M.
Rorippa gambelii	Gambel's water cress	FE	ST	1B	MARSHES AND SWAMPS.	FRESHWATER AND BRACKISH MARSHES AT THE MARGINS OF LAKES AND ALONG STREAMS, IN OR JUST ABOVE THE WATER LEVEL. 5-1305M.
Caulanthus californicus	California jewel-flower	FE	SE	1B	CHENOPOD SCRUB, VALLEY AND FOOTHILL GRASSLAND, PINYON JUNIPER WOODLAND.	HISTORICAL FROM VARIOUS VALLEY HABITATS IN BOTH CENTRAL V. AND CARRIZO PLAIN. 65-900M.
Opuntia basilaris var. brachyclada	short-joint beavertail	--	--	1B	CHAPARRAL, JOSHUA TREE WOODLAND, MOHAVEAN DESERT SCRUB, PINYON JUNIPER WOODLAND, RIPARIAN WOODLAND.	SANDY SOIL OR COARSE, GRANITIC LOAM. 425-1800M.
Atriplex coronata var. coronata	crownscale	--	--	4	CHENOPOD SCRUB?, VALLEY AND FOOTHILL GRASSLAND, VERNAL POOLS.	FINE, ALKALINE SOILS, AND CLAY SOILS. 1-200M.
Atriplex coulteri	Coulter's saltbush	--	--	1B	COASTAL BLUFF SCRUB, COASTAL DUNES, COASTAL SCRUB, VALLEY AND FOOTHILL GRASSLAND.	OCEAN BLUFFS, RIDGETOPS, AS WELL AS ALKALINE LOW PLACES. 10-440M.

Atriplex pacifica	South Coast saltscale	--	--	1B		COASTAL SCRUB, COASTAL BLUFF SCRUB, PLAYAS, CHENOPOD SCRUB.	ALKALI SOILS. 1-500M.
Atriplex parishii	Parish's brittlescale	--	--	1B	X1	ALKALI MEADOWS, VERNAL POOLS, CHENOPOD SCRUB, PLAYAS. PLANT COLLECTED ONLY ONCE IN CALIFORNIA SINCE 1974 (IN 1993).	USUALLY ON DRYING ALKALI FLATS WITH FINE SOILS. 4-140M.
Atriplex serenana var. davidsonii	Davidson's saltscale	--	--	1B	X1	COASTAL BLUFF SCRUB, COASTAL SCRUB.	ALKALINE SOIL. 3-250M.
Suaeda californica	California seablite	FE	--	1B		MARSHES AND SWAMPS.	MARGINS OF COASTAL SALT MARSHES. 0-5M.
Suaeda esteroa	estuary seablite	--	--	1B	X1	MARSHES AND SWAMPS.	COASTAL SALT MARSHES IN CLAY, SILT, AND SAND SUBSTRATES. 0-5M.
Suaeda taxifolia	woolly seablite	--	--	4		COASTAL BLUFF SCRUB, MARSHES AND SWAMPS.	MARGINS OF SALT MARSHES. 0-15M.
Calystegia peirsonii	Peirson's morning-glory	--	--	4		CHAPARRAL, COASTAL SCRUB, CHENOPOD SCRUB, CISMONTANE WOODLAND, LOWER MONTANE CONIFEROUS FOREST.	OFTEN IN DISTURBED AREAS OR ALONG ROADSIDES OR IN GRASSY, OPEN AREAS. 390-1470M.
Calystegia sepium ssp. binghamiae	Santa Barbara morning-glory	--	--	1A	X1	COASTAL MARSHES. FORMERLY KNOWN FROM SOUTHERN CALIF. MARSHES; MAY BE EXTINCT.	0-30M.

Dudleya multicaulis	many-stemmed dudleya	--	--	1B	X1	CHAPARRAL, COASTAL SCRUB, VALLEY AND FOOTHILL GRASSLAND. ENDEMIC TO SOUTHERN CALIFORNIA.	IN HEAVY, OFTEN CLAYEY SOILS OR GRASSY SLOPES. 0-790M.
Tetracoccus dioicus	Parry's tetracoccus	--	--	1B		CHAPARRAL, COASTAL SCRUB.	STONY, DECOMPOSED GABBRO SOIL. 150-1000M.
Astragalus brauntonii	Braunton's milk-vetch	FE	--	1B		CLOSED-CONE CONIFEROUS FOREST, CHAPARRAL, COASTAL SCRUB, VALLEY AND FOOTHILL GRASSLAND.	RECENT BURNS OR DISTURBED AREAS; IN STIFF GRAVELLY CLAY SOILS OVERLYING GRANITE OR LIMESTONE. 4-640M.
Astragalus pycnostachyus var. lanosissimus	Ventura Marsh milk-vetch	FE	SE	1B	X1	COASTAL SALT MARSH. HISTORICALLY IN COASTAL SOUTHERN CALIFORNIA; NOW KNOWN AT ONE SITE IN VENTURA COUNTY.	WITHIN REACH OF HIGH TIDE OR PROTECTED BY BARRIER BEACHES, MORE RARELY NEAR SEEPS ON SANDY BLUFFS. 1-35M.
Ribes divaricatum var. parishii	Parish's gooseberry	--	--	1B	X1	RIPARIAN WOODLAND.	SALIX SWALES IN RIPARIAN HABITATS. 60-305M.

APPENDIX C

Who's Who in Watershed Management Technical Memo

Coyote Creek Watershed Management Plan

3/27/06

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APPENDICES

Attachment A: Watershed Directory

Attachment B: Agency Resources Matrix

1 Who's Who in Watershed Management

Management of a watershed includes many roles: regulatory, maintenance, development, capital improvements, monitoring, and restoration, among others. These roles are fulfilled by different agencies at various levels of governance, private and non-governmental organizations, special interest groups, the public, as well as other stakeholders. With multiple players managing the Coyote Creek watershed, it is essential to understand their roles and the tools they use to regulate and manage the watershed.

This section describes key governmental agencies, non-governmental agencies and private organizations that are active in the management of the Coyote Creek Watershed. This section also identifies agencies that have the potential to affect the watershed and their tools, plans, and programs through which this change can be made.

Since watershed management is multifaceted and ever-evolving, this section may not include all the stakeholders within the watershed, rather, it focuses only on key stakeholders. We presume that stakeholder identification would be an on-going process and would continue till the preparation of the Final Watershed Management Plan. An expanded list of stakeholders is attached as Attachment A: Who's Who In Watershed Management.

The stakeholders managing the Coyote Creek Watershed can be categorized into resource areas that they affect. The discussion in this section is divided in the following resource areas:

- Land Use and People
- Climate and Air Resources
- Geological Resources
- Water Resources
- Water Quality
- Biological Resources
- Historic and Cultural Resources

1.1 LAND USE AND PEOPLE

The discussion of land use and people within the watershed is all encompassing in that the entire watershed comprises a land use category. As the Coyote Creek Watershed is located in a highly urbanized area almost the entire watershed is populated. This section also discusses the political framework within the watershed as it affects the watershed through legislative decision-making.

1.1.1 Elected Officials

Elected officials set policies that govern their constituents. They make decisions that affect land and water resource use and enforce existing laws and local codes.

The following describes different levels of governance, from federal to local, existing within the Coyote Creek Watershed.

1.1.1.1 United States Senate

The United States Senators of California includes Dianne Feinstein and Barbara Boxer.

1.1.1.2 House of Representatives

Table 1-1 shows the House Districts and Representatives within the Study Area.

TABLE 1-1

House Districts and Representatives within the Study Area

District	Representative
38th District	Grace F. Napolitano
39th District	Linda T. Sánchez
40th District	Ed Royce
42nd District	Gary G. Miller
46th District	Dana Rohrabacher
47th District	Loretta Sanchez

1.1.1.3 State Senate and Assembly

Table 1-2 shows the State Senate and Assembly Districts and Representatives within the Study Area and Figure 1-1 shows the district boundaries.

TABLE 1-2

State Senate and Assembly Districts and Representatives

Assembly District	Representative	Senate District	Representative
54th District	Betty Karnette	27th District	Alan Lowenthal
55th District	Jenny Oropeza	29th District	Bob Margett
56th District	Rudy Bermúdez	30th District	Martha Escutia
58th District	Ron Calderon	33rd District	Dick Ackerman
60th District	Bob Huff	34th District	Joseph L. Dunn
67th District	Tom Harman	35th District	John Campbell
69th District	Tom Umberg		
72nd District	Lynn Daucher		

1.1.1.4 Supervisorial Districts

Orange, Los Angeles, and San Bernardino counties are divided into various supervisorial districts. The Study Area is located within some of these supervisorial districts as shown in Figure 1-2. Table 1-3 identifies the supervisorial districts, and supervisors, by county within the Study Area.

TABLE 1-3

Supervisorial Districts within the Study Area

District	County	Supervisor
2nd District	Orange	James W. Silva
3rd District	Orange	Bill Campbell
4th District	Orange	Chris Norby
1st District	Los Angeles	Gloria Molina
4th District	Los Angeles	Dan Knabe
4th District	San Bernardino	Gary Ovitt

1.1.1.5 County and City Jurisdictions

The Study Area includes three counties and 22 cities. These jurisdictions are shown in Figure 1-3. A list of these cities and counties within the Coyote Creek Watershed is given in Table 1-4.

TABLE 1-4

Political Jurisdictions within the Study Area

Orange County		Los Angeles County		San Bernardino County	
1	Anaheim	1	Artesia	1	Chino Hills
2	Brea	2	Cerritos		
3	Buena Park	3	Diamond Bar		
4	Cypress	4	Hawaiian Gardens		
5	Fullerton	5	La Habra Heights		
6	La Habra	6	Lakewood		
7	La Palma	7	La Mirada		
8	Los Alamitos	8	Long Beach		
9	Placentia	9	Norwalk		
10	Seal Beach	10	Santa Fe Springs		
		11	Whittier		

FIGURE 1-1
Supervisorial and Senatorial Districts

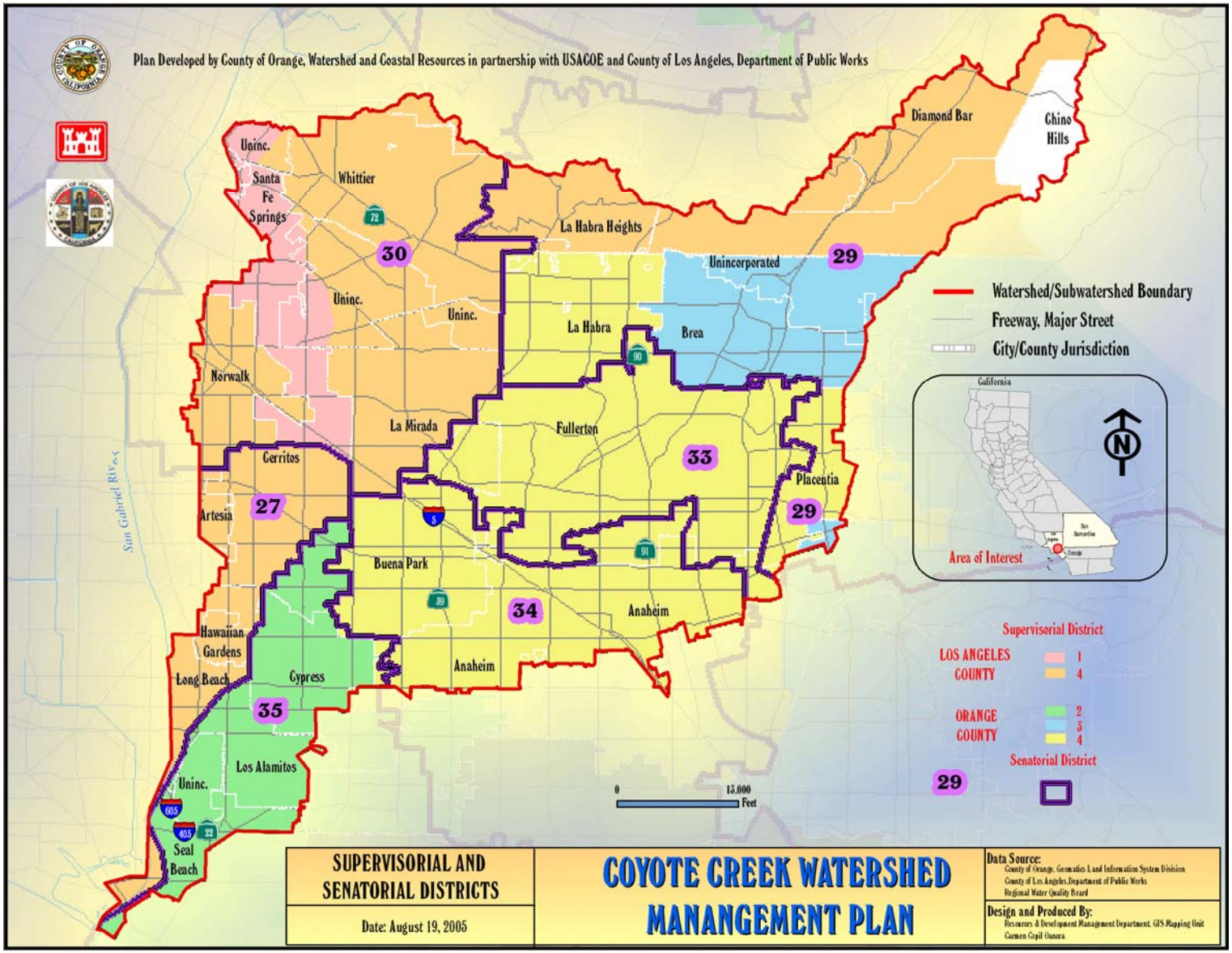
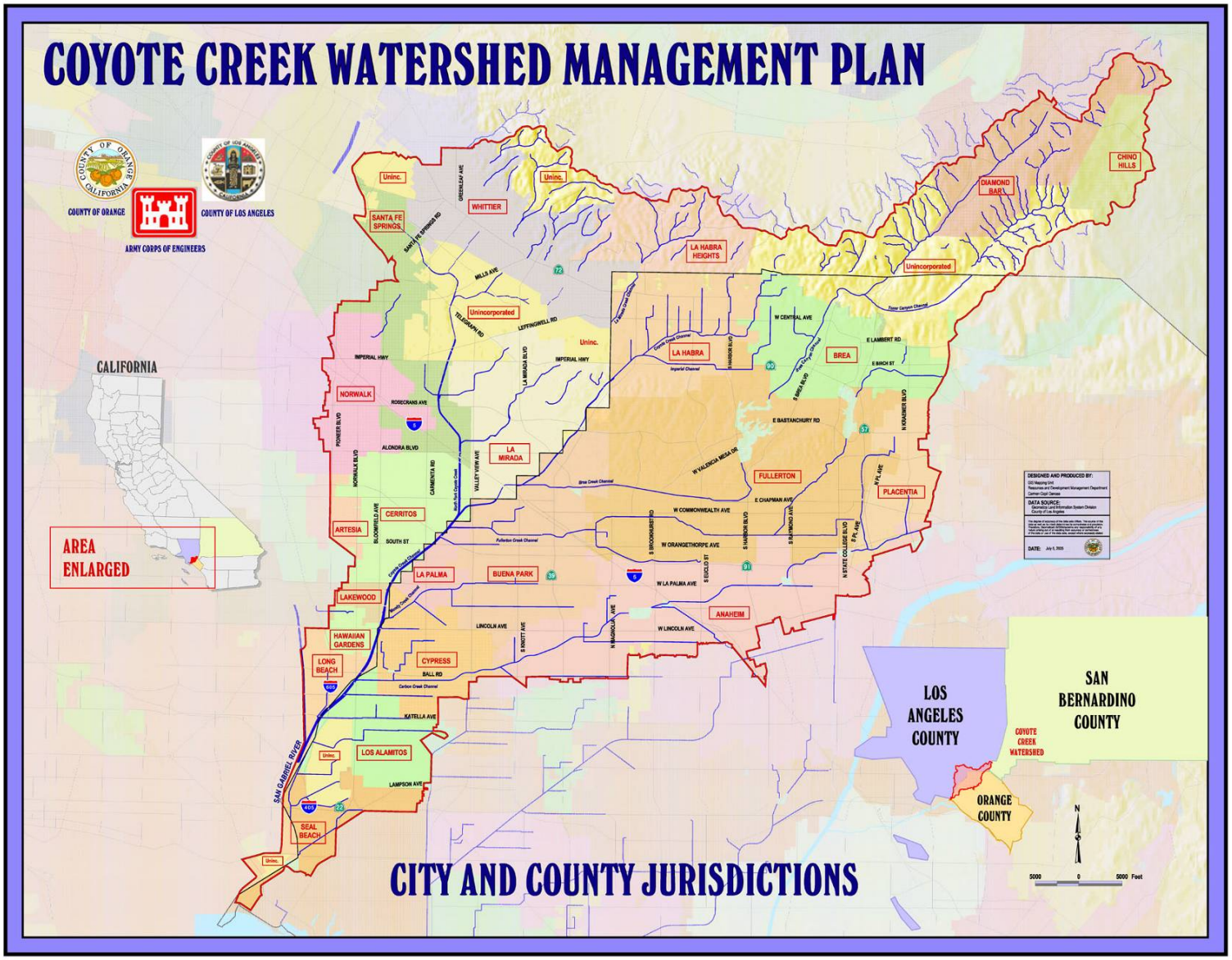


FIGURE 1-2
County and City Jurisdictions



1.1.2 Land Use

The primary tools for the management of land use and people within the study area are the general plans of the cities and counties. A general plan is a compendium of city or county policies regarding its long-term development. It is a legal document required of each local agency by the State of California Government Code Section 65301 and adopted by the City Council or Board of Supervisors. In California, the general plan has seven mandatory elements: Land Use, Circulation, Housing, Conservation, Open Space, Noise, and Safety; and may include any number of optional elements such as, Water, Air Quality, Capital Improvements/ Public Facilities, Community Design, Economic/ Fiscal Development, Energy, Flood Management, Geothermal, Hazardous Waste, and Parks and Recreation.

The general plans are an excellent resource to influence long range policies for land management and conservation within the watershed. Table 1.5 shows a list of the counties and cities within the Watershed area and their general plan elements that relate to the Coyote Creek Watershed Area.

The following table (Table 1.5) is an inventory of the county and city general plans that are within the watershed. The elements from each general plan that are related to the watershed are listed.

TABLE 1-5. COUNTIES AND CITIES GENERAL PLAN ELEMENTS

General Plan		Plan Elements	
1	Orange County General Plan	• Recreation • Growth Management	• Land Use • Resources • Open Space
2	Los Angeles County General Plan	• Land Use	• Conservation and Open Space
3	San Bernardino County General Plan	• Conservation • Circulation and Infrastructure • Safety	• Open Space • Land Use
4	City of Anaheim General Plan	• Land Use • Green Element • Community Design	• Growth Management • Safety • Public Services and Facilities
5	City of Brea General Plan	• Public Safety Community Development	• Community Resources
6	City of Buena Park General Plan	• Open Space and Recreation • Safety	• Urban Design • Conservation
7	City of Cerritos General Plan	• Open Space/ Recreation	• Conservation • Safety
8	City of Chino Hills General Plan	• Circulation • Conservation	• Parks, Recreation and Open Space
9	City of Cypress General Plan	• Conservation/ Open Space/ Recreation	• Land Use
10	City of Diamond Bar General Plan	• Land Use • Public Services and Facilities	• Public Health and Safety

TABLE 1-5 CONTINUED

General Plan		General Plan Elements	
11	City of Fullerton General Plan	• Land Use • Community Health and Safety	• Resource Management
12	City of Hawaiian Gardens General Plan	• Open Space • Safety	• Conservation • Economic Element
13	City of La Habra General Plan	• Circulation Infrastructure	• Health and Safety
14	City of La Habra Heights General Plan	• Safety • Land Use	• Environmental Resource Management • Circulation
15	City of La Mirada General Plan	• Safety and Community Services	• Open Space and Conservation • Circulation
16	City of La Palma General Plan	• City Structure	• Community Safety • Growth Management
17	City of Lakewood General Plan	• Safety • Circulation • Open Space	• Conservation • Recreation and Community Services
18	City of Long Beach General Plan	• Open Space and Recreation	
19	City of Los Alamitos General Plan	• Safety • Recreation	• Conservation • Circulation
20	City of Norwalk General Plan	• Land Use • Circulation	• Utility Infrastructure
21	City of Seal Beach General Plan	• Open Space • Land Use	• Hellman Ranch Specific Plan

LAND USE SUB CATEGORIES

Land uses within the Watershed can be categorized into the following types:

1. Residential
2. Open Space
3. Transportation
4. Utilities
5. Commercial
6. Industrial
7. Institutional
8. Recreational
9. Land Owners

1.1.2.1 Residential

Many individuals and families reside within the Coyote Creek Watershed. These residents live in a variety of residential structures which include: low- and high-density single family residential; low- and medium-rise apartments and condominiums; low-rise townhouses; duplexes, triplexes and 2- or 3-unit condominiums and townhouses; mobile home parks and trailer parks; and hotels and motels.

1.1.2.1.1 Key Residential Agencies and People

The following are major residential stakeholders within the Coyote Creek Watershed:

Homeowners Associations (HOA)

HOA are associations of homeowners in a particular subdivision, planned unit development (PUD), or condominium organized to manage the common area of the development and to enforce the association rules and regulations.

Residents, Employees, Students, and Visitors

The people who live, work, study, and play in the communities within the Coyote Creek Watershed.

1.1.2.2 Open Space

The Coyote Creek Watershed comprises a large area of land within Southern California. Within that land the Watershed comprises major open space areas, which include Puente Hills, Chino Hills, Coyote Hills and Los Cerritos Wetlands.

1.1.2.2.1 Key Open Space Agencies

The following key agencies serve as regulators or resource managers for the open space within the Coyote Creek Watershed

California Department of Parks and Recreation

The California Department of Parks and Recreation provides for the health, inspiration, and education of the people of California by helping to preserve the State's biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for outdoor recreation.

County of Los Angeles, Department of Parks and Recreation

The County of Los Angeles, Department of Parks and Recreation provides the public with social, cultural and recreational activities. This includes parks, gardens, lakes, trails, natural areas, and golf courses.

County of Orange, Harbors Beaches & Parks

The Orange County Department of Harbors, Beaches and Parks operates regional recreational facilities and manages historical and natural resources within Orange County. Approximately 37,000 acres of parkland and open space include regional and wilderness parks, nature preserves and recreational trails, historic sites, and harbors and beaches.

Hills for Everyone

Hills for Everyone protects, preserves and restores the environmental resources and natural environs of the Puente-Chino Hills and surrounding areas for the enjoyment of current and succeeding generations and to initiate, sponsor, promote, organize and carry out plans, programs, and activities that will tend to further these ends.

Hillside Open Space Education Coalition

The Hillside Open Space Education Coalition preserves strategic parcels of hillside open space from the threat of development and prevents unwanted impacts on existing traffic congestion, schools, community infrastructure, and runoff pollution, as well as the regional wildlife and open space corridor.

Puente Hills Native Habitat Preservation Authority

The Puente Hills Landfill Native Habitat Preservation Authority (Habitat Authority) is a Joint Powers Authority with a Board of Directors consisting of the City of Whittier, County of Los Angeles, Sanitation Districts of Los Angeles County, and the Hacienda Heights Improvement Association. The Habitat Authority came into existence in 1994 as mitigation for the Puente Hills Landfill.

1.1.2.3 Transportation

Within the Coyote Creek Watershed Area there are major transportation facilities. The major Interstates that pass through the Watershed Area are I-5 (the Santa Ana Freeway) and I-605 (the San Gabriel Freeway). State Routes include 39 (Beach Boulevard), 57, (Orange Freeway), 72 (Whittier Boulevard), 90 (Imperial Highway) and 91 (Riverside Freeway). In addition to the Interstates and State Routes, other transportation and utilities include parking lots, railroad corridors and bikeways.

1.1.2.3.1 Key Transportation Agencies

The following are the key transportation agencies and tools:

Federal Highway Administration (FHWA)

The FHWA carries out the Federal highway programs in partnership with the State of California and local agencies to meet the Nation's transportation needs. FHWA adds value to the delivery of the Federal highway programs by administering and overseeing these

programs to ensure that Federal funds are used efficiently. Federal Highways within the watershed include the 1-5 and I-605.

Federal Transit Administration (FTA)

The Federal government, through the FTA, provides financial assistance to develop new transit systems and improve, maintain, and operate existing systems. Region 9 of the FTA oversees grants to California State and local transit providers.

California Department of Transportation (Caltrans), Districts 7 & 12

Caltrans is the state agency responsible for highway, bridge, and rail transportation planning, construction, and maintenance. District 7 includes Los Angeles and Ventura counties. District 12 includes Orange County and vicinity.

Southern California Association of Governments (SCAG)

SCAG functions as the metropolitan planning organization for six counties: Los Angeles, Orange, San Bernardino, Riverside, Ventura and Imperial. The region encompasses a population exceeding 15 million persons in an area of more than 38,000 square miles. As the designated Metropolitan Planning Organization, the Association of Governments is mandated by the federal government to research and draw up plans for transportation, growth management, hazardous waste management, and air quality.

The following are plans and programs administered by SCAG:

Regional Transportation Plan (RTP): (Adopted April, 2004) The SCAG Regional Transportation Plan is comprised of the counties of Los Angeles, Orange, San Bernardino, Riverside, Ventura and Imperial - home to 17 million people. The RTP is the culmination of a three-year effort with a focus on improving the balance between land use and the current as well as future transportation systems.

Regional Transportation Improvement Program (RTIP): (Adopted September, 2004) The 2004 RTIP is a capital listing of transportation projects proposed over a six-year period, Fiscal Years (FY) 2004/05 – 2009/10. This listing identifies specific funding sources and funding amounts for each project. Projects include highway improvements, transit, rail and bus facilities, high occupancy vehicle lanes, signal synchronization, intersection improvements, freeway ramps, etc.

Los Angeles County Metropolitan Transportation Authority (Metro)

Metro serves as transportation planner and coordinator, designer, builder and operator for Los Angeles County serving more than 9.6 million people. The Los Angeles County comprises a portion of the Coyote Creek Watershed.

The following are plans and programs administered by Metro:

Metro Long Range Transportation Plan: (Adopted April, 2001) The Long Range Transportation Plan is a 25-year plan that recommends a balanced transportation program with a strong emphasis on public transit to meet growth in travel. The Plan

encourages more ridesharing, walking and bike riding, telecommuting, and improved management of truck traffic.

Metro Short Range Transportation Plan: (Adopted August, 2003) The Metro Short Range Transportation Plan focuses on the phasing of transportation improvements through 2009. The Plan relies on performance-based modeling to identify the best solution for each mobility challenge.

Bike-Transit Center Implementation Plan (BTCIP): (Adopted December, 2004) The BTCIP lays the groundwork and sets standards for creating a network of bike-transit centers with Metro transit throughout the County and provides tools that could be implemented by other cities and agencies.

Metro Bicycle Transportation Strategic Plan: (Adopted October, 2004) The Enhanced Public Outreach Project (EPOP) is a joint effort of the Los Angeles County Metropolitan Transportation Authority (Metro) and the Los Angeles County Bicycle Coalition (LACBC). The findings of the EPOP will assist Metro in identifying projects and policies that will improve the bicycling environment for Los Angeles County residents.

County of Los Angeles, Department of Regional Planning

The Department of Regional Planning's Planning Commission acts as an advisory body to the Board of Supervisors on all planning matters, and administers the provisions of the State Planning Law, the State Subdivision Map Act, CEQA, and the Los Angeles County Ordinances affecting planning such as the County Zoning Ordinance and Subdivision Ordinance. It formulates planning policies and conducts regular public hearings.

Orange County Transportation Authority (OCTA)

The OCTA is a multi-modal transportation agency serving Orange County. The OCTA provides bus and paratransit service, Metrolink commuter rail service, the 91 Express Lanes toll facility, freeway, street and road improvement projects, motorist aid services and by regulating taxi operations. The portion of the Watershed Area in Orange County is serviced by the OCTA.

The following are plans and programs administered by OCTA:

OCTA Long Range Transportation Plan: (Draft January, 2006) The OCTA Long Range Transportation Plan addresses growth in population, jobs-housing imbalance, increased inter-county travel and higher costs for improvements. Plan goals include congestion relief, alternatives to automobiles and system enhancements.

Master Plan of Arterial Highways (MPAH): (Adopted December, 2005) The Master Plan for Arterial Highways (MPAH) was initially established in 1956 and is continuously updated to reflect changing development and traffic patterns. This includes the Tonner Canyon future bypass. The OCTA is responsible for administering the MPAH, including the review and approval of amendments requested by local agencies.

OCTA Commuter Bikeways Strategic Plan (CBSP): (Adopted August, 2001) This CBSP serves as a policy document to guide the development and maintenance of a bicycle network, support facilities and other programs for Orange County over the next

20 years. These policies address important issues related to Orange County's bikeways such as planning, community involvement, utilization of existing resources, facility design, multi-modal integration, safety and education, support facilities as well as specific programs, implementation, maintenance and funding.

County of Los Angeles Road Maintenance Division

Public Works is responsible for the maintenance, repair and construction of County unincorporated roadways, parkways, and bridges, as well as implementing improvements to relieve traffic congestion.

County of Orange Roads Division

Under the County of Orange Resources and Development Management Department, the Road Division is responsible for road design, signal design, traffic engineering/ road program, and traffic operations.

San Bernardino County, Transportation Department

The primary transportation function of the Department is operation, maintenance, and improvements of the County road system that currently includes approximately 2,860 miles of roadways. Additional major activities are administration, planning, design, construction, and traffic operations.

San Bernardino Associated Governments (SANBAG)

The San Bernardino Associated Governments (SANBAG) is the council of governments and transportation planning agency for San Bernardino County. SANBAG is responsible for cooperative regional planning and furthering an efficient multi-modal transportation system countywide.

The following are plans and programs administered by SANBAG:

Comprehensive Transportation Plan: (2030 Update being drafted) The Comprehensive Transportation Plan identifies transportation improvements and strategies to enhance system performance and achieve emission reductions to meet air quality requirements; and integrate goods movement strategies currently under development and serve as a basis for action programs to be implemented through the Congestion Management Program.

Congestion Management Program: (Updated December, 2003) The CMP defines a network of state highways and arterials, level of service standards and related procedures, and provides technical justification for the approach.

Non-Motorized Transportation Plan: (Updated June, 2001) The Non-Motorized Transportation Plan coordinates the numerous bicycle plans among the County's twenty-four cities to ensure the development of a cohesive, consistent and quality bikeway system throughout the County. The Plan encourages visitors and residents to ride bicycles along the beautiful valleys, through the mountains and desert, and through diverse urban areas of San Bernardino County.

City Transportation Departments

The cities within the Study Area have local transportation departments which provide bus service, paratransit service, on-demand service, and other transportation services.

1.1.2.4 Utilities

Utilities provide essential commodities or services that allow urban environments to function. Utilities within the Study Area include transmission and communication lines, electrical power facilities, natural gas, water and wastewater infrastructure and solid waste containment. Specific agencies providing utilities in the Coyote Creek Watershed are listed below:

- Electricity: Southern California Edison
- Natural Gas: Southern California Gas Company
- Solid Waste: Puente Hills Landfill, Los Angeles County Sanitation District and Olinda Landfill, County of Orange Integrated Waste Management Department

1.1.2.5 Commercial

Major commercial uses within the Coyote Creek Watershed Area are for low- and medium-rise office buildings, high-rise office buildings, regional shopping centers, retail shopping centers, strip developments, open storage and commercial storage.

1.1.2.5.1 Key Commercial Agencies and People

The following are the key commercial agencies and people within the watershed:

Chambers of Commerce

A chamber of commerce is a business advocacy group which is usually not associated with government. Chambers of commerce can also include economic development groups, as well as tourism and visitors bureaus.

Business Owners

Business owners are those individuals and associations who own businesses in the Coyote Creek Watershed area.

1.1.2.6 Industrial

Major industrial uses within the Coyote Creek Watershed Area are industrial manufacturing, light industrial, mixed industrial and commercial, warehouse buildings, waste disposal, and chemical and cement processing. The key industrial agencies are listed below.

1.1.2.6.1 Key Industrial Agencies

The following are the key industrial agencies within the Watershed:

California Integrated Waste Management Board

The California Integrated Waste Management Board manages the estimated 76 million tons of waste generated each year in California by reducing waste whenever possible, promoting the management of all materials to their highest and best use, and protecting public health and safety and the environment.

California Department of Toxic Substances and Control (DTSC)

The California Department of Toxic Substances and Control protects California and Californians from exposures to hazardous wastes. Approximately 1,000 scientists, engineers and specialized support staff work in nine offices statewide.

County of Orange, Integrated Waste Management Department (Olinda Landfill)

The Integrated Waste Management Department owns and operates three public landfills in Orange County. The Olinda Landfill is within the Coyote Creek Watershed.

Los Angeles County Sanitation District (Puente Hills Landfill)

The Los Angeles County Sanitation District constructs, operates, and maintains facilities to collect, treat, recycle, and dispose-off sewage and industrial wastes. The Puente Hills landfill is located in unincorporated Los Angeles County, next to the City of Whittier within the Coyote Creek Watershed.

1.1.2.7 Institutional

Institutional uses in the Coyote Creek Watershed include public health and safety services like hospitals, medical centers and special care facilities. There are public services in the study area which are government offices, post offices, religious buildings and cemeteries. There are also many educational institutes which are listed below:

- California State University, Fullerton
- Whittier College
- Cypress College
- Cerritos College
- Biola University
- Fullerton City College
- Community Colleges
- Local School Districts
- Private Schools

1.1.2.7.1 Key Institutional Agencies

The following are the key institutional agencies and tools within the Watershed:

U.S. Department of Defense (DOD)

The Army, the Navy, and the Marine Corps were established in 1775, in concurrence with the American Revolution. The War Department was established in 1789, and was the precursor to what is now the Department of Defense. The DOD manages a comprehensive inventory of installations and facilities to ensure the nation's safety. The DOD has the following military installations within the Coyote Creek Watershed:

Seal Beach Naval Weapons Station: The Seal Beach Naval Weapons Station provides weapons storage, loading, maintenance and support to ships and submarines of the United States Pacific Fleet. The Station also supports Coast Guard vessels and Marine Corps units.

Los Alamitos Armed Forces Reserve Center: The Joint Forces Training Center in Los Alamitos has units of the California National Guard and Army Reserve. It also houses the Southern California Governor's Office of Emergency Services.

Los Angeles County Department of Health Services

The Los Angeles County Department of Health Services provides direct patient care and public health services for 10 million county residents. DHS is the major source of medical care for the more than 2 million residents without health insurance and provides the vast majority of all uncompensated medical care in the county.

County of Orange Health Care Agency (HCA)

The Orange County HCA is a regional provider, charged with protecting and promoting individual, family and community health through coordination of public and private sector resources. The mandates under which HCA operates require the County to provide for, or to regulate, certain health services.

Police Protection

Police protection within the Coyote Creek Watershed is provided by the County of Los Angeles Sheriffs Department, the County of Orange Sheriff's Department and the respective city police departments.

Fire Protection

Fire protection within the Coyote Creek Watershed is provided by the California Department of Forestry and Fire Protection (CDF), the County of Orange Fire Department, the County of Los Angeles Fire Department and the respective city fire departments.

1.1.2.8 Recreational

Recreational facilities can consist of existing open space, sports and recreational buildings and playing fields, hiking trails and bikeways. Within the Coyote Creek Watershed there are regional parks, local parks, trails, bikeways and golf courses. Regional parks include Clark, Craig, Cerritos, La Mirada and El Dorado. Trails include Puente-Chino Hills and Coyote Hills. Also included are the San Gabriel and Coyote Creek bikeways.

1.1.2.8.1 Key Recreational Agencies

The following are the key recreational agencies within the Watershed:

National Park Service, Rivers Trails & Conservation Assistance Program (NPS RTCA)

The Rivers Trails and Conservation Assistance Program provides technical assistance to community groups and local, State, and federal government agencies so they can conserve rivers, preserve open space, and develop trails and greenways. The RTCA program implements the natural resource conservation and outdoor recreation mission of the National Park Service in communities across America.

California Department of Parks and Recreation (DPR)

The California Department of Parks and Recreation provides for the health, inspiration, and education of the people of California by helping to preserve the State's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation.

County of Los Angeles, Department of Parks and Recreation

The County of Los Angeles Department of Parks and Recreation is committed to providing the public with social, cultural and recreational activities. The Department includes parks, gardens, lakes, trails, natural areas, and golf courses.

County of Orange, Harbors, Beaches & Parks Division

The Orange County Department of Harbors, Beaches and Parks Division operates regional recreational facilities and manages historical and natural resources. Thirty-seven thousand acres of parkland and open space include regional and wilderness parks, nature preserves and recreational trails, historic sites, and harbors and beaches.

City Parks and Recreation Departments

Each city within the Watershed Area has city parks and recreational departments within their municipal jurisdictions.

Friends of Harbors Beaches & Parks

The mission of the Friends of Harbors, Beaches and Parks, Inc. is to promote, protect and enhance the harbors, beaches, parks, trails, open spaces, natural preserves, and historical sites in Orange County.

Orange County Bicycle Coalition (OCBC)

The Orange County Bicycle Coalition is a non-profit advocacy organization for bicyclists in Orange County.

Los Angeles County Bicycle Coalition (LACBC)

The Los Angeles County Bicycle Coalitoin is a non-profit bicycle advocacy organization improving the bicycling environment and quality of life in Los Angeles County.

Trails4All

Trails4All is a non-profit corporation based in Orange County, established to assist with volunteer trail projects and to raise funds to support them.

1.1.3 Major Landowners

Major landowners in the Coyote Creek Watershed Area are divided into two sections: public/non-profit landowners and private landowners.

1.1.3.1.1 Key Public/Non-Profit Landowners

The following are the key public and non-profit landowners within the Watershed:

U.S. Department of Defense (DOD)

The Army, the Navy, and the Marine Corps were established in 1775, in concurrence with the American Revolution. The War Department was established in 1789, and was the precursor to what is now the Department of Defense. The DOD manages a comprehensive inventory of installations and facilities to ensure the nation's safety. The DOD has the following military installations within the Coyote Creek Watershed:

> **Seal Beach Naval Weapons Station:** The Seal Beach Naval Weapons Station is a major landowner in the Coyote Creek Watershed Area. The Station provides weapons storage, loading, maintenance and support to ships and submarines of the United States Pacific Fleet, Coast Guard vessels, and Marine Corps units stationed afloat and ashore.
>
> **Los Alamitos Armed Forces Reserve Center:** The Joint Forces Training Center in Los Alamitos, has units of the California National Guard and Army Reserve. It also houses the Southern California Governor's Office of Emergency Services.

City of Industry

The City of Industry, located in Los Angeles County, owns over 5500 acres of land constituting most of upper, middle and lower Tonner Canyon, which is primarily located in Los Angeles County but also encompasses portions of Orange and San Bernardino Counties. Since 1978, when the City of Industry first acquired land in Tonner Canyon, no development has occurred on any City-owned property. The City currently has no specific plans for its land other than continued recreational use and livestock grazing.

Boy Scouts of America, LA Area Council

In 2001, the City of Industry bought 2,423 acres of what was then the 3,293 acre Firestone Boy Scout Reservation. The Boy Scouts currently own about 870 acres in

Tonner Canyon, aka, the Firestone parcel. Based on the proposed boundaries of the CCWMP, much of the Boy Scout's remaining land appears to be outside of the Study Area watershed as it drains to the east of Tonner Canyon.

1.1.3.1.2 Key Private Landowners

The following are the key private landowners within the Watershed:

Aera Energy

Aera Energy LLC is one of California's leading oil and gas producers. Aera Energy owns a large parcel of land in the Watershed that totals approximately 2,530 acres. Aera is planning a residential development on this land adjacent to the communities of Roland Heights, La Habra Heights, Diamond Bar and Brea.

Chevron

The Chevron subsidiary, Pacific Coast Homes, owns 510 acres of coastal open space in Coyote Hills which spans Northern Orange County and Southern Los Angeles County. Pacific Coast Homes has a plan to build 760 units on this site.

1.2 CLIMATE AND AIR RESOURCES

The study area is within the jurisdiction of the South Coast Air Quality Management District (SC AQMD). The SC AQMD is the air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties.

Other resource agencies for air quality within the study area are the U.S. Environmental Protection Agency and the California Air Resource Board. Table 2-X below describes the roles of these agencies within the watershed.

TABLE 2-X

Climate and Air Resources

Agency	Role in the Watershed
U. S. Environmental Protection Agency (EPA)	Protects air quality through the regulatory process; sets limits on allowable pollutants
California Air Resources Board (ARB)	Works with the public, the business sector, and local governments to reduce air pollution
South Coast Air Quality Management District (SC AQMD)	Air pollution control agency for the watershed

More details on the roles of these agencies within the watershed, applicable regulations, and their plans and programs to monitor air quality are provided below.

1.2.1 Key Climate and Air Agencies

The following are the key climate and air agencies within the study area:

Environmental Protection Agency (EPA)

EPA protects human health and the environment through the regulatory process and voluntary programs such as Energy Star and Commuter Choice. Under the Clean Air Act, EPA sets limits on how much of a pollutant is allowed in the air anywhere in the United States.

The following acts give the EPA regulatory authority:

1955 Clean Air Act (CAA): The Clean Air Act is the comprehensive Federal law that regulates air emissions from area, stationary, and mobile sources. This law authorizes the U.S. Environmental Protection Agency to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment.

1970 Pollution Prevention Act (PPA): The Pollution Prevention Act focused industry, government, and public attention on reducing the amount of pollution through cost-effective changes in production, operation, and raw materials use. Opportunities for source reduction are often not realized because of existing regulations, and the industrial resources required for compliance, focus on treatment and disposal. Source reduction is fundamentally different and more desirable than waste management or pollution control.

The following are plans and programs administered by the EPA:

Acid Rain Program: A program designed to significantly reduce emissions responsible for acid deposition.

AirNow: Provides real-time air pollution data, information about the public health and environmental effects of air pollution, and information about ways to protect public health and reduce air pollution. Also known as the Ozone Mapping Project.

Best Workplaces for Commuters (formerly Commuter Choice Leadership Initiative): Best Workplaces for Commuters is a joint EPA and U.S. Department of Transportation recognition and partnership program that encourages employers to offer their employees an outstanding level of commuter benefits such as tax-free transit passes, vanpool benefits, or telecommuting.

Clean Energy: Clean energy is energy derived from highly efficient, clean technologies, including renewable, "green" power, and combined heat and power. The EPA's Clean Energy Programs are designed to improve the national foundation of information on Clean Energy by creating networks between the public and private sector, providing technical assistance, and offering recognition of environmental leaders that adopt Clean Energy practices.

Climate Leaders Partnership: Climate Leaders is a voluntary industry- government partnership that encourages companies to develop long-term comprehensive climate change strategies and set greenhouse gas (GHG) emissions reduction goals.

Combined Heat and Power: Also known as cogeneration, is an efficient and reliable approach to generating power and thermal energy from a single fuel source. CHP is more efficient, cleaner, and reliable than conventional central power plants. The EPA Combined Heat and Power Partnership is a voluntary program that seeks to reduce the environmental impact of power generation by fostering the use of cost-effective CHP.

Combustion: Ensures the safety and reliability of hazardous waste combustion in incinerators and boilers and industrial furnaces.

Design for the Environment (DfE): helps businesses incorporate environmental considerations into the design redesign of products, processes, and technical and management systems.

Energy Star Programs: Works with the private sector developing cutting-edge, voluntary partnerships for the production and use of energy-efficient equipment.

Enviroene: This site provides a single repository for pollution prevention, compliance assurance, and enforcement information and data bases.

Green Power Partnership: The Green Power Partnership is a voluntary Partnership between the U.S. Environmental Protection Agency (EPA) and organizations that are interested in buying green power. Through this program, the EPA supports organizations that are buying or planning to buy green power. As a Green Power Partner, an organization pledges to replace a portion of its electricity consumption with green power within a year of joining the Partnership. The EPA offers credible benchmarks for green power purchases, market information, and opportunities for recognition and promotion of leading purchasers.

Indoor Air Quality: Provides information on all aspects of indoor air quality including radon, asthma, smoke-free homes, mold, and the Indoor Air Quality Tools for Schools Program.

Lead Programs: Information on all aspects of the federal lead poisoning prevention program.

Mixed Waste Program: A program to coordinate management of mixed waste containing radioactive and hazardous waste.

Mobile Sources: Carries out a broad range of activities to reduce pollutants emitted from motor vehicles, off-road equipment (e.g., lawnmowers, boats, locomotives, etc.), and their fuels.

New Chemicals: Responsible for reviewing premanufacture notice (PMN) submissions and identifying new substances that require regulatory action.

Ozone Layer Protection Program: Contains information about the science of ozone depletion, regulations in the US designed to protect the ozone layer, and more.

Pollution Prevention: Works for "source reduction," and other practices that reduce or eliminate the creation of pollutants.

Radiation Programs: Coordinates activities that protect the public health and environment from the effects of ionizing radiation.

SmartWay Transport Program: Partnership with leading members of America's truck and rail transport sector which aims to reduce pollution and greenhouse gas emissions from ground freight carriers such as trucks and locomotives.

Sunwise Schools Program: This program provides materials to help teachers educate students in K-6 about protecting themselves from overexposure to the sun's ultraviolet radiation.

Toxics Release Inventory: The source of information about toxic chemicals that are being used, manufactured, transported, or released into the environment.

TSCA Biotechnology Program: Reviews new chemicals before they are introduced into commerce.

Voluntary Diesel Retrofit Program: Works to reduce pollution resulting from existing diesel vehicles and equipment by encouraging fleet owners to install pollution-reducing devices on the vehicles and to use cleaner-burning diesel fuel.

Waste Minimization: Focuses on reducing the generation and subsequent release to the environment of the most persistent, bioaccumulative, and toxic chemicals in hazardous wastes.

California Air Resources Board (ARB)

The California Air Resources Board (ARB) works with the public, the business sector, and local governments to protect the public's health, the economy and the state's ecological resources through the most cost-effective reduction of air pollution.

The following are California ARB Regulations:

- The ARB is responsible for monitoring the regulatory activity of California's 35 local air districts.
- California Air Pollution Control Laws
- California Air Quality Legislation
- Federal Clean Air Act

South Coast Air Quality Management District (SC AQMD)

The South Coast Air Quality Management District (SC AQMD) is the air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties. SC AQMD is responsible for controlling emissions primarily from stationary sources of air pollution. These can include anything from large power plants and refineries to the corner gas station.

The following are plans and programs administered by the SC AQMD:

Air Quality Management Plan (AQMP): (Adopted August, 2003) Every three years, AQMD prepares an AQMP for the air quality improvement. Each iteration of the plan is an update of the previous plan and has a 20-year horizon.

Air Toxics Control Plan: (Adopted March, 2000) The Air Toxics Control Plan is a planning document designed to examine the overall direction of the AQMD's air toxics control program. It includes strategies that aim to reduce toxic emissions and risk from both mobile and stationary sources.

Ozone Plans: The current Ozone Plan is the final 1999 Amendment to the 1997 Ozone SIP Revision for the South Coast Air Basin for the attainment of the federal ozone air quality standard.

1.3 GEOLOGIC RESOURCES

Geologic resources within the Coyote Creek Watershed Area are managed and regulated by U.S. Geologic Survey and the California Geological Survey.

1.3.1 Key Geologic Agencies and Tools

The following are the key geologic agencies within the study area:

U. S. Geological Survey (USGS)

As the Nation's largest water, earth, and biological science and civilian mapping agency, USGS collects, monitors, analyzes, and provides scientific understanding about natural resource conditions, issues, and problems. The agency's diversity of scientific expertise enables it to carry out large-scale, multi-disciplinary investigations and provide impartial scientific information to resource managers, planners, and other customers.

California Department of Conservation, California Geological Survey

The California Geological Survey provides information and advice to protect life and property from natural hazards and to promote a better understanding of California's diverse geologic environment.

The following are plans and programs administered by the California Geological Survey:

Alquist-Priolo Earthquake Fault Zones: This act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The Act only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards.

Liquefaction Zones: Liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking. The California Geological Survey delineates liquefaction zones in California.

Landslide Zones: Landslides can be caused by gravity, earthquakes, erosion heavy rains or snow. Landslides include a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows.

USGS Library: The USGS library is a major resource and the largest library for earth sciences in the world.

The National Biological Information Infrastructure (NBII): The NBII is a broad, collaborative program to provide increased access to data and information on the nation's biological resources.

Geodata.gov: Geodata.gov is a portal designed to facilitate communication and sharing of geographic data and resources to enhance government efficiency and improve citizen services.

1.4 WATER RESOURCES

Water resources within the study area are managed and regulated by federal, state and local agencies. The Clean Water Act (CWA) of 1972 is the basic regulation protecting surface water within the watershed. Special districts, such as the Orange County Water District, and several other local water districts manage water supply and replenishment within the study area.

The sanitation districts within the study area (OC Sanitation District and the LA County Sanitation Districts) help in maintaining water quality by requiring safe collection, treatment, and disposal of waste water and industrial waste within the study area.

1.4.1 Key Water Suppliers

The following are key water supply managers and wholesalers within the Coyote Creek watershed:

California Department of Water Resources (DWR)

The California Department of Water Resources operates and maintains the State Water Project, including the California Aqueduct. The department also provides dam safety and flood control services, assists local water districts in water management and conservation activities, promotes recreational opportunities, and plans for future statewide water needs.

The following are plans and programs administered by the DWR:

California Water Plan: (Updated December, 2005) The California Water Plan provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California's water future. The Plan, which is updated every five years, presents basic data and information on California's water resources including water supply evaluations and assessments of agricultural, urban, and environmental water uses to quantify the gap between water supplies and uses. The Plan also identifies and evaluates existing and proposed statewide demand management and water supply augmentation programs and projects to address the State's water needs.

Urban Streams Restoration Program - Division of Planning and Local Assistance: The Urban Streams Restoration Program are grants that assist communities in reducing damages from stream bank and watershed instability and floods while restoring the environmental and aesthetic values of streams.

Watershed Restoration - Division of Planning and Local Assistance: The Watershed Restoration Program manages water resources to protect, restore, and enhance the natural and human environments in California.

Metropolitan Water District (MWD) of Southern California

The Metropolitan Water District of Southern California is a consortium of 26 cities and water districts that provides reliable supplies of drinking water to meet the present and

future needs in an environmentally and economically responsible way to parts of Los Angeles, Orange, San Diego, Riverside, San Bernardino and Ventura counties.

The following is a plan by the MWD:

> **Regional Urban Water Management Plan:** (Adopted November, 2005) The Plan is a detailed evaluation of the supplies necessary to meet demands over a 20-year period in a single year and multi-year drought and average year conditions, documentation of the stages of actions it would undertake to address up to 50% reduction in its water supplies, description of the actions to be undertaken in the event of a catastrophic interruption in water supplies, and an evaluation of reasonable and practical efficient water uses, recycling, and conservation activities.

Municipal Water District of Orange County (MWDOC)

The Metropolitan Water District of Orange County (MWDOC) is dedicated to ensuring water reliability for some 30 retail water agencies and cities that rely on MWDOC for their imported water. Efforts are focused on sound planning and appropriate investment in water supply, regional delivery infrastructure and emergency preparedness. Approximately half of Orange County's water supply is imported.

The following plan is administered by the MWDOC:

> **Regional Urban Water Management Plan:** (Adopted December, 2005) The Plan is a detailed evaluation of the supplies necessary to meet demands over a 20-year period in a single year and multi-year drought and average year conditions, documentation of the stages of actions it would undertake to address up to 50% reduction in its water supplies, description of the actions to be undertaken in the event of a catastrophic interruption in water supplies, and an evaluation of reasonable and practical efficient water uses, recycling, and conservation activities.

Water Replenishment District

The Water Replenishment District of Southern California was established in 1959 to counteract the effects of overpumping the groundwater in the West Coast and Central basins. The California Water Code grants the district broad powers to do what is necessary to replenish and maintain the integrity of the basins.

The following plan is administered by the Water Replenishment District:

> **Southern California Water Replenishment District Draft Strategic Plan 2003:** The mission of the strategic plan is to provide, protect and preserve high quality groundwater through innovative, cost effective and environmentally sensitive basin management practices for the benefit of residents and businesses of the Central and West Coast Basin.

Central/West Basin Municipal Water District

The Central/ West Basin Municipal Water District is a public agency that purchases imported water from the MWD of Southern California. Central Basin wholesales the imported water to cities, mutual water companies, investor-owned utilities and private companies in southeast Los Angeles County.

Local Purveyors

The Water Service Area (WSA) is the boundary in which a city provides water service. Cities pump water from a water district basin in order to provide water for their residents. The WSAs within the Coyote Creek Watershed Area include the following:

- City of Brea W.S.A.
- City of Buena Park W.S.A.
- City of Cerritos W.S.A.
- City of Chino Hills W.S.A.
- City of Fullerton W.S.A.
- City of La Palma W.S.A.
- City of Norwalk W.S.A.
- City of Santa Fe Springs W.S.A.
- County of San Bernardino W.S.A.
- La Habra Heights County W.D.
- Long Beach Water District
- Main San Gabriel Basin
- Municipal Water District of Orange County
- Orange County Water District OCWD
- Orchard Dale Water District
- Park Water Company
- Rowland Area County Water District
- San Gabriel Valley Water Company
- Suburban Water Systems
- Upper San Gabriel Valley Water Company
- Walnut Valley Water District
- Water Replenishment District
- Yorba Linda Service Area

1.4.2 Key Water Supply Managers

The following are key water supply managers for the Coyote Creek Watershed:

California Department of Water Resources (DWR)

The California Department of Water Resources operates and maintains the State Water Project, including the California Aqueduct. The department also provides dam safety and flood control services, assists local water districts in water management and conservation activities, promotes recreational opportunities, and plans for future statewide water needs.

The following program is administered by the California Department of Water Resources:

Integrated Regional Water Management (IRWM) Grant Program: The Integrated Regional Water Management (IRWM) Grant Program is a joint program between DWR and the State Water Resources Control Board (SWRCB) which provides funding for projects to protect communities from drought, protect and improve water quality, and reduce dependence on imported water.

California Bay-Delta Authority (CALFED)

The mission of the CALFED Bay-Delta Program is to develop and implement a long-term comprehensive plan that will restore ecological health and improve water management for beneficial uses of the Bay-Delta System.

Rivers and Mountains Conservancy

The San Gabriel and Lower Los Angeles RMC is one of eight conservancies in the California Resources Agency. The mission is to preserve open space and habitat in order to provide for low-impact recreation and educational uses, wildlife habitat restoration and protection, and watershed improvements, including Coyote Creek Watershed within the jurisdiction. The RMC covers eastern Los Angeles County and western Orange County.

Santa Ana Watershed Project Authority (SAWPA)

The Santa Ana Watershed Project Authority works with legislators on ensuring there are useful laws on water resources, with funding sources to ensure that necessary projects can be completed, with planners to ensure that there is enough water in the future, with regulators to ensure that the water is safe and clean, and with all other stakeholders (including the concerned public) to build collaborative, regional solutions to the area's water needs.

1.4.3 Key Wastewater and Solid Waste Managers

The following are the key wastewater and solid waste managers in the Coyote Creek Watershed Area:

Los Angeles County Sanitation District

The Sanitation Districts construct, operate, and maintain facilities to collect, treat, recycle, and dispose of sewage and industrial wastes. The Sanitation Districts also provide for the management of solid wastes including disposal, transfer operations, and materials recovery. Local sewers and laterals that connect to the Sanitation Districts' trunk sewer lines are the responsibility of the local jurisdictions as is the collection of solid wastes. Wastewater facilities within the Los Angeles County Sanitation District include:

- Long Beach Water Reclamation Plant
- Los Coyotes Water Reclamation Plant
- Joint Water Pollution Control Plant (JWPCP)

Orange County Sanitation District (OCSD)

The Orange County Sanitation District is responsible for safely collecting, treating and disposing the wastewater generated by 2.3 million people living in a 470-square-mile area of central and northwest Orange County. The districts service area is divided into nine revenue areas.

Wastewater facilities within the Orange County Sanitation District include:

- Reclamation Plant No.1, Fountain Valley
- Treatment Plan No. 2, Huntington Beach

County of Orange Integrated Waste Management Department (IWMD)

IWMD owns and operates three public landfills in Orange County, California. These Landfills accept municipal solid waste.

Landfills include:

- Frank R. Bowerman Landfill, Irvine
- Olinda Alpha Landfill in Brea
- Prima Deshecha Landfill in San Juan Capistrano

1.5 WATER QUALITY

The Los Angeles and Santa Ana Regional Water Quality Control Boards (RWQCB) protect ground and surface water quality within the study area. The RWQCBs protect water quality by formulating and adopting water quality control plans for all ground and surface water bodies in the region and by prescribing and enforcing requirements on waste discharges.

1.5.1 Water Quality Regulators

Water quality regulators ensure that ground water and drinking water is clean and safe. They regulate pollution to reduce risks in communities, homes, workplaces, and ecosystems. The agencies that regulate water in the United States, California and the Coyote Creek Watershed Area are the U.S. Environmental Protection Agency (EPA), the State Water Resources Control Board (SWRCB), and the Regional Water Quality Control Boards (RWQCB).

The EPA enforces the Clean Water Act (CWA) and coordinates with states to implement CWA. The SWRCB enforces the CWA in California and coordinates between federal and regional agencies. The RWQCB consists of 9 regions in California which include the Los Angeles Region (R4) & LA River Basin Plan and Santa Ana Region (R8) & SAR Basin Plan. The RWQCB acts as the enforcement arm of the SWRCB. The RWQCB develops local priorities for water quality improvements and sets and implements Total Maximum Daily Loads (TMDLs).

U.S. Environmental Protection Agency (EPA)

The EPA prevents pollution of water bodies by enforcing the Clean Water Act. The following acts give the EPA regulatory power:

1974 Safe Drinking Water Act (SDWA): The Safe Drinking Water Act was established to protect the quality of drinking water in the U.S. This law focuses on all waters actually or potentially designed for drinking use, whether from above ground or underground sources. The Act authorized EPA to establish safe standards of purity and required all owners or operators of public water systems to comply with primary (health-related) standards. State governments, which assume this power from EPA, also encourage attainment of secondary standards (nuisance-related).

1947 Federal Insecticide, Fungicide and Rodenticide Act (FIFRA): The primary focus of FIFRA was to provide federal control of pesticide distribution, sale, and use. EPA was given authority under FIFRA not only to study the consequences of pesticide usage but also to require users (farmers, utility companies, and others) to register when purchasing pesticides. Through later amendments to the law, users also must take exams for certification as applicators of pesticides. All pesticides used in the U.S. must be registered (licensed) by EPA. Registration assures that pesticides will be properly labeled and that if in accordance with specifications, will not cause unreasonable harm to the environment.

1990 Oil Pollution Act (OPA): The Oil Pollution Act (OPA) of 1990 streamlined and strengthened EPA's ability to prevent and respond to catastrophic oil spills. A trust fund financed by a tax on oil is available to clean up spills when the responsible party is incapable or unwilling to do so. The OPA requires oil storage facilities and vessels to submit to the Federal government plans detailing how they will respond to large discharges. EPA has published regulations for aboveground storage facilities; the Coast Guard has done so for oil tankers. The OPA also requires the development of Area Contingency Plans to prepare and plan for oil spill response on a regional scale.

1970 Pollution Prevention Act (PPA): The Pollution Prevention Act focused industry, government, and public attention on reducing the amount of pollution through cost-effective changes in production, operation, and raw materials use. Opportunities for source reduction are often not realized because of existing regulations, and the industrial resources required for compliance, focus on treatment and disposal. Source reduction is fundamentally different and more desirable than waste management or pollution control.

Los Angeles Regional Water Quality Control Board

The Los Angeles Regional Water Quality Control Board (LARWQCB) protects ground and surface water quality in the Los Angeles Region, including the coastal watersheds of Los Angeles and Ventura Counties.

The Los Angeles Regional Board is one of nine Regional Boards statewide. These Boards are part of the California Environmental Protection Agency (CAL/EPA), along with the Air Resources Board, the Department of Pesticide Regulation, the Department of Toxic Substance Control, the California Integrated Waste Management Board, and the Office of Environmental Health Hazard Assessment.

Watershed Regulatory Section of the LA RWQCB implements the National Pollutant Discharge Elimination System (NPDES) permitting for the region.

The following are plans and programs administered by the LA RWQCB:

Water Quality Control Plan: L.A. Region Basin Plan for the Coastal Watersheds of L.A. & Ventura Counties: (Adopted June, 1994) The Los Angeles Regional Board's Basin Plan is designed to preserve and enhance water quality and protect the beneficial uses of all regional waters.

Watershed Management Initiative Chapter: The WMI is an integrated planning process in part designed to more effectively direct State and Federal funds to the highest priority water quality activities. Its distinguishing feature is the integration of the various regional, State, and United States Environmental Protection Agency (USEPA) programs on a watershed basis.

Trash TMDL for LA River Watershed: Total maximum daily load (TMDL) is designed to attain the water quality standards for trash in the Los Angeles River.

Santa Ana Regional Water Quality Control Board

The primary duty of the Regional Board is to protect the quality of the waters within the Region for all beneficial uses. This duty is implemented by formulating and adopting water quality control plans for all ground and surface water bodies in the region and by prescribing and enforcing requirements on waste discharges.

The following plans and programs are administered by the Santa Ana RWQCB:

Santa Ana River Basin Water Quality Control Plan: (Adopted March, 1994) The Basin Plan establishes water quality standards for all the ground and surface waters of the region. The Santa Ana Region includes the upper and lower Santa Ana River watersheds, the San Jacinto River watershed, and several other small drainage areas. The Santa Ana Region covers parts of southwestern San Bernardino County, western Riverside County, and northwestern Orange County.

Watershed Management Initiative (WMI) - 2004 revision of the Regional WMI : The WMI is an integrated planning process in part designed to more effectively direct State and Federal funds to the highest priority water quality activities. Its distinguishing feature is the integration of the various regional, State, and United States Environmental Protection Agency (USEPA) programs on a watershed basis.

Orange County Sanitation District (OCSD)

The OCSD is responsible for safely collecting, treating and disposing the wastewater generated by 2.3 million people living in a 470-square-mile area of central and northwest Orange County. The districts service area is divided into nine revenue areas.

The following plans and programs are administered by the OCSD:

Biosolids Program: The Orange County Sanitation District's biosolids policy is to strive to recycle its biosolids using sustainable options while protecting public health and the environment.

Final Long-Range Biosolids Management Plan: (Adopted December, 2003) OCSD intends to participate in any EPA program (including the development of a national incident reporting system and participation in a biosolids contaminant survey) that furthers the public acceptance of biosolids.

Ocean Monitoring Program: The Orange County Sanitation District (OCSD) treats an average of 234 million gallons of wastewater per day from 2.3 million people and approximately 1,000 businesses and industries in central, north and west Orange County. The OCSD operates two treatment plants, one in Fountain Valley and one in Huntington Beach. Sewage is transported to the two treatment facilities by 650 total miles of OCSD-owned sewers throughout the service area. Sewage is treated to remove solids, debris and some bacteria. Treated wastewater is released through 503 portholes of the last 6,000 feet of our 5 mile pipeline offshore of Huntington Beach through a 10-foot diameter outfall pipeline that rests on the ocean floor in approximately 200 feet of water.

Los Angeles County Sanitation District

The Sanitation Districts construct, operate, and maintain facilities to collect, treat, recycle, and dispose of sewage and industrial wastes. The Sanitation Districts also provide for the management of solid wastes including disposal, transfer operations, and materials recovery. Local sewers and laterals that connect to the Sanitation Districts' trunk sewer lines are the responsibility of the local jurisdictions as is the collection of solid wastes.

1.6 BIOLOGICAL RESOURCES

This section describes agencies responsible for the protection and enhancement of biological resources within the study area. This section is divided into four parts: key biological resource agencies, key biological planning and management agencies, key biological partnering agencies, and key biological stewardship organizations.

1.6.1 Key Biological Agencies

U.S. Environmental Protection Agency (EPA)

The EPA acts to conserves the threatened and endangered plants and animals and the habitats in which they are found.

The following acts give the EPA regulatory power:

1973 Endangered Species Act (ESA): Provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees. The law prohibits any action, administrative or real, that results in a "taking" of a listed species, or adversely affects habitat. Likewise, import, export, interstate, and foreign commerce of listed species are all prohibited.

1972 Coastal Zone Management Act: Authorizes the Coastal Zone Management Program which is a unique federal-state partnership that provides a proved basis for protecting, restoring, and responsibly developing the nation's important and diverse coastal communities and resources.

1972 Marine Protection, Research, and Sanctuaries Act: Authorizes the Secretary of Commerce to designate and manage areas of the marine environment with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archeological, educational, or esthetic qualities as National Marine Sanctuaries. The primary objective of this law is to protect marine resources, such as coral reefs, sunken historical vessels or unique habitats.

1972 Ocean Dumping Act: Prohibits transporting any material from the U.S. for the purpose of dumping it into ocean waters, or dumping any material into ocean waters, except as authorized by permit. The Act sets controls on materials and sites for dumping, and requires fees and compliance with agreements for alternative waste management and disposal.

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers is involved in planning, designing, building and operating water resources and other civil works projects. The Corps is developing a comprehensive watershed feasibility study to identify and recommend to Congress priority project for future development.

U.S. Fish and Wildlife Service (FWS)

The U.S. Fish and Wildlife Service maintains the list of 632 endangered species (326 are plants) and 190 threatened species (78 are plants). Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees.

The following act gives the U.S. Fish and Wildlife Service regulatory powers:

> **The Endangered Species Act (ESA):** The Endangered Species Act provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees. The law prohibits any action, administrative or real, that results in a "taking" of a listed species, or adversely affects habitat. Likewise, import, export, interstate, and foreign commerce of listed species are all prohibited.

The following plans and programs are administered by the U.S. Fish and Wildlife Service:

> **Recovery Plan for Six Plants from the Mountains Surrounding the Los Angeles Basin:** (Adopted January, 1999) Restoring endangered or threatened animals and plants to the point where they are again secure, self-sustaining members of their ecosystems is a primary goal of the Service's endangered species program. To help guide the recovery effort, the Service is working to prepare recovery plans for most of the listed species native to the United States. Recovery plans describe actions considered necessary for the conservation of the species, establish criteria for the recovery levels for downlisting or delisting them, and estimate time and cost for implementing the recovery measures needed.
>
> **Western Snowy Plover (Charadrius alexandrinus nivosus) Pacific Coast Population Draft Recovery Plan:** (Adopted August, 2001) In the habitats remaining for the snowy plover, human activity continues to be a key factor adversely affecting snowy plover coastal breeding sites and breeding populations in California. Projects or management activities in plover nesting areas that cause, induce or increase human-associated disturbance during the plover's breeding season (March 1-September 14) adversely impact plovers. These activities may reduce the functional suitability of nesting, foraging and roosting areas.
>
> **Recovery Plan for Vernal Pools of Southern California:** (Adopted December, 2005) This recovery plan features 33 species of plants and animals that occur exclusively or primarily within a vernal pool ecosystem in California and southern Oregon. The 20 federally listed species include 10 endangered plants, 5 threatened plants, 3 endangered animals, and 2 threatened animals.

California Department of Fish and Game (DFG)

The Department of Fish and Game maintains native fish, wildlife, plant species and natural communities for their intrinsic and ecological value and their benefits to people. This includes habitat protection and maintenance in a sufficient amount and quality to ensure the survival of all species and natural communities. The department is also responsible for the diversified use of fish and wildlife including recreational, commercial, scientific and educational uses.

The California Department of Fish and Game (DFG) protects and maintains the biological resources through the enforcement of the following regulations:

- California Fish and Game Code
- California Code of Regulations (Including Title 14)
- Fishing: 2005 Sport Fishing Regulations, Hunting: July 1, 2005-June 30
- 2006 Mammal Hunting and Trapping Regulations, July 1, 2005-June 30
- 2006 Resident and Migratory Game Upland Game Birds, Hunting Regulations
- July 1, 2004- June 30, 2005 Waterfowl Hunting Regulations
- 2004 Hunting Regulations for Waterfowl, Upland Game, and State and Federal Areas

The California Department of Fish and Game (DFG) implements the following plans and programs:

The Natural Community Conservation Planning (NCCP) program: NCCP is an unprecedented effort by the State of California, and numerous private and public partners that takes a broad-based ecosystem approach to planning for the protection and perpetuation of biological diversity. An NCCP identifies and provides for the regional or areawide protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity.

Federal Habitat Conservation Plans: Habitat Conservation Plans (HCP) are long-term agreements between an applicant and the U.S. Fish and Wildlife Service. They are designed to offset any harmful effects that a proposed activity might have on federally-listed threatened and endangered species. The HCP process allows development to proceed while providing a conservation basis to conserve the species and provide for incidental take.

Conservation Banking: A conservation or mitigation bank is privately or publicly owned land managed for its natural resource values. In exchange for permanently protecting the land, the bank operator is allowed to sell habitat credits to developers who need to satisfy legal requirements for compensating environmental impacts of development projects.

Mitigation Banking: A conservation or mitigation bank is privately or publicly owned land managed for its natural resource values. In exchange for permanently protecting the land, the bank operator is allowed to sell habitat credits to developers

who need to satisfy legal requirements for compensating environmental impacts of development projects.

Lake and Streambed Alteration Program: The Department of Fish and Game is responsible for conserving, protecting, and managing California's fish, wildlife, and native plant resources. To meet this responsibility, the law requires any person, state or local governmental agency, or public utility to notify the Department before beginning an activity that will substantially modify a river, stream, or lake. If the Department determines that the activity could substantially adversely affect an existing fish and wildlife resource, a Lake or Streambed Alteration Agreement is required.

California Coastal Commission

Protects, conserves, restores, and enhances environmental and human-based resources of the California coast and ocean for environmentally sustainable and prudent use by current and future generations. Established by voter initiative in 1972 (Proposition 20) and later made permanent by the Legislature through adoption of the California Coastal Act of 1976.

Regional Water Quality Control Board (RWQCB)

The RWQCB was created by the Legislature in 1967. The mission of the Water Board is to ensure the highest reasonable quality for waters of the State, while allocating those waters to achieve the optimum balance of beneficial uses. The joint authority of water allocation and water quality protection enables the Water Board to provide comprehensive protection for California's waters.

1.6.2 Key Biological Planning, Management and Partnering Agencies

The following are the key biological planning, management and partnering agencies within the Watershed:

National Park Service (NPS) – Rivers, Trails, & Conservation Assistance Program (RTCA)

The Rivers, Trails & Conservation Assistance Program assist trails development by facilitating work group for the Coyote Creek Bikeway Project.

California Coastal Conservancy

The California Coastal Conservancy is a State agency established in 1976 that uses entrepreneurial techniques to purchase, protect, restore, and enhance coastal resources, and to provide access to the shore. The agency works in partnership with local governments, other public agencies, nonprofit organizations, and private landowners.

California Department of Conservation (DOC)

The California DOC administers a variety of programs vital to California's public safety, environment and economy. The services DOC provides are designed to balance today's needs

with tomorrow's obligations by fostering the wise use and conservation of energy, land and mineral resources.

California Department of Parks and Recreation (DPR)

California Department of Parks and Recreation manages state park units, which contain a collection of natural, cultural, and recreational resources within California. The DPR is responsible for almost one-third of California's coastline, California State Parks manages the state's coastal wetlands, estuaries, beaches, and dune systems. DPR manages and owns the Chino Hills State Park within the watershed.

The following plans are administered by the California Department of Parks and Recreation:

> **Strategic Plan: The Seventh Generation - The Strategic Vision of California State Parks:** (Adopted 2001) The Strategic Vision defines the vision for California State Parks and serves as the Department's Strategic Plan. It outlines the Department's heritage, values, mission, and vision.
>
> **General Plans for State parks:** Focused and detailed planning results in the General Plans which are prepared for the System's individual park units. Park Unit General Plans deal with the protection, development and management of the individual park about which the plan is written.

County of Los Angeles Department of Regional Planning

The Department of Regional Planning's Planning Commission acts as an advisory body to the Board of Supervisors on all planning matters, and administers the provisions of the State Planning Law, the State Subdivision Map Act, CEQA, and the Los Angeles County Ordinances affecting planning such as the County Zoning Ordinance and Subdivision Ordinance. It formulates planning policies and conducts regular public hearings.

County of Orange Harbors, Beaches & Parks Division

The Orange County Harbors, Beaches and Parks operates regional recreational facilities and manages historical and natural resources within Orange County. Approximately 37,000 acres of parkland and open space include regional and wilderness parks, nature preserves and recreational trails, historic sites, and harbors and beaches.

Orange County Planning & Development Services Division (PDS)

PDS serves the planning and development entitlement requirements of private and public project applicants within unincorporated areas. PDS planners, engineers, technicians, and administrative support personnel serve both the current and, through stewardship of the physical environment, future residents of Orange County.

Puente Hills Landfill Native Habitat Preservation Authority

The purpose of the Authority is to acquire, restore and maintain open space in the Puente Hills as a permanent protection for the native habitat. The Habitat Authority's jurisdiction extends within eastern Los Angeles County approximately from the intersection of the 605 and 60 Freeways in the west to Harbor Boulevard in the east.

San Gabriel & Lower Los Angeles Rivers & Mountains Conservancy (RMC)

The San Gabriel and Lower Los Angeles RMC is one of eight conservancies in the California Resources Agency. The mission is to preserve open space and habitat in order to provide for low-impact recreation and educational uses, wildlife habitat restoration and protection, and watershed improvements, including Coyote Creek Watershed within the jurisdiction. The RMC covers eastern Los Angeles County and western Orange County.

The following are plans and programs administered by the RMC:

Common Ground from the Mountain to the Sea: (Adopted October, 2001) Common Ground is a Watershed and Open Space Plan for the San Gabriel and Los Angeles Rivers and was jointly developed by RMC and the Santa Monica Mountains Conservancy (SMMC).

Green Visions Plan for 21st Century Southern California: (Series of documents published 2004-2005) Green Visions is a visionary plan and practical planning tools to promote habitat conservation, watershed health and recreational open space created by the RMC, the Santa Monica Mountains Conservancy, Baldwin Hills Conservancy and Coastal Conservancy, and the University of Southern California's Center for Sustainable Cities and GIS Research Laboratory.

Missing Linkages: Restoring Connectivity to the California Landscape: (Adopted November, 2000) The Missing Linkages report are the results a gathering of professionals to coordinate a statewide effort in California to systematically identify, study, and protect wildlife corridors throughout the state and identify where future conservation might be directed.

Watershed Conservation Authority (WCA)

The Watershed Conservation Authority is a joint powers entity of the Rivers and Mountains Conservancy (RMC) and the Los Angeles County Flood Control District (LACFCD). The focus of the WCA is on projects which will provide open space, habitat restoration, and watershed improvement projects in the watersheds of both the San Gabriel River and the Lower Los Angeles River.

1.6.3 Key Biological Stewardship Organizations

The following are the key biological stewardship organizations within the Watershed:

Earth Resources Foundation

Earth Resources Foundation is an environmental educational non-profit organization developed to empower the general public with the resources needed to make environmentally sustainable choices and changes

Friends of Coyote Hills (FCH)

The mission of FCH is to ensure the permanent protection and preservation of the remaining natural open space and undeveloped areas in the West Coyote Hills of North Orange County. FCH seeks to protect the last of the existing native habitat in Coyote Hills.

Friends of Harbors, Beaches, and Parks

The Mission of the Friends of Harbors, Beaches and Parks, Inc. is to promote, protect and enhance the harbors, beaches, parks, trails, open spaces, natural preserves, and historical sites in Orange County.

Hills for Everyone

Hills for Everyone protects, preserves and restores the environmental resources and natural environs of the Puente-Chino Hills and surrounding areas for the enjoyment of current and succeeding generations and to initiate, sponsor, promote, organize and carry out plans, programs, and activities that will tend to further these ends.

Hillside Open Space Education Coalition

The Hillside Open Space Education Coalition preserves strategic parcels of hillside open space from the threat of development and prevents unwanted impacts on existing traffic congestion, schools, community infrastructure, and runoff pollution, as well as the regional wildlife and open space corridor.

Los Cerritos Wetlands Task Force

The task force is a collection of citizens and environmental groups concerned about the environment of the Los Cerritos Wetlands. The Task Force includes environmental groups such as, El Dorado Audubon Society, Sierra Club and Surfrider Foundation.

Wildlife Corridor Conservation Authority (WCCA)

The WCCA was established to provide for the proper planning, conservation, environmental protection, and maintenance of lands within the Puente-Chino Hills corridor area. Its goal is to assure that sufficient continuity of habitat can be preserved to maintain a functioning wildlife corridor made up of about 40,000 acres of land located between the Santa Ana Mountains and Whittier Hills.

1.7 HISTORIC AND CULTURAL RESOURCES

The Coyote Creek Watershed Area contains historic and cultural resources. These resources are administered by local, county, State, and non-profit agencies. The agencies that oversee these historic and cultural resources are described in this section.

1.7.1 Key Historic and Cultural Agencies and Tools

The following are the key historic and cultural agencies and tools within the Watershed:

California Department of Parks and Recreation - Office of Historic Preservation (OHP)

The Office of Historic Preservation is responsible for administration of federally and state mandated historic preservation programs in California. The mission of the Office of Historic Preservation is to preserve and enhance California's historic heritage as a matter of public interest.

California State Parks - Archaeology, History and Museums

California State Parks Archaeology, History and Museums provides a State resource for California cultural heritage, archaeological resources, and the management of cultural resources and landscapes.

County of Los Angeles Public Library

The County of Los Angeles Public Library provides reference and information services, loans of books and other media to California residents.

Orange County Public Library

The Orange County Public Library is a network of community libraries. There are 32 branches as well as an outlet in Orangewood Children's Home to provide a variety of services to residents throughout the County.

Friends of Harbors, Beaches and Parks

The Mission of the Friends of Harbors, Beaches and Parks, Inc. is to promote, protect and enhance the harbors, beaches, parks, trails, open spaces, natural preserves, and historical sites in Orange County.

City Libraries

Other city libraries within the Watershed Area provide resources and references for their respective cities.

Attachment A

WATERSHED DIRECTORY

LAND USE AND PEOPLE

Elected Officials

California Assembly District 54, Honorable Betty Karnette

California Assembly District 55, Honorable Jenny Oropeza

California Assembly District 56, Honorable Rudy Bermúdez

California Assembly District 58, Honorable Ron Calderon

California Assembly District 60, Honorable Bob Huff

California Assembly District 67, Honorable Tom Harman

California Assembly District 69, Honorable Tom Umberg

California Assembly District 72, Honorable Lynn Daucher

California Senate District 27, Honorable Alan Lowenthal

California Senate District 29, Honorable Bob Margett

California Senate District 30, Honorable Joseph Martha Escutia

California Senate District 33, Honorable Joseph Dick Ackerman

California Senate District 34, Honorable Joseph L. Dunn

California Senate District 35, Honorable Joseph John Campbell

County of Los Angeles Supervisorial District 1, Honorable Gloria Molina

County of Los Angeles Supervisorial District 4, Honorable Don Knabe

County of Orange Supervisorial District 2, Honorable James W.Silva

County of Orange Supervisorial District 3, Honorable Bill Campbell

County of Orange Supervisorial District 4, Honorable Chris Norby

County of Orange San Bernardino District 4, Honorable Gary Ovitt

U.S. Congressional District 38, Honorable Grace F. Napolitano

U.S. Congressional District 39, Honorable Linda T. Sanchez

U.S. Congressional District 40, Honorable Ed Royce

U.S. Congressional District 42, Honorable Gary G. Miller

U.S. Congressional District 46, Honorable Dana Rohrabacher

U.S. Congressional District 47, Honorable Loretta Sanchez

U.S. Senate, Honorable Barbara Boxer

U.S. Senate, Honorable Dianne Feinstein

Land Use Planning

California State Lands Commission

City of Anaheim, Planning Department

City of Artesia, Community Development Department

City of Brea, Development Services Department

City of Buena Park, Community Development Department

City of Cerritos, Community Development Department

City of Chino Hills, Community Development Department

City of Cypress, Community Development Department

City of Diamond Bar, Community Development Department

City of Fullerton, Development Services Department, Planning Division

City of Hawaiian Gardens, Community Development Department

City of La Habra Heights, Community Development Department

City of La Habra, Planning Department

City of La Mirada, Community Development Department

City of La Palma, Planning Division

City of Lakewood, Community Development Department

City of Long Beach, Planning and Building Department

City of Los Alamitos, Community Development Department

City of Norwalk, Community Development Department

City of Placentia, Department of Development Services

City of Santa Fe Springs, Department of Planning and Development

City of Seal Beach, Department of Development Services

City of Whittier, Planning Department

County of Los Angeles, Department of Regional Planning (LA DPR)

County of Orange, Planning & Development Services Division (OC PDSD)

Gateway Cities Council of Governments (GC COG)

Orange County Council of Governments (OC COG)

San Bernardino County, Land Use Services Department

Transportation (regional planning, infrastructure construction & maintenance,)

California Department of Transportation (Caltrans), Districts 7 & 10

Los Angeles County Metropolitan Transportation Authority (MTA)

Orange County Transportation Authority (OCTA)

San Bernardino County, Transportation Department

Southern California Association of Governments (SCAG)

Private Development

Aera Energy

American Society of Landscape Architects

Recreation & Trails

Equestrian Trails Incorporated

County of Los Angeles, Department of Parks and Recreation

County of Orange, Harbors Beaches & Parks

Los Angeles County Bicycle Coalition

Orange County Bicycle Coalition

California Resources Agency, Department of Park and Recreation

Industrial & Commercial

California Environmental Protection Agency, Integrated Waste Management Board (IWMB)

County of Orange, Integrated Waste Management Department

Senator Romero

Southern California Edison

Health & Safety

California Environmental Protection Agency, Department of Toxic Substances and Control (DTSC)

County of Los Angeles Department of Health Services

County of Los Angeles Sheriffs Department

County of Orange Health Care Agency

County of Orange Sherriff's Department

CLIMATE AND AIR RESOURCES

California Environmental Protection Agency, Air Resources Board (ARB)

South Coast Air Quality Management District (SC AQMD)

U. S. Environmental Protection Agency (EPA)

GEOLOGIC RESOURCES

California Department of Conservation, California Geological Survey

U.S. Geological Survey (USGS)

U.S. Natural Resources Conservation Services (NRCS)

WATER RESOURCES

General Water Resources

National Water Research Institute

U. S. Environmental Protection Agency (EPA) - Wetlands, Oceans, and Watersheds

Water Environment Federation

Coastal, Wetlands, Riparian & Aquatic Habitat

American Oceans Campaign (Oceana)

American Shores and Beach Preservation Association

Blue Planet Foundation

California Coastal Coalition

California Coastal Commission

California Coastal Conservancy

California Earth Corps

Clean Beaches Council

Heal the Bay

Los Cerritos Wetlands Conservancy

Orange County Coastkeeper

Orange County Resources and Development Management Department, Harbors, Beaches and Parks Division

Scripps Institution of Oceanography

Southern California Coastal Water Research Project

Surfrider Foundation

U.S. Coast Guard

Water Resources Center

Streams, Wetlands, Lakes

California Department of Fish and Game (DFG)

California Department of Water Resources

California Environmental Protection Agency, State Water Resources Control Board (SWRCB)

California Resources Agency, CALFED Bay Delta Program

California Resources Agency, Department of Boating and Waterways

California Resources Agency, Department of Water Resources

Friends of the San Gabriel River

Orange County Mosquito & Vector Control District

Watershed Organizations

California Watershed Network

Center for Watershed Protection

County of Los Angeles, Department of Public Works, Watershed Management Division

County of Orange, Resources & Development Management Department, Watershed and Coastal Resources Division

Los Angeles and San Gabriel Rivers Watershed Council

National Watershed Forum

National Watershed Library

U. S. Army Corps of Engineers (ACOE) - Los Angeles District, Plan Formulation Branch, Watershed Studies

Watershed Management Council

California Resources Agency - Watershed Portal

Water Supply

Central Basin Municipal Water District

City Of Brea W.S.A.

City Of Buena Park W.S.A.

City Of Cerritos W.S.A.

City Of Chino Hills W.S.A.

City Of Fullerton W.S.A.

City Of La Palma W.S.A.

City Of Norwalk W.S.A.

City Of Santa Fe Springs W.S.A

County Of San Bernardino W.S.A

La Habra Heights County Water District

Long Beach Water District

Los Angeles County, Department of Beaches and Harbors

Metropolitan Water District

Metropolitan Water District of Southern California

Municipal Water District of Orange County

Orange County Water District

Orchard Dale Water District

Park Water Company

Southeast Water Coalition

Suburban Water Systems

Three Valleys Municipal Water District

Upper San Gabriel Valley Metropolitan Water District

Water Replenishment District

West And Central Basin Municipal Water District

Yorba Linda Service Area

Water Quality

Regulators

California Environmental Protection Agency, Department of Pesticide Regulation (DPR)

California Environmental Protection Agency, Department of Toxic Substances and Control (DTSC)

California Environmental Protection Agency, Integrated Waste Management Board (IWMB)

Los Angeles County Sanitation District

Los Angeles County, Department of Public Works

County of Orange, Resources and Development Management Department, Flood Control Division

Regional Water Quality Control Board, Los Angeles Region 4 (LA RWQCB)

Regional Water Quality Control Board, Santa Ana Region 8 (SA RWQCB)

U.S. Environmental Protection Agency (EPA)

Regulated

County of Orange, Resources and Development Management Department, Watershed & Coastal Resources Division (lead permittee)

County of Los Angeles, Department of Public Works, Watershed Management Division (lead permittee)

All 22 Cities

Researchers

Southern California Coastal Water Research Project

BIOLOGICAL RESOURCES

Open Space Planning & Habitat

Amigos de los Rios

Audubon Society

Friends of Harbors, Beaches and Parks

Hills for Everyone

San Gabriel & Lower Los Angeles Rivers and Mountains Conservancy (RMC)

Sierra Club

South Coast Wildlands Project

Trust for Public Land

Habitat Regulators

California Exotic Pest Control

California Department of Fish and Game (DFG)

California Resources Agency, CALFED Bay Delta Program

California Resources Agency, California Conservation Corps

California Resources Agency, Department of Conservation

California Resources Agency, Department of Fish and Game

California State Parks

Conservation Biology Institute

Earth 911

Earth Resources Foundation

Fisheries Resource Volunteer Corps

Fly Fishers Club of Orange County

Friends of Harbors, Beaches and Parks

Laguna Greenbelt

Los Cerritos Wetlands Task Force

National Oceanic and Atmospheric Administration (NOAA)

National Park Service (NPS) - Rivers, Trails, & Conservation Assistance Program (RTCA)

Newport Bay Naturalists & Friends

North East Trees

Puente Hills Landfill Native Habitat Preservation Authority

San Gabriel Mountains Regional Conservancy

Seal Beach national Wildlife Refuge

SeaWeb

Serrano Creek Conservancy

U.S. Environmental Protection Agency (EPA)

U.S. Fish and Wildlife Service (FWS)

US Coast Guard

USC Sea Grant

HISTORIC AND CULTURAL RESOURCES

CA Resources Agency

California Department of Parks and Recreation - Office of Historic Preservation

Friends of Harbors, Beaches and Parks

Attachment B

AGENCY RESOURCES MATRIX

LAND USE AND PEOPLE

Elected Officials

No.	Agency Name	Role in the Watershed	Plans and Programs
1	California Assembly District 54, Honorable Betty Karnette		
2	California Assembly District 55, Honorable Jenny Oropeza		
3	California Assembly District 56, Honorable Rudy Bermúdez		
4	California Assembly District 58, Honorable Ron Calderon		
5	California Assembly District 60, Honorable Bob Huff		
6	California Assembly District 67, Honorable Tom Harman		
7	California Assembly District 69, Honorable Tom Umberg		
8	California Assembly District 72, Honorable Lynn Daucher		
9	California Senate District 27, Honorable Alan Lowenthal		
10	California Senate District 29, Honorable Bob Margett		
11	California Senate District 30, Honorable Joseph Martha Escutia		
12	California Senate District 33, Honorable Joseph Dick Ackerman		
13	California Senate District 34, Honorable Joseph L. Dunn		
14	California Senate District 35, Honorable Joseph John Campbell		
15	County of Los Angeles Supervisorial District 1, Honorable Gloria Molina		
16	County of Los Angeles Supervisorial District 4, Honorable Don Knabe		
17	County of Orange Supervisorial District 2, Honorable James W.Silva		
18	County of Orange Supervisorial District 3, Honorable Bill Campbell		
19	County of Orange Supervisorial District 4, Honorable Chris Norby		
20	County of Orange San Bernardino District 4, Honorable Gary Ovitt		
21	U.S. Congressional District 38, Honorable Grace F. Napolitano		

No.	Agency Name	Role in the Watershed	Plans and Programs
22	U.S. Congressional District 39, Honorable Linda T. Sanchez		
23	U.S. Congressional District 40, Honorable Ed Royce		
24	U.S. Congressional District 42, Honorable Gary G. Miller		
25	U.S. Congressional District 46, Honorable Dana Rohrabacher		
26	U.S. Congressional District 47, Honorable Loretta Sanchez		
27	U.S. Senate, Honorable Barbara Boxer		
28	U.S. Senate, Honorable Dianne Feinstein		

Land Use and Planning

No.	Agency Name	Role in the Watershed	Plans and Programs
1	California State Lands Commission		
2	City of Anaheim	Plans and regulates current and future land use development within its jurisdiction.	City of Anaheim General Plan
			• Land Use Element
			• Greening Element
			• Growth Management Element
3	City of Artesia	Plans and regulates current and future land use development within its jurisdiction.	City of Artesia General Plan
4	City of Brea	Plans and regulates current and future land use development within its jurisdiction.	City of Brea General Plan
			• Community Development
			- Land Use
			- Infrastructure
			- Growth Management
			• Community Resources
			- Parks and Open Space
			- Trails

No.	Agency Name	Role in the Watershed	Plans and Programs
			- Wildlife Habitat
			- Scenic Resources
			- Water Conservation Quality
			- Air Quality
			- Historic Resources
5	City of Buena Park	Plans and regulates current and future land use development within its jurisdiction.	City of Buena Park General Plan
			• Land Use Element
			• Infrastructure Element
			• Open Space and Recreation
			• Conservation
			• Air Quality
			• Growth Management Element
6	City of Cerritos	Plans and regulates current and future land use development within its jurisdiction.	City of Cerritos General Plan
			• Land Use
			• Conservation
			• Open Space/Recreation
			• Air Quality
			• Growth Management
7	City of Chino Hills	Plans and regulates current and future land use development within its jurisdiction.	City of Chino Hills General Plan
			• Land Use
			• Parks, Recreation and Open Space
			• Conservation
8	City of Cypress	Plans and regulates current and future land use development within its jurisdiction.	City of Cypress General Plan
			• Land Use Element
			• Open Space Element

No.	Agency Name	Role in the Watershed	Plans and Programs
			• Air Quality Element
			• Growth Management Element
9	City of Diamond Bar	Plans and regulates current and future land use development within its jurisdiction.	City of Diamond Bar General Plan
			• Land Use Element
			• Resource Management element
			• Public Health and Safety Element
10	City of Fullerton	Plans and regulates current and future land use development within its jurisdiction.	City of Fullerton General Plan
			• Resource Management Element
			- Natural Resources
			- Historic Resources
			- Open Space
			- Parks/Recreation
			- Scenic Corridor/Rural Streets
			• Community Health and Safety
			- Water, Sewer, Storm Drain/Flood
			• Regional Coordination
			- Air Quality
			- Solid Waste Management
			- Hazardous Waste Management
11	City of Hawaiian Gardens	Plans and regulates current and future land use development within its jurisdiction.	City of Hawaiian Gardens General Plan
			• Land Use Element
			• Conservation
			• Open Space/Recreation
			• Air Quality/Waste
12	City of La Habra	Plans and regulates current and future land use	City of La Habra General Plan

No.	Agency Name	Role in the Watershed	Plans and Programs
		development within its jurisdiction.	• Land Use/Circulation
13	City of La Habra Heights	Plans and regulates current and future land use development within its jurisdiction.	City of La Habra Heights
			• Environmental Resource Management
			• Air Quality
14	City of La Mirada	Plans and regulates current and future land use development within its jurisdiction.	City of La Mirada General Plan
			• Land Use Element
			• Open Space and Conservation Element
15	City of La Palma	Plans and regulates current and future land use development within its jurisdiction.	City of La Palma General Plan
			• Land Use Element
			• Open Space/Conservation Element
			• Growth Management Element
16	City of Lakewood	Plans and regulates current and future land use development within its jurisdiction.	City of Lakewood General Plan
			Land Use Element
			Conservation Element
			Open Space Element
			Recreation and Community Services Element
			Air Quality Element
17	City of Long Beach	Plans and regulates current and future land use development within its jurisdiction.	• City of Long Beach General Plan
			- Conservation Element
			- Land Use Element
			- Open Space and Recreation Element
			• City of Long Beach Local Coastal Program
			• El Dorado Nature Center Master Plan
			• DeForest Nature Center and Sixth Street Sites Wetland Feasibility Study: Final Summary Report

No.	Agency Name	Role in the Watershed	Plans and Programs
18	City of Los Alamitos	Plans and regulates current and future land use development within its jurisdiction.	City of Los Alamitos General Plan
			• Land Use Element
			• Conservation Element
			• Open Space and Recreation
			• Growth Management Element
19	City of Norwalk	Plans and regulates current and future land use development within its jurisdiction.	City of Norwalk General Plan
			• Land Use Element
			• Conservation Element
			• Open Space Element
			• Educational and Cultural Resources Element
			• Utility Infrastructure Element
20	City of Placentia	Plans and regulates current and future land use development within its jurisdiction.	City of Placentia General Plan
			• Land Use Element
21	City of Santa Fe Springs	Plans and regulates current and future land use development within its jurisdiction.	City of Seal Beach General Plan
			• Land Use Element
			• Open Space/Recreation/Conservation Element
			• Cultural Resources Element
			• Growth Management Element
22	City of Seal Beach	Plans and regulates current and future land use development within its jurisdiction.	• General Plan
			• City of Seal Beach Local Coastal Program
23	City of Whittier	Plans and regulates current and future land use development within its jurisdiction.	City of Whittier General Plan
24	County of Los Angeles, Department of Regional Planning (LA DPR)	Plans and regulates current and future land use development within its jurisdiction.	Los Angeles County General Plan
			• Land Use Element
			• Conservation and Open Space Element

No.	Agency Name	Role in the Watershed	Plans and Programs
25	County of Orange, Planning & Development Services Division (OC PDSD)	Plans and regulates current and future land use development within its jurisdiction.	Orange County General Plan
			• Land Use Element
			• Resources Element
			• Recreation Element
			• Growth Management Element
26	Gateway Cities Council of Governments (GC COG)		
27	Orange County Council of Governments (OC COG)		
28	San Bernardino County, Land Use Services Department	Plans and regulates current and future land use development within its jurisdiction.	San Bernardino County General Plan
			• Natural Resources Element
			- Biological
			- Cultural/Paleontological
			- Air Quality
			- Water
			- Open Space/Recreation
			- Soils/Agriculture
			- Minerals
			• Man-Made Resources
			- Wastewater
			- Solid Waste
			- Land Use/Growth Management

Transportation

1	California Department of Transportation (Caltrans), Districts 7 & 10
2	Los Angeles County Metropolitan Transportation Authority (MTA)
3	Orange County Transportation Authority (OCTA)
4	San Bernardino County, Transportation Department
5	Southern California Association of Governments (SCAG)
6	Private Development
7	Aera Energy
8	American Society of Landscape Architects

Industrial and Commercial

1	California Environmental Protection Agency, Integrated Waste Management Board (IWMB)
2	County of Orange, Integrated Waste Management Department
3	Senator Romero
4	Southern California Edison

Recreation and Trails

1	Equestrian Trails Incorporated
2	County of Los Angeles, Department of Parks and Recreation
3	County of Orange, Harbors Beaches & Parks
4	Los Angeles County Bicycle Coalition
5	Orange County Bicycle Coalition
6	California Resources Agency, Department of Park and Recreation

Health and Safety

No.	Agency Name	Role in the Watershed	Plans and Programs
1	California Environmental Protection Agency, Department of Toxic Substances and Control (DTSC)		
2	County of Los Angeles Department of Health Services		
3	County of Los Angeles Sheriffs Department		
4	County of Orange Health Care Agency		Ocean Water Protection Program
			Cross Connection Program
			Well Permitting Program
			Liquid Waste Hauling Vehicles Program
5	County of Orange Sherriff's Department		

CLIMATE AND AIR RESOURCES

No.	Agency Name	Role in the Watershed	Regulations	Plans and Programs
1	California Environmental Protection Agency, Air Resources Board (ARB)	ARB works with the public, the business sector, and local governments to protect the public's health, the economy and the state's ecological resources through the most cost-effective reduction of air pollution.	The ARB is responsible for monitoring the regulatory activity of California's 35 local air districts. California Air Pollution Control Laws California Air Quality Legislation Federal Clean Air Act	
2	South Coast Air Quality Management District (SC AQMD)	The AQMD is the air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties. AQMD is responsible for controlling emissions primarily from stationary sources of air pollution. These can include anything from large power plants and refineries to the corner gas station.		1. Air Quality Management Plan (AQMP): Every three years, AQMD prepares an AQMP for the air quality improvement. Each iteration of the plan is an update of the previous plan and has a 20-year horizon. 2. Air Toxics Control Plan: The Air Toxics Control Plan is a planning document designed to examine the overall direction of the AQMD's air toxics control program. It includes strategies that aim to reduce toxic emissions and risk from both mobile and stationary sources. 3. Ozone Plans: Final 1999 Amendment to the 1997 Ozone SIP Revision for the South Coast Air Basin
3	U. S. Environmental Protection Agency (EPA)	EPA protects human health and the environment through the regulatory process and voluntary programs such as Energy Star and Commuter Choice. Under the Clean Air Act, EPA sets limits on how much of a pollutant is allowed in the air anywhere in the United States.	**1955 Clean Air Act (CAA):** The Clean Air Act is the comprehensive Federal law that regulates air emissions from area, stationary, and mobile sources. This law authorizies the U.S. Environmental Protection Agency to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment. **1970 Pollution Prevention Act (PPA):** The Pollution Prevention Act focused industry, government, and public attention on reducing the amount of pollution through cost-effective changes in production, operation, and raw materials use. Opportunities for source reduction are	**Acid Rain Program** - a program designed to significantly reduce emissions responsible for acid deposition. **AirNow** - provides real-time air pollution data, information about the public health and environmental effects of air pollution, and information about ways to protect public health and reduce air pollution. Also known as the Ozone Mapping Project. **Best Workplaces for Commuters (formerly Commuter Choice Leadership Initiative)** - Best Workplaces for Commuters is a joint EPA and U.S. Department of Transportation recognition and partnership program that encourages employers to offer their employees an outstanding level of commuter benefits such as tax-free transit passes, vanpool benefits, or telecommuting. **Clean Energy** - Clean energy is energy derived from highly efficient, clean technologies, including renewable, "green" power, and combined heat and power. The EPA's Clean Energy Programs are designed to improve the national

No.	Agency Name	Role in the Watershed	Regulations	Plans and Programs
			often not realized because of existing regulations, and the industrial resources required for compliance, focus on treatment and disposal. Source reduction is fundamentally different and more desirable than waste management or pollution control.	foundation of information on Clean Energy by creating networks between the public and private sector, providing technical assistance, and offering recognition of environmental leaders that adopt Clean Energy practices. **Climate Leaders Partnership** - Climate Leaders is a voluntary industry- government partnership that encourages companies to develop long-term comprehensive climate change strategies and set greenhouse gas (GHG) emissions reduction goals. **Combined Heat and Power** - also known as cogeneration, is an efficient and reliable approach to generating power and thermal energy from a single fuel source. CHP is more efficient, cleaner, and reliable than conventional central power plants. The EPA Combined Heat and Power Partnership is a voluntary program that seeks to reduce the environmental impact of power generation by fostering the use of cost-effective CHP. **Combustion** - ensures the safety and reliability of hazardous waste combustion in incinerators and boilers and industrial furnaces. **Design for the Environment (DfE)** - helps businesses incorporate environmental considerations into the design redesign of products, processes, and technical and management systems. **Energy Star Programs** - works with the private sector developing cutting-edge, voluntary partnerships for the production and use of energy-efficient equipment. **Enviroene** - this site provides a single repository for pollution prevention, compliance assurance, and enforcement information and data bases. **Green Power Partnership** - The Green Power Partnership is a voluntary Partnership between the U.S. Environmental Protection Agency (EPA) and organizations that are interested in buying green power. Through this program, the EPA supports organizations that are buying or planning to buy green power. As a Green Power Partner, an organization pledges to replace a portion of its electricity consumption with green power within a year of joining the Partnership. The EPA offers credible benchmarks for green power purchases, market information, and opportunities for recognition and promotion of leading purchasers.

No.	Agency Name	Role in the Watershed	Regulations	Plans and Programs
				Indoor Air Quality - provides information on all aspects of indoor air quality including radon, asthma, smoke-free homes, mold, and the Indoor Air Quality Tools for Schools Program. **Lead Programs** - information on all aspects of the federal lead poisoning prevention program. **Mixed Waste Homepage** - a program to coordinate management of mixed waste containing radioactive and hazardous waste. **Mobile Sources** - carries out a broad range of activities to reduce pollutants emitted from motor vehicles, off-road equipment (e.g., lawnmowers, boats, locomotives, etc.), and their fuels. **New Chemicals** - responsible for reviewing premanufacture notice (PMN) submissions and identifying new substances that require regulatory action. **Ozone Layer Protection Program** - contains information about the science of ozone depletion, regulations in the US designed to protect the ozone layer, and more. **Pollution Prevention** - works for "source reduction," and other practices that reduce or eliminate the creation of pollutants. **Radiation Programs** - coordinates activities that protect the public health and environment from the effects of ionizing radiation. **SmartWay Transport Program** - partnership with leading members of America's truck and rail transport sector which aims to reduce pollution and greenhouse gas emissions from ground freight carriers such as trucks and locomotives. **Sunwise Schools Program** - This program provides materials to help teachers educate students in K-6 about protecting themselves from overexposure to the sun's ultraviolet radiation. **Toxics Release Inventory** - the source of information about toxic chemicals that are being used, manufactured, transported, or released into the environment. **TSCA Biotechnology Program** - reviews new chemicals before they are introduced into commerce. **Voluntary Diesel Retrofit Program** - works to reduce pollution resulting from existing diesel vehicles and equipment by encouraging fleet owners to install pollution-reducing devices on the vehicles and to use cleaner-burning diesel fuel. **Waste Minimization** - focuses on reducing the generation and

No.	Agency Name	Role in the Watershed	Regulations	Plans and Programs
				subsequent release to the environment of the most persistent, bioaccumulative, and toxic chemicals in hazardous wastes.

GEOLOGICAL RESOURCES

No.	Agency Name	Role in the Watershed	Regulations	Plans and Programs
1	California Department of Conservation, California Geological Survey			
2	U. S. Geological Survey	Provides information relating to water, biology, geography, and geology within the watershed		USGS Library The National Biological Information Infrastructure Geodata.gov
3	U.S. Natural Resources Conservation Services (NRCS)			

WATER RESOURCES

General Water Resources

No.	Agency Name	Role in the Watershed	Regulation/ Policy	Plans and Programs
1	National Water Research Institute			
2	U. S. Environmental Protection Agency (EPA) - Wetlands, Oceans, and Watersheds	EPA's Office of Water offers assistance to help water quality managers and staff throughout the public and private sectors develop and implement watershed approaches. The four main areas covered include watershed management training, statewide watershed approach facilitation, watershed program scoping, and technical analysis assistance.	1948 Clean Water Act (CWA): The Clean Water Act (CWA) is the cornerstone of surface water quality protection in the United States. (The Act does not deal directly with ground water nor with water quantity issues.) The statute employs a variety of regulatory and nonregulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff. These tools are employed to achieve the broader goal of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters so that they can support "the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water." · Wetlands Laws, Regulations, Executive Orders,Guidance, and Scientific Documents · Watershed-Based National Pollutant Discharge Elimination System (NPDES) Permitting Policy	Watershed Protection Approach Strategy: The Watershed Protection Approach is a strategy for effectively protecting and restoring aquatic ecosystems and protecting human health. This strategy has as its premise that many water quality and ecosystem problems are best solved at the watershed level rather than at the individual waterbody or discharger level. Major features of a Watershed Protection Approach are: targeting priority problems, promoting a high level of stakeholder involvement, integrated solutions that make use of the expertise and authority of multiple agencies, and measuring success through monitoring and other data gathering.
3	Water Environment Federation			

Coastal, Wetlands, Riparian, and Aquatic Habitat

1	American Oceans Campaign (Oceana)
2	American Shores and Beach Preservation Association
3	Blue Planet Foundation
4	California Coastal Coalition
5	California Coastal Commission
6	California Coastal Conservancy
7	California Earth Corps
8	Clean Beaches Council
9	Heal the Bay
10	Los Cerritos Wetlands Conservancy
11	Orange County Coastkeeper
12	Orange County Resources and Development Management Department, Harbors, Beaches and Parks Division
13	Scripps Institution of Oceanography
14	Southern California Coastal Water Research Project
15	Surfrider Foundation
16	U.S. Coast Guard
17	Water Resources Center

Streams, Wetlands, Lakes

No.	Agency Name	Role in the Watershed	Regulation/ Policy	Plans and Programs
1	California Resources Agency, Department of Fish and Game (DFG)	The Department of Fish and Game maintains native fish, wildlife, plant species and natural communities for their intrinsic and ecological value and their benefits to people. This includes habitat protection and maintenance in a sufficient amount and quality to ensure the survival of all species and natural communities. The department is also responsible for the diversified use of fish and wildlife including recreational, commercial, scientific and educational uses.	California Fish and Game Code: • California Code of Regulations (Including Title 14)· • Fishing: 2005 Sport Fishing Regulations, Hunting: July 1, 2005-June 30· • 2006 Mammal Hunting and Trapping Regulations, July 1, 2005-June 30· • 2006 Resident and Migratory Game Upland Game Birds, Hunting Regulations· • July 1, 2004- June 30, 2005 Waterfowl Hunting Regulations· • 2004 Hunting Regulations for Waterfowl, Upland Game, and State and Federal Areas	The Natural Community Conservation Planning (NCCP) program: The primary objective of the NCCP program is to conserve natural communities at the ecosystem scale while accommodating compatible land use.· Federal Habitat Conservation Plans: Habitat Conservation Plans (HCP) are long-term agreements between an applicant and the U.S. Fish and Wildlife Service. They are designed to offset any harmful effects that a proposed activity might have on federally-listed threatened and endangered species.· Conservation Banking: A conservation bank generally protects threatened and endangered species habitat. Credits are established for the specific sensitive species that occur on the site. Conservation banks must be approved by the wildlife agencies, such as the Department of Fish and Game and the U.S. Fish and Wildlife Service. · Mitigation Banking: Mitigation banking is the same concept as conservation banking, but is specifically for wetland restoration, creation, and enhancement undertaken to compensate for unavoidable wetland losses. Use of mitigation bank credits must occur in advance of development, when the compensation cannot be achieved at the development site or would not be as environmentally beneficial.
2	California Resources Agency, Department of Water Resources	DWR operates and maintains the State Water Project, including the California Aqueduct. The department also provides dam safety and flood control services, assists local water districts in water management and conservation activities, promotes recreational		• **California Water Plan:** The California Water Plan provides a framework for water managers, legislators, and the public to consider options and make decisions regarding California's water future. The Plan, which is updated every five years, presents basic data and information on California's water resources including water supply evaluations and

No.	Agency Name	Role in the Watershed	Regulation/ Policy	Plans and Programs
		opportunities, and plans for future statewide water needs.		assessments of agricultural, urban, and environmental water uses to quantify the gap between water supplies and uses. The Plan also identifies and evaluates existing and proposed statewide demand management and water supply augmentation programs and projects to address the State's water needs. · Urban Streams Restoration Program - Division of Planning and Local Assistance: Grants assist communities in reducing damages from stream bank and watershed instability and floods while restoring the environmental and aesthetic values of streams · Watershed Restoration - Division of Planning and Local Assistance: Managing water resources to protect, restore, and enhance the natural and human environments in California.
3	California Environmental Protection Agency, State Water Resources Control Board (SWRCB)			
4	California Resources Agency, CALFED Bay Delta Program			
5	California Resources Agency, Department of Boating and Waterways			
6	Friends of the San Gabriel River			
7	Orange County Mosquito & Vector Control District			

Water Organizations

No.	Agency Name	Role in the Watershed	Regulation/ Policy	Plans and Programs
1	California Watershed Network			
2	Center for Watershed Protection			
3	County of Los Angeles, Department of Public Works, Watershed Management Division			
4	County of Orange, Resources & Development Management Department, Watershed and Coastal Resources Division			
5	Los Angeles and San Gabriel Rivers Watershed Council			
6	National Watershed Forum			
7	National Watershed Library			
8	U. S. Army Corps of Engineers (ACOE) - Los Angeles District, Plan Formulation Branch, Watershed Studies	Developing comprehensive watershed feasibility study to identify and recommend to Congress priority project for future implementation.		Westminster Watershed Reconnaissance Study · Los Angeles and San Gabriel Rivers Watershed Feasibility Study · Coyote Creek -Lower San Grabiel River Watershed Feasibility Study
9				
10	Watershed Management Council			
11	California Resources Agency - Watershed Portal			

No.	Agency Name	Role in the Watershed	Regulation/ Policy	Plans and Programs
12	California Resources Agency - Watershed Portal	Watershed Portal: The California Resources Agency and California Environmental Protection Agency are in the process of developing this website and other online tools to identify ongoing watershed activities, provide access to important data and information, and links to the larger California Watershed community.		CA Agency Watershed 18 Month Action Plan · California Watershed Funding Database: The California Watershed Funding Database is the one-stop site for all environmental funding in the state of California. It consists of State, Federal and Private Foundation funding information. · Catalog of Federal Funding Sources for Watershed Protection :The Catalog of Federal Funding Sources for Watershed Protection Web site is a searchable database of financial assistance sources (grants, loans, cost-sharing) available to fund a variety of watershed protection projects. · Integrated Regional Water Management · Prop 40/50 Awards Website: On March 5, 2002, voters passed Proposition 40 the 'California Clean Water, Clean Air, Safe Neighborhood Parks, and Coastal Protection Act of 2002' (2002 Resources Bond). The passage of Proposition 40 provided $2.6 billion in bond funds for projects and grants for neighborhood parks, outdoor recreation, protection of wildlife habitat, open space, rangeland, clean beaches, water quality and watershed protection and restoration, air pollution projects, and preservation of cultural and historical resources. Eighteen (18) separate state departments administer Proposition 40 funds under various programs.

Water Supply

No.	Agency Name	Role in the Watershed	Regulation	Plans and Programs
1	Central Basin Municipal Water District			
2	City Of Brea W.S.A.			
3	City Of Buena Park W.S.A.			
4	City Of Cerritos W.S.A.			
5	City Of Chino Hills W.S.A.			
6	City Of Fullerton W.S.A.			
7	City Of La Palma W.S.A.			
8	City Of Norwalk W.S.A.			
9	City Of Santa Fe Springs W.S.A			
10	County Of San Bernardino W.S.A			
11	La Habra Heights County Water District			
12	Long Beach Water District			
13	Los Angeles County, Department of Beaches and Harbors			
14	Metropolitan Water District			
15	Metropolitan Water District of Southern California	Metropolitan Water District of Southern California provides drinking water in parts of Los Angeles and Orange counties		Regional Urban Water Management Plan
16	Municipal Water District of Orange County			Regional Urban Water Management Plan

No.	Agency Name	Role in the Watershed	Regulation	Plans and Programs
17	Orange County Water District	OCWD's primary responsibility is managing the vast groundwater basin under north and central Orange County that supplies water to more than 20 cities and water agencies, serving more than 2 million Orange County residents. OCWD monitors the groundwater taken out each year to ensure that the basin is not overdrawn; refills the basin; and carries out an assessment program to pay for operating expenses and the cost of imported replenishment water.		Orange County Water District Groundwater Management Plan
18	Orchard Dale Water District			
19	Park Water Company			
20	Southeast Water Coalition			
21	Suburban Water Systems			
22	Three Valleys Municipal Water District			
23	Upper San Gabriel Valley Metropolitan Water District			
24	Water Replenishment District			Southern California Water Replenishment District Draft Stratigic Plan 2003
25	West And Central Basin Municipal Water District			
26	Yorba Linda Service Area			

WATER QUALITY

No.	Agency Name	Role in the Watershed	Regulations	Plans and Programs
1	California Environmental Protection Agency, Department of Pesticide Regulation (DPR)			
2	California Environmental Protection Agency, Department of Toxic Substances and Control (DTSC)			
3	California Environmental Protection Agency, Integrated Waste Management Board (IWMB)			
4	Los Angeles County Sanitation District	The Sanitation Districts construct, operate, and maintain facilities to collect, treat, recycle, and dispose of sewage and industrial wastes. The Sanitation Districts also provide for the management of solid wastes including disposal, transfer operations, and materials recovery. Local sewers and laterals that connect to the Sanitation Districts' trunk sewer lines are the responsibility of the local jurisdictions as is the collection of solid wastes.		
5	Los Angeles County, Department of Public Works			
6	County of Orange, Resources and Development Management Department, Flood Control Division			
7	Regional Water Quality Control Board, Los Angeles Region 4 (LA RWQCB)	The Los Angeles Regional Water Quality Control Board (LARWQCB) protects ground and surface water quality in the Los Angeles Region, including the coastal watersheds of Los Angeles and Ventura Counties, along with very small portions of Kern and Santa Barbara Counties. The Los Angeles Regional Board is one of		Water Quality Control Plan: L.A. Region Basin Plan for the Coastal Watersheds of L.A. & Ventura Cty Watershed Management Initiative Chapter · Alternative Approaches to

No.	Agency Name	Role in the Watershed	Regulations	Plans and Programs
		nine Regional Boards statewide. These Boards are part of the California Environmental Protection Agency (CAL/EPA), along with the Air Resources Board, the Department of Pesticide Regulation, the Department of Toxic Substance Control, the California Integrated Waste Management Board, and the Office of Environmental Health Hazard Assessment. Watershed Regulatory Section implements the National Pollutant Discharge Elimination System (NPDES) permitting for the region.		Stormwater Quality Control Trash TMDL for LA River Watershed
8	Regional Water Quality Control Board, Santa Ana Region 8 (SA RWQCB)	The primary duty of the Regional Board is to protect the quality of the waters within the Region for all beneficial uses. This duty is implemented by formulating and adopting water quality control plans for all ground and surface water bodies in the region and by prescribing and enforcing requirements on waste discharges.		· Santa Ana River Basin Water Quality Control Plan · Watershed Management Initiate (WMI) - 2004 revision of the Regional WMI
9	U.S. Environmental Protection Agency (EPA)	Prevent pollution of water bodies	· 1974 Safe Drinking Water Act (SDWA): The Safe Drinking Water Act was established to protect the quality of drinking water in the U.S. This law focuses on all waters actually or potentially designed for drinking use, whether from above ground or underground sources. The Act authorized EPA to establish safe standards of purity and required all owners or operators of public water systems to comply with primary (health-related) standards. State governments, which assume this power from EPA, also encourage attainment of secondary	

No.	Agency Name	Role in the Watershed	Regulations	Plans and Programs
			standards (nuisance-related). · 1947 Federal Insecticide, Fungicide and Rodenticide Act (FIFRA): The primary focus of FIFRA was to provide federal control of pesticide distribution, sale, and use. EPA was given authority under FIFRA not only to study the consequences of pesticide usage but also to require users (farmers, utility companies, and others) to register when purchasing pesticides. Through later amendments to the law, users also must take exams for certification as applicators of pesticides. All pesticides used in the U.S. must be registered (licensed) by EPA. Registration assures that pesticides will be properly labeled and that if in accordance with specifications, will not cause unreasonable harm to the environment. · 1990 Oil Pollution Act (OPA): The Oil Pollution Act (OPA) of 1990 streamlined and strengthened EPA's ability to prevent and respond to catastrophic oil spills. A trust fund financed by a tax on oil is available to clean up spills when the responsible party is incapable or unwilling to do so. The OPA requires oil storage facilities and vessels to submit to the Federal government plans detailing how they will respond to large discharges. EPA has published regulations for aboveground storage facilities; the Coast Guard has done so for oil tankers. The OPA also requires the development of Area Contingency Plans to prepare and plan for oil spill response on a regional scale.	

No.	Agency Name	Role in the Watershed	Regulations	Plans and Programs
			· 1970 Pollution Prevention Act (PPA): The Pollution Prevention Act focused industry, government, and public attention on reducing the amount of pollution through cost-effective changes in production, operation, and raw materials use. Opportunities for source reduction are often not realized because of existing regulations, and the industrial resources required for compliance, focus on treatment and disposal. Source reduction is fundamentally different and more desirable than waste management or pollution control.	
10	Orange County Sanitation District	The Orange County Sanitation District (OCSD) is responsible for safely collecting, treating and disposing the wastewater generated by 2.3 million people living in a 470-square-mile area of central and northwest Orange County. The districts service area is divided into nine revenue areas.		Biosolids Program: The Orange County Sanitation District's biosolids policy is to strive to recycle its biosolids using sustainable options while protecting public health and the environment. Plan: Final Long-Range Biosolids Management Plan Ocean Monitoring Program: The Orange County Sanitation District (OCSD) treats an average of 234 million gallons of wastewater per day from 2.3 million people and approximately 1,000 businesses and industries in central, north and west Orange County. The OCSD operates two treatment plants, one in Fountain Valley and one in Huntington Beach. Sewage

No.	Agency Name	Role in the Watershed	Regulations	Plans and Programs
				is transported to the two treatment facilities by 650 total miles of OCSD-owned sewers throughout the service area. Sewage is treated to remove solids, debris and some bacteria. Treated wastewater is released through 503 portholes of the last 6,000 feet of our 5 mile pipeline offshore of Huntington Beach through a 10-foot diameter outfall pipeline that rests on the ocean floor in approximately 200 feet of water.

BIOLOGICAL RESOURCES

No.	Agency Name	Role in the Watershed	Regulations	Plans and Programs
1	U.S. Environmental Protection Agency (EPA)	Conservation of threatened and endangered plants and animals and the habitats in which they are found	1973 Endangered Species Act (ESA): The Endangered Species Act provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees. The law prohibits any action, administrative or real, that results in a "taking" of a listed species, or adversely affects habitat. Likewise, import, export, interstate, and foreign commerce of listed species are all prohibited. 1972 Coastal Zone Management Act 1972 Marine Protection, Research, and Sanctuaries Act 1972 Ocean Dumping Act	
2	U.S. Fish and Wildlife Service (FWS)	The U.S. Fish and Wildlife Service maintains the list of 632 endangered species (326 are plants) and 190 threatened species (78 are plants). Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees.	The Endangered Species Act (ESA): The Endangered Species Act provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees. The law prohibits any action, administrative or real, that results in a "taking" of a listed species, or adversely affects habitat. Likewise, import, export, interstate, and foreign commerce of listed species are all prohibited.	Recovery Plan for Six Plants from the Mountains Surrounding the Los Angeles Basin Western Snowy Plover (Charadrius alexandrinus nivosus) Pacific Coast Population Draft Recovery Plan Recovery Plan for Vernal Pools of Southern California
3	National Park Service (NPS) - Rivers, Trails, & Conservation	Assist trails development by facilitating work group for the Coyote Creek		

No.	Agency Name	Role in the Watershed	Regulations	Plans and Programs
	Assistance Program (RTCA)	Bikeway Project.		
4	California Department of Parks and Recreation (DPR)	California Department of Parks and Recreation manages state park units, which contain the finest and most diverse collection of natural, cultural, and recreational resources to be found within California. Responsible for almost one-third of California's scenic coastline, California State Parks manages the state's finest coastal wetlands, estuaries, beaches, and dune systems. DPR manages and owns the Chino Hills State Park within the watershed.		Stategic Plan: The Seventh Generation - The Strategic Vision of California State Parks General Plans for State parks Master plan for the White Tail Nature Preserve
5	California Department of Fish and Game	The Department of Fish and Game maintains native fish, wildlife, plant species and natural communities for their intrinsic and ecological value and their benefits to people. This includes habitat protection and maintenance in a sufficient amount and quality to ensure the survival of all species and natural communities. The department is also responsible for the diversified use of fish and wildlife including recreational, commercial, scientific and educational uses.	California Fish and Game Code California Code of Regulations (Including Title 14) Fishing: 2005 Sport Fishing Regulations, Hunting: July 1, 2005-June 30 2006 Mammal Hunting and Trapping Regulations, July 1, 2005-June 30 2006 Resident and Migratory Game Upland Game Birds, Hunting Regulations July 1, 2004- June 30, 2005 Waterfowl Hunting Regulations 2004 Hunting Regulations for Waterfowl, Upland Game, and State and Federal Areas	The Natural Community Conservation Planning (NCCP) program Federal Habitat Conservation Plans Conservation Banking Mitigation Banking Lake and Streambed Alteration Program

OPPORTUNITIES AND CONSTRAINTS TECHNICAL MEMORANDUM

Coyote Creek Watershed Management Plan

1/30/07

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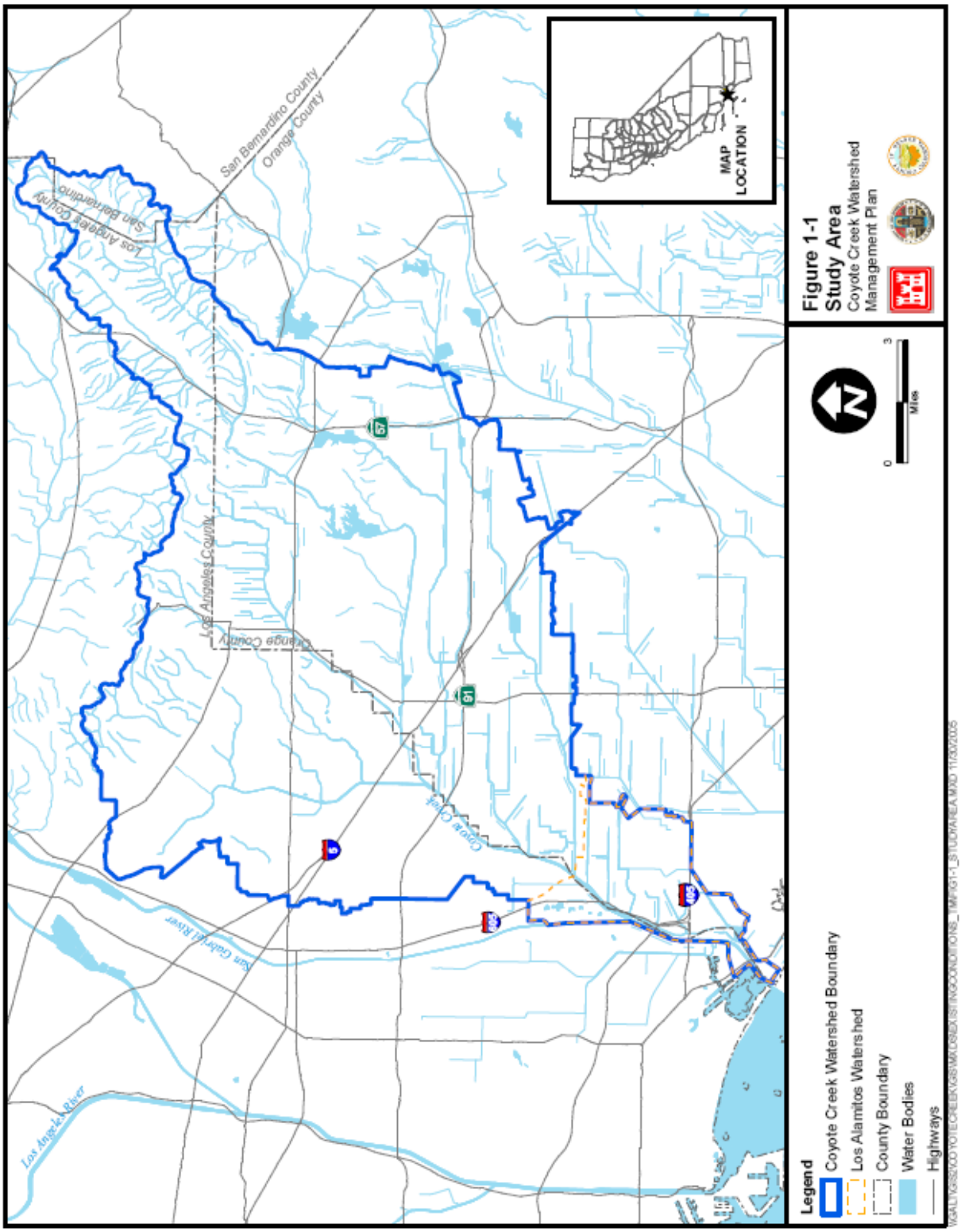
1 Introduction and Purpose

This opportunities and constraints analysis was completed for the Coyote Creek Watershed Management Plan (WMP). The Study Area is shown in Figure 1-1.

The purpose of this technical memorandum is to identify potential project opportunities in the watershed that could help meet the goals and objectives established by the stakeholders as part of the WMP. To achieve this, issues associated with the goals and objectives were identified. Opportunities to address these issues were then sought in two ways. First, using a Geographic Information System (GIS) analysis process additional project opportunities to address several of the watershed issues were identified. Secondly, planned projects, polices, and plans by agencies and cities were identified. Project opportunities consist of both physical projects and management/policy changes.


San Bernardino County
Orange County
Los Angeles County
San Bernardino
Los Angeles County
Orange County
Coyote Creek
San Gabriel River
Los Angeles River
MAP LOCATION
Legend
Coyote Creek Watershed Boundary
Los Alamitos Watershed
County Boundary
Water Bodies
Highways
0
3
Miles
Figure 1-1
Study Area
Coyote Creek Watershed Management Plan

2 Identification of Issues and Opportunities and Constraints Analysis

The development of the Study Area and related infrastructure has resulted in a number of issues in the watershed. This section includes an identification of issues, spatial opportunities and constraints analysis, and plans and policies opportunities and constraints analysis related to the Coyote Creek Watershed. For spatial analysis, the GIS tool provides an initial screening level of analysis, and may assist project proponents in focusing field reviews to refine specific project opportunities. For several of the issues, a GIS analysis was conducted to identify project opportunities and constraints. The plans and policies analysis involves review of applicable local and regional plan. These analyses are grouped by their associated goals and objectives and in some cases are limited by available data.

2.1 Structure of the Document

This document is organized by the four goals of Land, Water, People, and Management. These goals begin in section 2.3 and continue through section 2.6. Under each goal there are five objectives, except for the Management goal which contains four objectives. Each objective category is presented as an individual subsection of the goal. Each objective includes the identification of issues related to the objective. These issues were identified through spatial analysis and input from public meetings. Following the identification of issues section is an analysis of opportunities and constraints to address the identified issues. These analyses were preformed by reviewing plans and policies of the general plans of the cities and counties within the watershed. In the case of the Land and Water goals, spatial opportunities and constraints analysis are presented along with maps for visual representation of the objectives.

For illustrative purposes, the outline of section 2.3, Land, is used as an example below:

2.3 Land

- 2.3.1 Habitat
  - 2.3.1.1 Identification of Issues
  - 2.3.1.2 Spatial Opportunities and Constraints Analysis
  - 2.3.1.3 Plans and Policies Opportunities and Constraints Analysis

Public input has been acquired through stakeholder meetings. These meetings have provided a forum for stakeholders to present their ideas regarding the watershed. These meetings have included presentations by non-profit organizations, developers and landowners. These meetings to date were held on the following dates and locations:

May 11, 2005: City of Brea, California

July 14, 2005: City of Fullerton, California

September 8, 2005: City of Anaheim, California

November 10, 2005: City of Whittier, California

February 9, 2006: City of La Mirada, California

April 13, 2006: City of La Habra, California

The purpose of this process is to maximize participation and input from stakeholders and agencies throughout the planning process to achieve ultimate "buy in" for future development within the CCWMP. Key stakeholders have been identified within the watershed and affiliated local, state and federal agencies to solicit their participation and build consensus for development for the CCWMP.

Up to ten stakeholder meetings at designated city locations within the watershed will be conducted. All stakeholders that may be impacted by the proposed CCWMP, were invited to the stakeholder meetings. The meetings are intended to encourage stakeholder participation and comment, solicit information critical to the plan and focus on sharing information at each major task/milestone of the process. The stakeholder meetings are scheduled to coincide with the key milestones and submittal dates for review and discussion an associated deliverables. In general, the meetings occur every other month during the beginning of the project and then quarterly as the products become available. To date there have been presentations by the San Gabriel & Lower Los Angeles Rivers & Mountains Conservancy, the Puente Hills Landfill Native Habitat Preservation Authority, the Los Angeles County Department of Public Works, Aera Energy Puente Hills Project, the County of Orange, Friends of Coyote Hills, and Chevron Land & Development.

Identification of stakeholders was done through working with local, state and federal agencies to learn about known special interest groups and citizens that have been previously identified, who have a history of participating in the public process, and who have stakeholder interests in the project. The stakeholder information was compiled into a data base for use throughout the planning process.

2.2 Spatial Analysis Background

GIS is a layer-based system of geo-referenced spatial information. GIS is capable of managing large amounts of information and is useful for analyzing the geographic relationships of that information. It is particularly useful for watershed analysis because:

- Data can be queried or analyzed from a local or regional perspective;
- Issues and opportunities can be identified that may not be otherwise obvious;
- Spatially derived opportunities can be integrated with stakeholder derived opportunities;
- System-wide analysis of opportunities can be completed; and,
- Ecosystem issues can be addressed irregardless of political boundaries.

2.2.1 GIS Approach

GIS was used to analyze potential project opportunities within the Study Area. To complete the GIS analysis, base line conditions were determined by developing a Study Area wide GIS. The WMP goals and objectives were employed as the guiding factor for developing the GIS models of data. Based on those goals and where data was available, GIS models were completed to identify watershed issues. Once watershed issues were identified, opportunities to address those issues were developed using additional GIS models.

The resulting efforts of the GIS Modeling are broken into three distinct levels as follows:

1. Maps presenting baseline data are referred to herein as 1st Order Maps.
2. Maps presenting watershed issues or assessment of data are referred to herein as 2nd Order Maps.
3. Maps presenting potential project opportunities are referred to herein as 3rd Order Maps.

2.2.2 Base Conditions

One of the first steps in developing the WMP consisted of developing a Study Area wide GIS. To achieve this, data have been collected that meet the following criteria: (1) useful to analysis of the Study Area, (2) be free of cost, and (3) have the ability to be delivered on a desktop GIS. Data were also required to be free of license or distribution constraints; however, some data will require additional agreements before being publicly distributed.

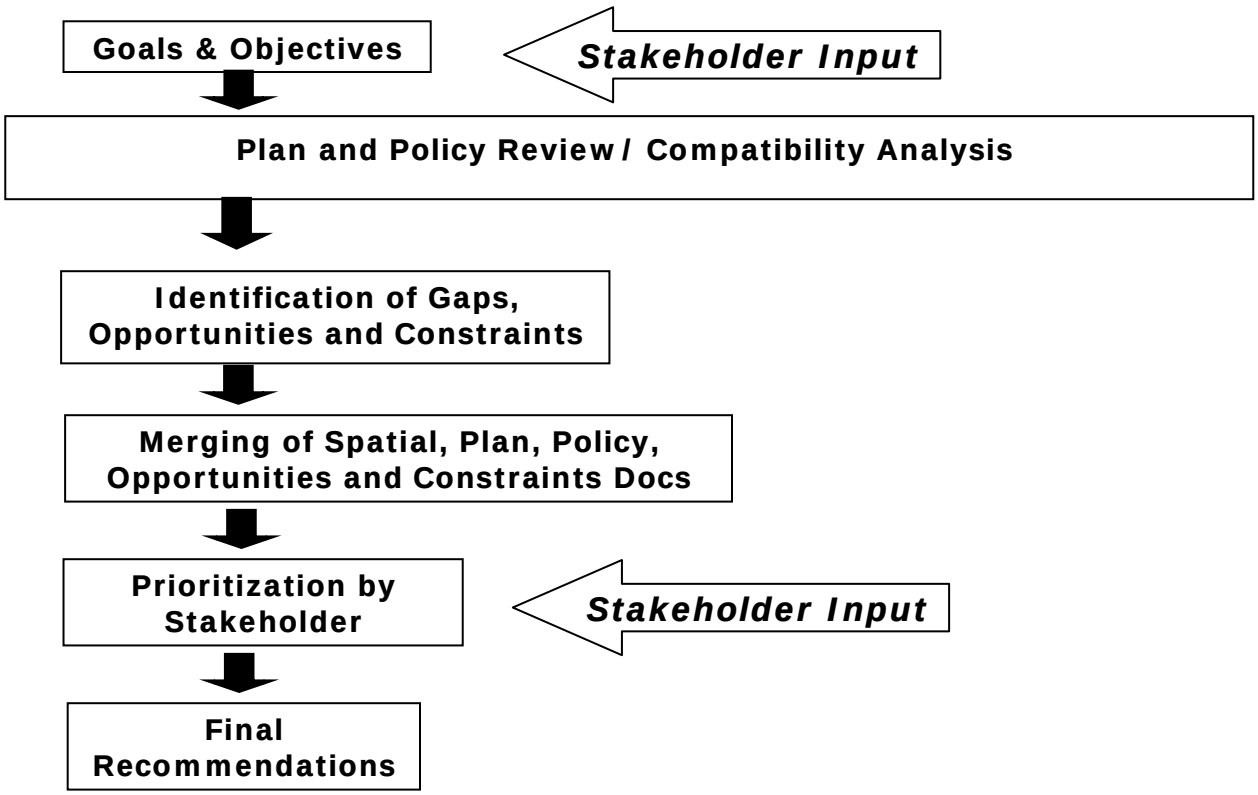
In summary, the Study Area encompasses approximately 165 square miles of densely urbanized residential, commercial, and industrial development, along with some areas of open space and natural lands. The Study Area has undergone unabated population growth associated with development since the 1940s, which has created a heavily urbanized area. In addition to the large population that lives in the Study Area, it has an extensive network of infrastructure. This infrastructure is composed of airports, roads (highways, freeways, and streets), railroads, water and wastewater pipelines and treatment facilities, power distribution lines, flood control structures, water conservation facilities, and other infrastructure components. More detailed information on base conditions data is presented in the Existing Conditions Technical Memorandum.

2.3 Plans and Policies Opportunities Analysis

The CCWMP Planning Team (Planning Team) followed a multi-step approach in identifying plans and policies opportunities and constraints. First, the Planning Team identified available county and city general plans relating to each goal and objective of the Watershed Management Plan (WMP). Second, the Planning Team identified most relevant plans for further review (see Diagram 2-1). The results of this exercise are summarized in Appendix A.

Third, the Planning Team reviewed each identified plan to assess the compatibility of the policies within the plan with the CCWMP goals and objectives. Appendix B exhibits the compatibility analysis. Opportunities, gaps, and constraints were identified during this review process.

Diagram 2-1: Plan and Policy Analysis Process



2.3.1 Plans and Policies Opportunities Analysis – Summary of Findings

The Planning Team reviewed plans and policies relating to each of the CCWMP goals and objectives. The following sections describe the findings of this analysis for the land, water, people, and management goals of the plan. All general plans from the twenty-one cities and three counties within the Coyote Creek Watershed area were reviewed to compare the respective plans to the CCWMP objectives. The complete general plans for the cities of Placentia and Whittier were not available for review at the time of the writing of this document.

The exact policies from the general plans that closely matched the goals and objectives of the CCWMP were recorded on a matrix (see Appendix A; Plans Inventory Matrix). The general plan policies did not have to match word-for-word with the CCWMP objectives. Rather, the general plan policies had to match the intention or spirit of the CCWMP goals and objectives. In that regard, some subjective evaluations were used. Table 2-1 shows a summary of the general plan policies that match the CCWMP objectives.

Table 2-1: Percentage of General Plan Policies That Match CCWMP Objectives

Agency	General Plan Adoption Date	GOAL			
		Land	Water	People	Management
Orange County	April 20, 2004	60%	60%	20%	0%
Los Angeles County	Update December 2003	100%	100%	20%	50%
San Bernardino County	Draft 2006	60%	60%	20%	50%
City of Anaheim	May 25, 2004	40%	80%	80%	50%
City of Brea	August 19, 2003	80%	40%	20%	75%
City of Buena Park	November 21, 1994	60%	40%	40%	50%
City of Cerritos	January, 2004	40%	60%	40%	25%
City of Chino Hills	September 13, 1994	60%	40%	20%	25%
City of Cypress	2000	40%	60%	40%	25%
City of Diamond Bar	July 25, 1995	60%	20%	40%	25%
City of Fullerton	1994 Update	60%	40%	20%	25%
City of Hawaiian Gardens	1993	60%	40%	80%	25%
City of La Habra	July 31, 1990	0%	40%	40%	0%
City of La Habra Heights	2004	20%	20%	40%	50%
City of La Mirada	March 25, 2003	60%	20%	20%	25%
City of La Palma	March 16, 1999	20%	605	40%	50%
City of Lakewood	November 1996	60%	40%	20%	0%
City of Long Beach	October 15, 2002 (partial plan)	40%	60%	20%	0%
City of Los Alamitos	1989	40%	40%	20%	0%
City of Norwalk	February 29, 1996	40%	60%	20%	0%
City of Placentia	Not Available	-	-	-	-
City of Santa Fe Springs	1994	40%	20%	40%	25%
City of Seal Beach	December 2003	60%	20%	40%	0%
City of Whittier	Not Available	-	-	-	-

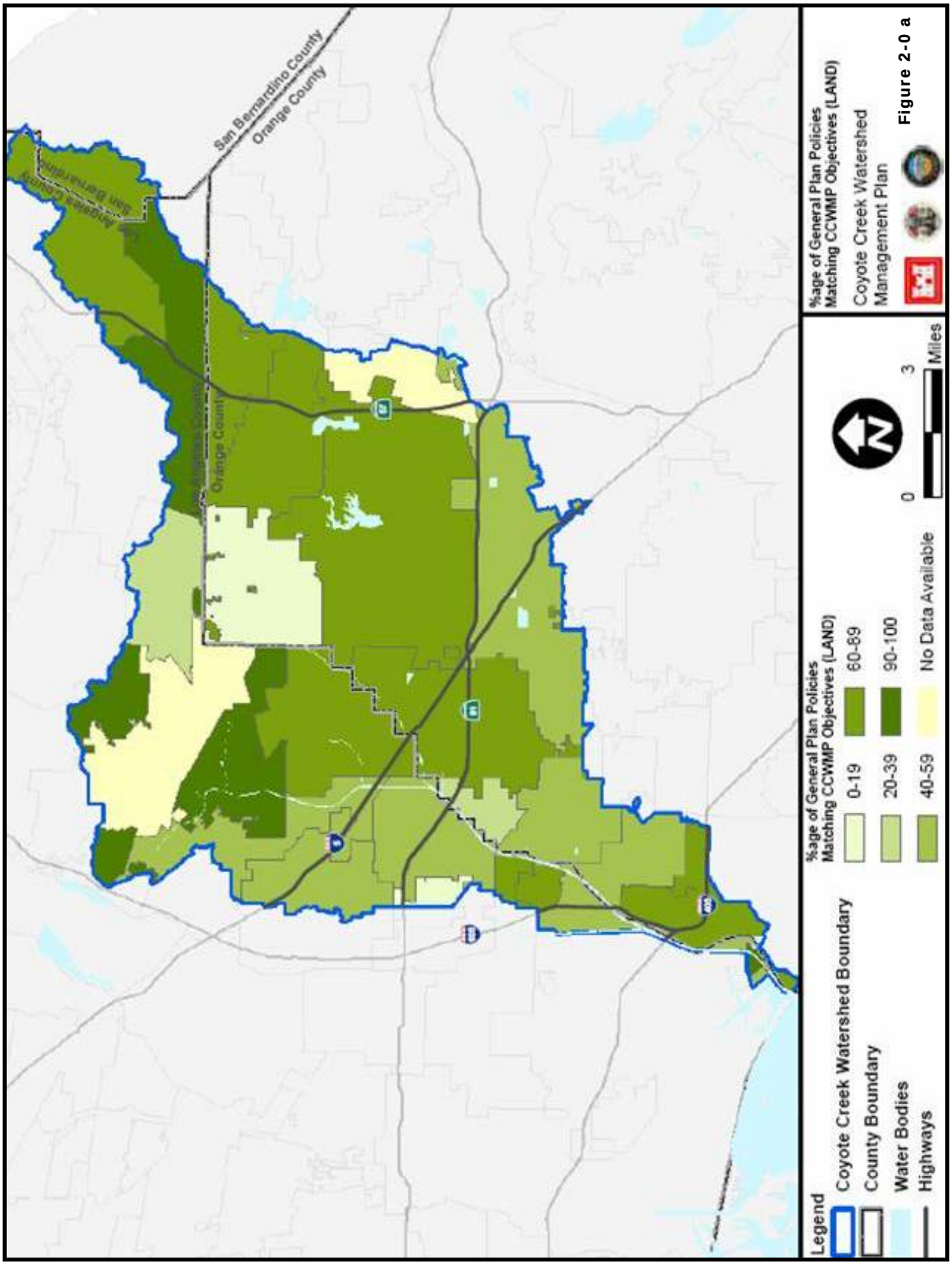

San Bernardino County
Orange County
Riverside County
San Bernardino
Orange County
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
%age of General Plan Policies Matching CCWMP Objectives (LAND)
0-19
20-39
40-59
60-89
90-100
No Data Available
0
3
Miles
%age of General Plan Policies Matching CCWMP Objectives (LAND)
Coyote Creek Watershed Management Plan

Figure 2-0 a

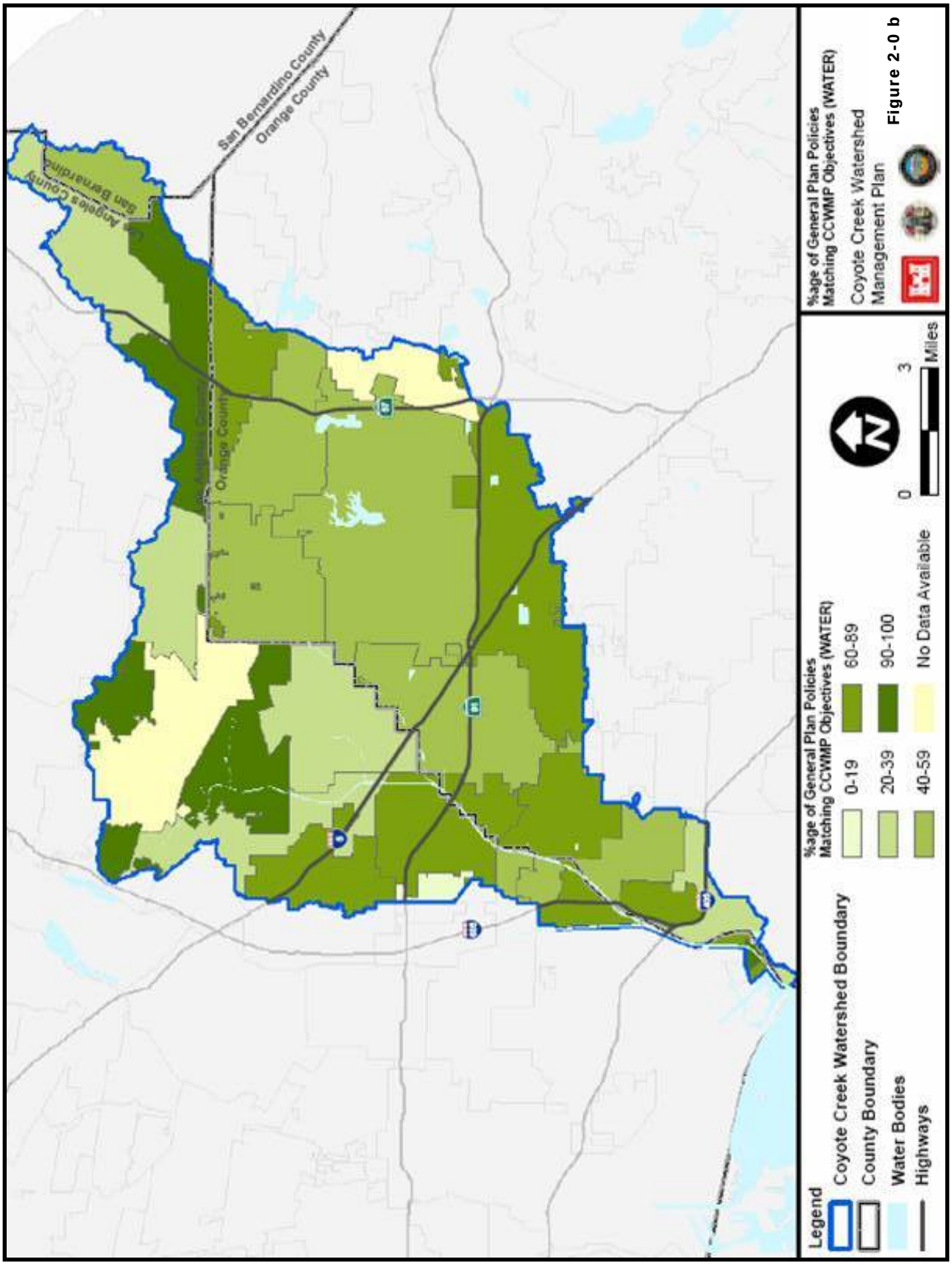

San Bernardino County
Orange County
Los Angeles County
San Bernardino
Orange County
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
%age of General Plan Policies Matching CCWMP Objectives (WATER)
0-19
20-39
40-59
60-89
90-100
No Data Available
0
3
Miles
%age of General Plan Policies Matching CCWMP Objectives (WATER)
Coyote Creek Watershed Management Plan

Figure 2-0 b

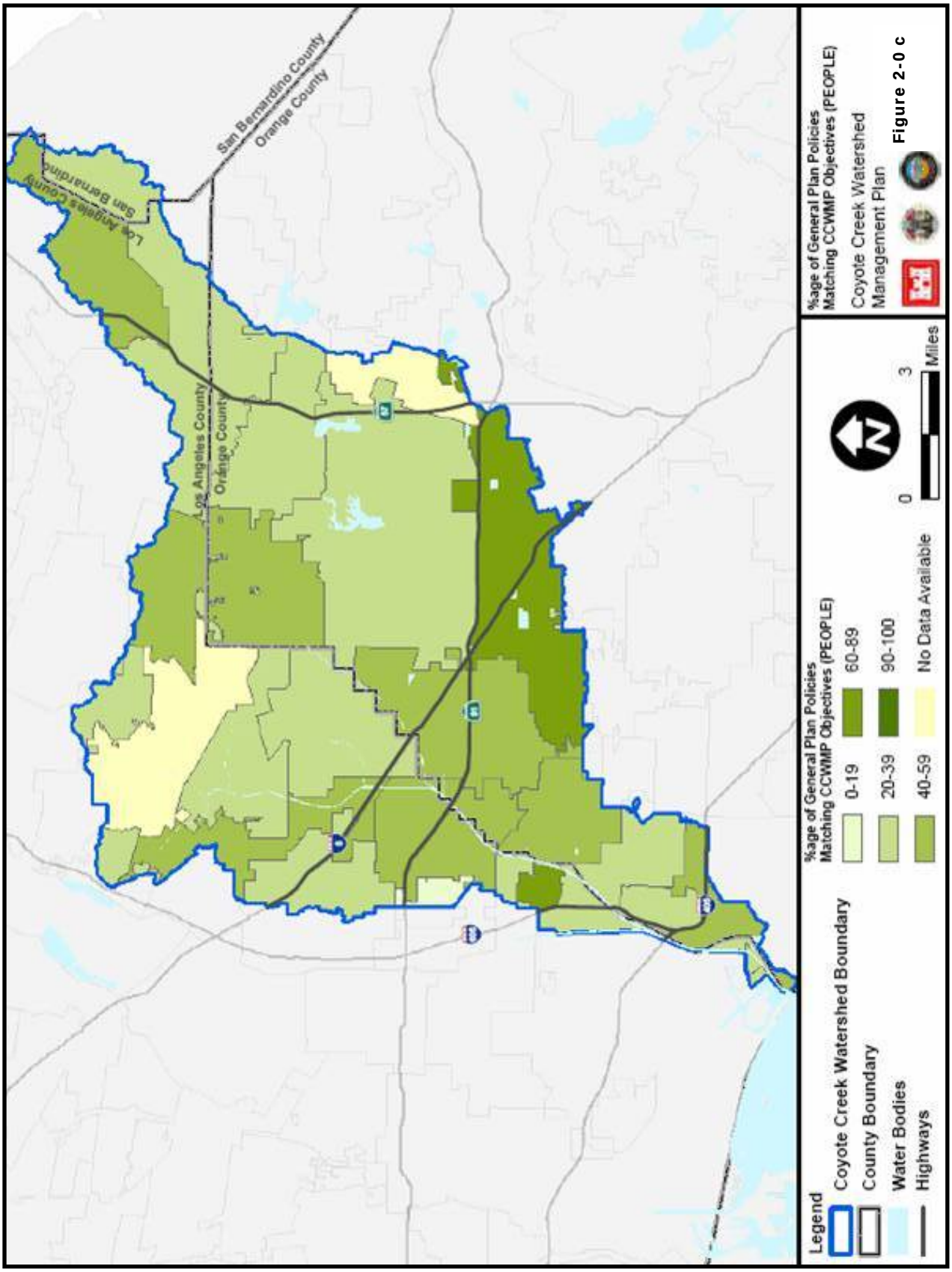

San Bernardino County
Orange County
Los Angeles County
San Bernardino
Los Angeles County
Orange County
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
%age of General Plan Policies Matching CCWMP Objectives (PEOPLE)
0-19
20-39
40-59
60-89
90-100
No Data Available
0
3
Miles
%age of General Plan Policies Matching CCWMP Objectives (PEOPLE)
Coyote Creek Watershed Management Plan

Figure 2-0 c

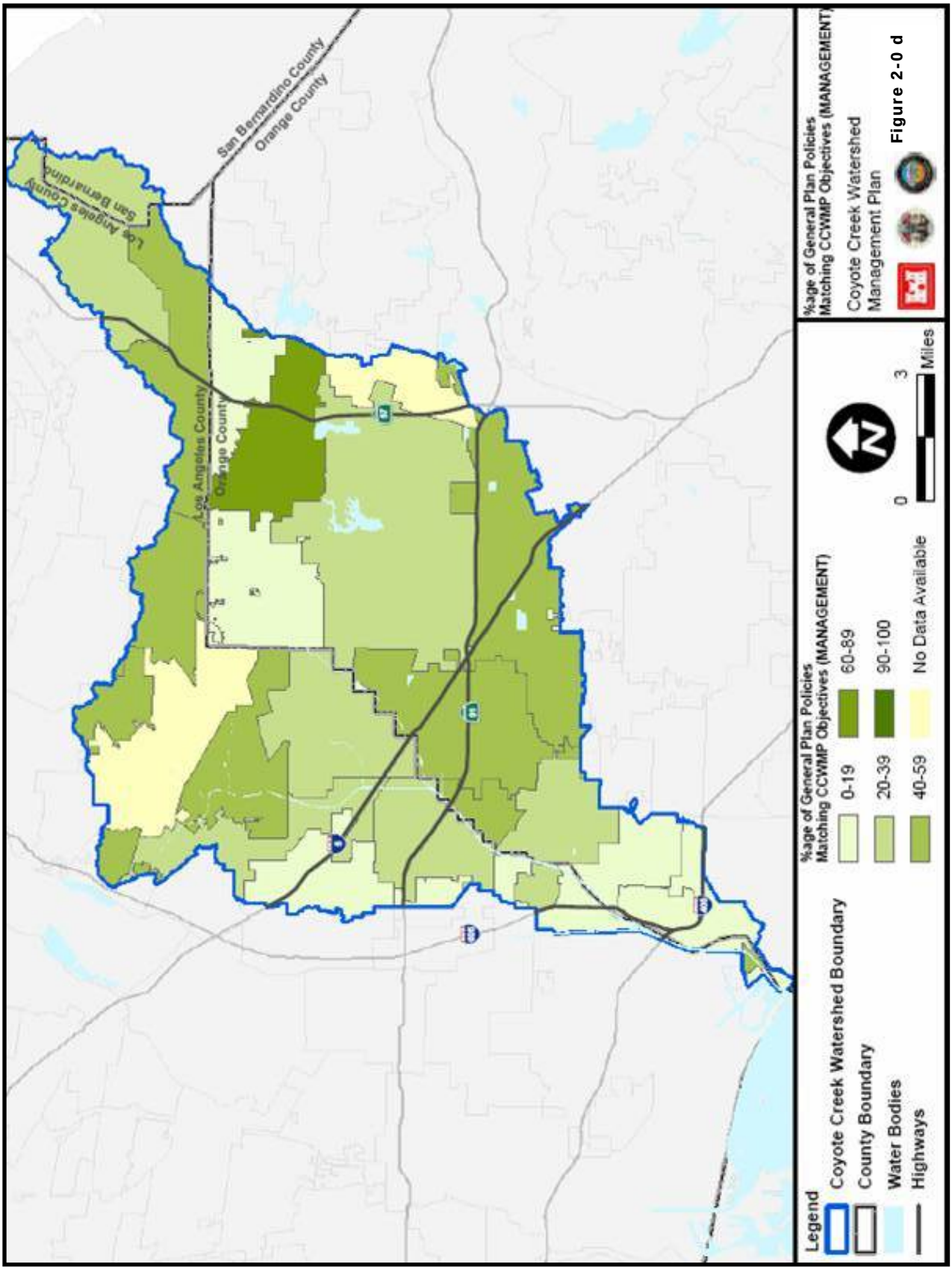

San Bernardino County
Orange County
Los Angeles County
San Bernardino
Los Angeles County
Orange County
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
%age of General Plan Policies Matching CCWMP Objectives (MANAGEMENT)
0-19
20-39
40-59
60-89
90-100
No Data Available
0
3
Miles
%age of General Plan Policies Matching CCWMP Objectives (MANAGEMENT)
Coyote Creek Watershed Management Plan

Figure 2-0 d

2.4 Land

The Land goal of the WMP includes five objective categories: (1) Habitat, (2) Recreation, (3) Open Space, (4) Economic Development, and (5) Mobility. Each objective category is presented below as an individual subsection and includes an identification of relevant issues followed by an analysis of opportunities and constraints to addressing the identified issues.

In short, the Study Area has experienced environmental and resource degradation due to urbanization, land development, and related infrastructure expansion. This has dramatically affected the quality and health of habitat within the Study Area and has led to a reduction in open space, trails and bikeways, and associated recreational opportunities for the residents of the watershed. This also affects the prospects for future growth and the potential long term economic vitality of the Study Area.

Review of Plans and Policies

A review of plans and policies relating to Land goals and objectives shows that habitat, recreation and open space objectives are well addressed by city and county plans and policies, whereas, there are limited plans and policies available relating to economic development and mobility objectives. Likewise, most plans address mobility in their circulation element, but few address multi-modal mobility.

Table 2-2: Percent of General Plans That Address Land Goal and Objectives

Objective:	Habitat	Recreation	Open Space	Economic Dev	Mobility
Percent of General Plans:	55%	85%	65%	5%	25%
Objective Number:	L-1	L-2	L-3	L-4	L-5

The five objectives listed under Land are all addressed by different elements of the city and county general plans. For example, the habitat objective is mainly addressed by the conservation element of the city and county general plans, while the recreation objective is mainly addressed by open space and recreation elements of the city and county general plans. Similarly, the open space objective is mainly addressed by open space and land use elements of the city and county general plans. The economic development objective is addressed by the optional economic development element of the city and county general plans. And finally, the mobility objective is addressed by the circulation element of the city and county general plans.

About 50% of all the general plans reviewed matched the CCWMP land goals and objectives. Some general plans did a better job of addressing CCWMP goals and objectives than others. For example, the City of Chino Hills' general plan policies matched 80% of the Land goals, while the City of La Habra's general plan did not match any.

2.4.1 Habitat

2.4.1.1 Identification of Issues

Habitat Preservation Issues

Wildlife habitat within developed and urbanized areas is limited to landscaped parks and golf courses, residential neighborhoods, transportation corridors, and flood control channels. However, within the Study Area, some areas of open space and natural lands persist. These include areas of coastal sage scrub, coast live oak woodland, native grasslands, coastal dunes and salt marsh, California walnut woodlands, and riparian woodlands. These habitats support a variety of native wildlife, including native birds, fish, mammals, reptiles, and amphibians. The most extensive remnant habitats occur in the northern part of the Study Area, including natural, open space in Tonner Canyon, Brea Canyon, Carbon Canyon, and open areas extending west to the Whittier Hills.

Larger, more intact habitats generally support a greater number and diversity of native species, including species with "special-status" designation by state or federal wildlife agencies. Smaller or "fragmented" areas of habitat support fewer species. As native habitats become isolated by urban development, species abundance and diversity decline. Large or higher-order predatory species typically begin to disappear when home range size or energy requirements can't be met by the smaller fragmented habitat patch. The grizzly bear is one example; the last sighting in southern California was 1853, but their current range is now restricted to the northern U.S. Obviously, with less available habitat and increased human interaction, there is less food to eat, less denning and rearing spots, less hiding places, less reproduction, negative interactions with humans, and high levels of stress, leading to species extirpation (i.e. localized species extinction; the species may exist elsewhere, but their overall range is reduced).

In addition, the smaller populations of wildlife associated with fragmented habitat are subjected to greater stochastic (random) or genetic pressures than larger populations (so called "island" effects), and are more prone to localized extinctions. These effects have been directly observed on populations of wildlife within the Study Area, and species abundance and diversity generally decline when comparing the larger, more intact or connected patches with the smaller, more isolated ones (Spencer 2005). This "island" effect is dramatically evident in the Coyote Hills. The Coyote Hills is an "island" of intact habitat surrounded by urban development, and lacks any connection to other large patches of open space habitat. The Coyote Hills were not identified in the California Missing Linkages (Spencer 2005) report as a significant area to link to, as far as large mammal movement was concerned. But at a smaller scale, habitat patches such as the Coyote Hills can still provide viable habitat for smaller wildlife species, as long as natural communities are maintained. The Coyote Hills most notable resident is the California gnatcatcher; a federally listed endangered species.

In the broader context, California's rich biodiversity put it on the global map of Conservation International's "Biodiversity Hotspots." This means its biodiversity is very rich, but very threatened overall, with over 70 percent habitat loss. The key factor putting California on the map is that species found here are not found any where else in the world. For this reason once such species are gone from California, they are gone from the planet; California's Floristic Province is the only place in the U. S. to make this list. For a more

complete discussion of biological resources within the Study area, potential implications of habitat fragmentation, and a discussion of intact habitats within the watershed, see the Existing Conditions Technical Memorandum for the WMP.

While linking habitat patches can dramatically improve habitat quality, preserving existing intact habitat is of maximum benefit to the overall biological resources within the Study Area. This is essential for several reasons: (1) preservation of habitat is a more cost efficient approach for benefiting biological resources than restoration or recreating habitat; (2) restoration takes significant time to achieve the same value of existing high value habitat; and, (3) restoration is labor intensive and requires ongoing monitoring and maintenance to achieve target success criteria.

Riparian Habitat Issues

In addition to degradation of upland habitat, development of the Study Area has dramatically affected riparian and aquatic resources, including changes to the natural processes of the streambeds, stream hydrology, and the composition of riparian plant communities. These changes have resulted in increased population of exotic plant communities and loss of native riparian vegetation and habitat.

Specific analysis of opportunities for habitat preservation and riparian habitat enhancement are detailed in the section below.

2.4.1.2 Spatial Opportunities and Constraints Analysis

Habitat Preservation Opportunities

Opportunities for habitat preservation exist within the watershed and may include preservation of wetland, riparian, aquatic, and upland habitats. Preservation may be achieved by acquisition or exchange of lands and management to limit development and preserve biodiversity. Habitat preservation opportunities are analyzed below. To evaluate habitat preservation opportunities the following GIS modeling was completed:

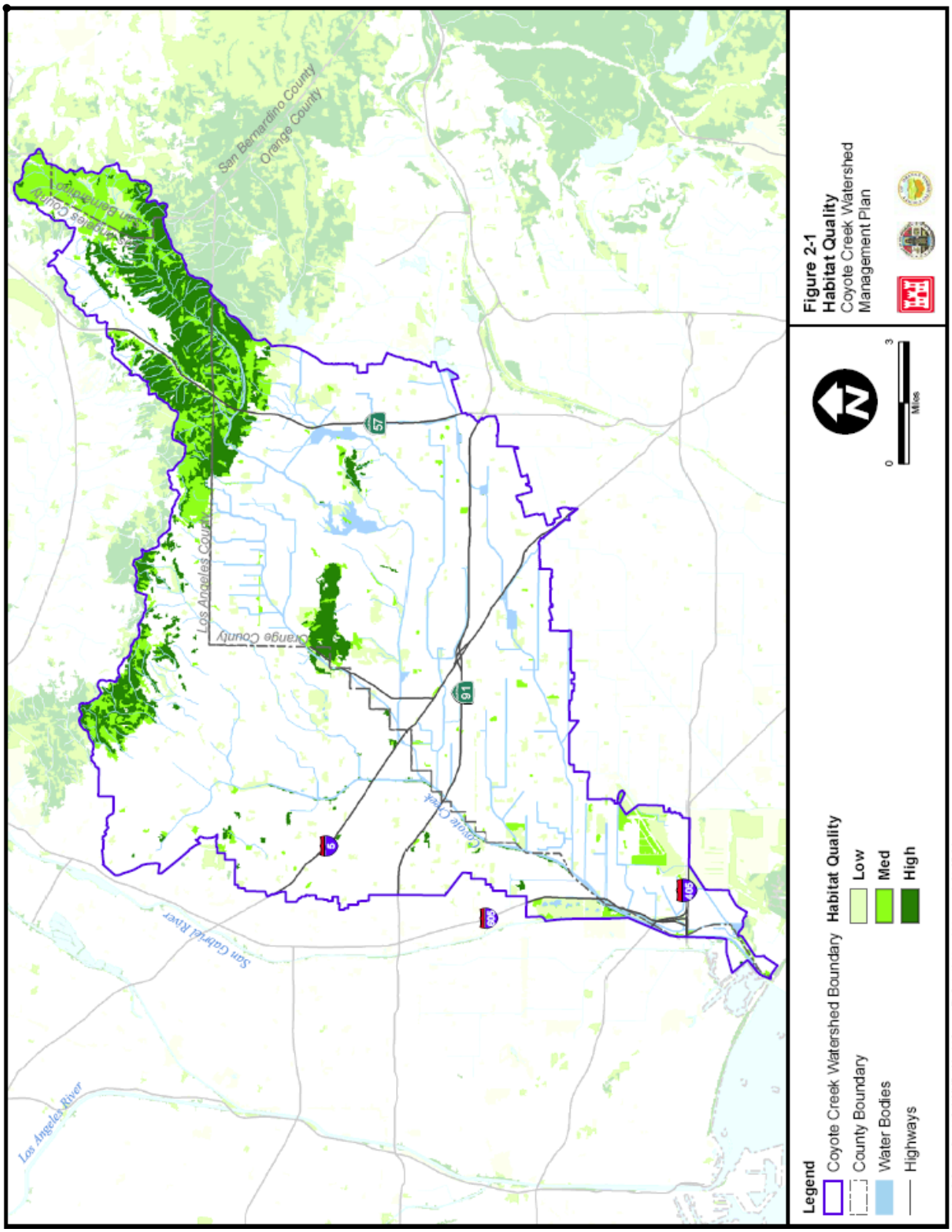
Applicable 1st Order Maps were determined and include: (1) Existing Vegetation Types; (2) Land Use.

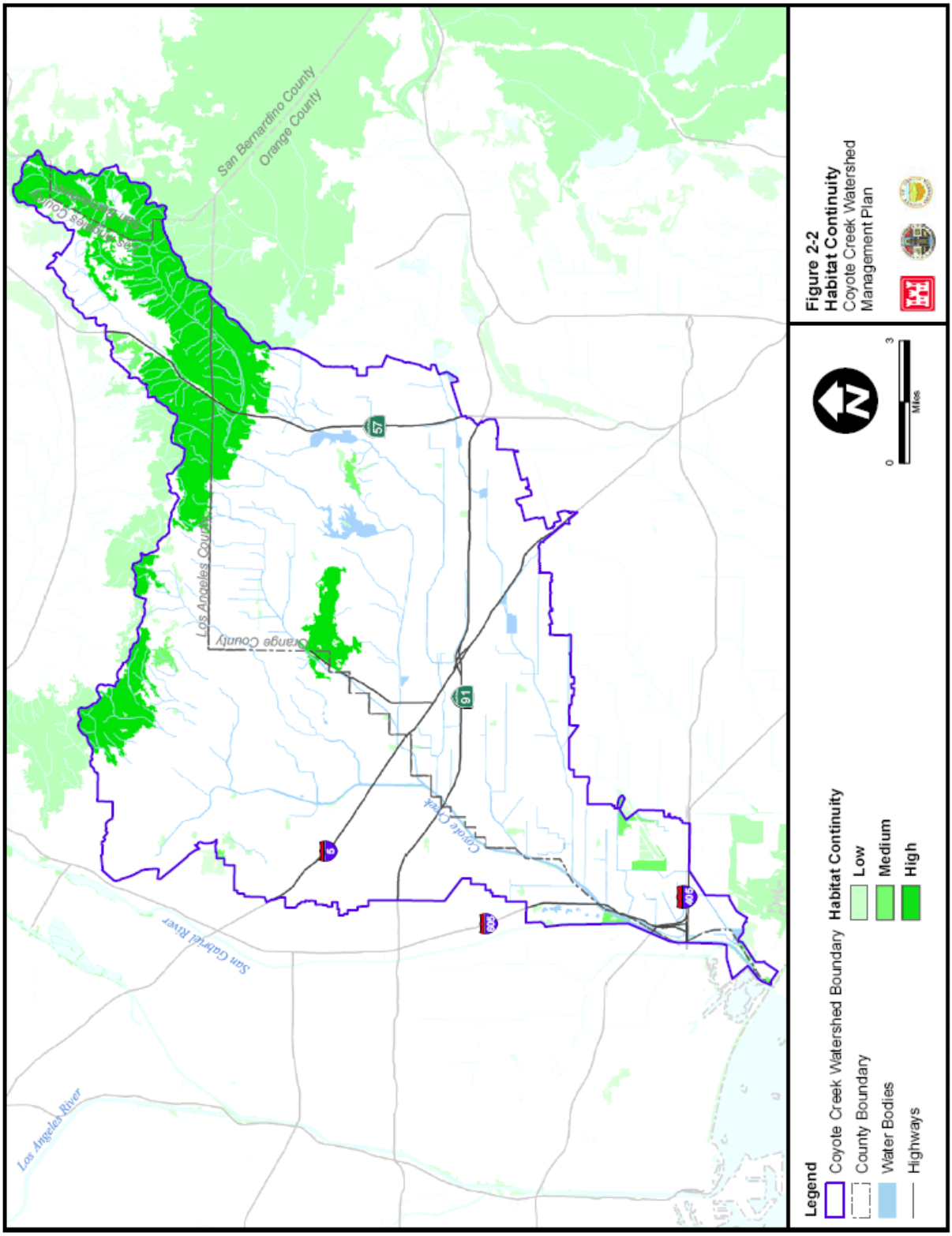
2nd Order Maps were then developed to further refine habitat preservation opportunities. First a 2nd Order Map was completed to characterize the habitat value of the Study Area (Figure 2-1). Land use was reclassified to identify habitat value as follows:

- Excluded if consisting of urban developed areas that are of limited habitat value.
- Low value habitat consisted of landscaped or agricultural areas.
- Medium value habitat consisted of non-native but naturalized areas.
- High value habitat consisted of native intact habitat.

In addition to habitat quality, a 2nd Order Map was completed to identify continuous areas of existing habitat (Figure 2-2). Existing vegetation was reclassified by the following continuous block acreages:

- Classification 1 included continuous block acreages of habitat between 10 and 100 acres.


San Bernardino County
Orange County
Los Angeles County
Orange County
San Bernardino County
Los Angeles River
San Gabriel River
Coyote Creek
57
91
5
605
10
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Habitat Quality
Low
Med
High
0
3
Miles
Figure 2-1
Habitat Quality
Coyote Creek Watershed
Management Plan


San Bernardino County
Orange County
Los Angeles County
Orange County
Los Angeles River
San Gabriel River
Coyote Creek
57
91
5
605
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Habitat Continuity
Low
Medium
High
0
3
Miles
Figure 2-2
Habitat Continuity
Coyote Creek Watershed
Management Plan

Classification 2 included continuous block acreages of habitat between 100 and 1,000 acres.

- Classification 3 included continuous block acreages of habitat greater than 1,000 acres.

Additional 2nd Order Maps were developed as follows:

A map to identify areas within the Study Area that are already preserved or managed for open space or recreation (Figure 2-3); i.e. currently managed such that biodiversity would generally be expected to be preserved; and

Maps to identify Proposed Projects, consisting of proposed developments or proposed preservation projects.

These 2nd Order Maps serve as a starting point for determining potential habitat preservation opportunities.

Data identified in the 2nd Order Maps were then overlaid to create a 3rd Order Map that identifies potential habitat preservation opportunities. Specifically, potential project opportunity areas comprise high value habitat areas within continuous block acreages of habitat (i.e. not yet as highly fragmented), and that are not already preserved or managed for open space or recreation, and which are specifically proposed for development or preservation (Figure 2-4). These potential project opportunity areas are primarily located in the Puente-Chino Hills and Coyote Hills, with additional areas in the lower watershed along the lower San Gabriel River or near Cerritos Wetlands. Existing development and lack of existing habitat is the major constraint to habitat preservation opportunities. Refer to Section 3 for the identification of potential projects.

Riparian Habitat Enhancement Opportunities

Opportunities for riparian enhancement exist within the watershed and may include removing exotic vegetation from riparian corridors and replanting with native riparian vegetation. Riparian habitat enhancement opportunities are analyzed below. To evaluate riparian habitat enhancement opportunities the following GIS modeling was completed:

Applicable 1st Order Maps were determined and include: (1) Existing Vegetation; (2) Land Use; (3) Existing Channel Locations and Conditions; and, (4) Topography.

2nd Order Maps were then developed to further characterize riparian enhancement issues. Drawing from 1st Order Maps the following 2nd Order Map assessments were completed:

- Existing Vegetation data was screened to only show Exotic Plant Communities (Figure 2-5).
- Land Use data was screened to only show Existing Open Space and was reclassified to identify open space suitable for conducting riparian enhancement (Figure 2-6). Open space was classified for suitability for riparian enhancement by land use as follows:
  - Low suitability consisted of education and religion and residential.
  - Medium quality consisted of agricultural land use.
  - High quality consisted of public, vacant, and recreational.

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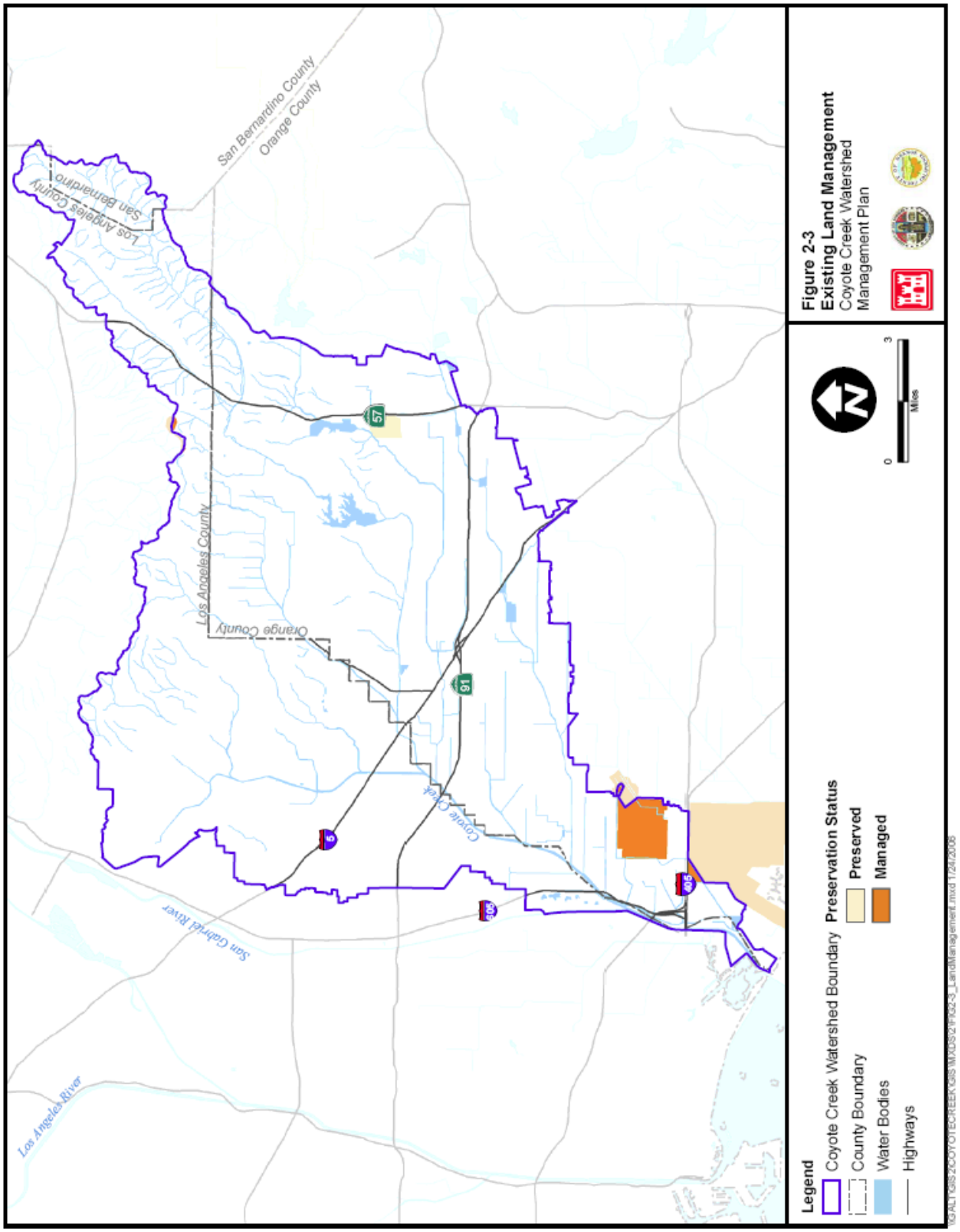
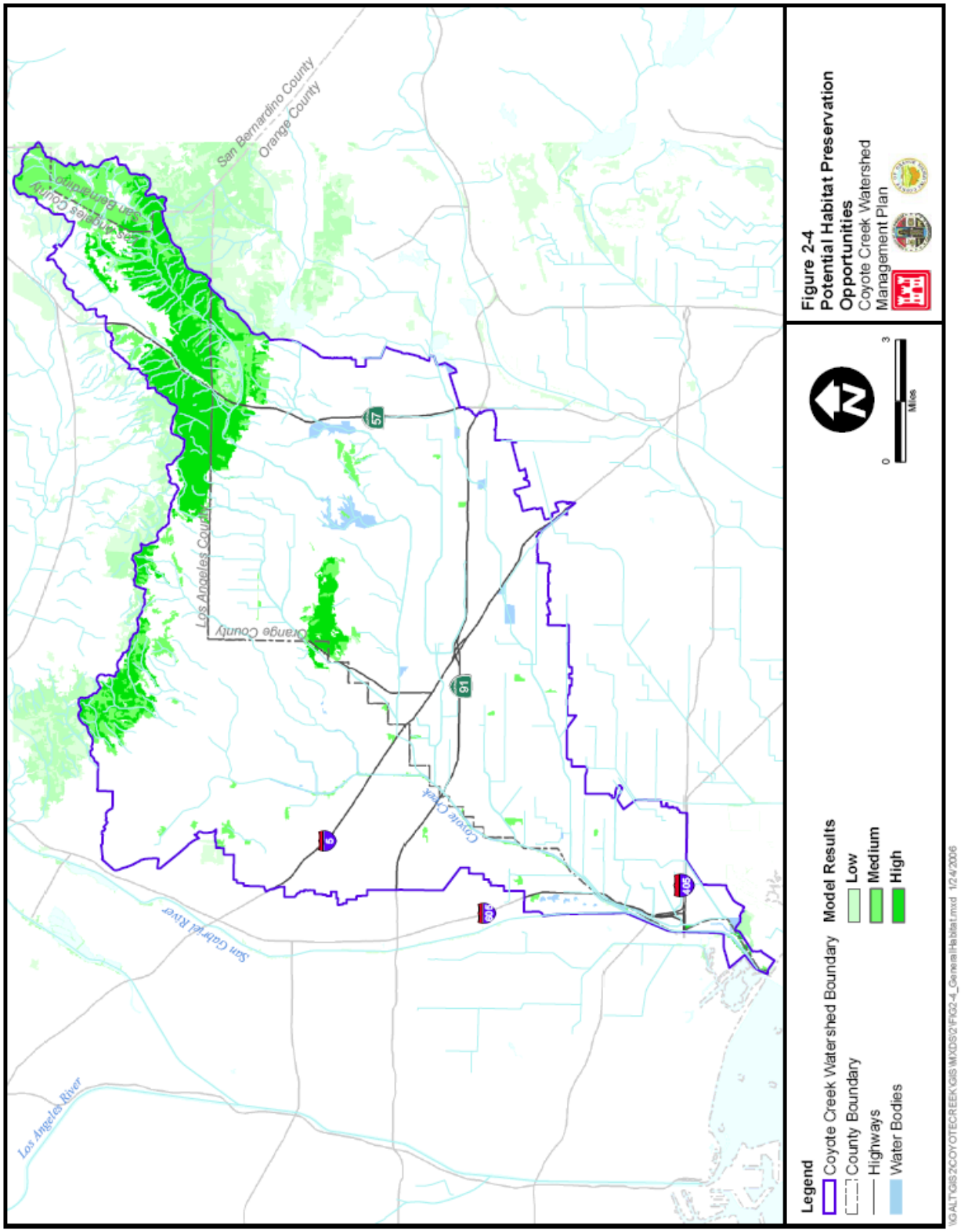


Figure 2-3
Existing Land Management
Coyote Creek Watershed
Management Plan
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Preservation Status
Preserved
Managed
0
3
Miles
San Bernardino County
Orange County
Los Angeles County
San Bernardino
Los Angeles County
Orange County
Coyote Creek
San Gabriel River
Los Angeles River
57
91
5
605
605


San Bernardino County
Orange County
Los Angeles County
San Bernardino
Orange County
Coyote Creek
San Gabriel River
Los Angeles River
57
91
5
605
405
Legend
Coyote Creek Watershed Boundary
County Boundary
Highways
Water Bodies
Model Results
Low
Medium
High
0
3
Miles
Figure 2-4
Potential Habitat Preservation Opportunities
Coyote Creek Watershed Management Plan
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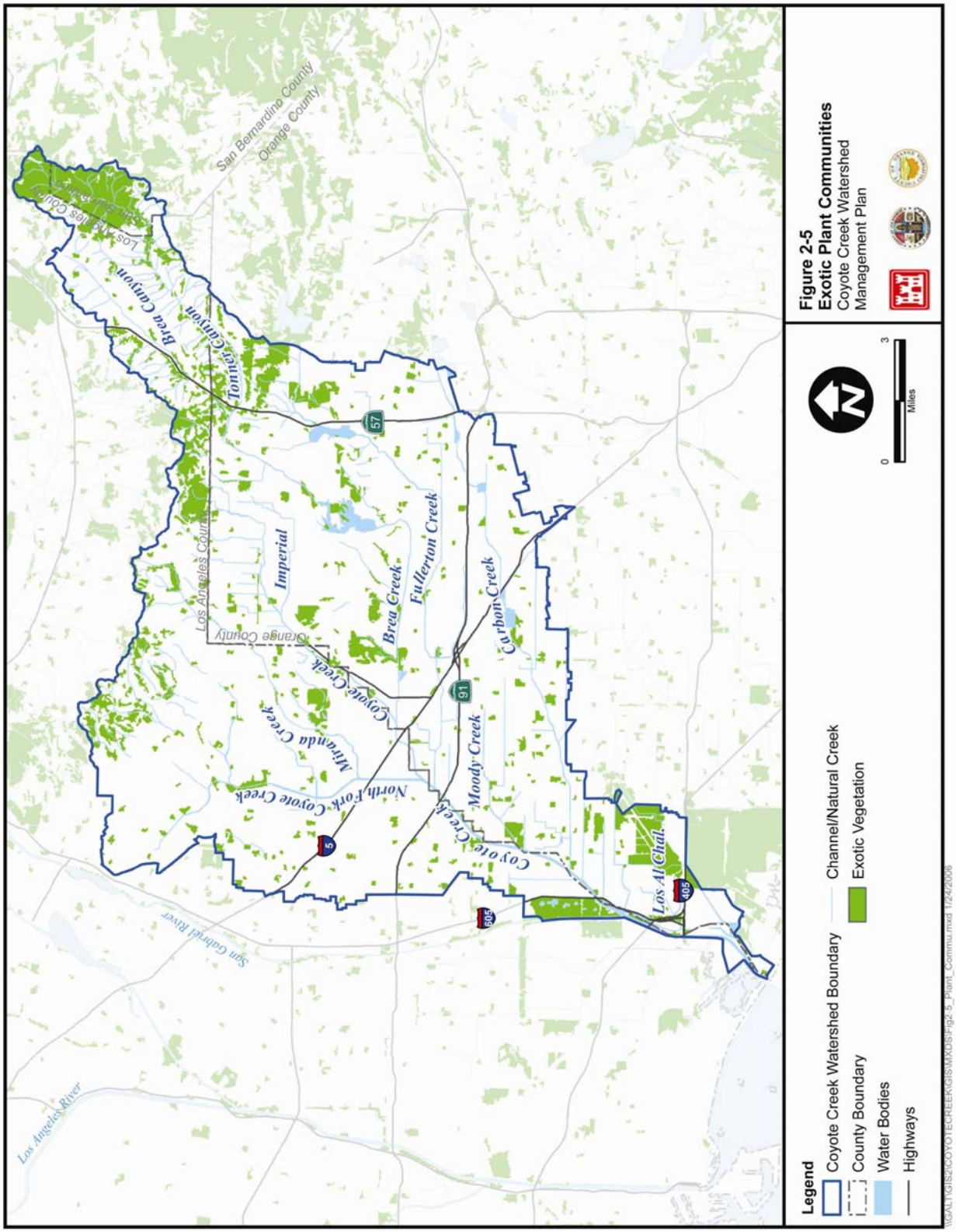
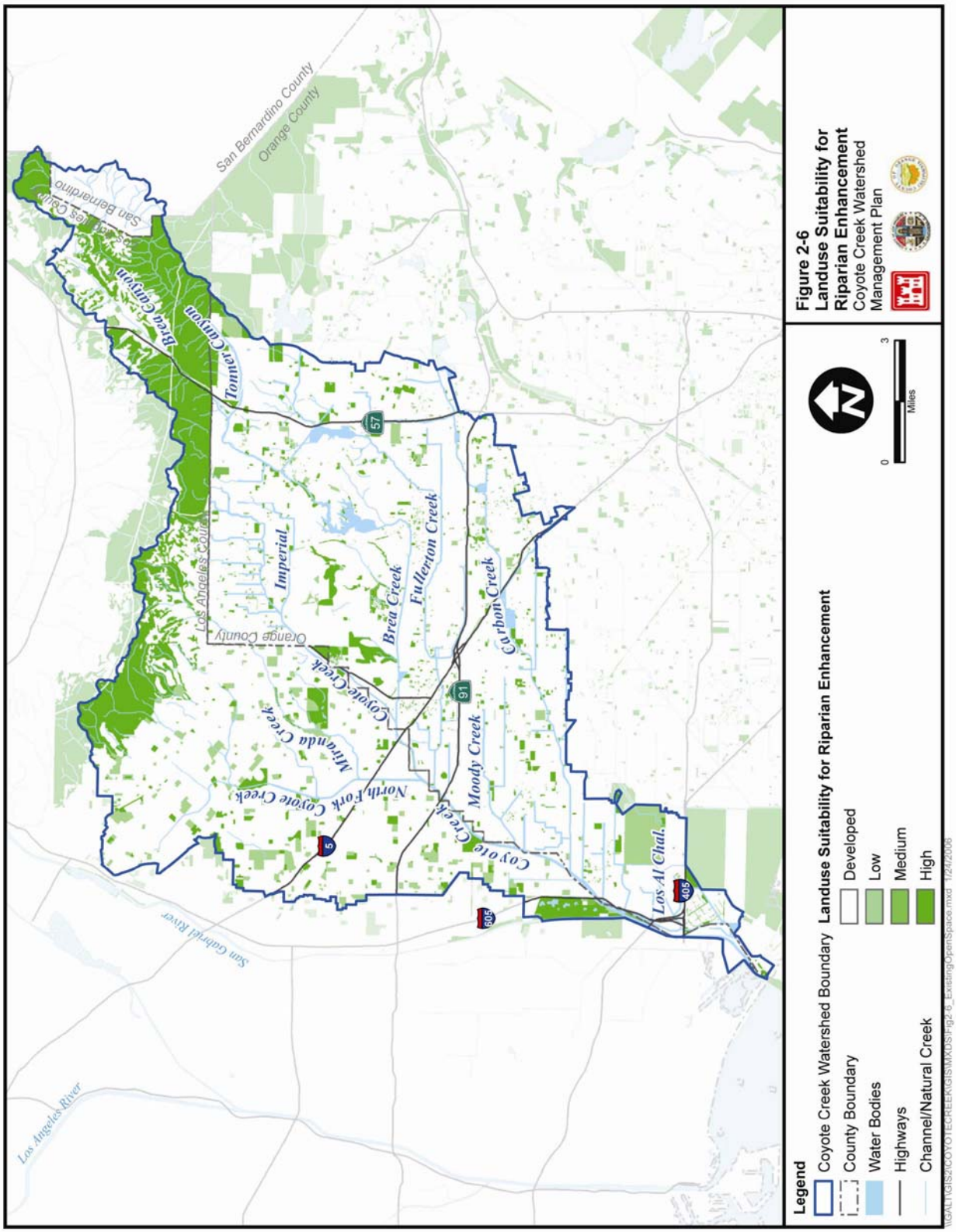


Figure 2-5
Exotic Plant Communities
Coyote Creek Watershed
Management Plan
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Channel/Natural Creek
Exotic Vegetation
0
3
Miles
San Bernardino County
Orange County
Los Angeles County
Orange County
Los Angeles County
Los Angeles River
San Gabriel River
Brea Canyon
Tonner Canyon
Imperial
Brea Creek
Fullerton Creek
Carbon Creek
Coyote Creek
Miranda Creek
North Fork Coyote Creek
Moody Creek
Coyote Creek
Los Alamitos Channel
57
91
5
605
405


San Bernardino County
Orange County
San Bernardino
Brea Canyon
Tonner Canyon
Los Angeles County
Orange County
Imperial
Brea Creek
Fullerton Creek
Carbon Creek
Coyote Creek
Miranda Creek
North Fork Coyote Creek
Moody Creek
Coyote Creek
Los Al Chal.
San Gabriel River
Los Angeles River
57
91
5
605
405
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Channel/Natural Creek
Landuse Suitability for Riparian Enhancement
Developed
Low
Medium
High
0
3
Miles
Figure 2-6
Landuse Suitability for Riparian Enhancement
Coyote Creek Watershed Management Plan

- Topography and Existing Channels were reclassified to select areas within 10 vertical feet of the range of the channel invert (Figure 2-7), and within 100 horizontal feet of existing channels. This analysis is intended to identify areas that would be hydrologically suitable to support riparian vegetation, either because they are potentially within floodplain elevations, or potentially within the range of shallow groundwater often associated with stream channels. This approach is expected to provide an approximation of these conditions.

Data identified in the 2nd Order Maps were then overlaid to create a 3rd Order Map that identifies potential riparian habitat enhancement opportunities. Specifically, potential project opportunity areas comprise exotic plant communities within existing open space, are within a 10-foot vertical range of a channel invert, and are within 100-foot horizontal range of existing channels (Figure 2-8). The potential project opportunity areas are infrequently located at certain channel areas, and channel confluence zones, throughout the Study Area. The limited amount of open space areas adjacent to channels is a constraint to riparian enhancement opportunities. Additionally, potential riparian enhancement opportunities are constrained by the need to be within a 10-foot vertical range of the channel invert and a 100-foot horizontal range of a channel. These range restrictions are due to the need for a consistent water supply to support riparian habitat. Refer to Section 3 for the identification of potential projects.

2.4.1.3 Plans and Policies Opportunities and Constraints Analysis

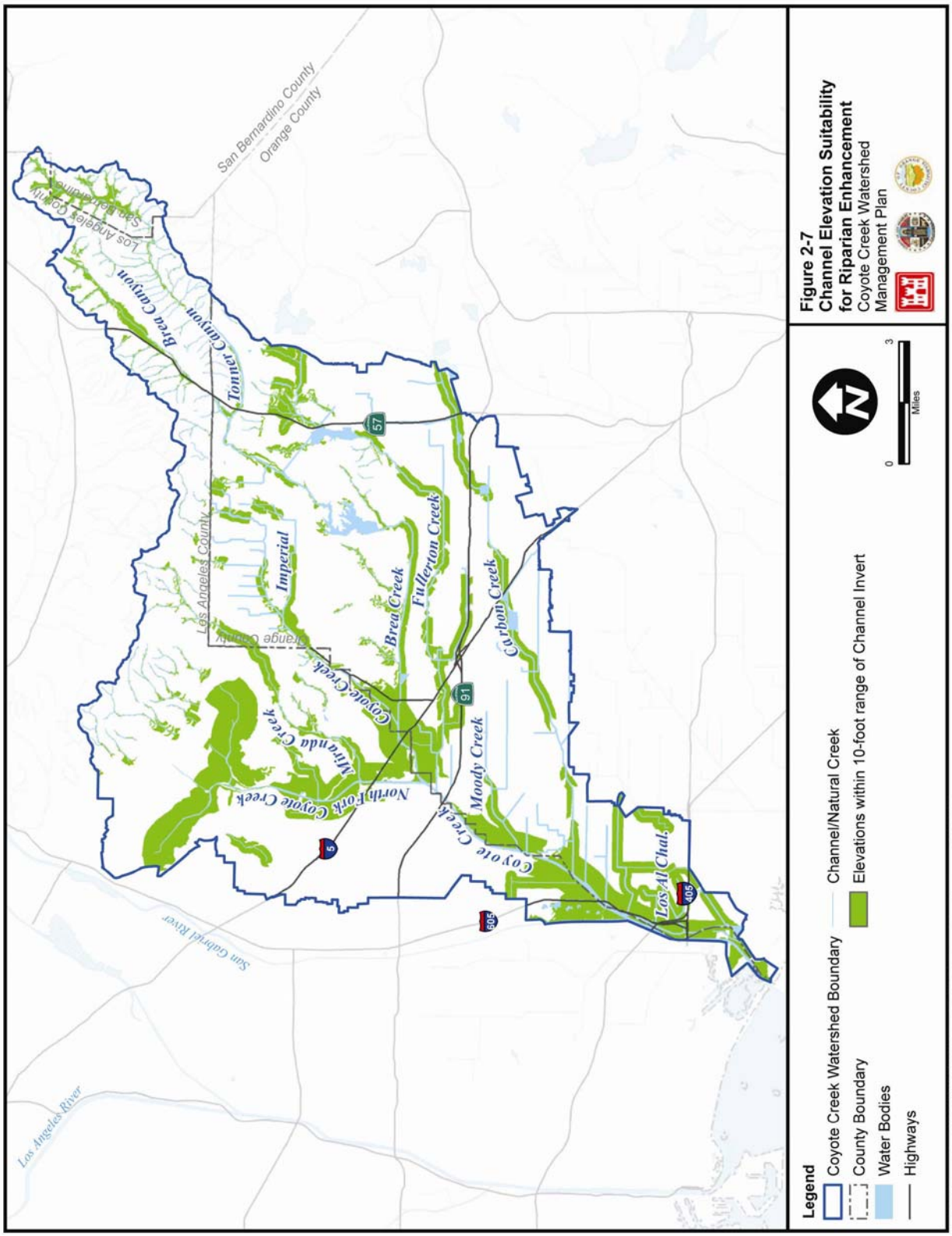
The habitat objective is to *restore, maintain and protect habitat quality and quantity*. Fifty-five percent of the general plans reviewed had a policy that closely matched this objective. These policies were mostly located within the land use or conservation elements of the general plans. Some of the general plans do not mention habitat at all. This may be due to the fact that several cities within the watershed are completely built-out, and therefore habitat conservation may not be an issue that the city deems imperative. State general plan guidelines suggest analyzing habitat under the open space element.

2.4.2 Recreation

2.4.2.1 Identification of Issues

Recreation provides many important physical and psychological benefits to humans such as fitness, stress reduction, and increased community involvement. Recreational opportunities can range from developed and undeveloped regional and community parks and recreational areas to bikeways and trails, and public and private golf courses. In particular, these areas provide recreational opportunities for walking, hiking, jogging, biking, aerobics, nature observation, and informal and organized team sports. These recreational opportunities are vital for this highly populated region. However, rapid urbanization has left parts of the Study Area with a shortage of adequate recreational opportunities to serve local populations.

Opportunities for creating new recreational opportunities are severely limited by existing development. For this reason, determining recreational opportunities that are compatible with existing land uses can bring about latent prospects for recreation in highly developed


San Bernardino County
Orange County
Los Angeles County
San Bernardino County
Los Angeles County
Orange County
Brea Canyon
Tonner Canyon
Imperial
Brea Creek
Fullerton Creek
Carbon Creek
Coyote Creek
Moody Creek
Los Al Chal.
Alhambra Creek
North Fork Coyote Creek
Los Angeles River
San Gabriel River
57
91
5
605
405
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Channel/Natural Creek
Elevations within 10-foot range of Channel Invert
0
3
Miles
Figure 2-7
Channel Elevation Suitability
for Riparian Enhancement
Coyote Creek Watershed
Management Plan
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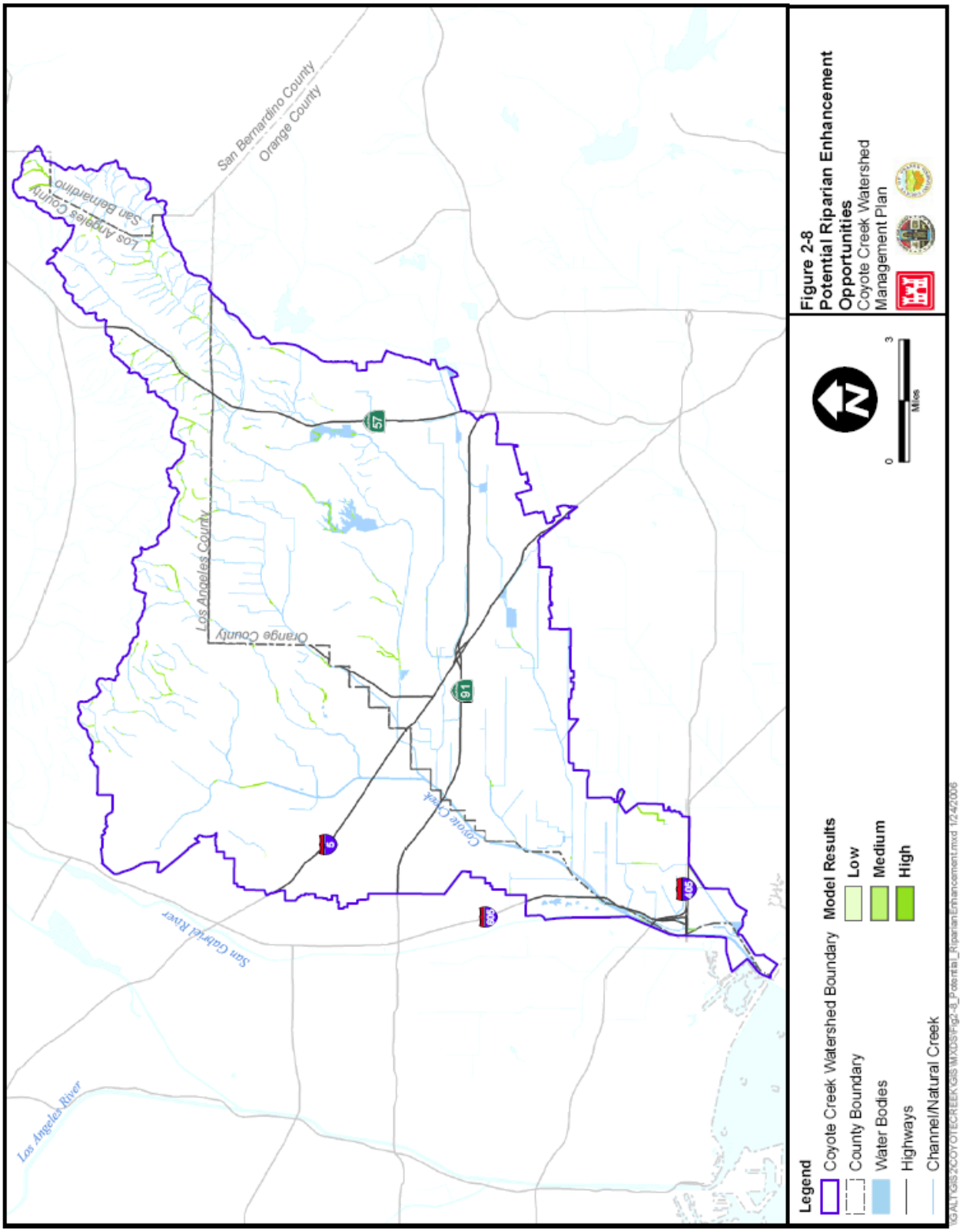
Figure 2-8
Potential Riparian Enhancement Opportunities
Coyote Creek Watershed Management Plan
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Channel/Natural Creek
Model Results
Low
Medium
High
0
3
Miles
San Bernardino County
Orange County
Los Angeles County
San Bernardino
Los Angeles County
Orange County
Coyote Creek
San Gabriel River
Los Angeles River
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\\GALT\GIS2\COYOTECREEK\GIS\MXDS\Fig2-8_Potential_RiparianEnhancement.mxd 1/24/2006

densely populated areas. An effective strategy for doing this is to identify new passive park opportunities.

Passive parks, rather then active parks, provide greater flexibility for siting in developed areas. Often times, corridor land uses, such as transportation greenbelts and stream and creek corridors, are suitable areas for passive parks. Passive parks can include trails and bikeways mixed with picnic and sitting areas and/or landscape and public art features. They provide important recreational opportunities such as walking, hiking, jogging, biking, nature observation, and scenic outdoor daytrips for local residents. Passive parks also provide the community benefit of physically linking, through trails and greenways, active parks and open space areas with residential areas, schools, civic spaces, and historic and cultural places of interest.

Specific analysis of opportunities new passive parks is detailed in the section below.

2.4.2.2 Spatial Opportunities and Constraints Analysis

New Passive Park Opportunities

To evaluate new passive park opportunities the following GIS modeling was completed:

Applicable 1st Order Maps were determined and include: (1) Land Use; (2) Existing Park Locations; (3) Population Density (Figure 2-9), and, (4) Predominantly Minority Areas, as a reflection of environmental justice considerations.

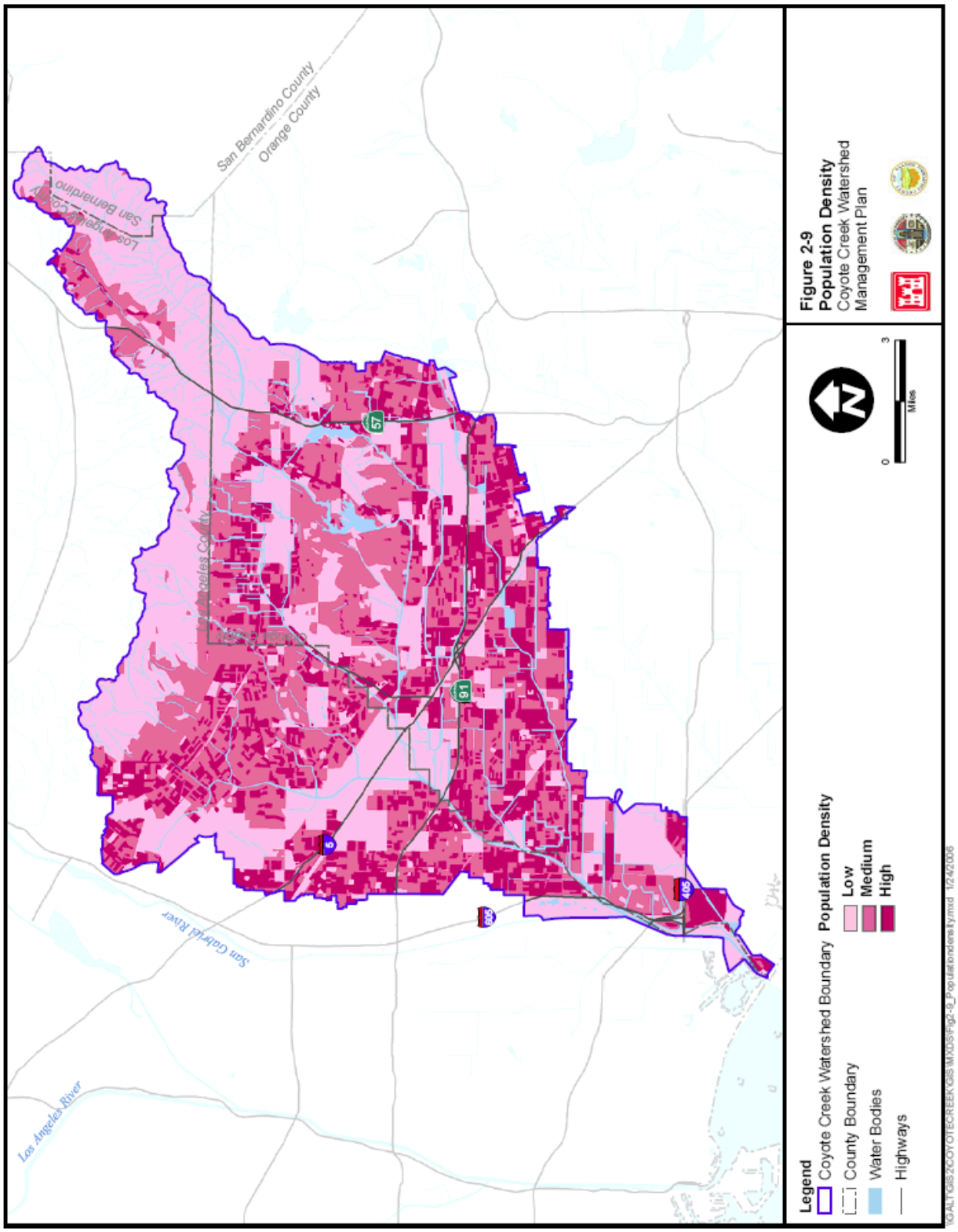
Drawing from 1st Order Maps the following 2nd Order Map assessments were completed which included the following:

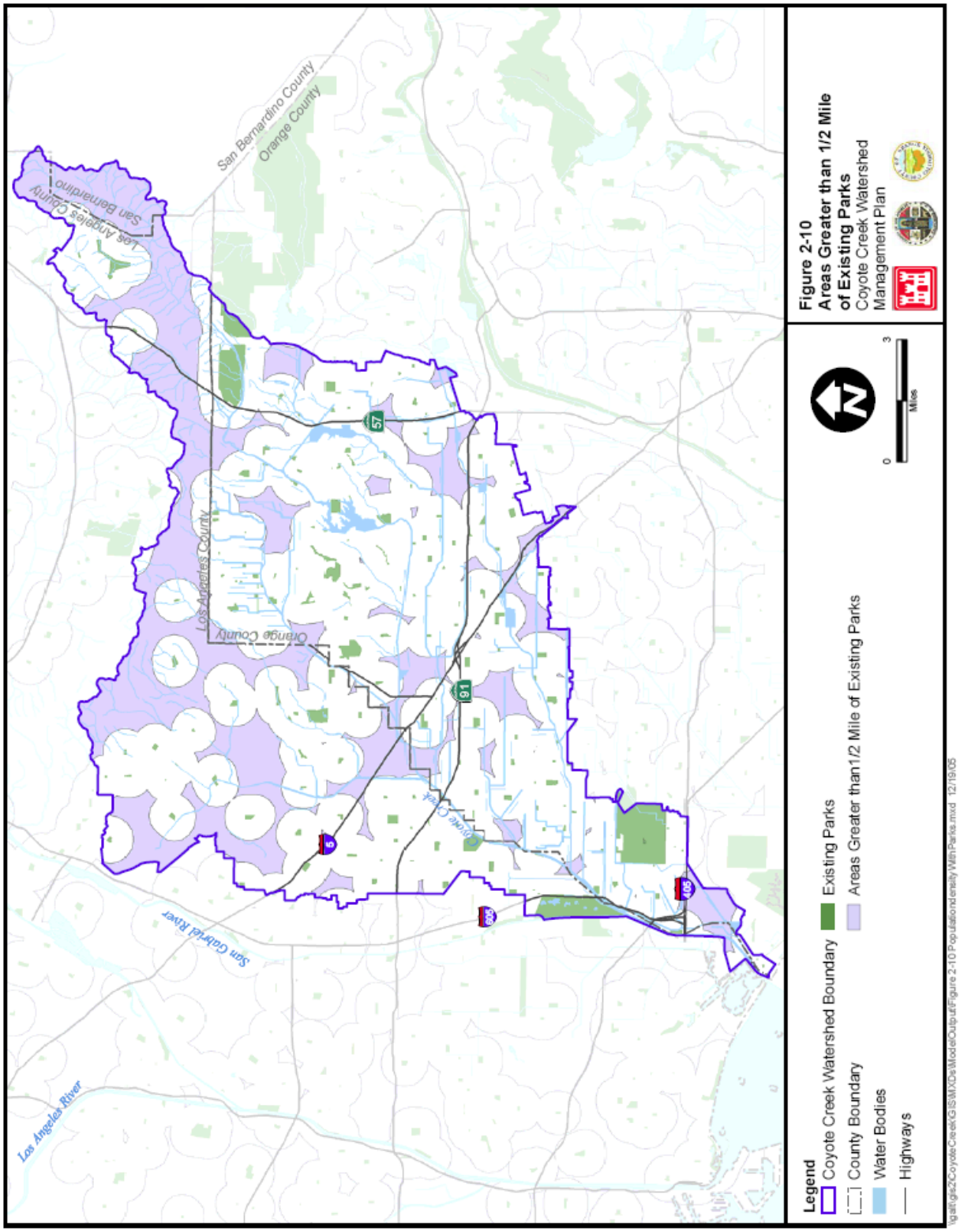
- Parks were buffered by ½-mile to identify areas that were generally not well represented by existing parks (Figure 2-10).
- Areas of with greater than 50 percent minority populations were identified (Figure 2-11).
- Land Use data was reclassified for passive park suitability (Figure 2-12) as follows:

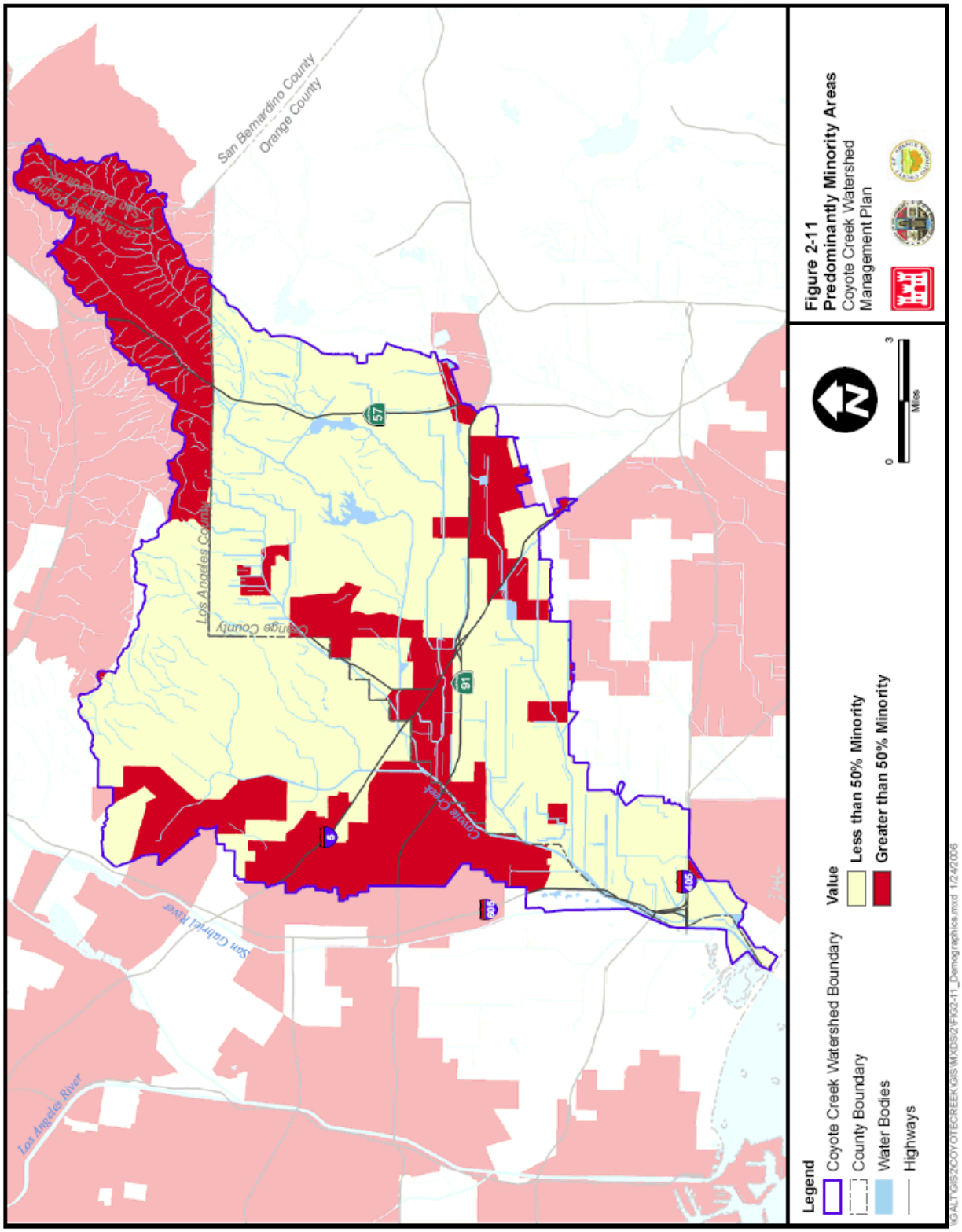
Excluded land uses consisted of Commercial, Industrial, Residential, Transportation, Education and Religion, and existing Recreational.

  – Suitable passive park land uses included Public, Agricultural, or Vacant land.

Data identified in the 2nd Order Maps were then overlaid to create a 3rd Order Map that identifies potential new passive park opportunities. Specifically, potential project opportunity areas comprise areas of suitable land use, preferring areas which currently do not have existing parks within ½-mile, have high population density, and have a majority population which is minority (Figure 2-13). The potential project opportunity areas are located in limited areas throughout the Study Area. New passive park opportunites are constrained in large parts of the Study Area which have land uses that are inappropriate to locating new passive parks. Potential opportunities are emphasized in areas with predominantly minority populations, with the intent of serving these otherwise generally underserved communities. Refer to Section 3 for the identification of potential projects.


San Bernardino County
Orange County
Los Angeles County
San Bernardino County
Los Angeles County
Whittier Narrows
San Gabriel River
Los Angeles River
57
91
5
605
405
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Population Density
Low
Medium
High
0
3
Miles
Figure 2-9
Population Density
Coyote Creek Watershed
Management Plan


San Bernardino County
Orange County
Los Angeles County
San Bernardino
Los Angeles County
Orange County
Coyote Creek
San Gabriel River
Los Angeles River
57
91
5
605
710
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Existing Parks
Areas Greater than1/2 Mile of Existing Parks
0
3
Miles
Figure 2-10
Areas Greater than 1/2 Mile of Existing Parks
Coyote Creek Watershed Management Plan


San Bernardino County
Orange County
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San Bernardino
Los Angeles County
Orange County
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405
Coyote Creek
San Gabriel River
Los Angeles River
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Value
Less than 50% Minority
Greater than 50% Minority
0
3
Miles
Figure 2-11
Predominantly Minority Areas
Coyote Creek Watershed
Management Plan
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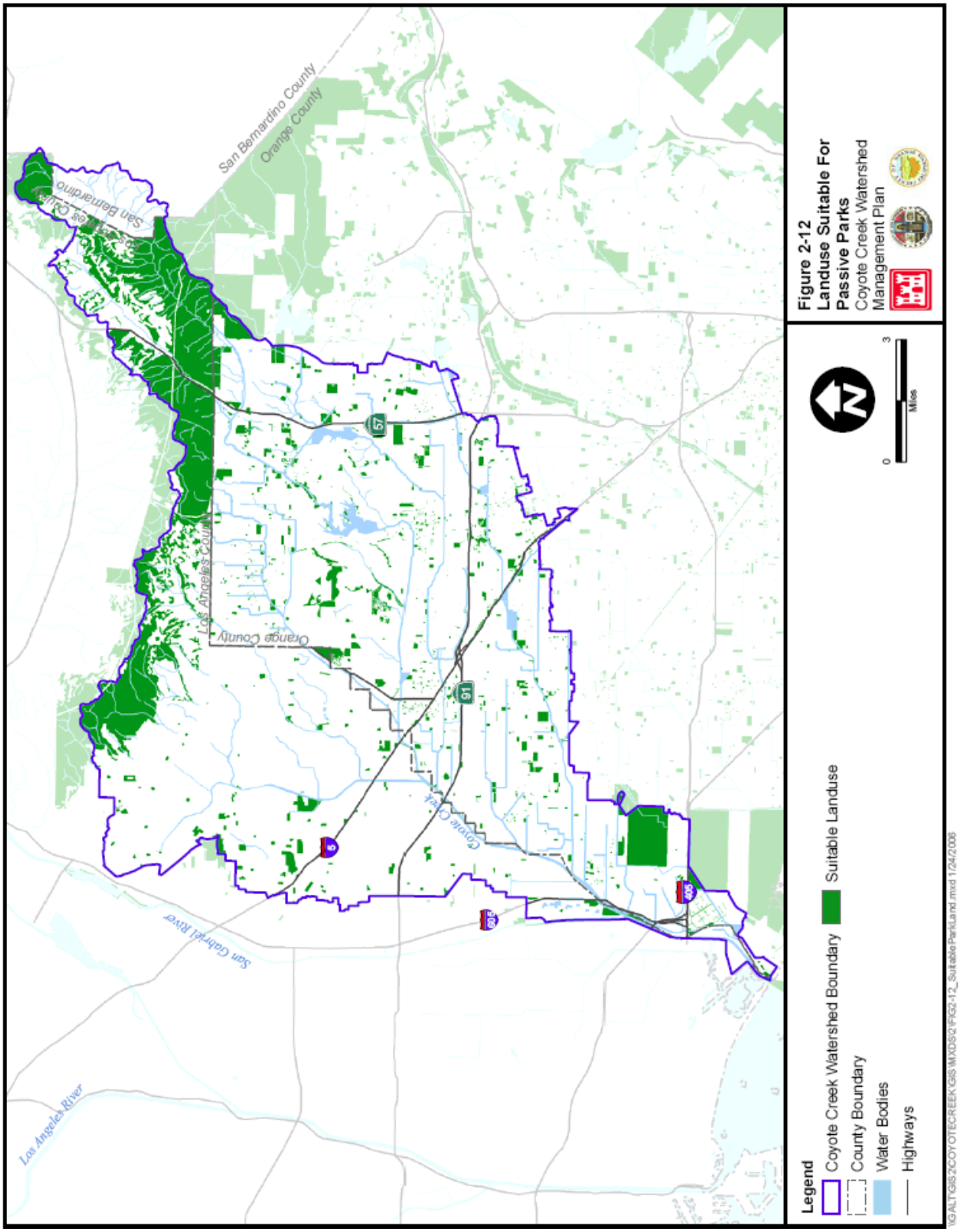
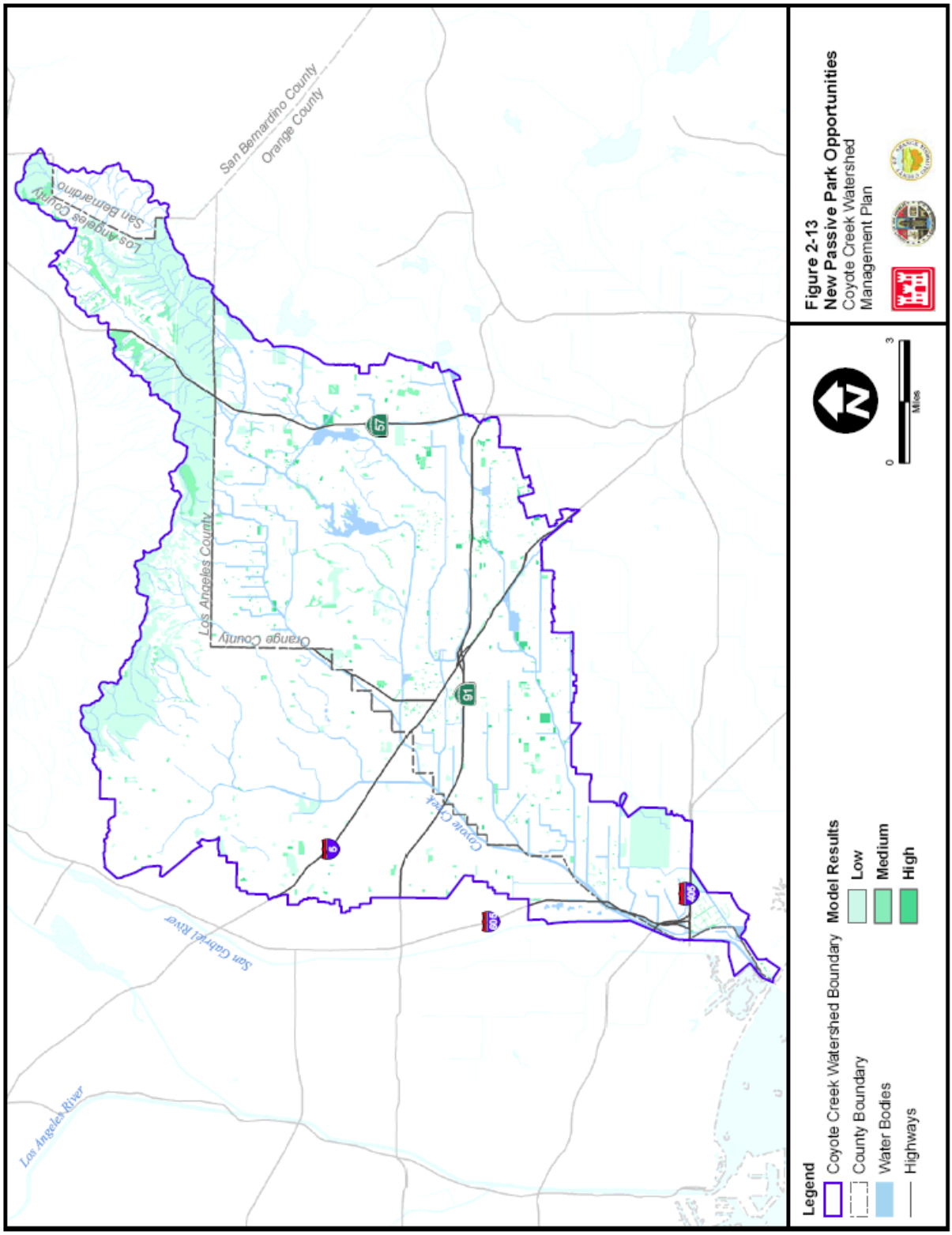

San Bernardino County
Orange County
San Bernardino
Los Angeles County
Orange County
Los Angeles County
Coyote Cr.
San Gabriel River
Los Angeles River
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Suitable Landuse
0
3
Miles
Figure 2-12
Landuse Suitable For
Passive Parks
Coyote Creek Watershed
Management Plan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San Gabriel River
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57
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605
405
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Model Results
Low
Medium
High
0
3
Miles
Figure 2-13
New Passive Park Opportunities
Coyote Creek Watershed
Management Plan
\\GALTGIS2\COYOTECREEK\GIS\MXDS\2\FIG2-13_PassiveParkOpps.mxd 1/24/2006

2.4.2.3 Plans and Policies Opportunities and Constraints Analysis

The recreation objective is to *increase recreational opportunities, access and connectivity.* Eighty-five percent of all general plans reviewed have a policy that matches this objective. Recreation policies are generally very common in general plans and most general plans address recreation in their open space element. Of the general plans reviewed, recreation was more than likely addressed in every single plan, but not in a manner that matches the wording or spirit of the CCWMP objective. The key indicators of whether or not a plan's policy matches this objective was if the policy addressed increasing or enhancing recreational spaces in addition to the public's access to recreation.

2.4.3 Open Space

2.4.3.1 Identification of Issues

Prior to development, the Study Area was characterized by an open flood plain braided by the shifting corridors of rivers and creeks originating from the Puente and Chino Hills, located in its upper boundary. Today, following several cycles of development and urbanization, open space is limited to the mountain and hill areas, and limited wetland and riparian habitat areas. Open space, in this sense, is open and/or undeveloped land.

Open space is important because it provides many benefits to the human population and plant and animal wildlife. Benefits include: improved air and water quality associated with the natural processes of plants and wetland systems; reductions in flooding and sedimentation associated with flow dispersion and slope stabilization; habitat for native plants and wildlife, and corridor linkages to other natural habitat areas; and, recreation and environmental education opportunities for the local human population. Because the Study Area is highly populated, and has been extensively developed, maintaining and enhancing existing open space areas is critical to the ecological health of the human population and plant and animal wildlife residing within the watershed.

2.4.3.2 Spatial Opportunities and Constraints Analysis

Specific open space opportunities were evaluated under the opportunities analysis for habitat and recreation (Figures 2-4, 2-8, and 2-13).

2.4.3.3 Plans and Policies Opportunities and Constraints Analysis

The open space objective is to *enhance open space opportunities for the public*. Sixty-five percent of the general plans reviewed addressed this objective. Similar to the habitat objective of the CCWMP, some cities within the watershed are completely built out, and do not address open space in their general plan. Open space is a required element of the general plan, and those cities that did not address it are not conforming to state general plan guidelines. General plans that did not properly address open space should do so in their next general plan update. Cities that are completely built out and do not have vast amounts of undeveloped land, may be able to address open space through addressing areas suited for parks and outdoor recreation and areas used for recharge of groundwater basins.

2.4.4 Economic Development

2.4.4.1 Identification of Issues

Economic development and environmental quality are often perceived as conflicting goals; and in some cases they are. However, the quality of the environment can be a sign of the economic health of a region. Typically urban regions that are economically depressed are also characterized by high levels of pollution and a degraded environment. In other words, poverty and environmental degradation are often interrelated. On the contrary, economic growth creates the potential to improve environmental quality. It enlarges the capital base available to individuals and societies to minimize environmental degradation and improve the health of the environment.

Conflicts between economic development and environmental quality are exceedingly evident when looking at the current approach to environmental regulation and the nature of economic development. Most importantly the two goals are not integrated. Specifically, private developers and local public works departments make decisions on a project by project basis, while environmental resources function as a larger system; and would be more effectively managed using a spatial approach. Additionally, environmental regulations leave the financial burden for avoiding impacts entirely on the developer or local public works department. This often drains private and municipal budgets and acts as a disincentive to supporting natural resources. At the same time, however, communities rely exclusively on these environmental regulations to protect the environment from degradation.

The Study Area is home to several natural splendors including the Puente and Chino Hills, Coyote Hills, Los Cerritos Wetlands, and the Pacific Ocean at its ultimate terminus. These natural areas provide aesthetic, environmental, and recreational benefits to the local population. The semiarid climate of the Study Area also makes it a highly sought after destination to work and live. This along with the Study Area's lively economic array of technology, commercial, industrial, tourism, academic, development, business, entrepreneurial, and finance opportunities, attracts a healthy and vibrant workforce.

It is recognized that continued economic growth is necessary to maintain and improve the quality of the environment. However, unbridled economic development that results in rapid environmental degradation reduces the potential for future economic growth through impacts to human health and resources. This is evident with respect to water and air pollution. Environmental degradation can also reduce future incomes through impacts on resource productivity. For this reason, land-use and environmental strategies, such as this WMP, that benefit both economic development and environmental quality could be essential to the long term vitality of the Study Area. Of utmost importance is the cooperative support needed to: preserve scenic, natural, historic, cultural, and recreational resources; protect the local character and promote the civic strength of communities; and, to encourage economic development through adaptive reuse and planned development and growth. In summary, sound economic development is critical to ensuring the environmental health of the watershed, providing prosperous opportunities to its population, and limiting and revitalizing areas of urban blight.

Fundamentally, there are innate connections between economic development and environmental quality within the Study Area. Hence, the objective of economic

development must value these connections; it must consider water, air, native flora and fauna, and their interaction with the human population and its educational, social, and cultural values.

A practical strategy for valuing the connections between economic development and environmental quality is to identify watershed connectivity opportunities that foster a sense of connection between the local population and the scenic, natural, historic, cultural, and recreational resources in which they work and live. An effective means for establishing connectivity between the local population and the watershed is to develop a unique signage scheme that highlights natural, cultural, and historic features of interest within the watershed.

Specific analysis of watershed connectivity opportunities is detailed in the section below.

2.4.4.2 Spatial Opportunities and Constraints Analysis

Watershed Connectivity Opportunities

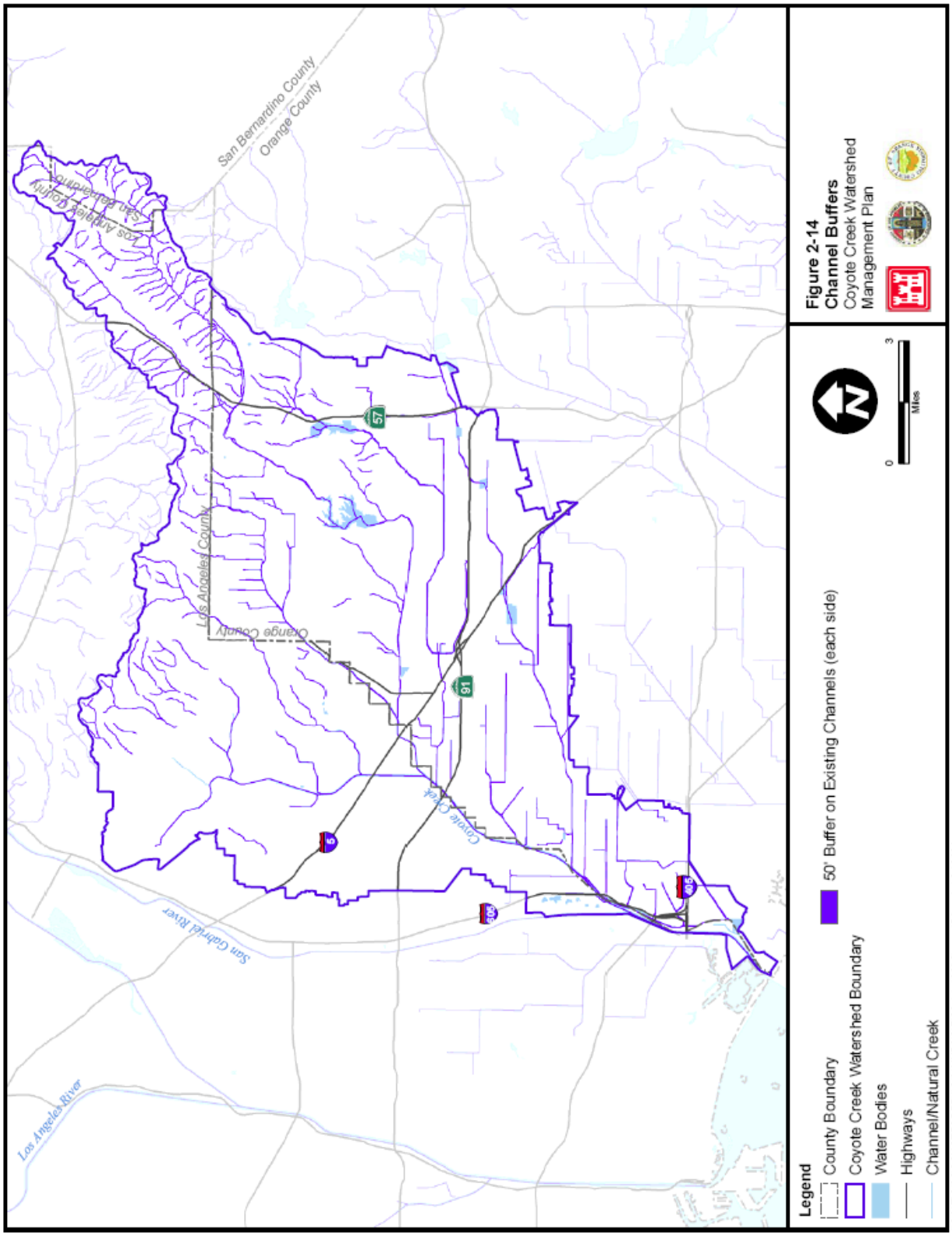
To evaluate connectivity opportunities the following GIS modeling was completed:

Applicable 1st Order Maps were determined and include: (1) Land Use; (2) Existing Channel Locations; and, (3) Existing Trails and Bikeways.

2nd Order Maps were then developed to further refine potential connectivity opportunities. Drawing from 1st Order Maps the following 2nd Order Map assessments were completed:

- Existing Channels were reclassified to select areas within 50-feet to each side of channels (Figure 2-14).
- Existing Trails and Bikeways were analyzed to identify areas within 60-feet to each side of trails or bikeways (Figure 2-15).
- Land Use was reclassified to show value for developing watershed connectivity facilities (Figure 2-16). Connectivity value was classified by land use as follows:
  - Excluded land uses consisted of Commercial, Industrial, Transportation, Agricultural and Vacant.
  - Low value land use for connectivity facilities included Residential.
  - Medium value land use for connectivity facilities included Education and Religion and Public.
  - High value land use for connectivity facilities included Recreational.

Data identified in the 2nd Order Maps were then overlaid to create a 3rd Order Map that identifies potential connectivity opportunities. Specifically, potential high value project opportunity areas are within 50-feet of existing channels, have existing adjacent trails and bikeways, and are of recreational land use (Figure 2-17). The potential project opportunity areas are primarily located along existing channels with Recreational land use. Connectivity opportunities are constrained by the limited amount of Recreational areas adjacent to existing channels. Refer to Section 3 for the identification of potential projects.


San Bernardino County
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Orange County
Los Angeles River
San Gabriel River
Coyote Creek
57
91
5
605
Legend
County Boundary
Coyote Creek Watershed Boundary
Water Bodies
Highways
Channel/Natural Creek
50' Buffer on Existing Channels (each side)
0
3
Miles
Figure 2-14
Channel Buffers
Coyote Creek Watershed
Management Plan
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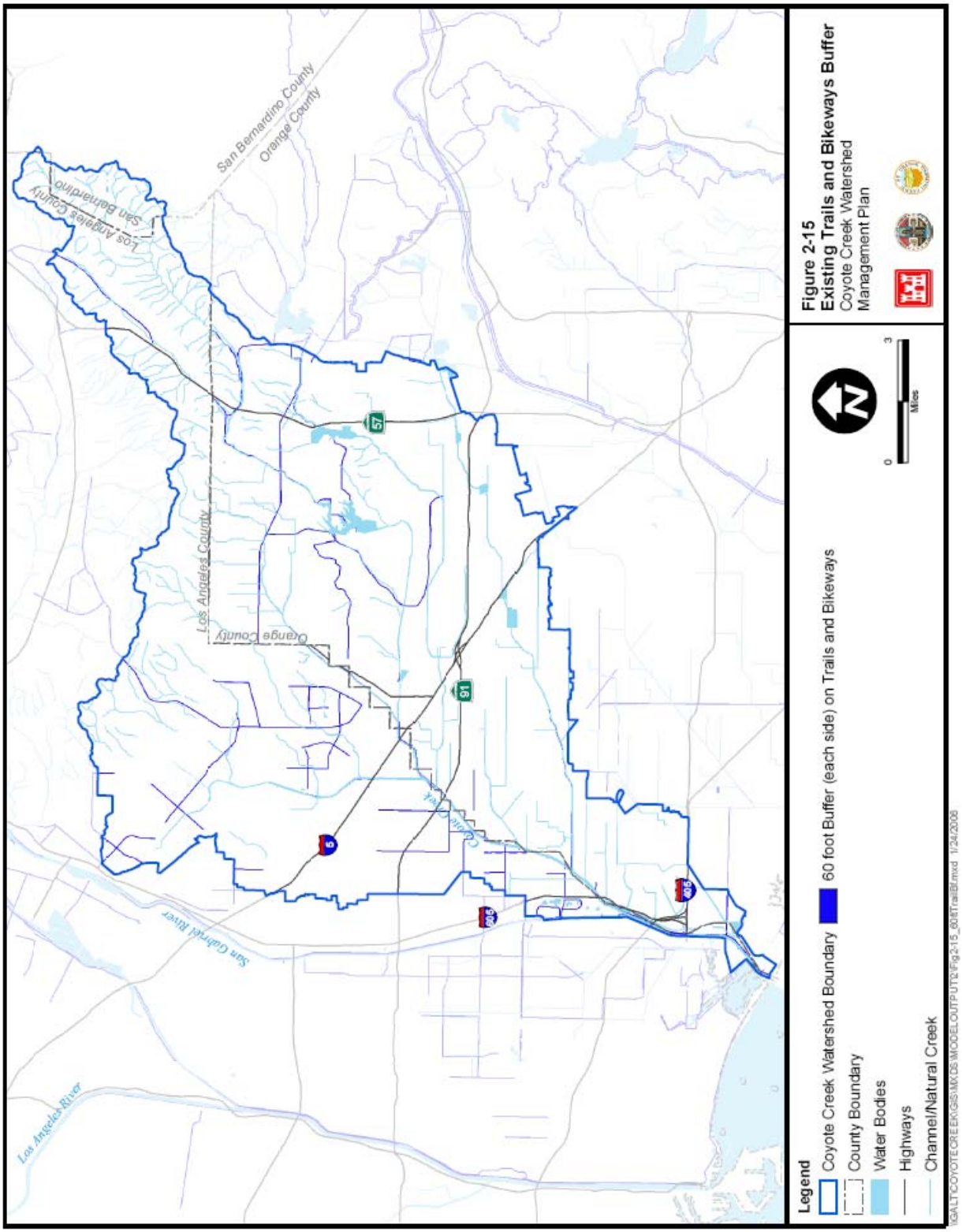
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Orange County
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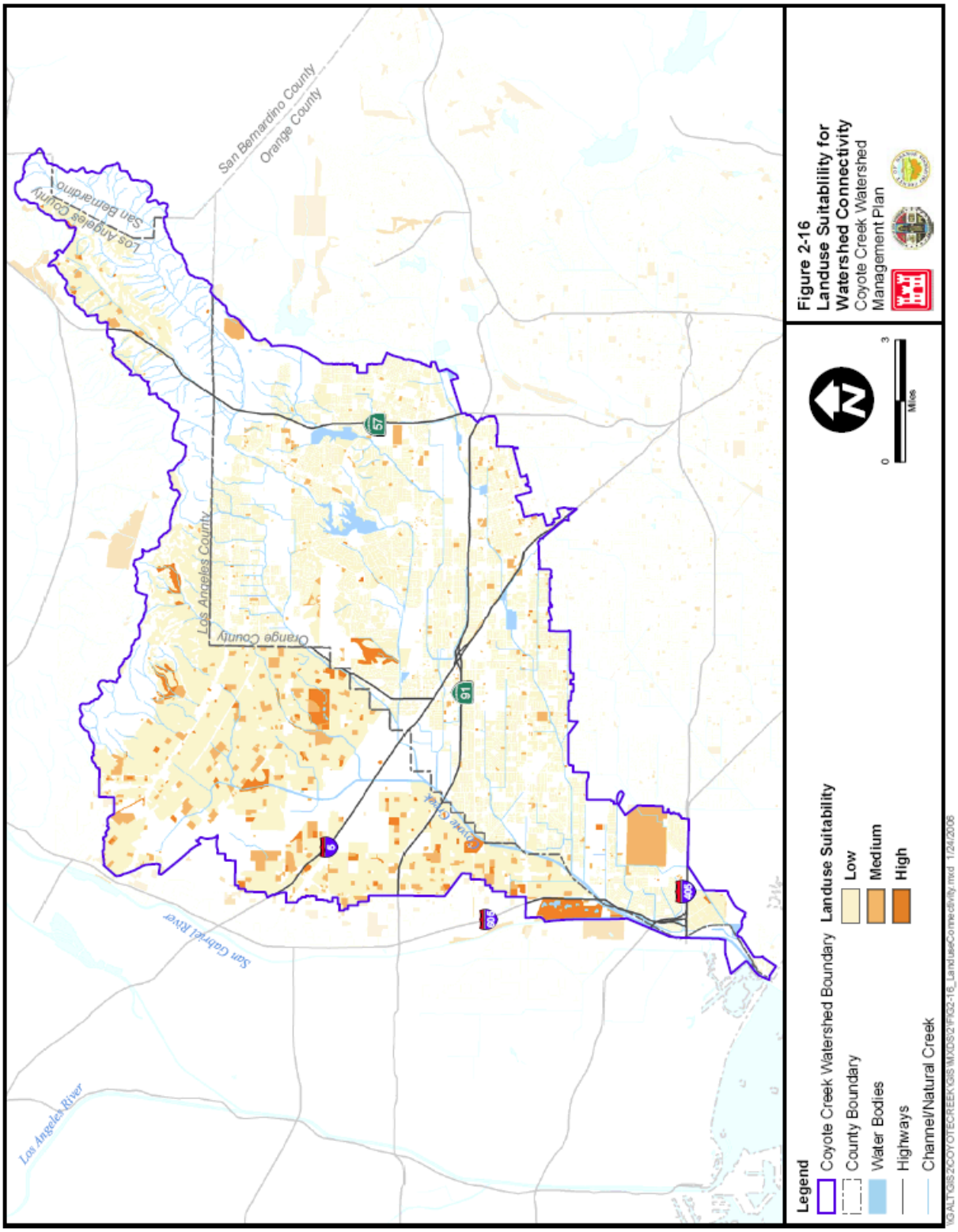
Coyote Creek
San Gabriel River
Los Angeles River
Legend
Coyote Creek Watershed Boundary
60 foot Buffer (each side) on Trails and Bikeways
County Boundary
Water Bodies
Highways
Channel/Natural Creek
0
3
Miles
Figure 2-15
Existing Trails and Bikeways Buffer
Coyote Creek Watershed
Management Plan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Coyote Creek
San Gabriel River
Los Angeles River
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Channel/Natural Creek
Landuse Suitability
Low
Medium
High
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3
Miles
Figure 2-16
Landuse Suitability for Watershed Connectivity
Coyote Creek Watershed Management Plan
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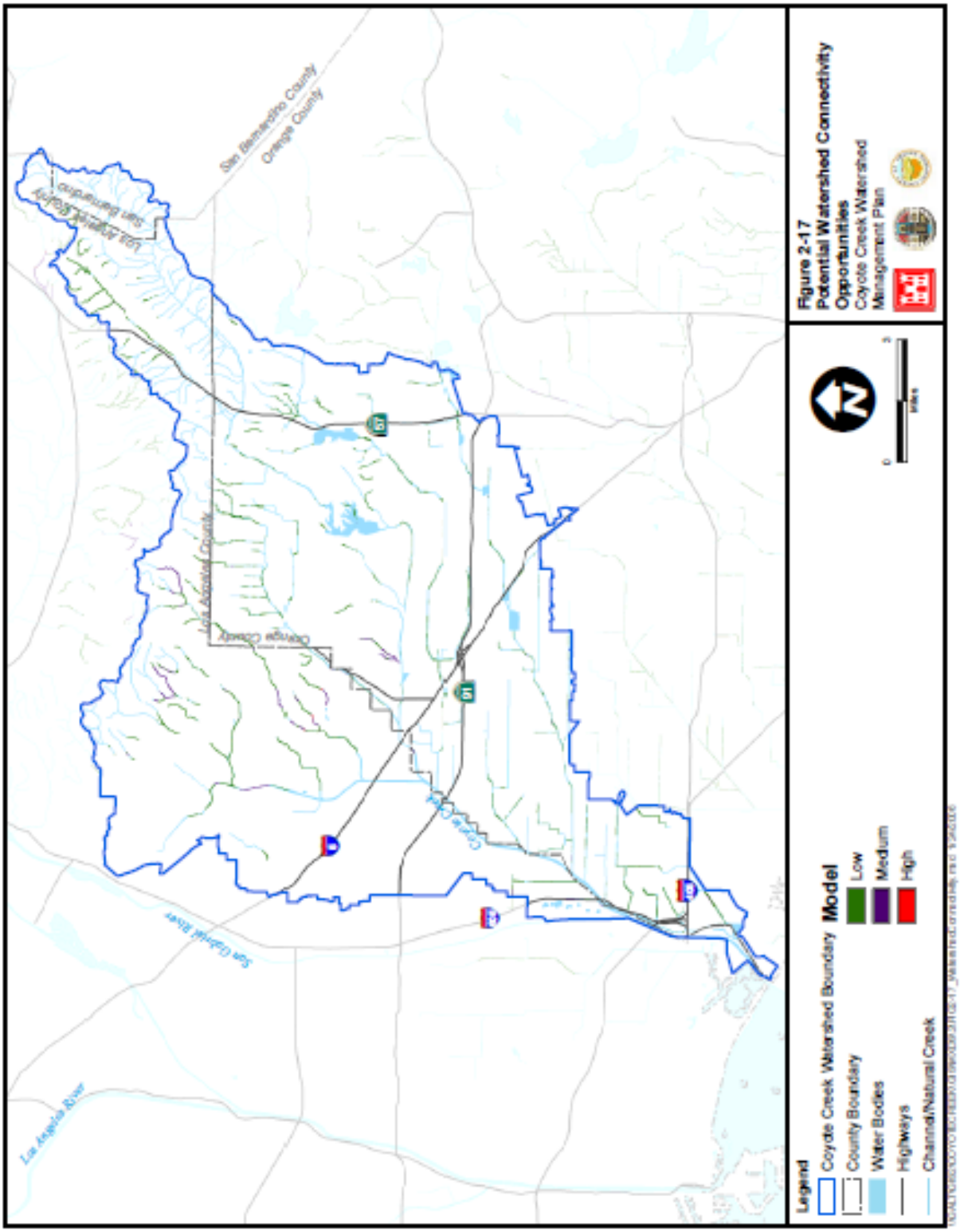


Figure 2-17
Potential Watershed Connectivity Opportunities
Coyote Creek Watershed Management Plan
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Channel/Natural Creek
Model
Low
Medium
High
miles
San Bernardino County
Orange County
Los Angeles County
San Gabriel River
Los Angeles River
Coyote Creek

2.4.4.3 Plans and Policies Opportunities and Constraints Analysis

The economic development objective is to *integrate best watershed practices into economic development activities.* Economic development is not one of the mandatory elements of the general plan required by the state. However, most general plans do include an economic development element. In reviewing these general plans, only one plan (5% of the plans reviewed) had an economic development policy that simultaneously addresses economic development as well as the environment. This general plan policy does not mention the watershed specifically, but it captures the spirit of the objective by addressing the environment when establishing a policy for economic development. The City of Hawaiian Gardens has a policy that states to 'maintain a healthy balance between economic growth and environmental quality.'

2.5 Water

The Water goal of the WMP includes five objective categories: (1) Water Supply, (2) Impervious Surfaces, (3) Water Quality, (4) Flood Protection, and (5) Wetland Protection. Each objective category is presented below as an individual subsection and includes an identification of relevant issues followed by an analysis of opportunities and constraints to addressing the identified issues.

In short, the water supply and quality of the Study Area has also been affected by urbanization and development. The Study Area is heavily reliant on imported water and has many environmental stresses that affect water quality. Large areas of impervious surfaces affect both local groundwater recharge and the quality of stormwater discharge to surface waters. Additionally, flood protection and wetland protection are important management objectives to ensuring the safety of the human population and providing important benefits to the water quality and habitat value of the watershed.

Review of Plans and Policies

A review of plans and policies relating to Water goals and objectives shows that water supply/conservation, water quality, and flood objectives are well addressed by city and county plans and policies, however, there are limited plans and policies available relating to impervious surfaces and wetland protection objectives.

Table 2-3: Percent of General Plans that address Water Goal and Objectives

Objective:	Water Supply	Impervious Surfaces	Water Quality	Flood	Wetland Protection
Percent of General Plans:	70%	15%	80%	40%	10%
Objective Number:	W-1	W-2	W-3	W-4	W-5

The five objectives listed under the Water goal are addressed by different elements of the general plans. Mostly, issues pertaining to water are found under the conservation element, a required element. The conservation element should assess future water supply, water quality and the identification of water resources within the general plan boundaries. As

shown in Table 2-3 above, impervious surfaces and wetland protection are objectives that are not well addressed in general plans within the Coyote Creek Watershed. The safety element of general plans addresses flooding. The safety element is a required element and states that the element must address flood hazard areas and to establish policies to avoid unreasonable flood risks.

About 50% of all the general plans reviewed matched the CCWMP water goals and objectives. Some general plans did a better job of addressing CCWMP goals and objectives than others. For example, the City of Cerritos' general plan policies matched 80% of the Water goals.

2.5.1 Water Supply and Conservation

2.5.1.1 Identification of Issues

The Study Area is heavily reliant on imported water from the Colorado River and Sacramento Bay-Delta. Imported water is also used as a source for replenishing local groundwater basins. Potential reapportionment of imported water supply sources could reduce the amount of water available. Possible reductions in supply in addition to population expansion could result in increased water supply needs in the future. For this reason, maximizing water storage and local supplies within the Study Area is of critical importance to ensuring a reliable and available water supply. In particular, groundwater storage has many advantages over surface water storage including: (1) surface water reservoirs occupy vast areas of land, often times damming large open space and habitat areas, that could serve other purposes; (2) surface water reservoirs are an inefficient means of water storage because of evaporation; and, (3) surface water reservoirs are expensive to construct and maintain.

The Study Area is dominated by impervious surfaces, which limit the potential for groundwater recharge. Additionally, the lower western part of the Study Area has an impermeable aquitard, which also limits the potential for groundwater recharge. There are, however, certain areas suitable for groundwater recharge. An effective approach for utilizing these areas for groundwater recharge would be to employ them with new onsite infiltration basins.

Specific analysis of new onsite infiltration basin opportunities is detailed in the section below.

2.5.1.2 Spatial Opportunities and Constraints Analysis

New Onsite Infiltration Basin Opportunities

Opportunities for new onsite infiltration basins exist within the watershed and may include areas without the presence of impervious surfaces that are over groundwater infiltration areas and are of low or flat elevation. To evaluate new onsite infiltration basin opportunities the following GIS modeling was completed:

Applicable 1st Order Maps were determined and include: (1) Land Use; (2) Groundwater Basins; and, (3) Topography.

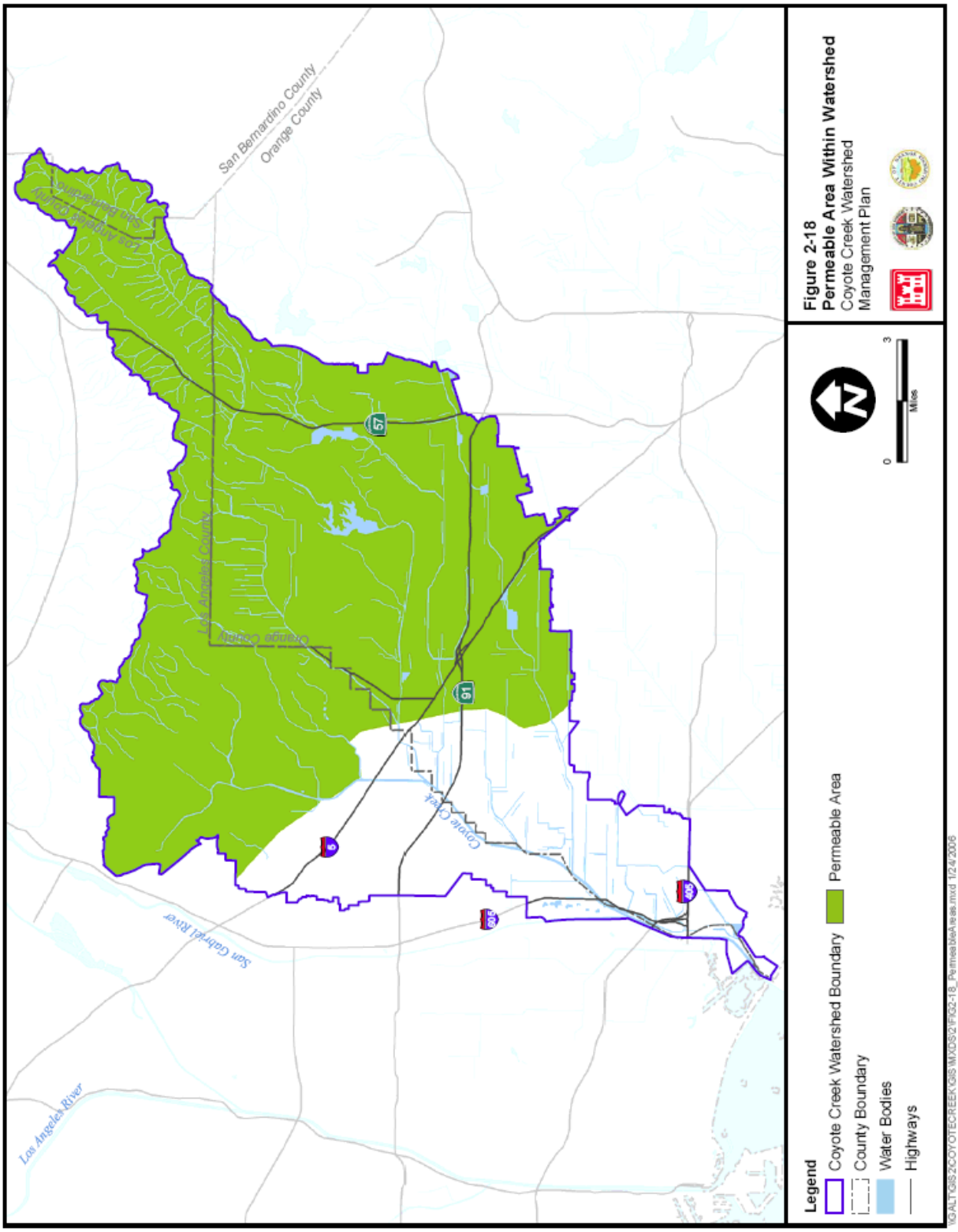
2nd Order Maps were then developed to further characterize groundwater recharge areas. Drawing from 1st Order Maps the following 2nd Order Map assessments were completed:

- Soil suitability was reclassified to exclude impervious areas within the watershed (Figure 2-18).
- Low elevation areas were identified out of the hilly areas of the watershed where surface water retention for infiltration is feasible (Figure 2-19).
- Land Use was reclassified to show potential onsite infiltration value (Figure 2-20). Onsite infiltration value was classified by land use as follows:
  - Excluded land uses for potential onsite infiltration included areas of No Data.
  - Low value land uses for potential onsite infiltration included Commercial, Industrial, and Residential.
  - Medium value land use for potential onsite infiltration included Transportation.
  - High value land uses for potential onsite infiltration included Education and Religion, Public, Agricultural, Vacant Land, and Recreational.

Data identified in the 2nd Order Maps were then overlaid to create a 3rd Order Map that identifies potential new onsite infiltration basin opportunities. Specifically, new onsite infiltration basin opportunities exclude impervious areas for groundwater recharge, are in low elevation areas, and are of high value land uses for supporting infiltration (Figure 2-21). The potential project opportunity areas are primarily located in the central part of the watershed in areas with the greatest potential for groundwater infiltration. New onsite infiltration basin opportunities are constrained by a clay lense that generally underlies the southern and western part of the watershed, which limits groundwater infiltration. New onsite infiltration basin opportunities are also constrained in the upper part of the watershed where the topographic slope is too steep and surface runoff to great for groundwater infiltration. Also, land uses that are highly impervious, such as Commercial and Industrial, are constraints to potential onsite infiltration basin opportunities. Refer to Section 3 for the identification of potential projects.

2.5.1.3 Plans and Policies Opportunities and Constraints Analysis

The water supply and conservation objective is to *decrease dependence on imported water.* Seventy percent of the general plans reviewed had policies that closely match this objective. This was mostly addressed in the conservation element of the general plans. The CCWMP objective of decreasing dependence on imported water goes beyond what the state calls for in the writing of a general plan's conservation element.


San Bernardino County
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Coyote Creek
San Gabriel River
Los Angeles River
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Permeable Area
0
3
Miles
Figure 2-18
Permeable Area Within Watershed
Coyote Creek Watershed
Management Plan
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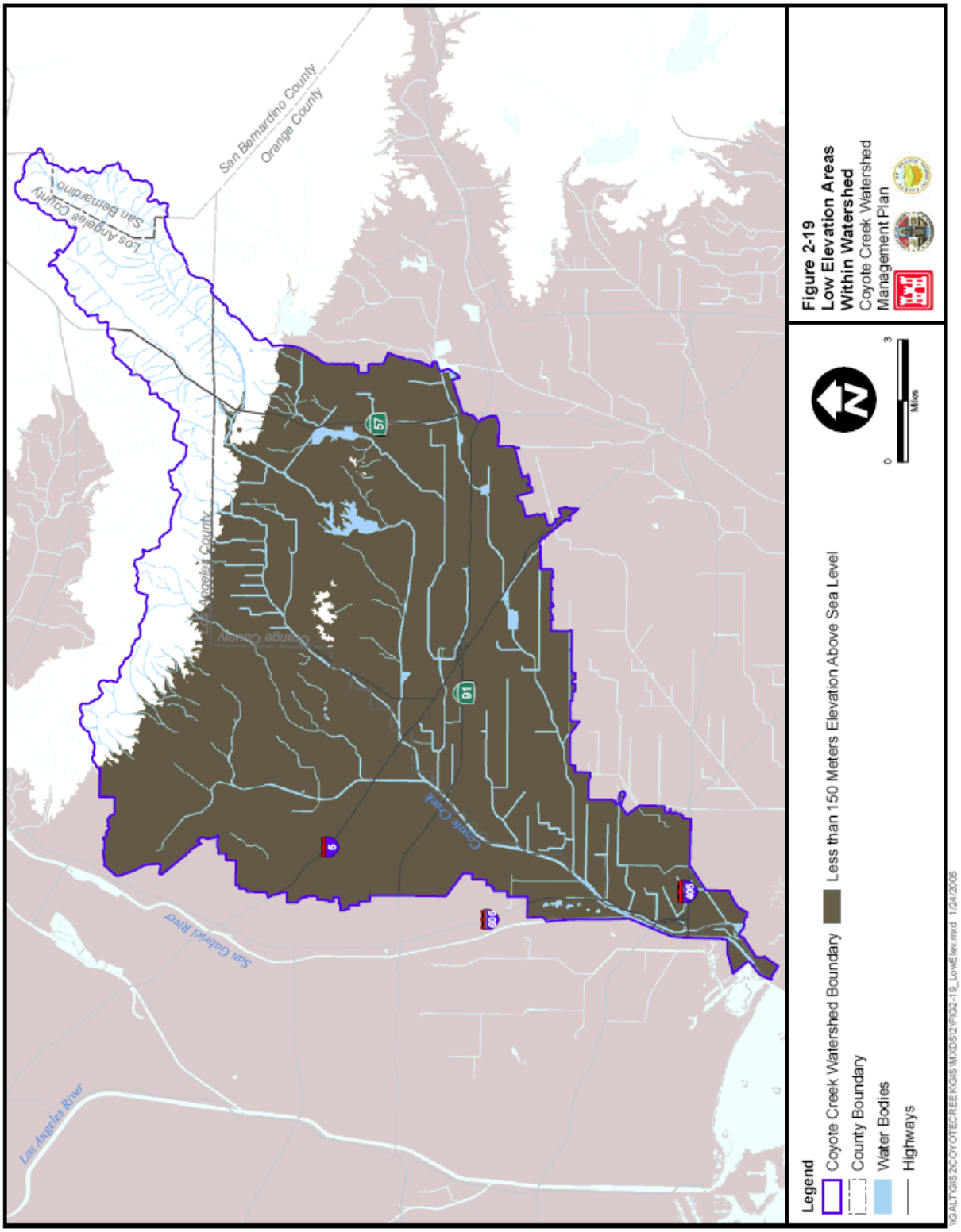
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Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Less than 150 Meters Elevation Above Sea Level
0
3
Miles
Figure 2-19
Low Elevation Areas
Within Watershed
Coyote Creek Watershed
Management Plan
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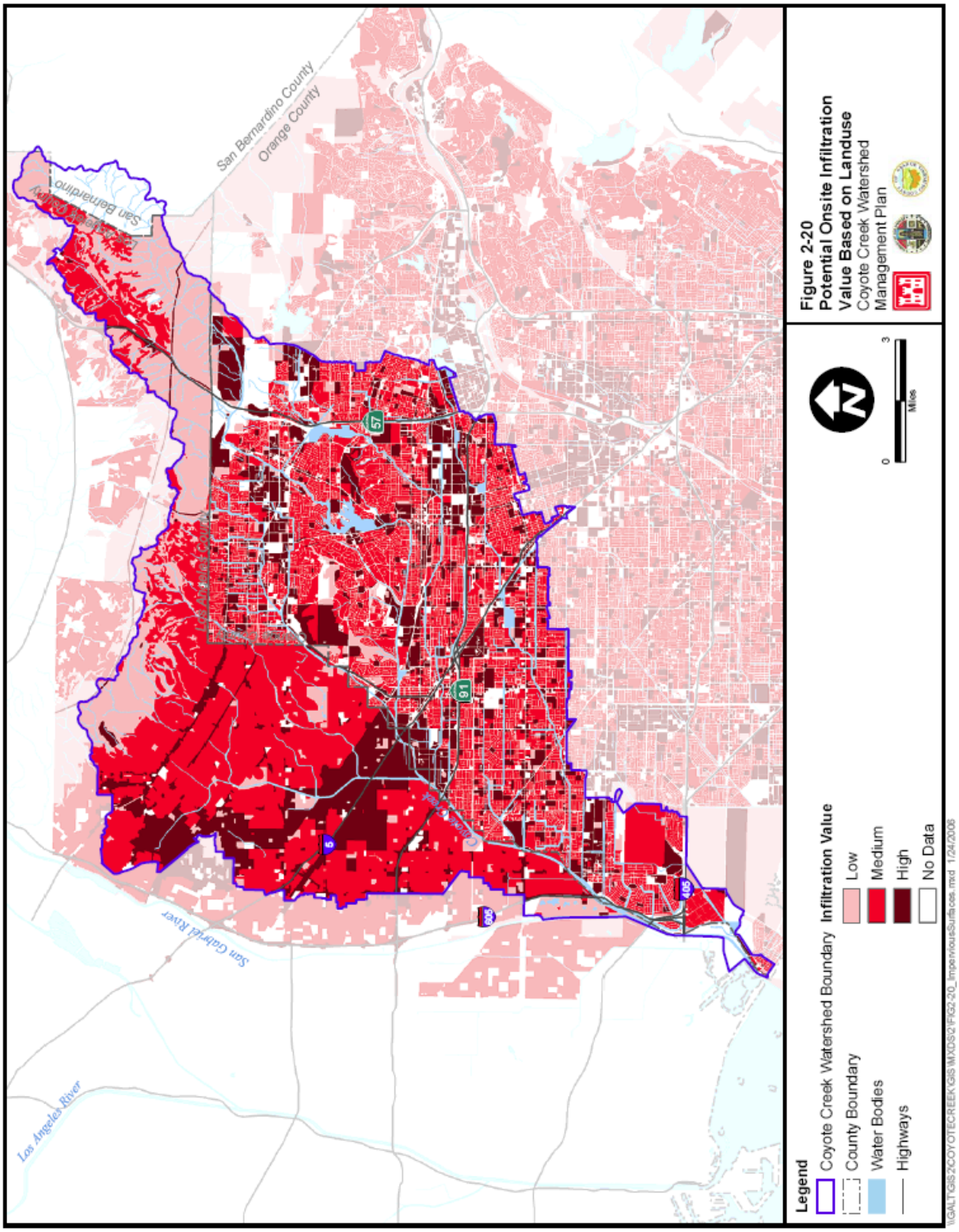

San Bernardino County
Orange County
San Bernardino
Los Angeles County
San Gabriel River
Los Angeles River
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Infiltration Value
Low
Medium
High
No Data
0
3
Miles
Figure 2-20
Potential Onsite Infiltration
Value Based on Landuse
Coyote Creek Watershed
Management Plan

2.5.2 Impervious Surfaces

2.5.2.1 Identification of Issues

Urbanization has considerably affected the hydrology of the Study Area. Effects range from increased land erosion and the discharge of pollutants to creeks and rivers to reduced infiltration and higher rates of flooding. One of the most dramatic effects of development is the way in which it affects flood runoff. Because urbanization produces extended impervious surfaces of asphalt, concrete, and pavement, rates of flood runoff increase in comparison with rural sites. Impervious surfaces also limit the potential for groundwater infiltration and recharge to groundwater recharge, as discussed above. Additionally, residuals and other pollutants collect on impervious surfaces during dry periods and result in polluted stormwater discharge to creeks and rivers during rain events.

2.5.2.2 Spatial Opportunities and Constraints Analysis

Specific opportunities for addressing the groundwater infiltration limiting and water quality affects of impervious surfaces were evaluated under the opportunities analysis for water supply and water quality (Figures 2-21 and 2-24).

2.5.2.3 Plans and Policies Opportunities and Constraints Analysis

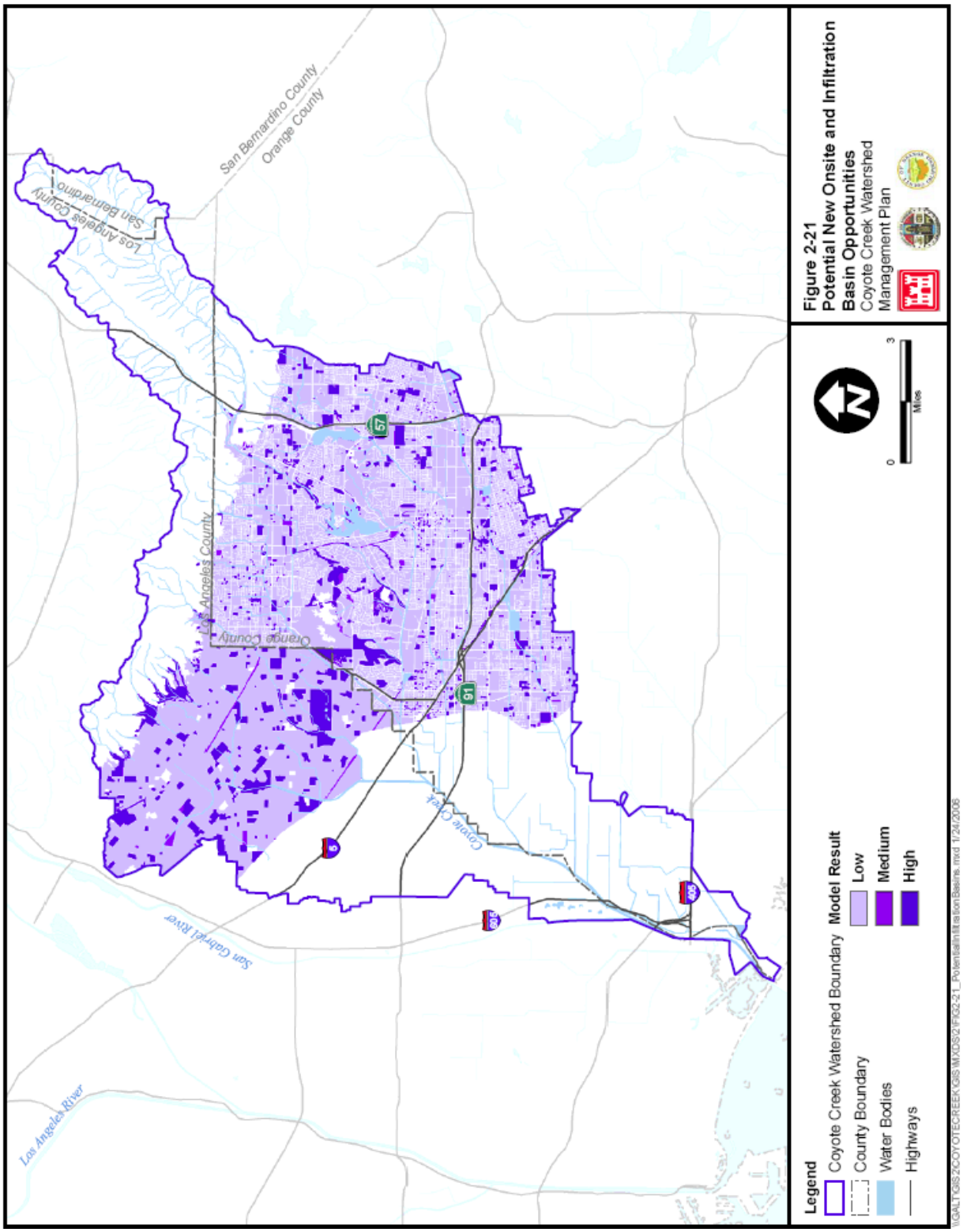
The impervious surfaces objective is to *increase permeability of the urban environment.* Only 15% of the general plans reviewed addressed impervious surfaces. Impervious surfaces are not something the state requires or suggests to be addressed by the general plan. Therefore, it is not a common policy to appear in the general plans that were reviewed.

2.5.3 Water Quality

2.5.3.1 Identification of Issues

Another concern for the Study Area is the degradation of water quality. Water quality is typically degraded with biological pollutants as well as contamination from heavy metals or other chemical pollutants. Water pollution can result in many adverse effects to human and wildlife health and undesirable odors or aesthetic views. Pollution sources include municipal wastewater treatment plants, commercial and industrial operations, construction sites, and a number of nonpoint source discharges that effect urban runoff. In particular, nonpoint source contaminants like oil and grease residuals and trash, which collect on roads and parking lots during dry periods, severely affect water quality when washed by stormwater into creeks and rivers during rain events.

The water quality of nonpoint source discharge is more challenging to regulate than point source discharge because its source is broad and anonymous. For the same reason, site specific treatment opportunities are not practical for controlling the quality of nonpoint source pollution. However, wetlands are effective in removing pollutants from nonpoint source discharge. Wetland ecosystems are characterized by the presence of saturated soils and plants that grow and thrive in these conditions. These two features encourage natural processes that trap, transform, and utilize a variety of the materials, including many pollutants, which flow into a wetland system. Wetlands also slow flow and provide water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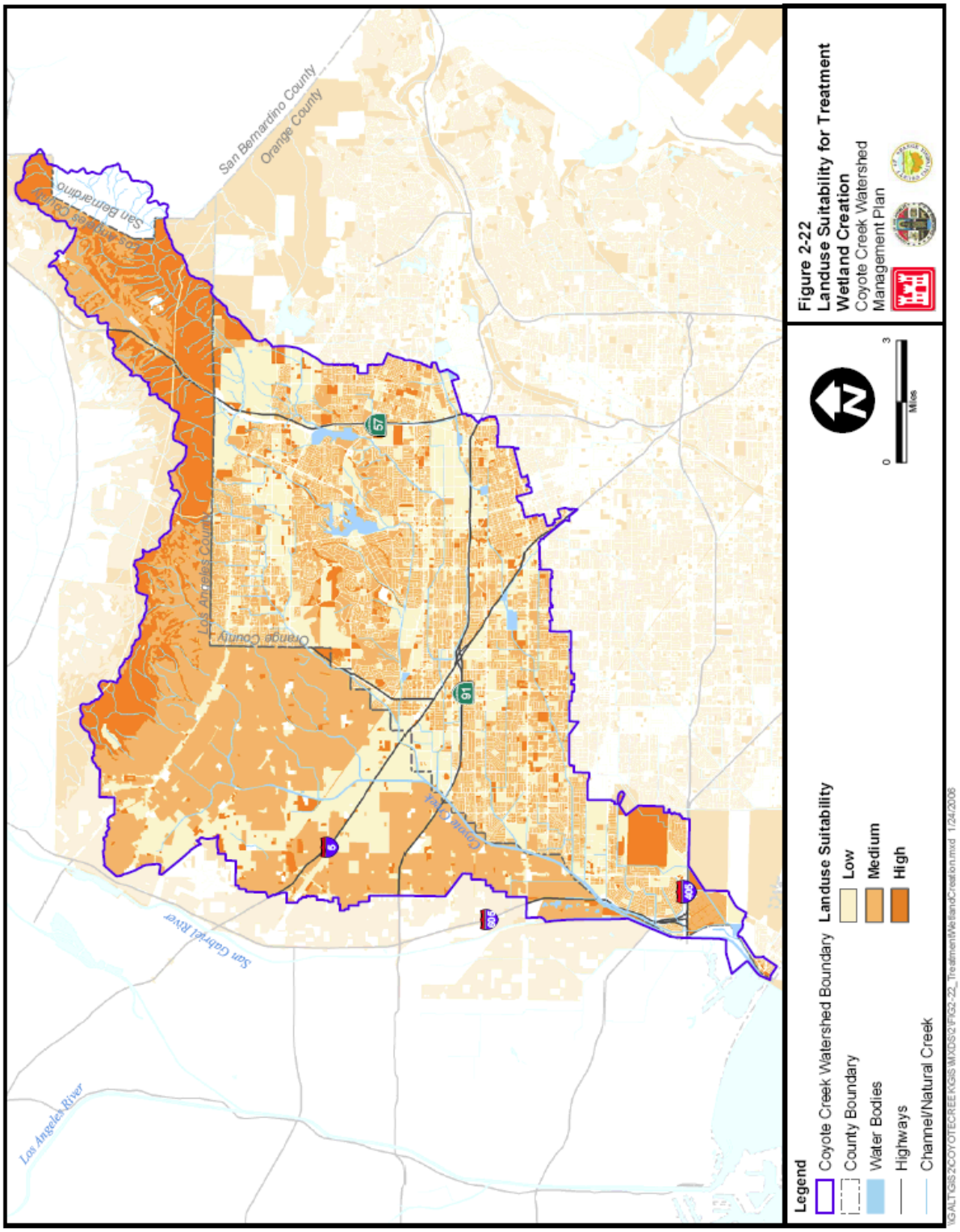
Coyote Crk.
San Gabriel River
Los Angeles River
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Model Result
Low
Medium
High
0
3
Miles
Figure 2-21
Potential New Onsite and Infiltration Basin Opportunities
Coyote Creek Watershed Management Plan
\\GALT\GIS\2COYOTECREEK\GIS\MXDS\2\FIG2-21_PotentialInfiltrationBasins.mxd 1/24/2006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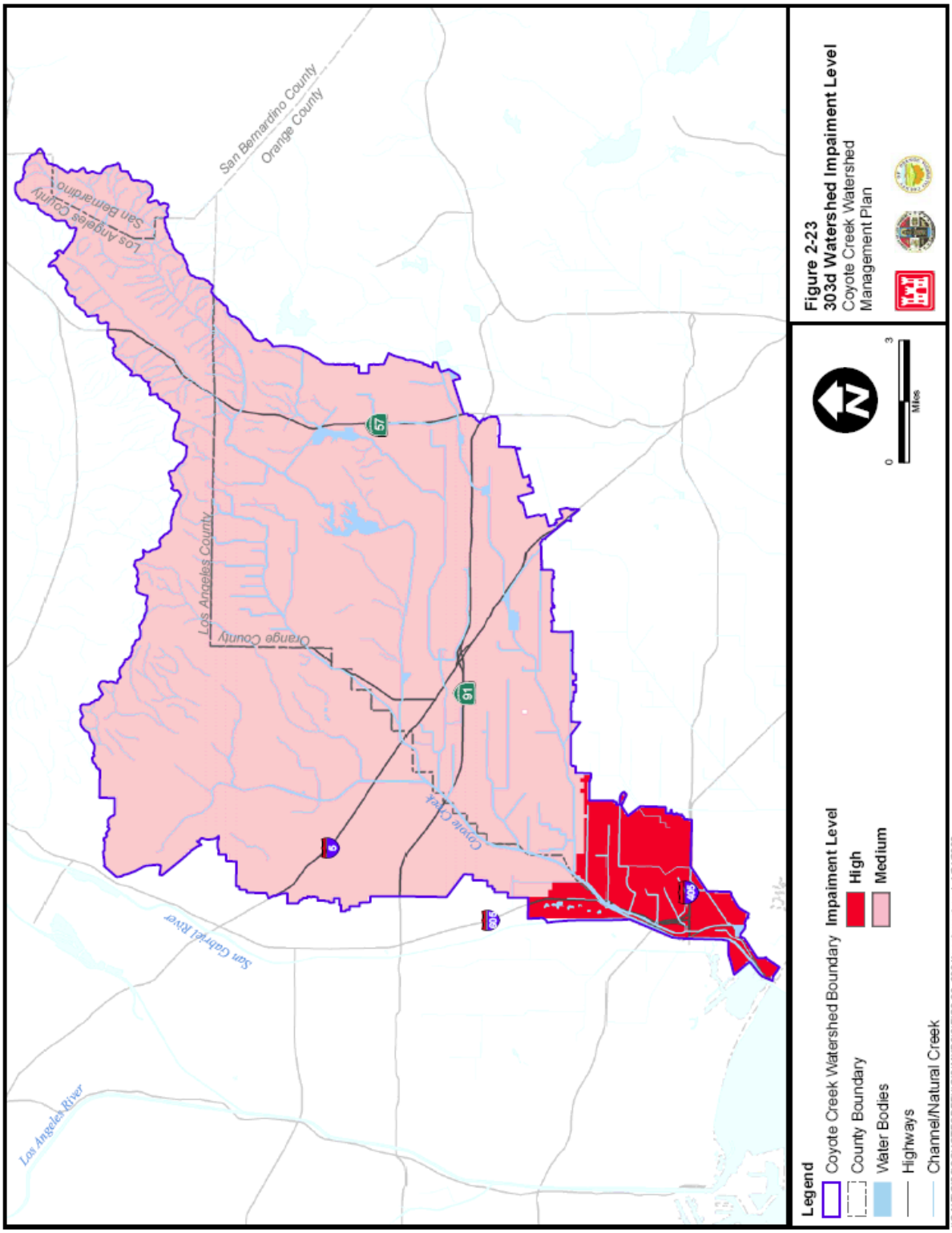
Legend
Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Channel/Natural Creek
Landuse Suitability
Low
Medium
High
0
3
Miles
Figure 2-22
Landuse Suitability for Treatment Wetland Creation
Coyote Creek Watershed Management Plan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Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
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Impaiment Level
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Figure 2-23
303d Watershed Impaiment Level
Coyote Creek Watershed
Management Plan
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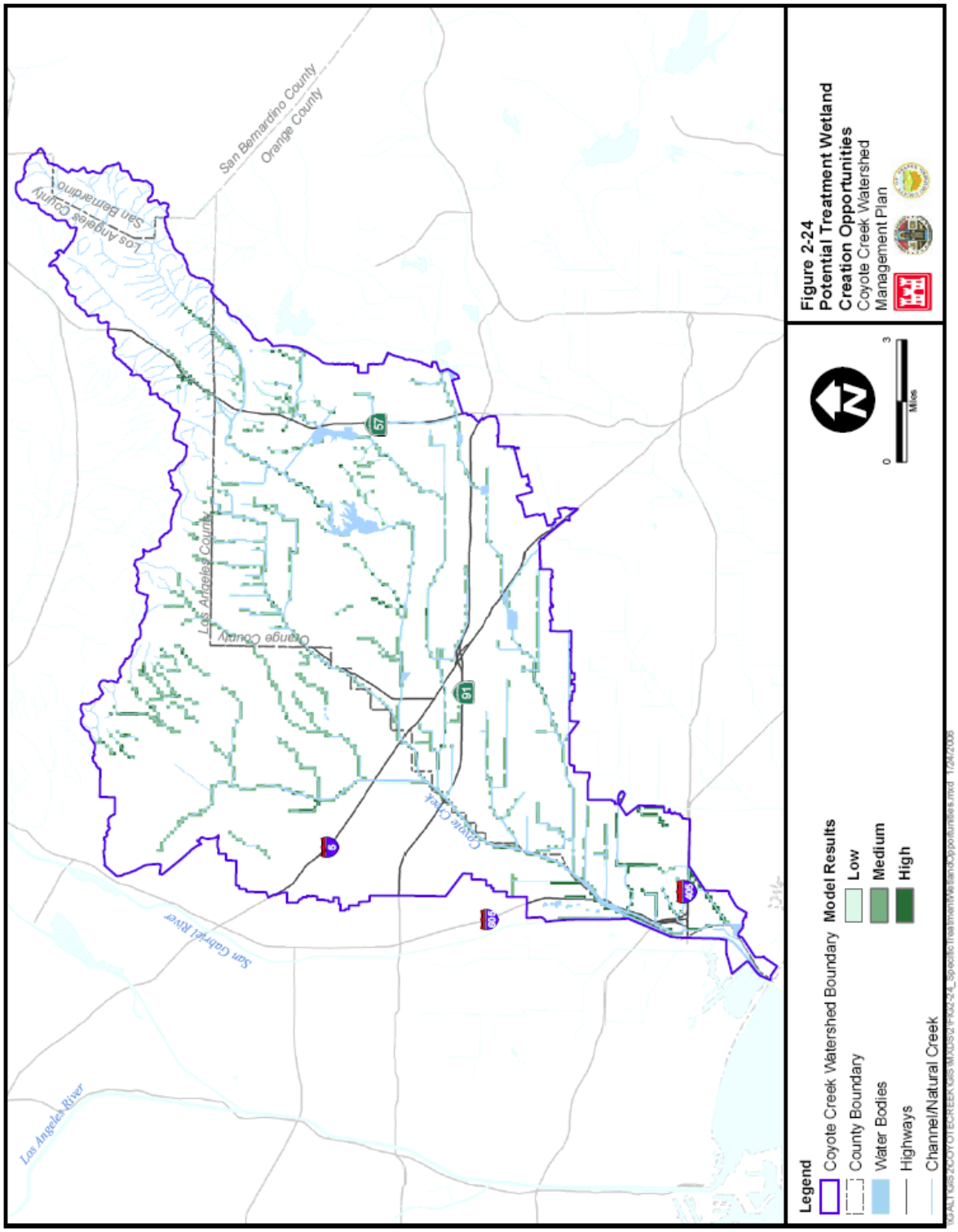
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Coyote Creek Watershed Boundary
County Boundary
Water Bodies
Highways
Channel/Natural Creek
Model Results
Low
Medium
High
0
3
Miles
Figure 2-24
Potential Treatment Wetland Creation Opportunities
Coyote Creek Watershed Management Plan

storage, which helps control flooding, and are rich in biodiversity making them valuable habitat. Because wetlands have the capacity to remove contaminants from water, they are often utilized and constructed for treating polluted waters. Constructed wetlands can be created to effectively treat nonpoint source discharge, diverted from storm drains, which improves water quality.

Specific analysis of treatment wetland creation opportunities is detailed in the section below.

2.5.3.2 Spatial Opportunities and Constraints Analysis

Treatment Wetland Creation Opportunities

Opportunities for treatment wetland creation exist within the watershed and may include areas with impaired waters, within 200 feet of existing channels and within 10 feet of the channel invert elevation, of low elevation and appropriate land use. To evaluate treatment wetland creation opportunities the following GIS modeling was completed:

Applicable 1st Order Maps were determined and include: (1) Land Use; (2) existing channel locations and conditions; (3) impaired waterways; and, (4) Topography.

2nd Order Maps were then developed to identify areas for treatment wetland creation opportunities. Drawing from 1st Order Maps the following 2nd Order Map assessments were completed:

- Land Use was reclassified to show potential treatment wetland creation suitability (Figure 2-22). Suitability value was classified by land use as follows:
  - Excluded land uses for potential treatment wetland creation included areas of No Data.
  - Low value land uses for potential treatment wetland creation included Commercial and Industrial.
  - Medium value land use for potential treatment wetland creation included Transportation, Education and Religion, Residential, and Recreational.
  - High value land uses for potential treatment wetland creation included Public, Agricultural, and Vacant Land.
- Subwatersheds with identified constituents on the Regional Water Quality Control Board's 303(d) impairment list were classified as medium and high suitability for treatment wetlands; with high representing the most impaired due to water quality (Figure 2-23).
- Areas within 200 horizontal feet of existing channels and within 10 vertical feet of the channel invert elevation were identified in Figure 2-7; low elevation areas (less than 200 meters) within the watershed were identified in Figure 2-19.

Data identified in the 2nd Order Maps were then overlaid to create a 3rd Order Map that identifies potential treatment wetland creation opportunities. Specifically, areas for potential treatment wetland creation include areas with impaired waters, within 200 feet of existing channels and within 10 feet of the channel invert elevation, of low elevation and appropriate

land use (Figure 2-24). The potential project opportunity areas that are of the greatest beneficial value are located in the lower part of the Study Area where surface waters are highly impaired. The limited amount of high value land uses, such as Public, Agricultural, and Vacant Land, adjacent to channels is a constraint to potential treatment wetland opportunities opportunities. Additionally, potential treatment wetland opportunities are constrained by the need to be within a 10-foot vertical range of the channel invert and a 200-foot horizontal range of a channel. These range restrictions are due to the practical need for treatment wetlands to be near existing channels to provide treatment. Refer to Section 3 for the identification of potential projects.

2.5.3.3 Plans and Policies Opportunities and Constraints Analysis

The water quality/storm water objective is to *improve surface water quality and protect groundwater resources for present and future beneficial uses.* Eighty percent of the general plans reviewed address water quality/ storm water. The conservation element required by the state suggests assessing the quality of current and future bodies of water, including groundwater. The general plans that did not address water quality were not following the state's recommendations for analyzing the city's or county's resources. These plans that did not sufficiently address water quality should do so in their next general plan update by assessing the current and future quality of groundwater.

2.5.4 Flood Protection

2.5.4.1 Identification of Issues

Flood protection is designed to contain and control runoff to prevent flooding of developed or sensitive areas. The creeks and channels of the Study Area are a major component of the flood protection system and serve to capture, direct, and regulate flow into retention basins and the ocean. Areas of potential flooding result from storm flows that overwhelm the capacity of flood control facilities. For this, reason areas adjacent to confluence zones, storm drains, and pump station are generally areas of potential flooding during heavy storm events.

In recent years, several areas of flooding have occurred in the middle and lower reaches of the Study Area. This includes: areas along Brea Creek and Fullerton Creek between Beach Boulevard and Dale Street in the City of Buena Park; areas along Fullerton Creek between Woods Avenue and Harbor Boulevard in the City of Fullerton; areas along Carbon Creek between Crescent Avenue and West Street in the City of Anaheim; at Cypress Pump Station and at Crescent Avenue and Moody Creek in the City of Cypress; at Los Alamitos Channel and Westminster Avenue in the City of Seal Beach; and at storm drains located at Kempton Drive and Katella Avenue in the City of Los Alamitos and at Montecito Drive in the City of Seal Beach.

Potential flood control opportunities include constructing structural engineering improvements to the existing flood control facilities that specifically target areas of flooding. In addition to structural improvements flood control opportunities include maximizing existing wetland areas and placement of constructed wetlands. In particular, wetlands have tremendous capacity to act as natural flood control. When rivers overflow during rain events, wetlands can absorb and slow floodwaters, which can significantly prevent property damage and help protect human safety. In contrast to narrower streambeds and channels,

the wider open areas in wetlands and their vegetation reduce the speed of floodwaters, which can then evaporate into the atmosphere and recharge the groundwater. Furthermore, when wetlands are destroyed, flooding increases.

2.5.4.2 Spatial Opportunities and Constraints Analysis

Specific control opportunities associated with wetlands were evaluated under the opportunities analysis for habitat and water quality (Figures 2-4, 2-8, and 2-24).

2.5.4.3 Plans and Policies Opportunities and Constraints Analysis

The flood/sediments objective is to *balance flood protection with sediment management and habitat.* Within the mandatory Safety element, the state requires that flood hazards be assessed. The CCWMP goes beyond addressing flood protection by calling for the balance between flood protection and sediment management. Not one general plan had a policy that directly addressed sediment management. However, 40% of the plans have policies that address flood protection in accord with the natural environment which captures the spirit of this objective.

2.5.5 Wetland Protection

2.5.5.1 Identification of Issues

Wetlands are transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land. Wetlands are recognized as very important ecosystems with many multiple values and functions including: biological diversity and habitat, flood control, groundwater recharge, and recreation. Over the last century, many of California's wetlands have been converted to agricultural and urban uses, resulting in an 85 to 90 percent reduction of total wetland areas. It is important to protect remaining and future wetlands because they have been and will continue to be heavily disturbed and because of their many functional benefits.

2.5.5.2 Spatial Opportunities and Constraints Analysis

Specific wetland protection opportunities were evaluated under the opportunities analysis for habitat and water quality (Figures 2-4, 2-8, and 2-24).

2.5.5.3 Plans and Policies Opportunities and Constraints Analysis

The wetland protection objective is to *coordinate wetland protection, creation and restoration with other surface and groundwater protection programs.* Wetland protection is not a subject that is commonly addressed within a general plan, and in fact only two (10%) of the general plans reviewed address wetland protection. Wetlands generally include swamps, marshes, bogs and similar areas. Many of the cities within the watershed are completely built out and urbanized, so they contain no wetlands and therefore do not address wetlands in their general plans.

2.6 People

People are a key component to establishing a healthy, well-functioning watershed. The individuals who live, work or visit within the watershed are affected by the health of the

watershed. The visual aesthetics of the watershed are important in providing a sense of place for the communities within the watershed. For the individuals who do not completely understand the function of the watershed, education and outreach are necessary to notify the public on what a watershed is, and how it affects their community. Environmental justice refers to the fact that minorities and low-income populations often experience exposure to higher than average rates of environmental pollution. Environmental justice is also an issue with this population's relationship to the watershed. It must also be determined if people are safe when in close proximity to the watershed. Finally, people becoming stewards of their watershed and participating in the health of their watershed will allow the watershed to remain healthy into the future.

The People goal of the WMP includes five objective categories: (1) Aesthetics, (2) Education and Outreach, (3) Environmental Justice, (4) Health, and (5) Citizen Participation. Each objective category is presented below as an individual subsection and includes an identification of relevant issues followed by an analysis of opportunities and constraints to addressing the identified issues. Review of Plans and Policies

A review of plans and policies relating to people goals and objectives shows that only one of the objectives is well addressed by city and county plans and policies. Health and safety is addressed by 85% of the general plans within the watershed. Policies that address health and safety can be found under the mandatory safety element, and almost all of the plans address health and safety. The place value/aesthetics objective is matched by 50% of the general plans reviewed. Education & outreach, environmental justice, and citizen participation (15%, 10%, and 5% respectively) have a very limited number of plans relating to these objectives, as seen in Table 2-4. Only about one quarter of the objectives are addressed by the general plans within the watershed.

Table 2-4: Percent of General Plans that address People Goal and Objectives

Objective:	Aesthetics	Education and Outreach	Environmental Justice	Health	Citizen Participation
Percent of General Plans:	50%	15%	10%	85%	5%
Objective Number:	P-1	P-2	P-3	P-4	P-5

All of the required elements of the general plan address physical, or land-based, elements. People are not addressed directly. There is however, the required safety element which addresses the health and safety of the residents within the general plan boundaries. Place value/ aesthetics are found mostly in the conservation element. Education and outreach can be found in any element within the general plan. Environmental justice is becoming an issue that is being addressed more and more by general plans, and in fact the state suggests, but does not require, that it be addressed in the land use element. Citizen participation is required when writing a general plan, but as the CCWMP defines citizen participation it does not match any policies (except for one) in the general plans reviewed.

2.6.1 Aesthetics

2.6.1.1 Identification of Issues

The Aesthetics objective is to *create a community-based identity by improving visual quality.* Aesthetics can be described as the pleasurable sensations, mental and physical, which humans may experience as a result of certain environmental resources. In relation to the watershed, good aesthetics would bring the physical and visual resources of the watershed closer to the communities in which they are located. Aesthetics and visual sensitivity can be balanced with the function and context of providing a safe and healthy watershed. Good aesthetics also provides a sense of place and high quality of experience for individuals and the community, allowing for a positive personal response to the immediate and regional environment. Identity and improved visual quality can create a sense of place within the communities of the watershed. Sense of place can give individuals more attachment and connection to their environment and surroundings and provide a foundation for better understanding of the function of the watershed.

The following issues have been identified by the public which relate to the Aesthetics within the watershed:

- All watercourses in the study area are generally not aesthetically pleasing
- Trash and debris accumulating in all watercourses impact aesthetics as well as navigation and ecosystems
- People are disconnected with their home watershed
- Many people do not realize that many flood control channels used to be creeks
- Creeks and storm drains are often hidden, fenced-off or underground
- Flood control channels are visually unattractive and attract heat

2.6.1.2 Plans and Policies Opportunities and Constraints Analysis

Fifty percent of the general plans had policies that matched the aesthetics objective. These policies were found mostly under the conservation elements of the general plans. It is not required by the state for general plans to address aesthetics; still half of the general plans reviewed addressed this. Under the People goal, aesthetics was the objective that had the most matches to the general plans that were reviewed.

In addition to the city and county general plans that were reviewed, the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy is funding a portion of a project called the "Emerald Necklace" which is a vision for a 17-mile loop of parks and greenways connecting 10 cities and nearly 500,000 residents along the Rio Hondo and San Gabriel rivers. This project will provide bike paths, equestrian paths, signage, and native plants along the river which will connect communities to one another and provide a strong sense of place for residents and visitors to the greenway and provide improved aesthetics.

2.6.2 Education and Outreach

2.6.2.1 Identification of Issues

The Education and Outreach objective is to *increase watershed awareness and education*. Outreach is an effort by an organization or group to connect its ideas or practices to the efforts of the general public. Outreach often takes on an educational component, but

outreach is also engagement of the community, rather than only dissemination of information. This objective is for the people within the Coyote Creek watershed to learn more about their local watershed and participate in activities to enhance their natural surroundings and communities.

The following are issues identified by the public which relate to Education and Outreach within the watershed:

- Lack of public awareness about watersheds and their utility
- Lack of understanding among agency staff and community leaders watersheds and their importance
- "Message points" for the watershed must be determined
- It is not widely known that wildfires are a natural occurrence for native plant communities
- People's behavior still do not respect watershed resources

2.6.2.2 Plans and Policies Opportunities and Constraints Analysis

While all general plans would like to encourage education and outreach for the planning process, only three plans (15%) have policies that specifically address increasing awareness about the watershed, or less specifically, the environment.

In addition to reviewing the city and county general plans, there are other regional plans that address education and outreach of the watershed. A San Gabriel River Discovery Center is being planned to replace the existing, small Nature Center in Los Angeles County's Whittier Narrows Recreation Area. The Discovery Center will present the story of the San Gabriel River and its watershed and will emphasize the importance of water resources and the natural values of the watershed. Its audience will range from school children to adults. The Center will also continue the current natural history message presented by LA County Parks and Recreation at the existing Nature Center.

2.6.3 Environmental Justice

2.6.3.1 Identification of Issues

The Environmental Justice objective is to *promote environmental justice through balanced projects and plans*. Environmental justice is defined in state planning law as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations and policies. Environmental justice addresses the supposition that racial minorities and low-income populations experience higher than average exposure to environmental pollution. Environmental justice is also related to the watershed. In addition to environmental pollution, minority and low-income communities have less access to parks, open space, bike paths and trails. These amenities can be provided by developing greenways along rivers and streams within the watershed. While connecting communities to one another, these greenways also provide open space which is crucial for a healthy community. Opportunities to experience nature may also be accomplished through educational access to open space, habitat parks as part of regional open space network within Puente-Chino Hills.

Environmental justice states that minority and low-income populations have less access to these amenities than the remainder of the population.

The following are issues identified by the public which relate to Environmental Justice within the watershed:

- North Orange County and South East Los Angeles County have high population density and high concentration of low income households and lack parks, trails and open space.

2.6.3.2 Plans and Policies Opportunities and Constraints Analysis

Environmental justice is not a mandatory topic in the general plan. Recently the state has suggested that environmental justice be addressed in the land use element of the general plan. Environmental justice is a topic that is not common amongst the general plans reviewed for the watershed, but may become more common in the future. Only 2 cities (10%) of the general plans reviewed addressed environmental justice.

There is an existing state-wide program, the Environmental Justice Coalition for Water (EJCW), which works to ensure that Californians from all walks of life have access to a safe, clean supply of water. The Coalition empowers community groups, educates the public, and develops policy recommendations to ensure that low income communities and communities of color are well represented in important water policy discussions.

2.6.4 Health

2.6.4.1 Identification of Issues

The Health objective is to *maintain and improve health and safety of the public in the watershed.* There are many health issues related to the watershed. The watershed can provide access to greenways and open space for the people in the surrounding communities. With an increase in adult and child obesity rates, it is ever more important for communities to have open space areas that provide a place for people to walk, jog, bike ride, and exercise out of doors. Streams and rivers provide a location for trails and bike paths that have not been utilized to the fullest extent.

In terms of safety as it relates to the watershed, drainage ditches provide flood control for the watershed. Drainage ditches can become a safety hazard during heavy rains.

The following are issues identified by the public which relate to Health within the watershed:

- West Nile Virus is a concern for wetlands projects
- West Nile Virus is a concern for water quality BMP projects and is a maintenance issue

2.6.4.2 Plans and Policies Opportunities and Constraints Analysis

There is a mandatory safety element in the general plans and because of this seventeen (85%) of the plans reviewed have policies that address the health and safety of their residents. Within the general plans, safety deals mainly with seismic safety, hazardous materials and flood protection, along with police and fire response to emergencies. The general plans that do not address safety are not conforming to the state requirements.

Within watersheds, safety is addressed by a flood control district. Food control districts are responsible to the people within their district to keep them safe from flooding. For example, the Orange County Flood Control District (OCFCD) provides control of flood and storm waters of the district and of streams flowing into the district to protect Orange County areas from the threat and damage of flooding

In addition, fencing is erected around flood control channels to prevent people from entering the channel which could become a deadly hazard during a storm. While fencing may not be aesthetically pleasing, it serves the purpose of keeping the public from entering flood control channels which can be very dangerous during a storm.

2.6.5 Citizen Participation

2.6.5.1 Identification of Issues

The Citizen Participation objective is to *increase citizen participation and stewardship within the watershed*. Citizen participation is voluntary participation in betterment issues that involve community decision making. Public involvement can result in making better decisions about the watershed. In addition, citizen participation can provide special insight and local knowledge about specific areas within the watershed. Likewise, stewardship can be defined as the responsibility for taking good care of watershed resources entrusted to the community.

The following are issues identified by the public which relate to Citizen Participation within the watershed:

- Citizen participation in the Watershed Management Plan and stewardship of the Watershed needs to be encouraged

2.6.5.2 Plans and Policies Opportunities and Constraints Analysis

Citizen participation is required by the state in developing a general plan. Many cities and counties call upon the public to participate in the development of the general plan. This is accomplished by asking the public to explain the issues they are most concerned about. Also, the public is often asked to review the goals and policies created in the draft general plan. However, citizen participation and stewardship of the environment or watershed is not called upon specifically. There is no one element where citizen participation can be addressed as suggested by the state. Only one plan (5%) of the general plans reviewed has a policy addressing ongoing citizen participation.

The Coyote Creek Watershed Council committee has held public stakeholder meetings to receive input about the Coyote Creek watershed. All plans have been developed utilizing input from the stakeholder process.

A Citizen Participation program with national coverage is the Rivers, Trails, and Conservation Assistance Program (RCTA), and is the community assistance arm of the National Park Service. RTCA staff provides technical assistance to community groups and local, State, and federal government agencies so they can conserve rivers, preserve open space, and develop trails and greenways. The RTCA program implements the natural

resource conservation and outdoor recreation mission of the National Park Service in communities across America.

2.7 Management

The Management goal of the WMP includes four objective categories: (1) Organization, (2) Collaboration, (3) Communication, and (4) Multiple Objective Projects. Each objective category is presented below as an individual subsection and includes an identification of relevant issues followed by an analysis of opportunities and constraints to addressing the identified issues.

Management of the watershed is imperative to the watershed's health. Watershed management is a concept that is becoming more common as communities realize that a healthy watershed has a positive affect on the community, the environment and the health of the people who live within the watershed. There are many progressive management techniques that contribute to a healthy and successful watershed which have been outlined in the objectives of the Management goal. Organization refers to the management of resources that one or more agencies have authority over, often leading to a duplication of efforts. Collaboration in management means having management agencies work together on individual projects. Communication in management is important so that agencies do not conflict with one another in management of resources. Finally, Multiple Objective Projects is an innovative approach to addressing several different objectives through a single project.

Review of Plans and Policies

A review of plans and policies relating to management goals and objectives shows that none of the objectives are well addressed by city and county plans and policies. The organization objective has a matching rate of 45%. Collaboration, communication and multiple objective projects (20%, 10% and 25% respectively) have a very limited number of policies relating to these objectives. See Table 2-5 below.

Table 2-5: Percent of General Plans That Address Management Goal and Objectives

Objective:	Organization	Collaboration	Communication	Multiple Objective Projects
Percent of General Plans:	45%	20%	10%	25%
Objective Number:	M-1	M-2	M-3	M-4

All of the required elements of the general plan address physical, or land-based, elements. Management is not addressed directly. In fact, policies relating to management are found within a variety of different elements discussed in the general plans.

2.7.1 Organization

2.7.1.1 Identification of Issues

The Organization objective is to *organize efficiently to manage cross-jurisdictional resources*. Resources that are cross-jurisdictional are present under the management of more than one

agency. For example, a resource such as a watershed crosses through several jurisdictions when is passes through different city and county borders. Management of a resource that crosses through different jurisdictions or boundaries can be difficult because not all jurisdictions have the same plans or policies regarding that specific resource. That is why it is important for jurisdictions to organize to effectively manage a resource that expands beyond its boundaries.

The following are issues identified by the public which relate to Organization within the watershed:

- It is not clear who has jurisdiction over Coyote Creek
- It has not been determined if there will be a Watershed Management Authority

2.7.1.2 Plans and Policies Opportunities and Constraints Analysis

Forty-five percent of the plans reviewed have policies that address managing cross-jurisdictional resources. These policies were found mostly under the conservation element of the respective general plans. Because general plans address issues that are land-based, there are no specific elements that address cross-jurisdictional resources.

A good example of cross jurisdictional organization is the Watershed Conservation Authority (WCA). The WCA is a joint powers entity of the Rivers and Mountains Conservancy (RMC) and the Los Angeles County Flood Control District (LACFCD). The focus of the WCA is on projects which will provide open space, habitat restoration, and watershed improvement projects in the watersheds of both the San Gabriel River and the Lower Los Angeles River. The use of a joint powers agency is considered the most effective and efficient method of conducting the joint projects. Joint powers agencies have been very successful in leveraging funding and implementing projects which serve the purposes of each member agency.

2.7.2 Collaboration

2.7.2.1 Identification of Issues

The Collaboration objective is to *facilitate collaboration to yield innovative and integrated projects, plans, programs, policies and data products.* Collaboration is an essential part of effective and efficient watershed management. Collaborating refers to working in association with other agencies for a common goal. Collaboration can occur between institutions, national agencies, local government, and non-governmental organizations that all may have a stake in the watershed. In addition, the nature of a watershed, which exists across multiple jurisdictions, is a prime example of a resource that must have collaboration between agencies for effective management.

The following are issues identified by the public which relate to Collaboration within the watershed:

- Planning by individual jurisdictions often does not adequately consider downstream or watershed-wide implications
- There are too many land and water resources managers and not enough collaboration between the managers

- In order to back up the efforts of the Plan, Watershed Council members must be invited to the meetings with elected officials

2.7.2.2 Plans and Policies Opportunities and Constraints Analysis

Twenty percent, or four out of the twenty general plans reviewed addressed collaboration. Because general plans address issues that are land-based, there are no specific elements that address collaboration. Collaborating with other jurisdictions may become a more common concept in general plans in the future, but of the plans reviewed collaboration policies are not yet prevalent.

An example of a collaborative project in the Southern California region is the Santa Ana Watershed Project Authority (SAWPA). The SAWPA provides stable regional leadership through creative professionals balancing the needs of diverse interests in the Watershed to accomplish significant programs and projects. The SAWPA's mission is to facilitate communication, identify emerging opportunities, develop regional plans, secure funding, implement programs, build projects, and operate and maintain faculties. This authority is collaboration with the Eastern Municipal Water District, Inland Empire Utilities Agency, Orange County Water District, the San Bernardino Valley Municipal Water District, and the Western Municipal Water District.

2.7.3 Communication

2.7.3.1 Identification of Issues

The Communication objective is to *promote effective communication mechanisms to resolve conflicts and maximize resources*. This objective is related to the Organization and Collaboration objective, but is another element for efficient and effective watershed management. The main point of this objective is to avoid conflict with other agencies. Often when agencies are not in communication with one another, the agencies are unaware of each other's ideas, plans and policies about a resource. When agencies are not communicating with one another properly, conflicts will undoubtedly arise. Communication allows different agencies to have a good relationship with each other, which benefits the resources they are responsible for managing. Not only does good communication avoid conflicts, it also is a medium for sharing ideas and polices between agencies which could lead to collaborating and better organization. The following are issues identified by the public which relate to Communication within the watershed:

- Clarification is needed that the Watershed Management Plan is not a regulatory document

2.7.3.2 Plans and Policies Opportunities and Constraints Analysis

Only two (10%) of the twenty general plans reviewed addressed communication. This is a very specific objective by the CCWMP, and communication to resolve conflicts is not commonly addressed in general plans.

The Los Angeles and San Gabriel Rivers Watershed Council (LASGRWC) provides a good example of communication. The LASGRWC is a non-profit organization of community groups, government agencies, business and academia working cooperatively to solve problems in the watershed. The Council holds meetings once a month in which everyone is

welcome. Within the meeting stakeholders are given an opportunity to share information about activities, projects, and concerns. This forum provides a venue for communication, not only between different agencies and community groups, but also with other stakeholders such as the public.

2.7.4 Multiple Objective Projects

2.7.4.1 Identification of Issues

Public infrastructure and development in the Study Area has historically occurred to achieve a single purpose. For instance, flood control infrastructure was designed exclusively for controlling flooding and parks were designed exclusively for providing recreational opportunities. Now that the Study Area has been largely developed, and environmental degredation has occurred, there is limited space available for implementing projects beneficial to the health of the watershed. For this reason it is of critical importance to identify projects that achieve multiple objectives. In addition, multiple objective projects can also be more cost effective at providing watershed benefits than single purpose projects. An example of a multiple objective project would include combining parks with treatment wetlands and infiltration and detention basins. Such a project would achieve recreational, habitat, water quality, water supply, and flood control objectives. Ultimately, multiple objective projects provide greater benefits to the overall health of the watershed while making better use and value of the land resources they use.

In this section, potential opportunities for multiple objective projects are evaluated. As per Sections 2.3 and 2.4, this analysis is completed using GIS based models.

2.7.4.2 Spatial Opportunities and Constraints Analysis

In addition to the opportunities and constraints analysis presented above, multi-objective opportunities were considered. Projects which serve more than the single objectives specified can serve to amplify limited financial and planning resources by meeting multiple objectives, with little incremental increase in planning or cost. Projects which serve more than one objective are more likely to find ample funding and stakeholder buyin; specifically, they may qualify for more than one type of grant funding, and are likely to find approval among a broader base of stakeholders. The sections below describe the analysis that was conducted to identify multi-objective projects.

Habitat Parks (Riparian)

Opportunities for creation of habitat parks in riparian areas exist within the watershed and may include areas with which were ranked high for riparian enhancement, habitat preservation, new passive parks, and watershed connectivity projects. To evaluate habitat parks (riparian) opportunities the following GIS modeling was completed:

Applicable 3rd Order Maps were determined and include: (1) Riparian Enhancement (Figure 2-8); (2) Habitat Preservation (Figure 2-4); (3) New Passive Parks (Figure 2-13); and, (4) Watershed Connectivity (Figure 2-17).

4th Order Maps were created by normalizing data on the 3rd Order Maps and overlaying them in an additive process, providing equal weighting to each 3rd Order Map.

The outcome of this overlay was then displayed with appropriate categorization of results into intervals representing high, medium, and low levels of suitability for creation of Riparian Habitat Parks (Figure 2-25). New riparian habitat park opportunites are constrained by the limited amount of areas with higher quality habitat and/or restoration potential, lying along creeks or in riparian areas, meeting criteria for passive parks, and meeting criteria for watershed connectivity or interpretive signage. Refer to Section 3 for the identification of potential projects.

Habitat Parks (Watershed-Wide)

Opportunities for creation of watershed-wide habitat parks exist within the watershed and may include areas with which were ranked high for habitat preservation, new passive parks, and watershed connectivity projects. To evaluate habitat parks (watershed-wide) opportunities the following GIS modeling was completed:

Applicable 3rd Order Maps were determined and include: (1) Habitat Preservation (Figure 2-4); (2) New Passive Parks (Figure 2-13); and, (3) Watershed Connectivity (Figure 2-17). 4th Order Maps were created by normalizing data on the 3rd Order Maps and overlaying them in an additive process, providing equal weighting to each 3rd Order Map.

The outcome of this overlay was then displayed with appropriate categorization of results into intervals representing high, medium, and low levels of suitability for creation of Watershed-wide Habitat Parks (Figure 2-26). New watershed-wide habitat park opportunites are constrained by the limited amount of areas with higher quality habitat and/or restoration potential, occurring throughout the watershed, meeting criteria for passive parks, and meeting criteria for watershed connectivity or interpretive signage. Refer to Section 3 for the identification of potential projects.

Infiltration Parks

Opportunities for creation of infiltration parks exist within the watershed and may include areas with which were ranked high for riparian enhancement, new passive parks, watershed connectivity, and new infiltration basin projects. To evaluate infiltration park opportunities the following GIS modeling was completed:

Applicable 3rd Order Maps were determined and include: (1) Riparian Enhancement (Figure 2-8); (2) New Passive Parks (Figure 2-13); (3) Watershed Connectivity (Figure 2-17); and (4) New Infiltration Basins (Figure 2-21).

4th Order Maps were created by normalizing data on the 3rd Order Maps and overlaying them in an additive process, providing equal weighting to each 3rd Order Map.

The outcome of this overlay was then displayed with appropriate categorization of results into intervals representing high, medium, and low levels of suitability for creation of Infiltration Basin Parks (Figure 2-27). New infiltration park opportunites are constrained by the limited amount of areas with restoration potential, lying along creeks or in riparian areas, meeting criteria for passive parks, meeting criteria for watershed connectivity or interpretive signage, and meeting criteria for new infiltration basins. Refer to Section 3 for the identification of potential projects.

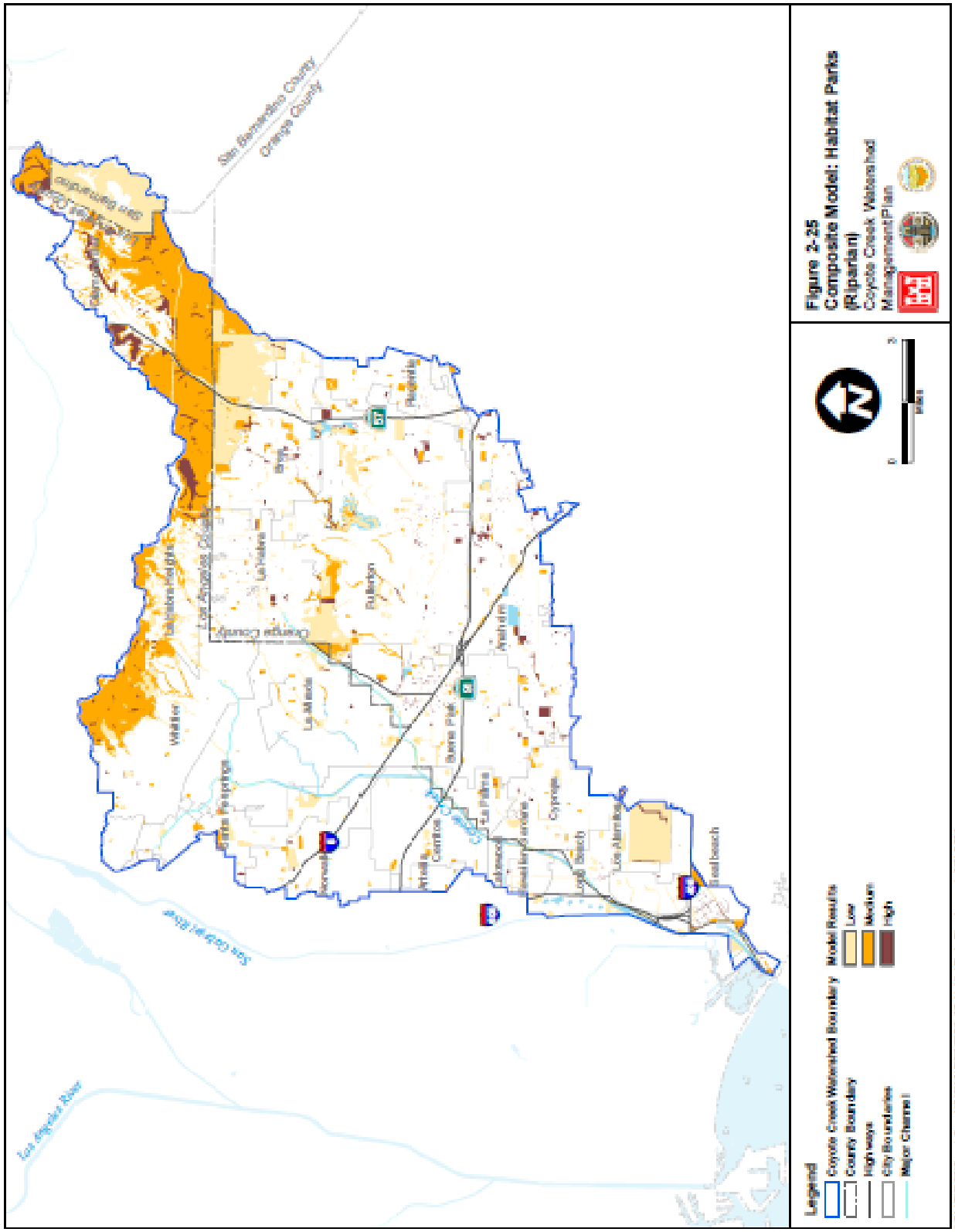
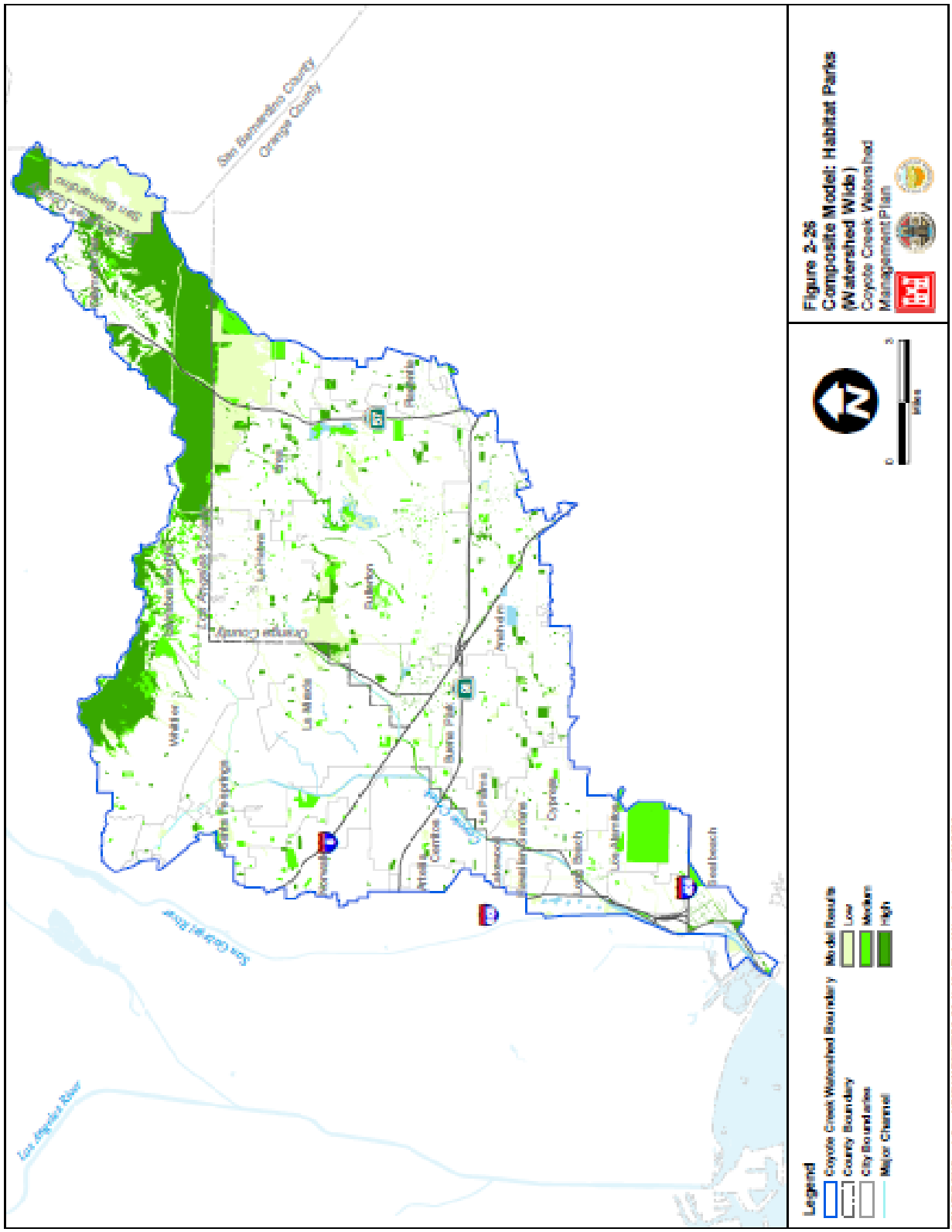


Figure 2-25
Composite Model: Habitat Parks
(Riparian)
Coyote Creek Watershed
Management Plan
Legend
Coyote Creek Watershed Boundary
County Boundary
Highways
City Boundaries
Major Channel
Model Results
Low
Medium
High
Miles
San Bernardino County
Orange County
Los Angeles County
Los Angeles River
San Gabriel River
Anaheim
Fullerton
Placentia
Yorba Linda
Brea
La Habra
Buena Park
Cypress
Los Alamitos
Seal Beach
Rossmoor
Stanton
Garden Grove
Westminster
Fountain Valley
Huntington Beach
Walnut
Diamond Bar
Chino Hills
Rancho Palos Verdes
Los Alamitos Bay


Legend
Coyote Creek Watershed Boundary
County Boundary
City Boundaries
Major Channel
Model Results
Low
Medium
High
Miles
Figure 2-26
Composite Model: Habitat Parks
(Watershed Wide)
Coyote Creek Watershed
Management Plan
San Bernardino County
Orange County
Los Angeles County
Los Angeles River
Santa Ana River
Anaheim
Buena Park
Cypress
Fullerton
Hacienda Heights
Hawaiian Gardens
Huntington Beach
La Habra
La Mirada
Los Alamitos
Norwalk
Placentia
Rancho Santa Fe Springs
Stanton
Whittier

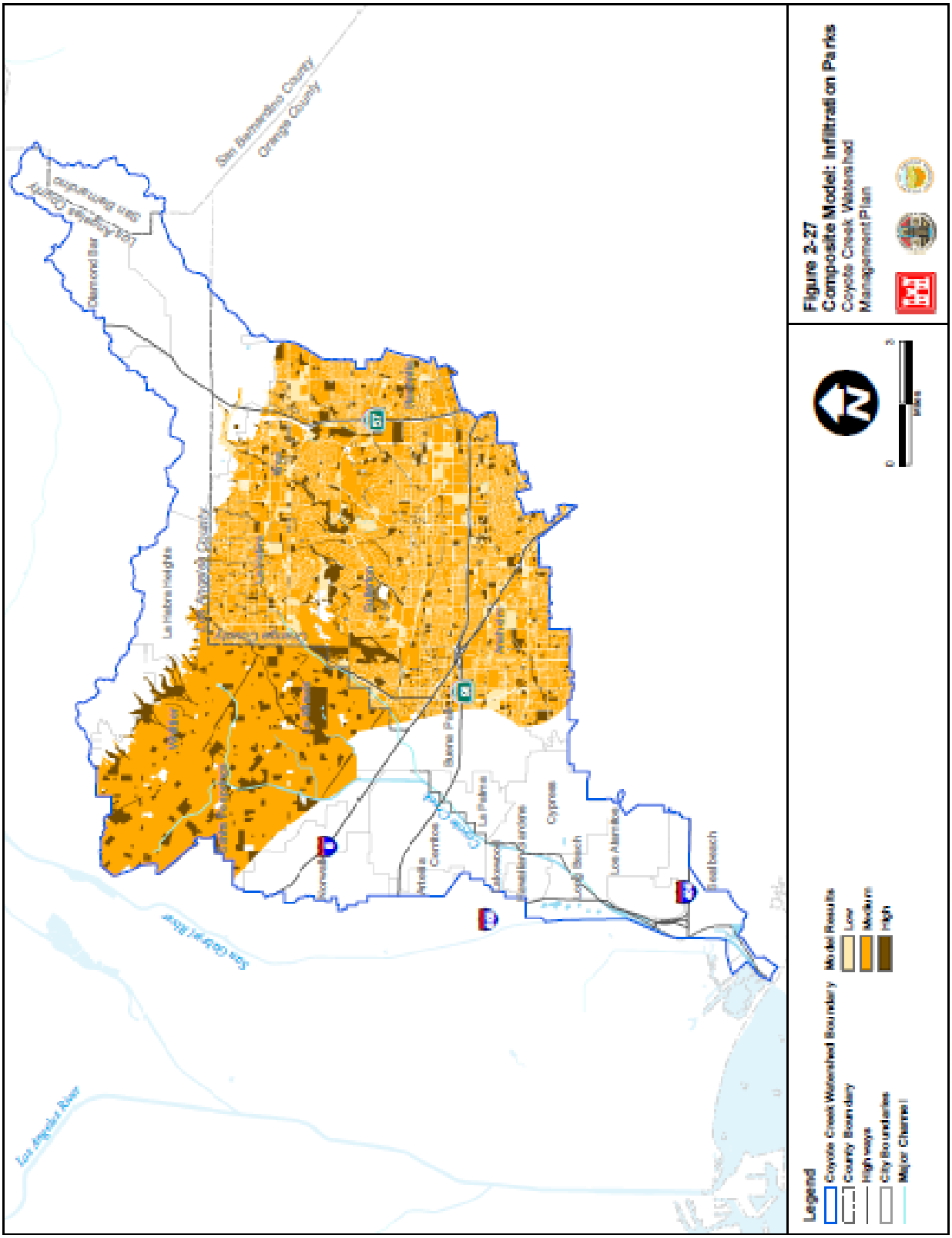


Figure 2-27
Composite Model: Infiltration Parks
Coyote Creek Watershed
Management Plan
Legend
Coyote Creek Watershed Boundary
County Boundary
Highways
City Boundaries
Major Channel
Model Results
Low
Moderate
High
Los Angeles River
San Gabriel River
Orange County
San Bernardino County
Los Angeles County
Diamond Bar
La Habra Heights
Whittier
Pico Rivera
Norwalk
Artesia
Cerritos
Bellflower
Lakewood
Downey
Paramount
Bellflower
Cypress
Long Beach
Los Alamitos
Seal Beach

Treatment Wetland Parks

Opportunities for creation of treatment wetland parks exist within the watershed and may include areas with which were ranked high for riparian enhancement, new passive parks, and new treatment wetland projects. To evaluate treatment wetland park opportunities the following GIS modeling was completed:

Applicable 3rd Order Maps were determined and include: (1) Riparian Enhancement (Figure 2-8); (2) New Passive Parks (Figure 2-13); and (4) Treatment Wetland Creation projects (Figure 2-24).

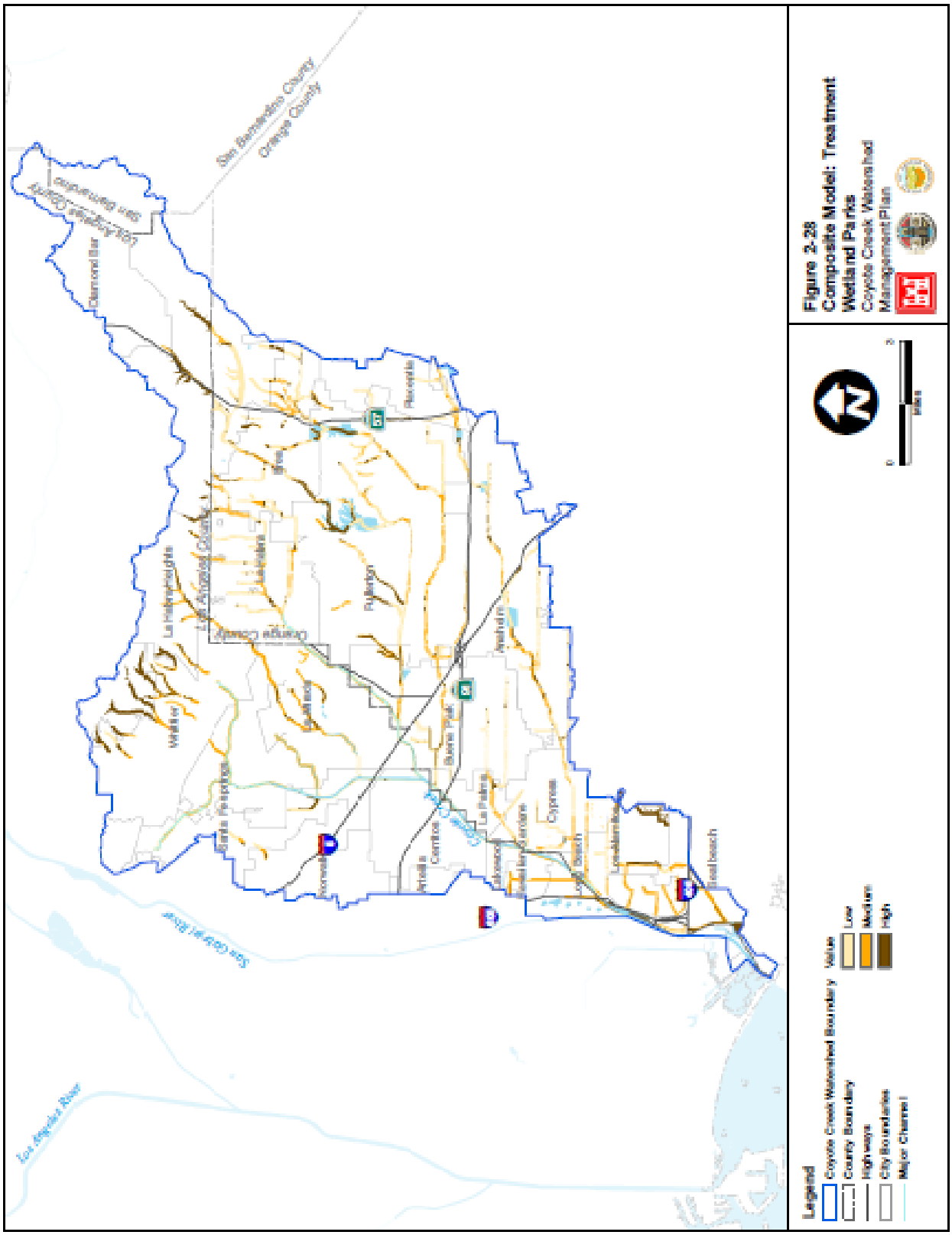
4th Order Maps were created by normalizing data on the 3rd Order Maps and overlaying them in an additive process, providing equal weighting to each 3rd Order Map.

The outcome of this overlay was then displayed with appropriate categorization of results into intervals representing high, medium, and low levels of suitability for creation of Treatment Wetland Parks (Figure 2-28). New treatment wetland park opportunites are constrained by the limited amount of areas with restoration potential, lying along creeks or in riparian areas, meeting criteria for passive parks, and meeting criteria for treatment wetland creation. Refer to Section 3 for the identification of potential projects.

2.7.4.3 Plans and Policies Opportunities and Constraints Analysis

Five (25%) of the twenty general plans reviewed had polices that addressed multiple objective projects. Because general plans address issues that are land-based, there are no specific elements that address multiple objective projects.

California Proposition 12 can provide examples of Multiple Objective Projects in progress. Proposition 12 funds an array of park and conservation projects around the state. This includes money for the state parks system and for neighborhood projects. In order for the state to provide funding a proposed project, the proposal must exemplify that the project will address multiple objectives simultaneously. Not only are the multiple projects more efficient and effective, but the public is receiving the project with the most benefit for their respective communities.


Legend
Coyote Creek Watershed Boundary
County Boundary
Highways
City Boundaries
Major Channel
Value
Low
Medium
High
Miles
Figure 2-28
Composite Model: Treatment Wetland Parks
Coyote Creek Watershed Management Plan
Los Angeles River
San Gabriel River
Long Beach
Lakewood
Cerritos
Bellflower
Paramount
Downey
Norwalk
Pico Rivera
Whittier
Santa Fe Springs
La Habra Heights
Los Angeles County
Orange County
San Bernardino County
Diamond Bar
Pomona
Rowland Heights
Hacienda Heights
Fullerton
Anaheim
Cypress
Stanton
Buena Park
La Palma
Los Alamitos
Seal Beach
Rossmoor
Garden Grove
Orange County
San Bernardino County

3 Potential Project Opportunities

3.1 Identification of Project Areas

The criteria-based spatial analysis modeling provided in Section 2 was conducted throughout the watershed and provides opportunities to identify potential projects that could benefit the watershed. It is also a useful tool in identifying both new projects, or confirming the suitability of existing proposed projects. The generalized, data-dependent approach may also identify potential projects which would not otherwise be identified through other methods of project identification, such as local knowledge.

"Project Areas" were identified based on spatial modeling and represent areas of high potential suitability for specific objectives. The areas represent narrow to broad geographic regions where suitability was similarly high, and which were continuous. These areas in and of themselves are not proposed as potential projects, but are likely to have multiple project opportunities within them. They would require more detailed investigation for specific project identification, including field surveys of conditions on the ground, and interviews with local landowners, city administrators, or others with knowledge of future land use objectives or potential "project readiness".

The following sections describe the specific types of potential opportunities identified as part of this study. These opportunities include habitat preservation, treatment wetlands, passive parks, infiltration basins, watershed connectivity, and multiple objective. Also described are the recommended next steps necessary to further evaluate an opportunity and identify its project feasibility, as well as overall recommendations regarding future evaluation and analysis of these potential opportunities.

Figures 3-1 through 3-6 show Project Areas for each specific opportunity type and Table 3-1 provides preliminary information on the Project Areas, including location, current land use, current vegetation types, and other information.

3.2 Potential Project Opportunities

3.2.1 General Habitat Preservation

The single most important element in a strategy to preserve long-term regional biodiversity is to conserve existing intact native habitats. Habitat destruction or fragmentation has repeatedly been indicted as a major cause in the loss and local extirpation of native plant, fish, wildlife, and invertebrate species. Cumulative habitat loss over entire regions has resulted in the extinction, or the threat of extinction, of sensitive species, subspecies, or populations. The importance of large, intact habitat areas has been described in the Watershed Existing Conditions Report. In summary, most species require fairly large, contiguous habitats to produce and maintain viable populations. Smaller, patchy habitats may support individuals of the species, but may have low reproductive success and offer limited benefits to overall population viability.

TABLE 3-1
Project Area and Potential Opportunity

Number	Project Area Name	General Location	Specific Location	Area Size (acres)	Potential Opportunities	Dominant Landcover	Dominant Vegetation Type	Subwatersheds
Individual Model Results								
1	W. Puente Hills Project Area	Between Whittier and Hacienda Heights	N 33.997, W 118	2069	Habitat Preservation Projects	Open Space	Shrub, Herbaceous	Coyote Creek - North Fork
2	Reposado Project Area	South of Skyline Dr. N. of Reposado Dr	N 33.970, W 117.945	315	Habitat Preservation Projects	Open Space	Shrub, Herbaceous, woodland	Coyote Creek - South Fork
3	W. Coyote Hills Project Area	Fullerton; Borders La Habra, La Mirada E. of Beach Blvd	N 33.900, W 117.966	1075	Habitat Preservation Projects	Open Space, Developed	Shrub	Brea Creek
4	E. Puente Hills Project Area	N. of Brea, W. of Hwy 57	N 33.955, W 117.891	3291	Habitat Preservation Projects	Open Space, Residential: Low Density	Shrub, Herbaceous, woodland	Brea Creek
5	Chino Hills Project Area	N. of Brea, E. of Hwy 57	N 33.95, W 117.835	4669	Habitat Preservation Projects	Open Space	Shrub, Herbaceous, woodland	Brea Creek
6	Tonner Canyon Project Area	S. of Hwy 60, W. of Chino	N 34.012, W 117.775	745	Habitat Preservation Projects	Open Space	Herbaceous	Brea Creek
7	E. Coyote Hills Project Area	Fullerton, S. of Bastanchury Rd	N 33.89, W 117.9	285	Habitat Preservation Projects	Open Space - Developed	Shrub, Herbaceous	Fullerton Creek
8	Cerritos Wetland Project Area	Seal Beach, N. Hwy 1, S. of Westminster Ave. (Seal Beach Oil Field)	N 33.755, W 118.102	187	Habitat Preservation Projects	Developed	Urban	Los Alamitos

Number	Project Area Name	General Location	Specific Location	Area Size (acres)	Potential Opportunities	Dominant Landcover	Dominant Vegetation Type	Subwatersheds
Individual Model Results								
9	Los Alamitos Channel	Seal Beach, N. Hwy 1, S. of Westminster Ave.	N 33.75, W 118.090	61	Habitat Preservation Projects	Developed	Urban	Los Alamitos
10	Brea Canyon Wetland Project Area	E. of Sunny Hills near Harbor Blvd and Bastanchury Rd.	N 33.90, W 117.90	307	Treatment Wetland Projects	Open Space, Residential: Low Density	Mixed woodland, Shrub, Herbaceous, Barren	Brea Creek
11	Buena Park Wetland Project Area	Buena Park, N. of Malvern Ave	N 33.88, W 117.97	78	Treatment Wetland Projects	Open Space	Herbaceous	Brea Creek
12	Bolsa Chica Channel Wetland Project Area	Los Alamitos Armed Forces Reserve Center	N 33.80, W 118.040	54	Treatment Wetland Projects	Developed	Urban	Los Alamitos
13	La Canada Verde Crk Project Area	Candlewood Country Club in Whittier	N 33.90, W 118.03	34	Treatment Wetland Projects	Developed	Urban	Coyote Creek - North Fork
14	Villaverde Wetland Project Area	East Whittier, Villaverde Dr.		43	Treatment Wetland Projects	Open Space	Shrub	Coyote Creek - North Fork
46	La Habra Wetland Project Area	Beach Blvd and Imperial Hwy	N 33.91, W 117.96	60	Treatment Wetland Projects	Developed	Urban, Herbaceous	Coyote Creed - South Fork
37	Coyote Creek Wetland Project Area	LA Co & OC Co Border, near Orangethorpe Ave and Buena Park	N 33.86, W 118.00	166	Treatment Wetland Projects	Open Space	Urban	Coyote Creek and portions of Fullerton Creek
15	Brea Park Project Area	Brea, Imperial Hwy and Hwy 57	N 33.90, W 117.90	84	Passive Park Projects	Developed	Urban	Brea Creek
16	Fullerton Park Project Area	Fullerton, Imperial Hwy and Hwy 57	N 33.90, W 117.87	28	Passive Park Projects	Developed	Urban	Brea Creek

Number	Project Area Name	General Location	Specific Location	Area Size (acres)	Potential Opportunities	Dominant Landcover	Dominant Vegetation Type	Subwatersheds
Individual Model Results								
17	Western Park Project Area	Anaheim, corner of Orange Ave and Western Ave		42	Passive Park Projects	Developed	Urban	Carbon Creek
18	Anaheim Park Project Area	Anaheim, La Palma Av - N. from West St to Harbor Blvd.	N 33.85, 117.90	155	Passive Park Projects	Developed	Urban	Fullerton Creek
19	Commonwealth Park Project Area	Fullerton, Commonwealth Ave N. from Acacia Av to State College	N 33.80, W 117.90	142	Passive Park Projects	Developed	Urban	Fullerton Creek
20	Aera Shell Park Project Area	N. of La Habra off Harbor Blvd	N 33.95, W 117.90	145	Passive Park Projects	Developed	Shrub, Herbaceous	Brea Creek
21	Carbon Creek Park Project Area	Anaheim, Lincoln Av and Magnolia Ave.	N 33.83, W 117.97	104	Passive Park Projects	Developed	Urban	Carbon Creek
40	Brea Canyon Park Project Area	Diamond Bar Blvd	N 33.98, W 117.82	124	Passive Park Projects	Open Space	Woodland	Brea Creek
41	Norwalk Park Project Area	Bloomfield Ave in Norwalk	N 33.90, W 118.05	30	Passive Park Projects	Developed	Urban	Coyote Creek - North Fork
42	San Miguel Park Project Area	North of Whittier in the Puente Hills	N 33.96, 117.98	40	Passive Park Projects	Open Space	Woodland, Shrub, Herbaceous	Coyote Creek - North Fork
45	Placentia Park Project Area	corner of State College Blvd & Placentia Ave	N 33.85, 117.88	9	Passive Park Projects	Developed	Urban	Carbon Creek
22	La Canada Verde Crk Infiltration Project Area	East Whittier, La Canada Verde Creek	N 33.96, 118.00	150	Infiltration Basin Projects	Open Space, Residential: Low Density	Shrub, Urban	Coyote Creek - North Fork

Number	Project Area Name	General Location	Specific Location	Area Size (acres)	Potential Opportunities	Dominant Landcover	Dominant Vegetation Type	Subwatersheds
Individual Model Results								
23	La Serna Infiltration Project Area	La Serna High School	N 33.95, W 117.99	307	Infiltration Basin Projects	Developed	Urban	Coyote Creek - North Fork
24	Brea Canyon Infiltration Project Area	E. of Sunny Hills near Harbor Blvd and Bastanchury Rd.	N 33.90, W 117.90	107	Infiltration Basin Projects	Open Space	Urban	Brea Creek
25	LA Mirada Infiltration Project Area	La Mirada Blvd	N 33.90, W 117.99	404	Infiltration Basin Projects	Developed	Urban	Coyote Creek - North Fork
26	Buena Park Infiltration Project Area	Buena Park, N. of Malvern Ave	N 33.88, W 117.97	239	Infiltration Basin Projects	Open Space	Herbaceous	Brea Creek
27	Coyote Creek Infiltration Project Area	Borders La Habra, La Mirada and Fullerton. E. of Beach Blvd	N 33.90, W 117.97	209	Infiltration Basin Projects	Open Space	Shrub	Brea Creek
28	West Coyote Hills Infiltration Project Area	West Coyote Hills, Euclid Ave	N 33.90, W 117.94	231	Infiltration Basin Projects	Open Space	Shrub	Brea Creek
43	CSU Fullerton Infiltration Project Area	CSU Fullerton	N 33.87, W 117.88	71	Infiltration Basin Projects	Developed	Urban	Carbon Creek and Fullerton Creek
44	Edison Infiltration Project Area	Edison School, Romneya Dr and State College Blvd	N 33.84, W 117.89	19	Infiltration Basin Projects	Developed	Urban	Carbon Creek
29	La Serna Watershed Project Area	La Serna High School	N 33.95, W 117.99	75	Watershed Connectivity Projects	Developed	Shrub, Herbaceous	Coyote Creek - North Fork

Number	Project Area Name	General Location	Specific Location	Area Size (acres)	Potential Opportunities	Dominant Landcover	Dominant Vegetation Type	Subwatersheds
Individual Model Results								
30	La Mirada Creek Watershed Project Area	La Habra Heights, Hacienda Golf Club	N 33.95, W 117.95	61	Watershed Connectivity Projects	Developed	Shrub, Herbaceous	Coyote Creek - South Fork
31	Brea Canyon Watershed Project Area	Brea Canyon, Diamond Bar Blvd	N 33.98, W 117.82	233	Watershed Connectivity Projects	Residential: Medium Density	Urban	Brea Creek
32	Los Coyotes Watershed Project Area	Los Coyotes Country Club, South of W. Coyote Hills	N 33.88, W 117.97	77	Watershed Connectivity Projects	Developed	Herbaceous	Brea Creek
33	La Mirada Watershed Project Area	La Mirada Blvd	N 33.90, W 118.00	115	Watershed Connectivity Projects	Open Space, Developed	Urban	Coyote Creek - North Fork
34	La Canada Watershed Project Area	Candlewood Country Club in Whittier	N 33.90, W 118.03	147	Watershed Connectivity Projects	Open Space	Urban	Coyote Creek - North Fork
35	Fullerton Creek Watershed Project Area	South of Bastanchury Rd	N 33.89, W 117.88	69	Watershed Connectivity Projects	Open Space	Urban	Fullerton Creek
36	Brea Creek Watershed Project Area	Maivern Ave, South of West Coyote Creek	N 33.87, W 117.98	29	Watershed Connectivity Projects	Open Space	Urban, Herbaceous, Woodland	Brea Creek
38	Rossmoor Watershed Project Area	Rossmoor, watersheds cross Foster Rd	N 33.77, W 118.00	58	Watershed Connectivity Projects	Residential: Medium Density	Urban	Los Alamitos
39	Los Alamitos Watershed Project Area	Los Alamitos Armed Forces Reserve Center	N 33.79, W 118, 05	42	Watershed Connectivity Projects	Developed	Urban	Los Alamitos

Number	Project Area Name	General Location	Specific Location	Area Size (acres)	Potential Opportunities	Dominant Landcover	Dominant Vegetation Type	Subwatersheds
Composite Model Results								
47	Tonner Canyon Riparian Habitat Park Area	S. of Hwy 60, W. of Chino	N 34, W 117.78	356	Riparian Enhancement, Habitat Preservation, New Passive Parks, Watershed Connectivity Projects	Open Space	Herbaceous	Brea Creek
48	Brea Canyon Riparian Habitat Park Area	Diamond Bar Blvd	N 33.98, W 117.82	138	Riparian Enhancement, Habitat Preservation, New Passive Parks, Watershed Connectivity Projects	Open Space	Woodland	Brea Creek
49	Rincon de la Brea Riparian Habitat Park Area	Diamond Bar Blvd	N 33.96, W 117.85	231	Riparian Enhancement, Habitat Preservation, New Passive Parks, Watershed Connectivity Projects	Open Space	Herbaceous	Brea Creek
50	Northern Riparian Habitat Park Area	N. of La Habra off Harbor Blvd	N 33.95, W 117.90	271	Riparian Enhancement, Habitat Preservation, New Passive Parks, Watershed Connectivity Projects	Open Space	Herbaceous	Brea Creek
51	Pacific Riparian Habitat Park Area	Basianchury Rd and Euclid St	N 33.89, W 117.94	1125	Riparian Enhancement, Habitat Preservation, New Passive Parks, Watershed Connectivity Projects	Developed, Residential: Medium	Urban	Brea Creek

Number	Project Area Name	General Location	Specific Location	Area Size (acres)	Potential Opportunities	Dominant Landcover	Dominant Vegetation Type	Subwatersheds
Composite Model Results								
52	Western Riparian Habitat Park Area	Anaheim, corner of Orange Ave and Western Ave	N 33.83, W 117.99	415	Riparian Enhancement, Habitat Preservation, New Passive Parks, Watershed Connectivity Projects	Developed, Residential: Medium	Urban	Carbon Creek
53	Tonner Canyon Habitat Park Area	S. of Hwy 60, W. of Chino	N 34, W 117.78	538	Habitat Preservation, New Passive Parks, Watershed Connectivity Projects	Open Space	Herbaceous	Brea Creek
54	Puente/Chino Hills Habitat Park Area	N. of Brea, W. of Hwy 57	N 33.95, W 117.85	6971	Habitat Preservation, New Passive Parks, Watershed Connectivity Projects	Open Space	Herbaceous, Shrub, Woodland	Brea Creek
55	Puente Hills Habitat Park Area	Between Whittier and Hacienda Heights	N 33.997, W 118	1817	Habitat Preservation, New Passive Parks, Watershed Connectivity Projects	Open Space	Herbaceous, Shrub, Woodland	Coyote Creek - North Fork
56	Coyote Hills Habitat Park Area	Borders La Habra, La Mirada and Fullerton. E. of Beach Blvd	N 33.900, W 117.966	831	Habitat Preservation, New Passive Parks, Watershed Connectivity Projects	Open Space	Herbaceous, Shrub	Brea Creek
57	Brea Habitat Park Area	E. of Sunny Hills near Harbor Blvd and Bastanchury Rd.	N 33.90, W 117.93	229	Habitat Preservation, New Passive Parks, Watershed Connectivity Projects	Open Space, Residential: Low Density	Herbaceous, Shrub, Woodland	Brea Creek
58	Western Habitat Park Area	Anaheim, corner of Orange Ave and Western Ave	N 33.83, W 118.01	963	Habitat Preservation, New Passive Parks, Watershed Connectivity Projects	Residential: Medium Density	Urban	Carbon Creek

Number	Project Area Name	General Location	Specific Location	Area Size (acres)	Potential Opportunities	Dominant Landcover	Dominant Vegetation Type	Subwatersheds
Composite Model Results								
59	San Gabriel River Habitat Park Area	Seal Beach, N. Hwy 1, S. of Westminster Ave.	N 33.75, W 118.090	252	Habitat Preservation, New Passive Parks, Watershed Connectivity Projects	Developed, Residential: Low Density	Urban	Los Alamitos
60	Fullerton Infiltration Park	Pioneer Ave and State College Blvd	N 33.89, W 117.89	402	Riparian Enhancement, New Passive Parks, Watershed Connectivity Projects, New Infiltration Basins Projects	Developed, Residential: Low Density	Herbaceous, Urban	Fullerton Creek
61	Coyote Hills Infiltration Park	Euclid St near Sunny Hills	N 33.90, W 117.94	191	Riparian Enhancement, New Passive Parks, Watershed Connectivity Projects, New Infiltration Basins Projects	Developed, Residential: Low Density	Urban	Brea Creek
62	La Mirada Infiltration Park	Beach Blvd and Rosecrans Ave	N 33.90, W 117.98	1236	Riparian Enhancement, New Passive Parks, Watershed Connectivity Projects, New Infiltration Basins Projects	Developed, Open Space, Residential: Low Density	Herbaceous, Shrub, Urban	Brea Creek, Coyote Creek - North and South Fork
63	La Canada Verde Crk Infiltration Park	Candlewood Country Club in Whittier	N 33.90, W 118.03	425	Riparian Enhancement, New Passive Parks, Watershed Connectivity Projects, New Infiltration Basins Projects	Developed, Residential: Low Density	Herbaceous, Urban	Coyote Creek - North Fork

Number	Project Area Name	General Location	Specific Location	Area Size (acres)	Potential Opportunities	Dominant Landcover	Dominant Vegetation Type	Subwatersheds
Composite Model Results								
64	La Canada Verde Infiltration Park	Whittier Blvd and Colima	N 33.96, W 118.00	418	Riparian Enhancement, New Passive Parks, Watershed Connectivity Projects, New Infiltration Basins Projects	Developed, Open Space, Residential: Low Density	Herbaceous, Shrub, Urban	Coyote Creek - North Fork
65	Chino Hills Treatment Wetland Park	N. of Brea, W. of Hwy 57	N 33.95, W 117.85	286	Riparian Enhancement, New Passive Parks, Treatment Wetland Projects	Open Space, Residential: Low Density	Herbaceous, Shrub, Woodland	Brea Creek
66	Brea Treatment Wetland Park	E. of Sunny Hills near Harbor Blvd and Bastanchury Rd.	N 33.90, W 117.93	323	Riparian Enhancement, New Passive Parks, Treatment Wetland Projects	Developed, Open Space, Residential: Low Density	Herbaceous, Shrub, Woodland	Brea Creek and Fullerton Creek
67	La Mirada Crk Treatment Wetland Park	From Rosecrans Ave North to La Habra Heights	N 33.92, W 117.99	1412	Riparian Enhancement, New Passive Parks, Treatment Wetland Projects	Developed, Open Space, Residential: Low Density	Urban	Coyote Creek - South and North Fork
68	Whittier Hills Treatment Wetland Park	Whittier Blvd and Colima in Whittier	N 33.96, W 118.00	2373	Riparian Enhancement, New Passive Parks, Treatment Wetland Projects	Open Space	Herbaceous, Shrub, Woodland	Coyote Creek - North Fork
69	South Coyote Crk Treatment Wetland Park	Seal Beach, Los Alamitos, Hawaiian Gardens		464	Riparian Enhancement, New Passive Parks, Treatment Wetland Projects	Developed, Open Space, Residential: Low Density	Herbaceous, Urban	Los Alamitos

On a similar note, movement or migratory corridors are also recognized as an important landscape feature for some species to provide connectivity between habitat patches. These may allow for genetic exchange between otherwise isolated populations, allow for dispersal and range expansion of productive populations, allow for additional habitat use in wide-ranging species, or allow for seasonal movements of species. However, it should be cautioned that movement corridors themselves are in no way a replacement for large, contiguous habitats. When formerly contiguous habitats are fragmented, there is little benefit to providing connectivity to them, except perhaps for common, less sensitive species. As sensitive species move from contiguous, intact habitat to fragmented habitat across movement corridors, they may be subjected to higher mortality rates and lower reproductive rates, and in fact reduce overall population viability. Landscape-level developments which favor movement corridors at the expense of contiguous, intact habitat patches are less beneficial to wildlife.

The potential project areas provided in Figure 3-1 and described in Table 3-1 represent areas that meet multiple criteria for being potential highly suitable areas for general habitat preservation. They are generally higher quality native habitats, continuous with other native habitats, may have been recognized either as undeveloped or as sites important for preservation, and do not currently have any known land protection associated with them. These are optimal areas to pursue land conservation or preservation, where biodiversity is the objective. Specific projects within these areas could potentially include the following:

- Land acquisition from willing sellers: Funding has historically been available from non-government organizations (NGOs), the state, or other sources to purchase and preserve natural habitats, particularly where habitats represented are rare examples of relict natural communities that have little representation elsewhere, or little representation remaining in the region.
- Land conservation: Conservation easements are title restrictions (sometimes but not always in perpetuity) that may permit historical uses of land (such as grazing), but preserve the land from development. Funding may be available from some state and federal agencies for private landowners who are interested in implementing conservation easements.
- Mitigation banking: Mitigation banks are for-profit enterprises that may preserve land and offer conservation "credits" for sale to developers or agencies/cities who are required to mitigate for the loss of habitats. Mitigation banks can be an effective way to focus conservation on large, continuous habitats where impacts are affecting already-fragmented habitats.
- Mitigation set-asides: In preparing plans for sites, developers may in negotiation with resource agencies identify habitat areas to set aside as mitigation for loss of habitats on other portions of the site. The overall outcome may be beneficial for biodiversity if the largest, continuous habitat blocks are preserved, and the development minimizes fragmentation of existing intact habitats. However, where sensitive habitats are also the easiest to develop (e.g. oak or walnut woodlands on rolling hills), often the resulting exchange may result in loss of important regional habitats.

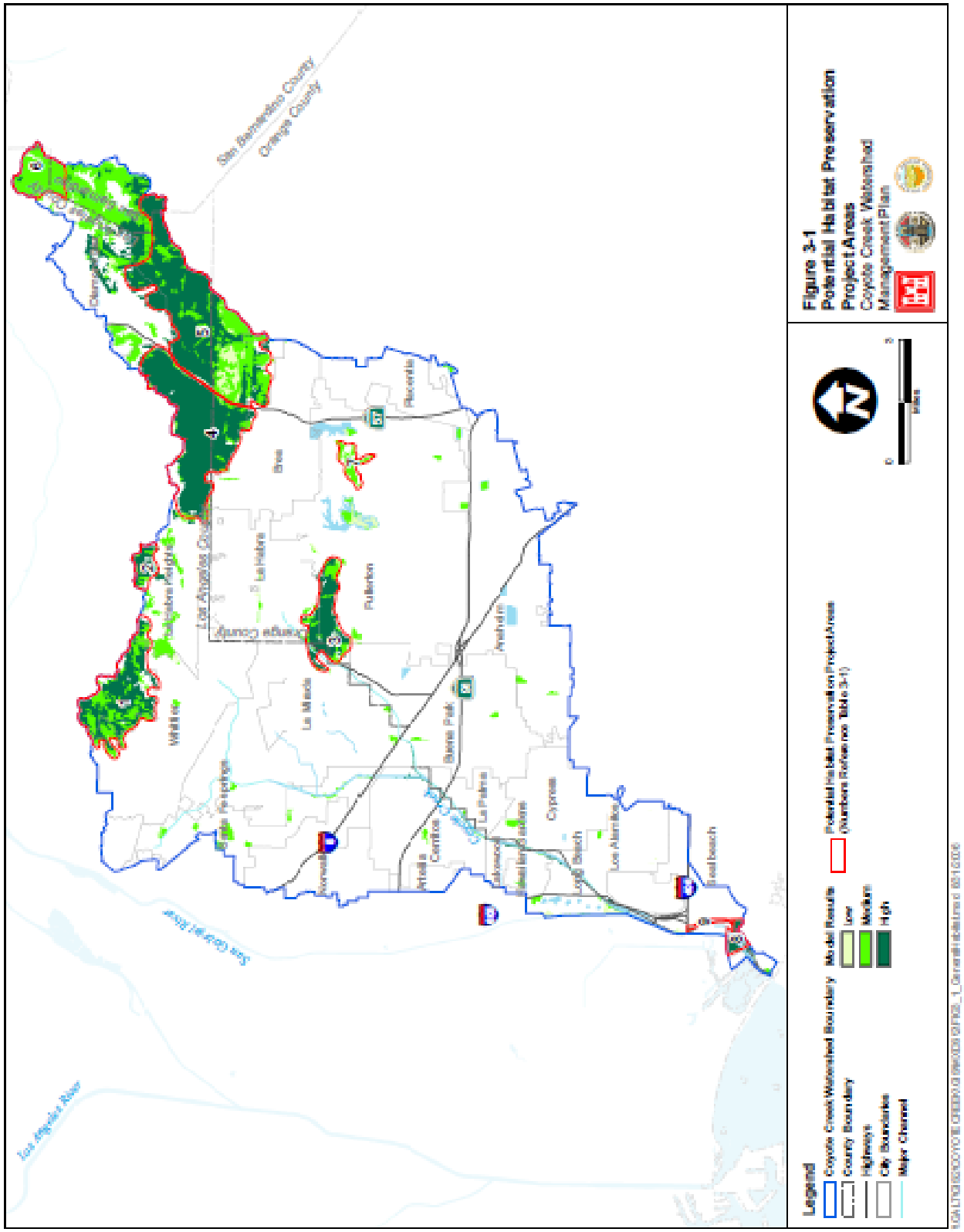


Figure 3-1
Potential Habitat Preservation Project Areas
Coyote Creek Watershed Management Plan
Legend
Coyote Creek Watershed Boundary
County Boundary
Highways
City Boundaries
Major Channel
Model Results
Low
Medium
High
Potential Habitat Preservation Project Areas (Numbers Referenced in Table 3-1)
San Bernardino County
Orange County
Los Angeles County
Los Angeles River
San Gabriel River
Whittier
La Habra Heights
La Habra
Brea
Placentia
Fullerton
La Mirada
Anaheim
Buena Park
Cypress
La Palma
Artesia
Cerritos
Los Alamitos
Long Beach
Seal Beach

- Park establishment or federal ownership: Many of the most continuous, preserved habitats in Orange County are preserved because they were the sites of historic county, regional, or state parks, or were owned by the federal government either as military lands, U.S. Forest Service lands, etc. Additional acquisition by county, state, or federal agencies should not be precluded, but is obviously contingent on available funds and interest.
- Land exchanges: An option for land acquisition which perhaps has not adequately been explored in Orange County is land exchange. Where county, state, or federal agencies own highly prized, developable land which has been identified as excess property (e.g. Tustin Air Base, El Toro Marine Base), exchanging that land for important, privately-owned parcels with high habitat value could be explored as an option to the current government practice of sale of the land.

Within the project areas identified on Figure 3-1 and described in Table 3-1, the next steps may include the following:

- Further characterize habitat quality and continuity for project suitability;
- Identify parcel boundaries and current land owner(s) within the area;
- Identify current City general plan or zoning restrictions on the parcels in the area;
- Identify any local or landowner knowledge, interest, or intent in regards to the parcels in the area;
- Develop specific project boundaries and identify a "proposed project";
- Identify stakeholders and a project support team;
- Develop a "project study report" for the proposed project which would evaluate multiple factors, such as land habitat value, real estate value, ownership, owner intent, conservation strategies, and potential funding sources.

3.2.2 Treatment Wetlands

Natural and man-made wetland systems have long been recognized for their capacity to remove water quality contaminants. Wetlands are most effective at reducing nutrients (e.g. nitrogen, phosphorus), but may also substantially reduce harmful elements and heavy metals (e.g. selenium, copper), organics (e.g. pesticides), and bacteria (e.g. coliform). Table 3-2 provides typical expected removal efficiency in treatment wetlands. In many parts of the country, wetlands are being purposefully designed and installed for water quality improvement. In Southern California, numerous small, medium, and large treatment wetlands are operating. This includes Prado Wetlands, which is operated to remove nutrients (primarily nitrogen) by the Orange County Water District from the Santa Ana River mainstem. This water provides the major source for groundwater infiltration basins downstream. Other treatment wetlands in the region include San Joaquin Wetlands operated the by Irvine Ranch Water District (IRWD), and the Laguna Niguel Wetlands which represent small, in-series pocket wetlands designed to treat urban low-flow.

TABLE 3-2
Typical Removal Efficiency of Water Quality Contamination for Treatment Wetlands

Constituent	Removal Efficiency	Lower Limit
Biological Oxygen Demand (BOD)	50 – 90%	2 – 10 mg/L
Total Suspended Solids (TSS)	50 – 90%	2 – 10 mg/L
Total Nitrogen (TN)	40 – 90%	1 – 3 mg/L
Total Phosphorus (TP)	10 – 90%	<1 mg/L
Fecal Coliforms	80 – 99%	<100 – 1,000 col/100 mL
Metals	50 – 90%	Below Detection

Note - Removal efficiencies and effluent concentrations are very dependent upon influent concentration and hydraulic loading rate.

The potential project areas provided in Figure 3-2 and described in Table 3-1 represent areas that meet multiple criteria for being potential highly suitable areas for treatment wetland establishment. That is, they meet multiple criteria important for identifying potential treatment wetland project sites. This includes the following: (1) an adjacent water supply, such as a major channel likely to convey urban runoff; (2) they are generally on low-lying areas where gravity flow from existing channels may be achievable; (3) they are comprised of land uses where there is high potential for land conversion to wetland (e.g. open, vacant land); and (4) they are located in portions of the watershed with recognized water quality problems. Specific projects within these areas could potentially include the following:

- Full-scale treatment wetlands: This may include significant areas (e.g. 10 acres or more) converted to wetland with a continuous water supply. Ideally water would gravity flow from an existing low-flow channel to an adjacent area. Residence time would be optimized for treatment objectives, and purified water would be returned to the supply channel, also preferably by gravity.

- In-channel treatment systems: This may include "bioswales" or other in-line treatment options, where water flowing in a channel is slowed by weirs or other obstructions and allowed to pool to support wetland vegetation during summer months. Irvine Ranch Water District is currently developing these in some drainage systems. Water is purified by residence time in wetland pools before continuing downstream. In winter months, wetland vegetation is anticipated to be scoured out by storm flows.

- Off-channel subsurface wetlands: Subsurface wetlands may consist of sand or gravel beds of varying depths, in some cases with surface vegetation. They can be effective in treating specific water quality constituents. For example, IRWD is currently developing a subsurface wetland to treat high selenium levels in Peters Canyon Wash. Treatment cells will ultimately be buried and out of view beneath a school play field. Water will be supplied with a diversion structure and pump, and return via gravity.

Within the project areas identified on Figure 3-2 and described in Table 3-1, the next steps may include the following:

- Further characterize water quality needs and objectives for subwatershed;

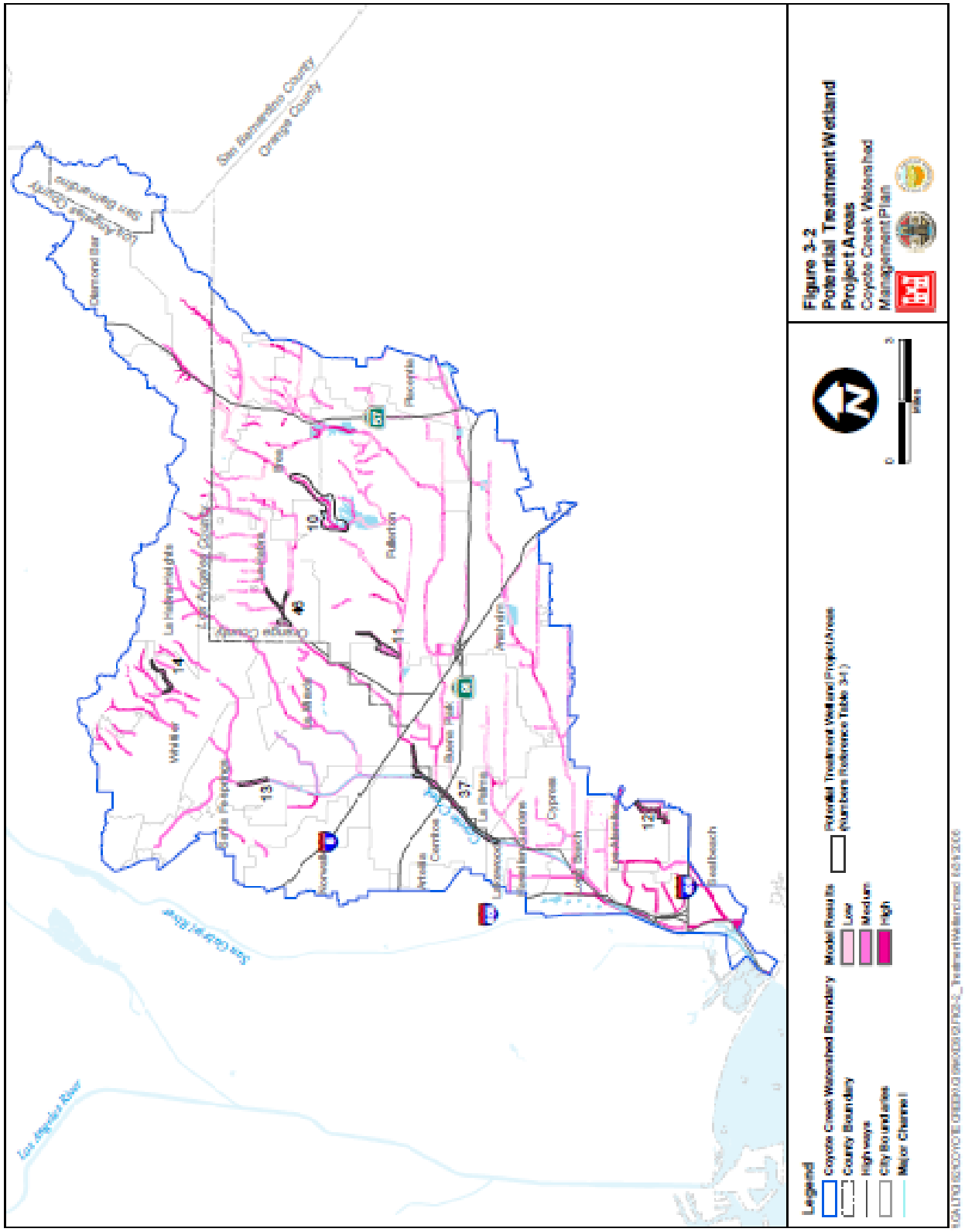


Figure 3-2
Potential Treatment Wetland
Project Areas
Coyote Creek Watershed
Management Plan
Legend
Coyote Creek Watershed Boundary
County Boundary
Highways
City Boundaries
Major Channel
Model Results
Low
Medium
High
Potential Treatment Wetland Project Areas
(Numbers Reference Table 3-1)
Los Angeles County
Orange County
San Bernardino County
Riverside County
Los Angeles River
San Gabriel River
Pacific Ocean
Whittier
La Habra Heights
Santa Fe Springs
Norwalk
Artesia
Cerritos
Lakewood
Bellflower
Hawaiian Gardens
Long Beach
Signal Hill
Cypress
Seal Beach
Rossmoor
Los Alamitos
Stanton
Anaheim
Fullerton
Placentia
Diamond Bar
10
11
12
13
14
37

- Identify current and proposed land use within proposed project areas;
- Identify water sources, hydrology, and water quality for existing surface water;
- Identify parcel boundaries and current land owner(s) within the area;
- Identify current City general plan or zoning restrictions on the parcels in the area;
- Identify any local or landowner knowledge, interest, or intent in regards to the parcels in the area;
- Develop specific project boundaries and identify a "proposed project";
- Identify stakeholders and a project support team;
- Develop a "project study report" for the proposed project which would evaluate multiple factors, such as channel adjacency and hydrology, real estate value, ownership, owner intent, treatment strategies, and potential funding sources.

3.2.3 Passive Parks

Passive parks are developed to support passive recreational activities including hiking, biking, birdwatching, environmental education, or nature observation. This contrasts with active parks which may include children's playgrounds, sports fields, gymnasiums, tennis courts, or other sports related facilities. Passive parks may include landscaped parks or picnic areas, but the general implication is that significant portions of the park would have natural land cover suitable for hiking or nature observation. This may include wetland or riparian habitats, or upland woodland or scrub habitats. Passive parks are intended to provide a remedy for the general lack of connectedness that most urban residents feel with the natural world. In most cases, other project objectives stated in this report can be combined with passive park opportunities for multi-objective projects.

The potential project areas provided in Figure 3-3 and described in Table 3-1 represent areas that meet multiple criteria for being potential highly suitable areas for passive park creation. Specifically, they have landuse which would be suitable for conversion to park, open space - that is, they are not currently developed. Areas with a lack of current park facilities were also targeted; that is, areas at least one-half mile away from existing parks, and with low park acreage per capita, ranked high. Areas with higher population of minorities also ranked high, since these areas have historically lacked equal park acreage representation. Specific projects within these areas could potentially include the following:

- Acquisition of new parkland: Funding for park acquisition may be available from a variety of local, state, and federal sources.
- Development of new park facilities: Many public and private open space areas may exist where passive park activities could readily take place, but are limited only by access. Projects may include developing new passive use facilities, such as trails, bikeways, rest stops, viewpoints, interpretive facilities, campgrounds, picnic areas, and supporting parking.

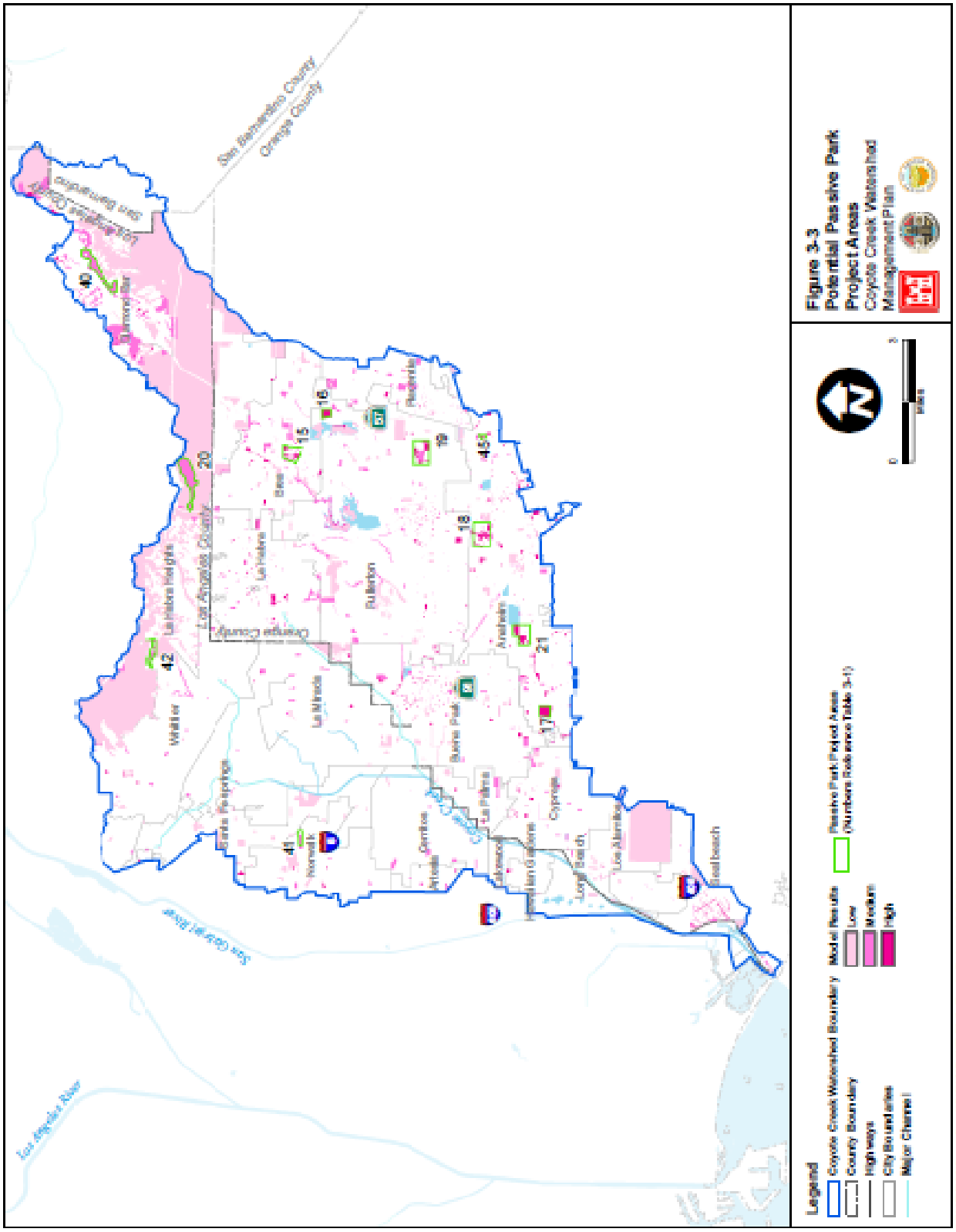


Figure 3-3
Potential Passive Park Project Areas
Coyote Creek Watershed Management Plan
Legend
Coyote Creek Watershed Boundary
County Boundary
Highways
City Boundaries
Major Channels
Model Results
Low
Moderate
High
Passive Park Project Areas (Numbers Reference Table 3-1)
San Bernardino County
Orange County
Los Angeles County
Los Angeles River
San Gabriel River
Whittier
La Habra Heights
La Habra
Fullerton
Anaheim
Buena Park
Cypress
Long Beach
Los Alamitos
Seal Beach
Norwalk
Bellflower
Placentia
Yorba Linda
Brea
Pico Rivera
Stanton
Orange County
Los Angeles County
40
20
42
41
15
16
19
45
18
21
17

- Regional trail connections: Regional biking and hiking trails have been proposed, and passive park areas may be utilized to provide connection and access points for these trails.

Within the project areas identified on Figure 3-3 and described in Table 3-1, the next steps may include the following:

- Further characterize park needs and objectives for subwatershed;
- Identify stakeholders or focus groups to identify park need;
- Identify current and proposed land use within proposed project areas;
- Identify habitat types and quality within the areas;
- Identify parcel boundaries and current land owner(s) within the area;
- Identify current City general plan or zoning restrictions on the parcels in the area;
- Identify any local or landowner knowledge, interest, or intent in regards to the parcels in the area;
- Develop specific project boundaries and identify a "proposed project";
- Identify a project support team;
- Develop a "project study report" for the proposed project which would evaluate multiple factors, park need, real estate value, ownership, owner intent, suitable park types, and potential funding sources.

3.2.4 Infiltration Basins

Southern California is in constant demand of ongoing water supply. Groundwater basins can effectively store water for future extraction and use by municipal users. Infiltration in Southern California has been achieved by creating active basins which are continuously managed for infiltration. Storm water or river flows are diverted to basins for infiltration. Infiltration rates are managed by utilizing equipment to manage soil conditions or remove impediments to infiltration. In addition to traditional infiltration basins, additional infiltration could be achieved with appropriate retrofit and management of facilities such as parklands, landscaped areas, schools, parking lots, or other types of facilities. These facilities could collect onsite or offsite runoff, and be designed and managed to retain runoff and allow for infiltration.

The potential project areas provided in Figure 3-4 and described in Table 3-1 represent areas that meet multiple criteria for being potential highly suitable areas for new infiltration basin creation. Specifically, they are located in portions of the watershed that have known soil characteristics which are suitable for infiltration, they are in relatively flat or low-slope areas below the mountains, they are on landuse which is suitable to basin development, and they are adjacent to channels for water supply. In addition, low-lying areas which may be gravity-fed from existing channels are represented. Specific projects within these areas could potentially include the following:

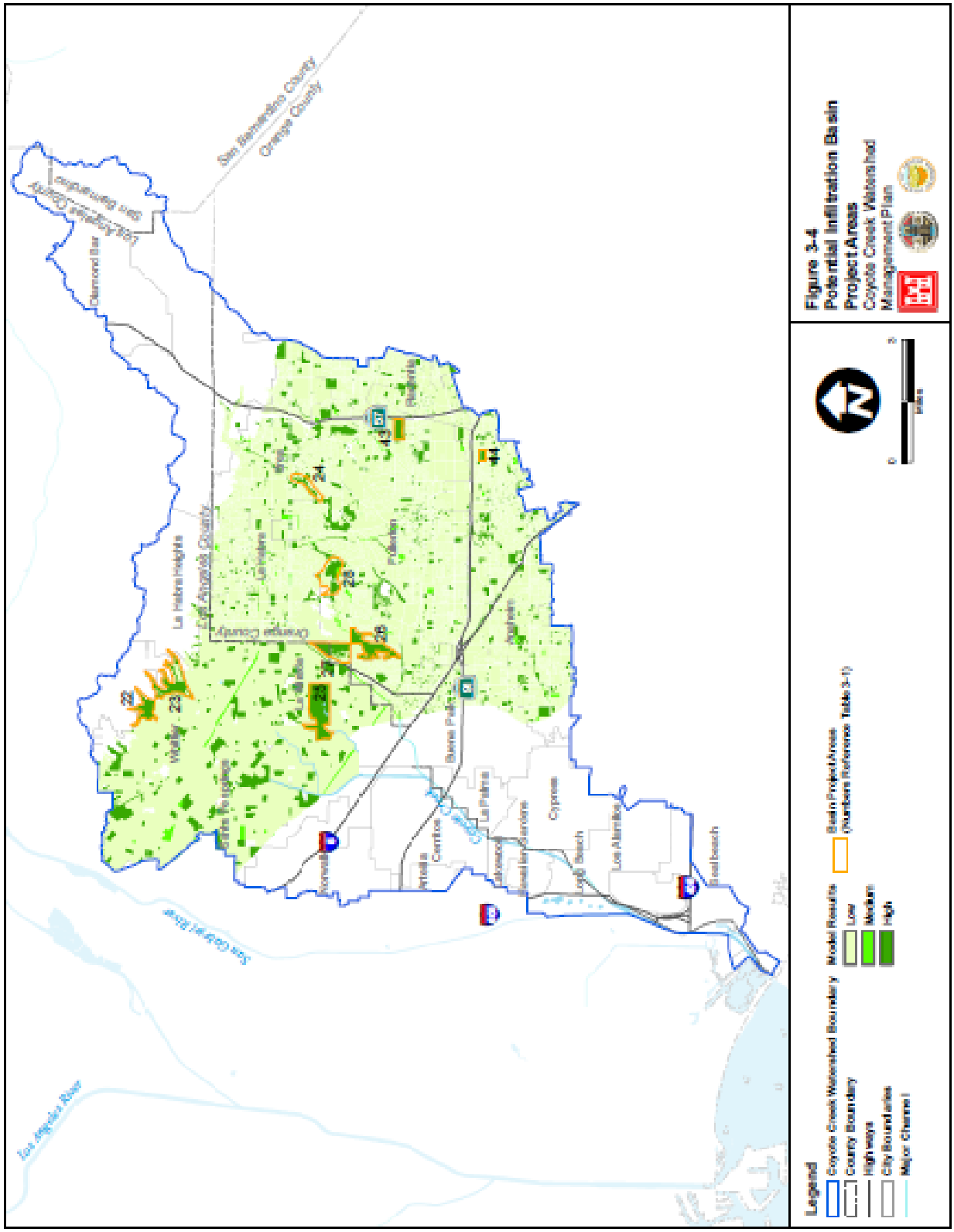


Figure 3-4
Potential Infiltration Basin Project Areas
Coyote Creek Watershed Management Plan
Legend
Coyote Creek Watershed Boundary
County Boundary
Highways
City Boundaries
Major Channel
Model Results
Low
Median
High
Basin Project Areas (Numbers Reference Table 3-1)
San Bernardino County
Orange County
Los Angeles County
San Gabriel River
Los Angeles River
Diamond Bar
La Habra Heights
Whittier
Pico Rivera
Norwalk
Bellflower
Paramount
Lakewood
Cerritos
Hawaiian Gardens
Cypress
Los Alamitos
Seal Beach
Fullerton
Placentia
Anaheim
Yorba Linda
Brea
Chino Hills
Walnut
Diamond Bar
Pomona
Ontario
Chino
Rancho Cucamonga
Upland
Claremont
Glendora
Azusa
Covina
West Covina
Baldwin Park
Rosemead
Pico Rivera
Bellflower
Norwalk
Cerritos
La Palma
Los Alamitos
Seal Beach
Cypress
Hawaiian Gardens
Lakewood
Paramount
Bellflower
Norwalk
Pico Rivera
Whittier
La Habra Heights
Diamond Bar
Chino Hills
Walnut
Yorba Linda
Brea
Placentia
Fullerton
Anaheim
Orange County
Los Angeles County
San Bernardino County
Miles

- New infiltration basins: Areas specifically set aside and designated for infiltration may be targeted as projects where existing landuse is open and undeveloped, and conditions for the flow and infiltration of water are appropriate.
- Retrofit of existing public facilities: Schools, parks, golf courses, or other open, landscaped areas may be targeted for retrofit to allow surface or subsurface infiltration galleries. These areas would collect relatively small amounts of rainwater which could be infiltrated in short periods of time so as to not interfere with other site uses or objectives.
- Retrofit of developed or private facilities: Large commercial areas, parking lots, or other developed facilities can be explored for potential projects involving onsite retention and infiltration.

Within the project areas identified on Figure 3-4 and described in Table 3-1, the next steps may include the following:

- Further characterize infiltration needs and objectives for subwatershed;
- Identify agency proponents for infiltration facilities and a project support team;
- Identify current and proposed land use within proposed project areas;
- Identify parcel boundaries and current land owner(s) within the area;
- Identify current City general plan or zoning restrictions on the parcels in the area;
- Identify any local or landowner knowledge, interest, or intent in regards to the parcels in the area;
- Develop specific project boundaries and identify a "proposed project";
- Develop a "project study report" for the proposed project which would evaluate multiple factors, hydrology and infiltration potential, real estate value, ownership, owner intent, suitable basin types, and potential funding sources.

3.2.5 Watershed Connectivity

Creating a sense and awareness of the Coyote Creek Watershed and implications of activities within the drainage of the watershed among the general public may have real effects in improving the overall conditions within the watershed. A cohesive interpretive presentation at various highly visible points throughout the watershed may contribute to connectivity through public awareness, and provide valuable information on low-impact lifestyles that may benefit the watershed. Such displays may define a sense of place that is watershed-based.

The potential project areas provided in Figure 3-5 and described in Table 3-1 represent areas that meet multiple criteria for being potential highly suitable areas for watershed connectivity. Specifically, these areas represent open space/public land and recreation areas where people congregate and are adjacent to existing river or flood channels. They are near or include areas with existing natural habitats. In addition, they are adjacent to existing regional bikeways or hiking trails. Areas that meet all these criteria are likely to have

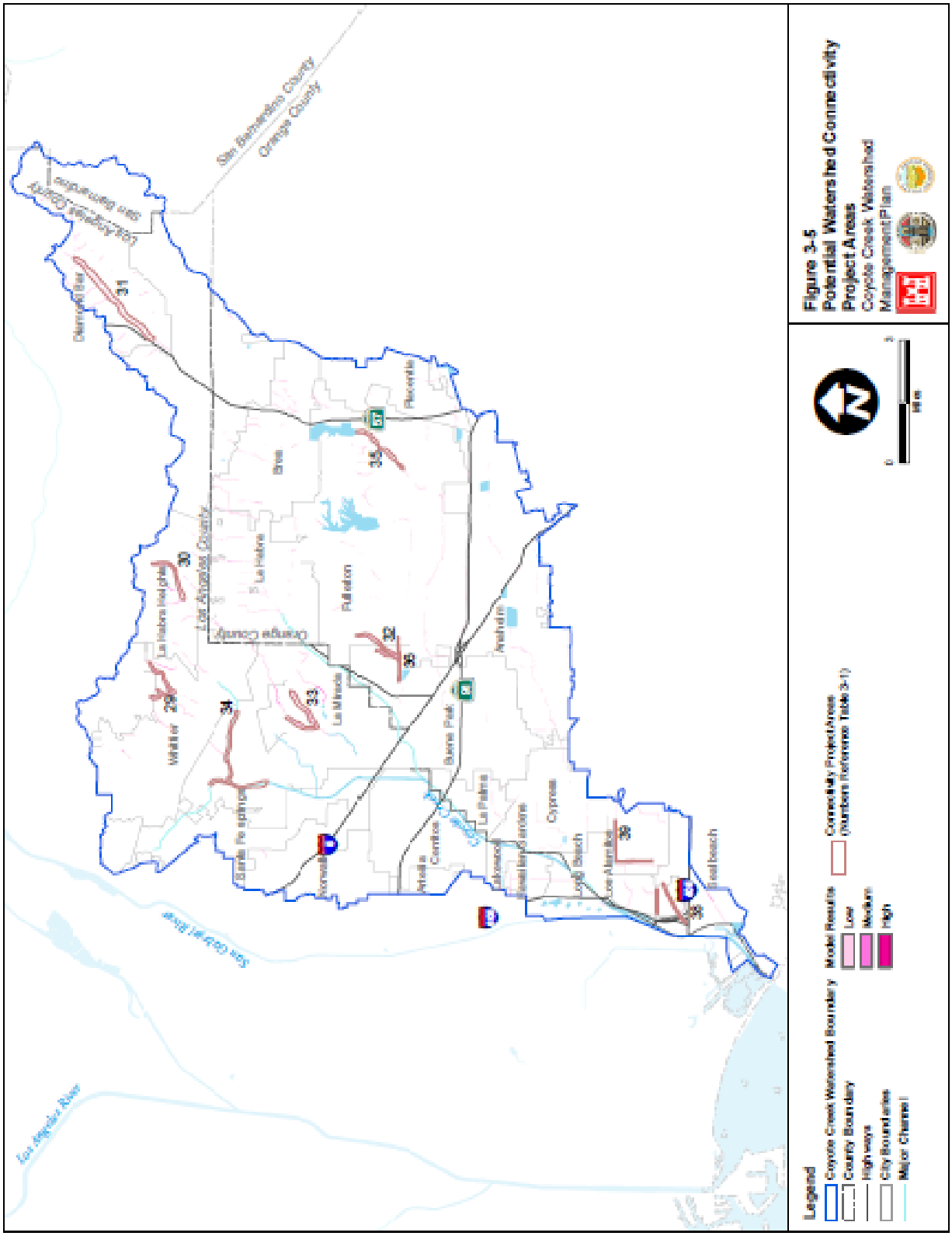


Figure 3-5
Potential Watershed Connectivity Project Areas
Coyote Creek Watershed Management Plan
Legend
Coyote Creek Watershed Boundary
County Boundary
Highways
City Boundaries
Major Channel
Model Results
Low
Medium
High
Connectivity Project Areas (Numbers Reference Table 3-1)
Los Angeles County
Orange County
San Bernardino County
Los Angeles River
San Gabriel River
Pacific Ocean
Whittier
La Habra Heights
Brea
Fullerton
Anaheim
Cypress
Los Alamitos
Seal Beach
Norwalk
Santa Fe Springs
La Mirada
Buena Park
La Palma
Stanton
Garden Grove
Long Beach
Placentia
Anaheim Canyon
Yorba Linda
Diamond Bar
29
30
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considerable public use and access, and to provide suitable locations to reach the largest number of individuals. At the same time, the adjacent features provide suitable surrounding to introduce the public to watershed information. Specific projects within these areas could potentially include the following:

- Interpretive watershed signage: Potential information nodes presenting information on habitat, water quality, water supply, hydrology, and other relevant watershed issues. Signs could also present information on low-impact lifestyles that minimize watershed impacts.
- Outdoor classrooms: Amphitheatres, water quality sampling stations, or other facilities can be specifically tailored for environmental education activities.
- Watershed visitor or science center: A combined facility which offers visitors information, graphic displays, multi-media presentations, etc. on watershed conditions, issues, and low-impact lifestyles could be combined with laboratories, offices, or other facilities that promote watershed understanding (e.g. modeled after the Los Angeles River Center).

Within the project areas identified on Figure 3-5 and described in Table 3-1, the next steps may include the following:

- Further characterize interpretive needs and objectives for the watershed;
- Identify agency proponents, stakeholders, and a project support team;
- Identify current level of public use within proposed project areas;
- Identify current and proposed land use within proposed project areas;
- Identify parcel boundaries and current land owner(s) within the area;
- Identify current City general plan or zoning restrictions on the parcels in the area;
- Identify any local or landowner knowledge, interest, or intent in regards to the parcels in the area;
- Develop specific project boundaries and identify a "proposed project";
- Develop a "project study report" for the proposed project which would evaluate multiple factors, public use, real estate value, ownership, owner intent, suitable interpretive types, and potential funding sources.

3.2.6 Multiple Objective Projects

In addition to the project area analysis presented above, multiple objective project opportunities were considered, and project areas identified from composite model maps (See Figures 2-25 through 2-28). Projects which serve more than the single objectives specified can serve to amplify limited financial and planning resources by meeting multiple objectives, with little incremental increase in planning or cost. Projects which serve more than one objective are more likely to find ample funding and stakeholder buy in; specifically, they may qualify for more than one type of grant funding, and are likely to find approval among a broader base of stakeholders.

The potential project areas provided in Figure 3-6 through Figure 3-9 and described in Table 3-1 represent areas that meet the multiple project objectives identified in the composite modeling. These areas ranked in the medium to high categories of suitability on the composite maps. These composite maps objectives were previously described, and are summarized here. Project areas identified may support one or multiple specific projects based on the criteria for the following:

- Habitat Parks (Riparian): These would represent areas with higher quality habitat and/or restoration potential, lying along creeks or in riparian areas, meeting criteria for passive parks, and meeting criteria for watershed connectivity or interpretive signage. The project opportunities for each of these objectives were more specifically described in the sections above. See Figure 3-6.
- Habitat Parks (Watershed-wide): These would represent areas with higher quality habitat and/or restoration potential, occurring throughout the watershed, meeting criteria for passive parks, and meeting criteria for watershed connectivity or interpretive signage. The project opportunities for each of these objectives were more specifically described in the sections above. See Figure 3-7.
- Infiltration Parks: These would represent areas with restoration potential, lying along creeks or in riparian areas, meeting criteria for passive parks, meeting criteria for watershed connectivity or interpretive signage, and meeting criteria for new infiltration basins. The project opportunities for each of these objectives were more specifically described in the sections above. See Figure 3-8.
- Treatment Wetland Parks: These would represent areas with restoration potential, lying along creeks or in riparian areas, meeting criteria for passive parks, and meeting criteria for treatment wetland creation. The project opportunities for each of these objectives were more specifically described in the sections above. See Figure 3-9.

Within the project areas identified on Figure 3-6 through Figure 3-9, and described in Table 3-1, the next steps may include the following:

- Identify agency proponents, stakeholders, and a project support team;
- Identify current level of public use within proposed project areas;
- Identify current and proposed land use within proposed project areas;
- Identify parcel boundaries and current land owner(s) within the area;
- Identify current City general plan or zoning restrictions on the parcels in the area;
- Identify any local or landowner knowledge, interest, or intent in regards to the parcels in the area;
- Develop specific project boundaries and identify a “proposed project”;

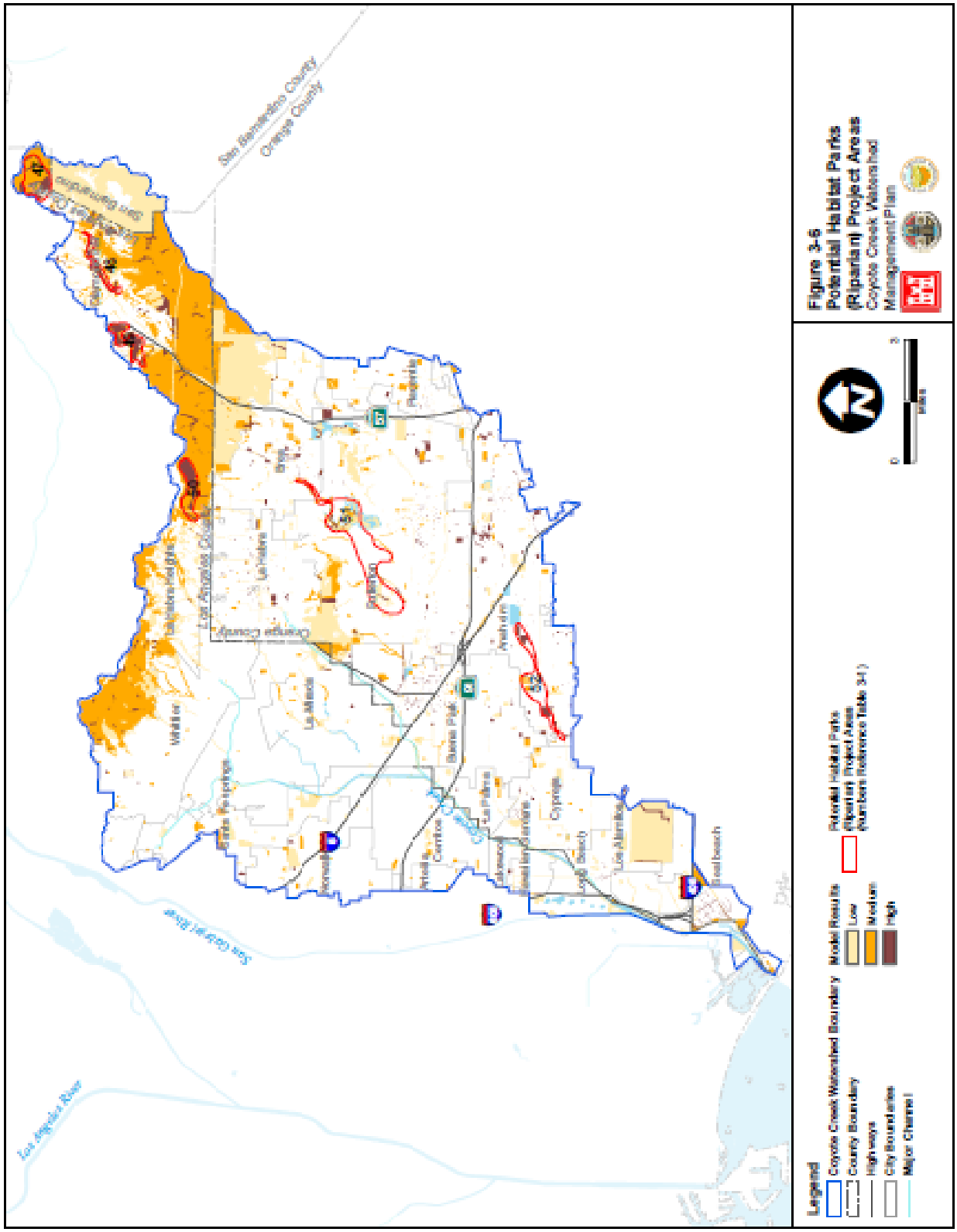
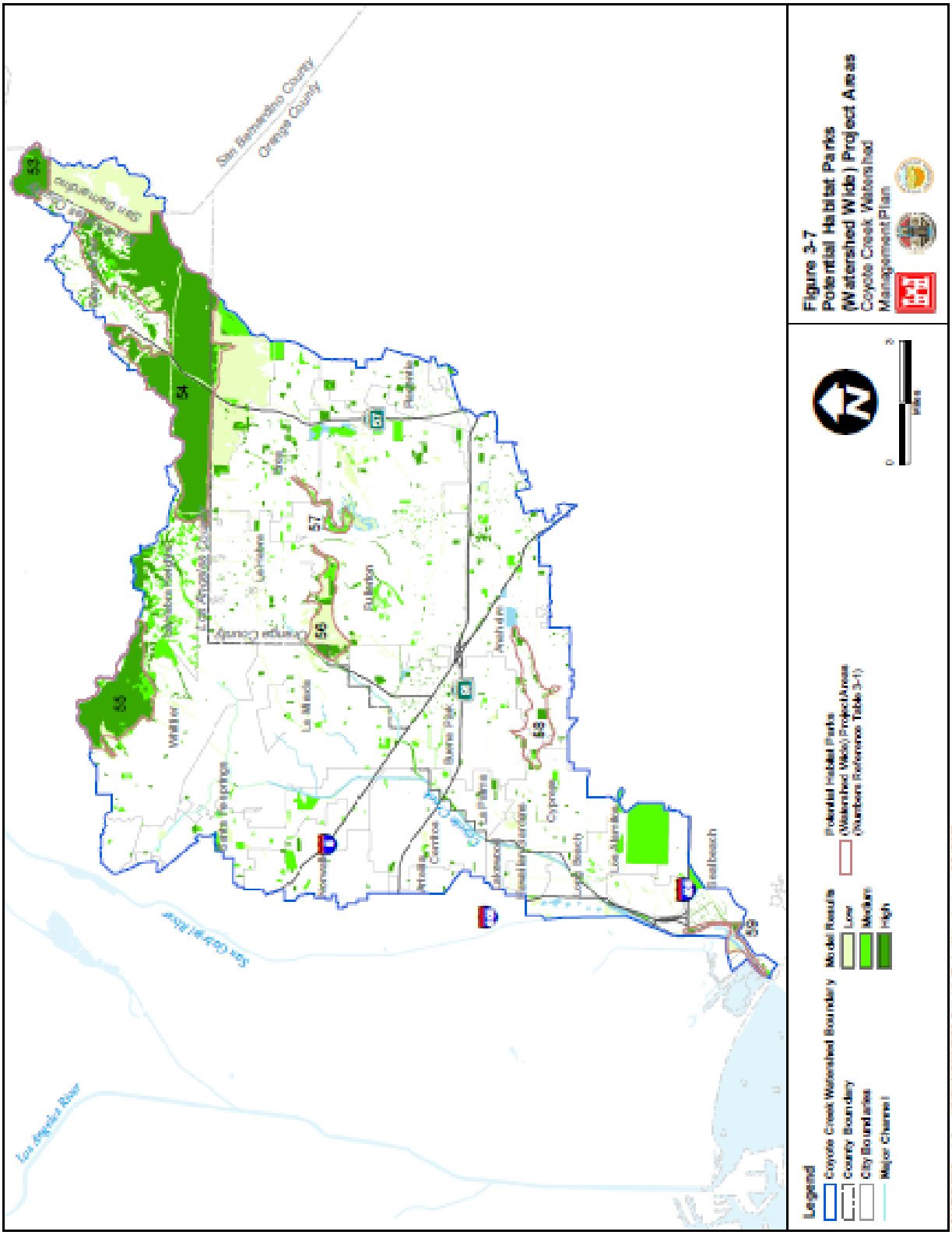


Figure 3-6
Potential Habitat Parks
(Riparian) Project Areas
Coyote Creek Watershed
Management Plan
Legend
Coyote Creek Watershed Boundary
County Boundary
Highways
City Boundaries
Major Channel
Model Results
Low
Medium
High
Potential Habitat Parks
Riparian Project Areas
(Numbers Reference Table 3-1)
San Bernardino County
Orange County
Los Angeles County
Los Angeles River
San Gabriel River
Pacific Ocean
Whittier
La Habra
La Mirada
Fullerton
Anaheim
Buena Park
Cypress
Los Alamitos
Seal Beach
Hacienda Heights
Rowland Heights
Brea
Placentia
Yorba Linda
Chino Hills
Tonner Canyon
Puente Hills
Chino Hills State Park
Carbon Canyon
Coyote Hills
Los Coyotes
Bolsa Chica
Anaheim Hills
Santa Ana Mts
Santa Ana River
Prado Dam
Prado Park
Chino Creek
Tonner Canyon


Legend
Coyote Creek Watershed Boundary
County Boundary
City Boundaries
Major Channel
Model Results
Low
Medium
High
Potential Habitat Parks
(Watershed Wide) Project Areas
(Numbers Reference Table 3-1)
Miles
Figure 3-7
Potential Habitat Parks
(Watershed Wide) Project Areas
Coyote Creek Watershed
Management Plan
Los Angeles River
San Gabriel River
San Bernardino County
Orange County
Los Angeles County
Whittier
La Habra
La Mirada
Fullerton
Anaheim
Buena Park
Cypress
Los Alamitos
Seal Beach
Sunset Beach
Huntington Beach
Pacific Ocean
53
54
55
56
57
58
59

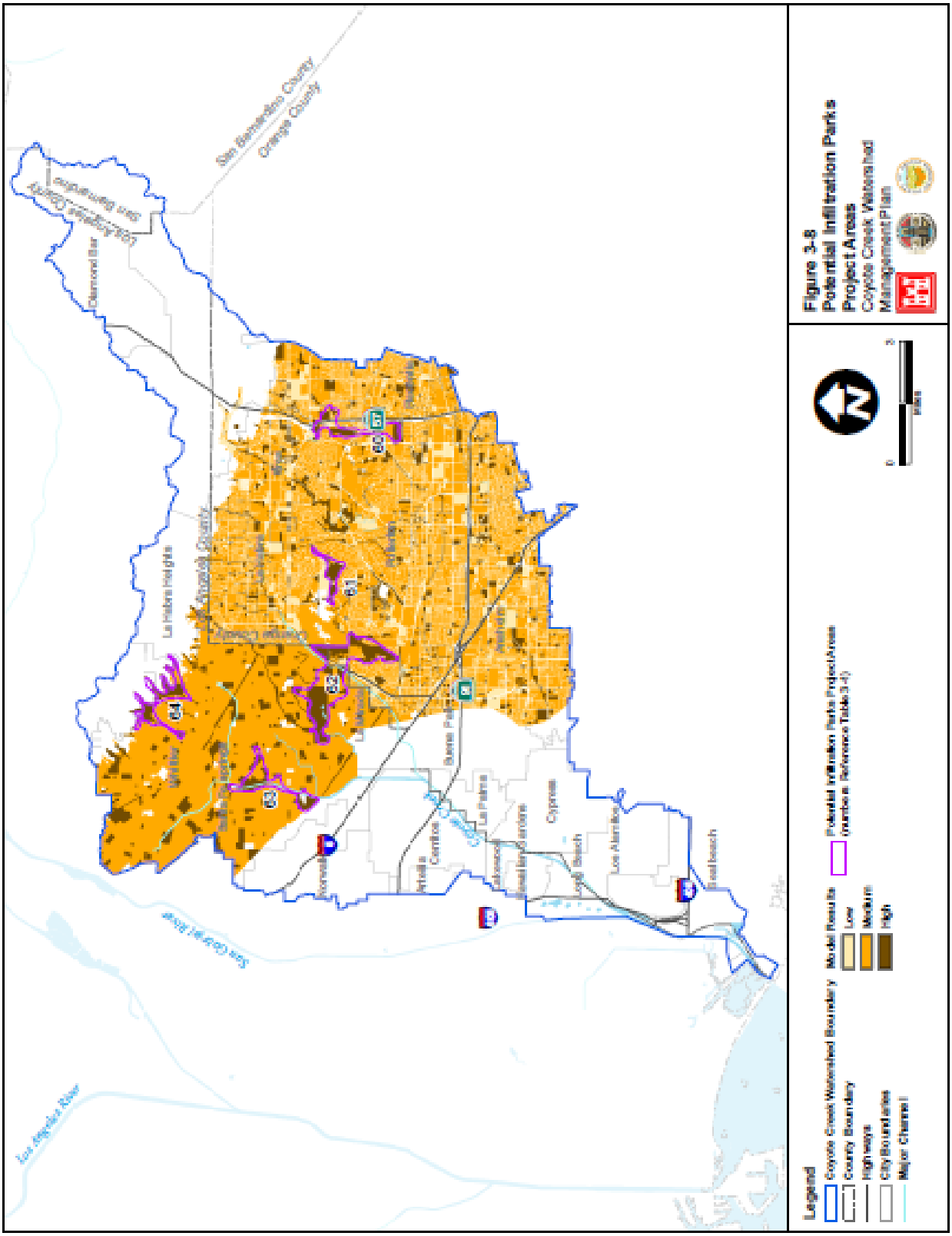


Figure 3-8
Potential Infiltration Parks
Project Areas
Coyote Creek Watershed
Management Plan
Legend
Coyote Creek Watershed Boundary
County Boundary
Highways
City Boundaries
Major Channel
Model Results
Low
Medium
High
Potential Infiltration Parks Project Areas
(number is Reference Table 3-4)
Miles
San Bernardino County
Orange County
Los Angeles County
Diamond Bar
La Habra Heights
Whittier
Santa Fe Springs
Norwalk
Pico Rivera
Downey
Bellflower
Paramount
Lakewood
Long Beach
Cypress
Los Alamitos
Seal Beach
Los Angeles River
San Gabriel River

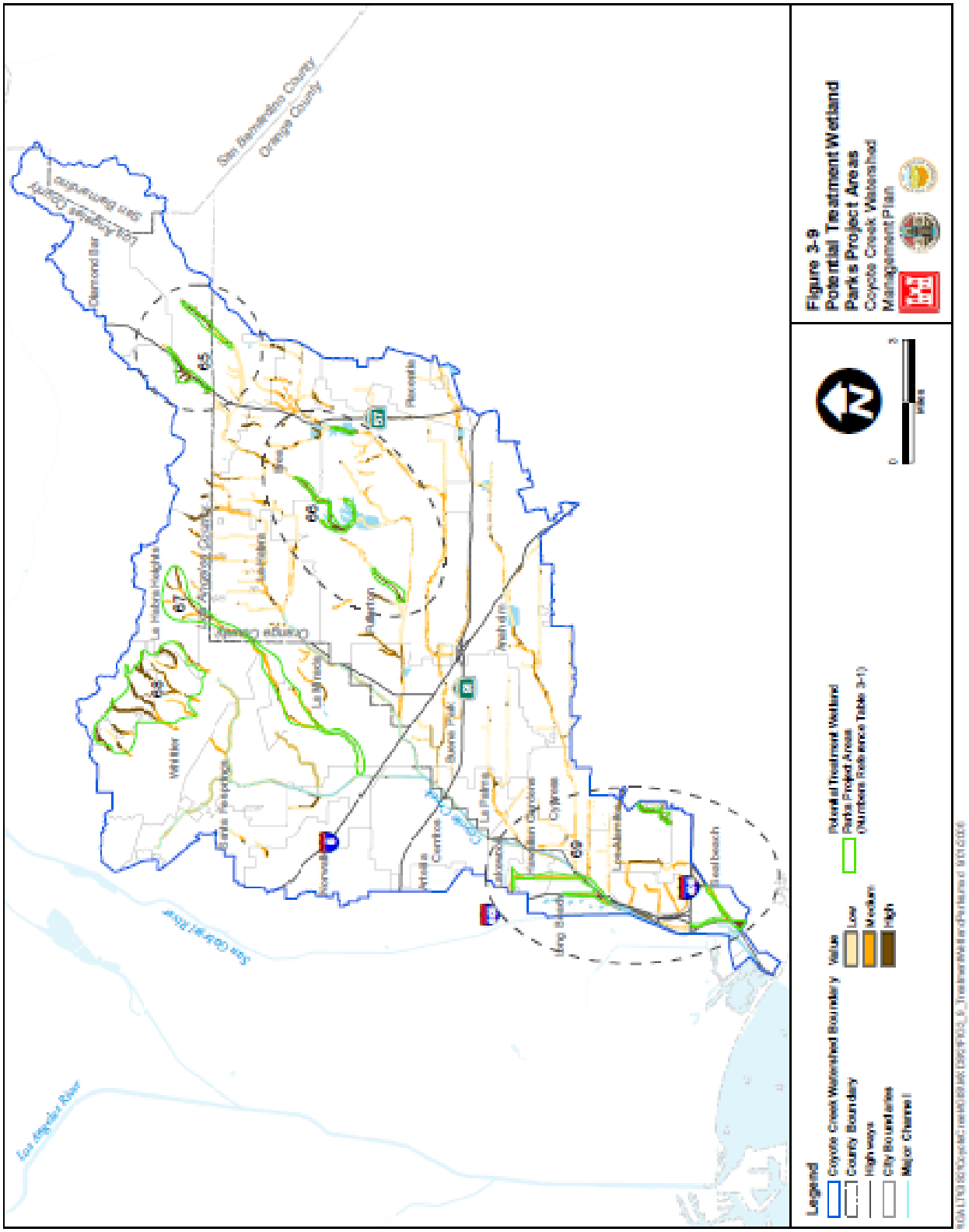


Figure 3-9
Potential Treatment Wetland
Parks Project Areas
Coyote Creek Watershed
Management Plan
Legend
Coyote Creek Watershed Boundary
County Boundary
Highways
City Boundaries
Major Channel
Value
Low
Medium
High
Potential Treatment Wetland
Parks Project Areas
(Numbers Reference Table 3-1)
Miles
San Bernardino County
Orange County
Los Angeles County
Los Angeles River
San Gabriel River
Diamond Bar
Chino Hills
Yorba Linda
Placentia
Anaheim
Fullerton
Brea
Buena Park
Cypress
Stanton
Garden Grove
Westminster
Fountain Valley
Huntington Beach
Seal Beach
Long Beach
Lakewood
Cerritos
Artesia
Norwalk
Whittier
La Habra Heights
Hacienda Heights
Rowland Heights
Walnut
Chino
Ontario
Rancho Cucamonga
Upland
Pomona
Claremont
Glendora
Azusa
Irwindale
Duarte
Monrovia
Arcadia
Sierra Madre
Pasadena
Altadena
La Mirada
Bellflower
Lakewood
Long Beach
Seal Beach
Huntington Beach
Fountain Valley
Cypress
Stanton
Garden Grove
Westminster
Anaheim
Fullerton
Brea
Placentia
Yorba Linda
Chino Hills
Diamond Bar
Walnut
Hacienda Heights
La Habra Heights
Rowland Heights

3.3 Summary

The identification of potential project areas related to specific types of opportunities have included habitat preservation, treatment wetlands, passive parks, infiltration basins, watershed connectivity, and multiple objective. Extensive opportunities are available throughout the watershed in each of these categories. Table 3-3 summarizes the acreage and/or number of sites identified as high suitability areas from the model results. This provides an overview of the large potential acreage that may be available for projects with the specific stated objectives.

Large, extensive acreage of natural habitat in portions of the watershed could contribute to natural habitat preserves that include hiking and biking opportunities for visitors. Passive park opportunities exist throughout the watershed, and treatment wetland opportunities are available where ample surface water from low-flow channels can be diverted to wetland sites. Finally, groundwater infiltration basins could be created in settings ranging from urban developed parking lots to existing recreation facilities and parks, to open space areas. Based on the acreage available, tremendous water savings could be achieved. Assuming infiltration basins could be established which collect water from an area 10 times their size, and that half the water falling on the drainage area could be collected and infiltrated in the basins, over 33,000 acre-feet of water could be infiltrated based on potential acreage in Table 3-3 and average rainfall rates throughout the watershed.

TABLE 3-3
Acreage and Number of Sites Identified as High Suitability by Modelling Objective

Model Objective	Acreage	Number of Sites
Individual Models		
General Habitat Preservation	9,217	53
Riparian Enhancement	5,211	393
New Passive Parks	732	144
New Infiltration Basins	5,798	53
Treatment Wetland Creation	1,709	217
Watershed Interpretation	N/A	25
Composite Models		
Habitat Parks – Riparian	5,211	393
Habitat Parks – Watershed-Wide	11,892	812
New Infiltration Parks	6,923	53
Treatment Wetland Parks	2,526	437

N/A – not applicable

Implementation of these potential projects could greatly increase the environmental quality and improve the interaction of humans and the natural environmental within the watershed. Preserving resources, creating recreational opportunities, and improving water

supply and quality, would improve the overall quality of life for residents of the watershed. This could subsequently provide socioeconomic benefits associated with increased land values, attraction of businesses, and greater employment opportunities. Additionally, implementation of these potential projects could provide the community benefit of physically linking, through trails and greenways, active parks and open space areas with residential areas, schools, civic spaces, and historic and cultural places of interest. Ultimately, implementation of these potential projects would be a dramatic step toward fulfilling the WMP vision of thriving communities living lightly within a healthy Coyote Creek Watershed.

3.4 Recommendations

The identification of potential project areas related to specific types of opportunities have included habitat preservation, treatment wetlands, passive parks, infiltration basins, watershed connectivity, and multiple objective. For each of the potential project areas the recommended next steps necessary to further evaluate an opportunity and identify its project feasibility, as well as overall recommendations regarding future evaluation and analysis of these potential opportunities were made. In addition to these recommendations, at each stage, the potential viability of a proposed project should be evaluated and the next steps developed and implemented. At the end of this process, it is anticipated that only contending, serious proposed projects would remain, and that they would have a measure of "project readiness". That is, project proponents would be identified, landowner negotiations would be underway, stakeholder input would be ongoing, and potential funding sources would be identified. Grant applications or funding solicitation could potentially follow.

Attachment A – Supporting GIS Data and Analysis

Introduction

This attachment provides a brief description of the file structure and content of the Geographic Information System (GIS) compiled for the Project. This GIS is owned by Orange County, and may be available in part by contacting the County. This attachment also provides a description of the spatial analysis conducted as a part of the Opportunities and Constraints Technical Memorandum (TM). Intermediate and final analysis layers resulting during this analysis are described here.

A number of tables incorporated in this attachment include (1) Tables A-1a, A-1c, A-1e [Secondary, Tertiary, Quaternary] Model Construct – Preliminary Data Modification and Tables A-1b, A-1c, A-1f [Secondary, Tertiary, Quaternary] Model Construct – Final Equation, which summarize preliminary data modification and final model equations for the opportunity and constraints modeling effort for the watershed; (2) Table A-2, which summarizes the Tertiary model objectives for the models that were run in the final Opportunities and Constraints TM analysis; and (3) Table A-3a Data Source for Figures and Legend Parameters, which provides documentation of data and legend parameters that went into figures presented in the Opportunities and Constraints TM, showing intermediate and final data modeling results; Table A-3b Landuse Crosswalk and Generalization – Los Angeles and Orange County Data, which provides the crosswalk and data generalization for landuse for modeling; and Table A-3c Landuse Classifications for Modeling, which summarizes how landuse was reclassified for various models.

GIS and Modeling Data

GIS First Order Data

Final GIS spatial layers acquired and developed for the watershed (i.e. first-order data) are summarized under the following headings. The actual data is filed under subdirectories with the same name.

ADMINISTRATIVE_BOUNDARIES\ - City, County, political, federal boundaries, and other administrative boundaries.

AERIAL_PHOTOGRAPHY\ - Small and large scale aerial photographs.

BIOLOGICAL_RESOURCES\ - Vegetation types, wetland locations, sensitive species locations, and other data.

CLIMATE\ - Currently precipitation data; a placeholder for other types of climatic data.

FLOODS_OTHER_HAZARDS\ - Fire hazard and fire history, and flood data from Federal Emergency Management Agency (FEMA).

GROUNDWATER\ - Groundwater basins, spreading grounds, and wells.

HYDROLOGY_AND_DRAINAGE\ - Creeks and channels, water districts, dams, and other data.

INFRASTRUCTURE\ - Roads, utility lines, pipelines, rails, and other data.

LANDUSE_AND_PLANNING\ - Land cover, population data, and other data.

PROPOSED_CONCEPT_PROJECTS\ - Proposed developments and proposed preservation/restoration projects.

RECREATION_FACILITIES\ - Parks, bike and hiking paths, and other data.

SOIL_AND_GEOLOGY\ - Soils and geology; earthquake faults.

STREAM_GEOMORPHOLOGY\ - Placeholder only; no data available.

STUDY_AREA\ - Study area boundaries and extent.

TOPOGRAPHY\ - Contours, Digital Elevation Model, and hillshade.

WATER_AIR_QUALITY\ - Impaired waterways data, superfund sites, hazardous waste sites, other data.

WATERSHED\ - Watershed and subwatershed boundaries.

Modeling Data

Modeling Database

A Microsoft Access database containing the modeling data catalog, potential models by code (unique identifier) and name, modeling parameters, and model equations stores actual modeling parameters. Tables A-1a through A-1f and Table A-2 were developed as downloads from this database, and identify the construct of the spatial models. Tables from the actual database are described below. Fields within the database are described in the table design view comment field in the database itself.

Anal_Gen – Full catalog of all potential analyses considered (1st through 4th Order), including categories, model codes, order, issues, potential solutions identified, whether modeling was performed, and priority.

Anal_Spec - Catalog of specific modeling approaches including analysis name, approach, data defined (for 2nd Order analysis), and special analysis approaches.

PreliminData_Poly – Preliminary polygon primary (1st Order) data codes and types for use in modeling.

PrimData_Grid – Grids of primary data prepared from polygon data to be used in modeling.

PrimAnal_Data – Table mapping primary data used in modeling to primary model code.

SecAnal_Data – Table mapping secondary (2nd Order) data used in modeling to secondary model code, and directing how component data was reclassified, including reclass data fields and reclass values.

SecAnal_Equat – Table directing construct of final secondary model, specifically how it was calculated from component data.

SecData_Grid – Table providing mapping to results of 2nd Order models, including data code and file link.

TertAnal_Data - Table mapping tertiary (3rd Order) data used in modeling to tertiary model code, and directing how component data was reclassified, including reclass data fields and reclass values.

TertAnal_Equat - Table directing construct of final tertiary model, specifically how it was calculated from component data.

QuatAnal_Data - Table mapping quaternary (4th Order) data used in modeling to quaternary model code, and directing how component data was reclassified, including reclass data fields and reclass values.

QuatAnal_Equat - Table directing construct of final quaternary model, specifically how it was calculated from component data.

Recl_Code – Reclass codes used in other tables (foreign key).

Model Construct

Each Secondary, Tertiary, and Quaternary Model was constructed first with preliminary data modification, then a final modeling equation. The typical equations presented here reference field names as indicated in Tables A-1a, A-1b, A-1c, A-1d, A-1e, and A-1f. Since the modeling process was comparable between Secondary, Tertiary, and Quaternary Models, only generic equations are presented here:

The Preliminary Data Modification Equation involves reclassifying specified values within the data layer to new values, a normalization process for facilitating combinations with other data layers –

RECL_GRID = IF (RECL = TRUE) THEN RECLASS (DATA_USED, RECL_FIELD (RECL_CODE, VAL, NODATA)) (1)

The NODATA value determines whether areas outside of the range of the specified reclassification values will end up in the final model result (FALSE value) with no contribution to the ultimate model value, or whether they will be altogether excluded from the final model result (TRUE value).

The Final Secondary, Tertiary, or Quaternary Model Equation involves weighting parameters which are multiplied to increase/decrease the relative contribution of individual data layers to the model, and then the additive combination of the modified data layers to produce the final model result –

$$DATA_DEFINED = (((WEIGHT_1) * RECL_GRID_1) + ((WEIGHT_2) * RECL_GRID_2) + \ldots ((WEIGHT_n) * RECL_GRID_n)) \quad (2)$$

Model Layers

The intermediate and final model results, including 2nd Order model results used in subsequent modeling, and final 3rd and 4th Order model results, are available in the GIS database owned by the County.

Figures - Data and Analysis Display

The TMs provide numerous figures of first, second, third, and fourth order GIS data and analysis results, and qualitative and limited quantitative descriptions of this data. A more precise quantitative understanding of data analysis results can be derived from the Tables A-1 and A-2 already described. Table A-3a provides additional information on the specific data source for each of the figures presented in the TMs, including associated model database code, and the breakline values on the legends; that is, where the color break was established between no, low, medium, and high model results. In addition, the location of the file utilized for the figures is provided relative to the GIS database owned by the County.

Table A-3b provides a crosswalk between Los Angeles County landuse data, Orange County data, and the simplified, generalized data set used in the modeling. Table A-3c provides a reiteration of how landuse was reclassified for the various model runs and objectives. Because land use classification was a key part of many of the models, this information is independently summarized here.

TABLE A-1a
SECONDARY MODEL CONSTRUCT - PRELIMINARY DATA MODIFICATION

ANAL_ CODE	SUBANAL_ CODE	ANAL_NAME	DATA_DEFINED	DATA_ USED	RECL[1]	RECL_FIELD	RECL_CODE1	RECL_CODE2	RECL_CODE3	VAL1	VAL2	VAL3	NODATA	RECL_GRID
GE2	A	Development Risk	2_DER	1_De	M								No	GE2A_1De
GE2	A	Development Risk	2_DER	1_Lu	R	LAND_USE	Vacant Land,Agricultural,Recreational			0			Yes	GE2A_1Lu
GE2	A	Development Risk	2_DER	1_Ow	M								No	GE2A_1Ow
GE2	A	Development Risk	2_DER	1_Zo	M								No	GE2A_1Zo
GE2	A	Development Risk	2_DER	2_MNB	R	VALUE	1	2		1	3		No	GE2A_2MNB
GE2	A	Development Risk	2_DER	2_MND	R	VALUE	-1,0	1	5,4,6	0	1	2	No	GE2A_2MND
GE2	B	Floodable Elevations	2_CER	1_Ch	S								Yes	GE2B_1Ch
GE2	B	Floodable Elevations	2_CER	1_El	S								Yes	GE2B_1El
GE2	C	Management - No Development	2_MND	1_Lu	R	LAND_USE	Residential,Industrial,Commercial, Education and Religion,No data,Public,Transportation	Vacant Land, Agricultural	Recreational	0	-1	1	No	GE2C_1Lu
GE2	C	Management - No Development	2_MND	1_Re	R	VALUE	1			5			No	GE2C_1Re
GE2	D	Management - Biodiversity	2_MNB	1_Ma	N								No	GE2D_1Ma
GE2	E	Channel Buffers	2_CBF	1_Ch	S								No	GE2E_1Ch
IH2	A	Exotic Plant Communities	2_HEX	1_Ht	R	Vegtype	AG,HG,IA,IC,IG,IH,IM,IS,LS,QZ			1			Yes	IH2A_1Ht
IH2	B	Habitat Value Dissolved	2_HFA	2_HQA	R	VALUE	2	3		1	1		Yes	IH2B_2HQA
IH2	C	Habitat Value	2_HQA	1_Ht	R	Vegtype	AG,IC,IG,IH,IM,IS	WA,HG,IA,LS, QZ	BA,BC,CA,CC,CQ,CS,DU,HC,HJ,HM,HT,ML,NR,NX,QA,QF,QO,QP,QV,RS,SB,SH,SM,SO,SQ,SS	1	2	3	No	IH2C_1Ht
IH2	C	Habitat Value	2_HQA	1_Wt	R	ATTRIBUTE	U	NO DATA	all others	0	0	3	No	IH2C_1Wt
IH2	D	Habitat Risk	2_HRK	1_HQA	N								Yes	IH2D_1HQA
IH2	D	Habitat Risk	2_HRK	2_DER	Y	VALUE	-4	-2	0,1,2,3,4	0	1	2	No	IH2D_2DER
IH2	D	Habitat Risk	2_HRK	2_HFR	R	VALUE	100 - 1000	1000 - 5000	5000 - 100,000	1	2	3	No	IH2D_2HFR
IH2	E	Habitat Fragmentation	2_HFR	2_HFA	S					1	2	3	No	IH2E_2HFA
IH2	F	Wetland Buffers	2_WET	1_Wt	S						0	0	No	IH2F_2WET
RE2	A	Park Need - Population	2_PDN	1_Po	S								No	RE2A_1Po
RE2	A	Park Need - Population	2_PDN	1_Re	S								No	RE2A_1Re
RE2	B	Park Need - Landuse	2_PNL	1_Lu	R	LAND_USE	Residential			1			Yes	RE2B_1Lu
RE2	C	Park Needs	2_PAG	2_PDN	R	VALUE	0 - 1.999	2 - 4.999	5 - 9.999	5	4	3	Yes	RE2C_2PDN
RE2	C	Park Needs	2_PAG	2_PNL	N								No	RE2C_2PNL
RE2	D	Trail Buffers	2_TBF	1_Tr	S					1			No	RE2D_1Tr
RE2	E	Park Buffers	2_PBF	1_Re	S								No	RE2E_1Re
SE2	A	SocioEconomic Index	2_SOC	1_Dm	R	VALUE	0 - 0.4999	5.000 - 1.000		1	0		No	SE2A_1Dm
SE2	A	SocioEconomic Index	2_SOC	1_Ec	M								No	SE2A_1Ec
SE2	B	SocioEconomic Conditions and Park Gaps	2_SPG	2_PAG	N	VALUE	2	3	4,5	1	2	3	Yes	SE2B_2PAG
SE2	B	SocioEconomic Conditions and Park Gaps	2_SPG	2_SOC	N								No	SE2B_2SOC
SE2	C	Watershed Connectivity	2_WSC	1_Re	N								No	SE2C_1Re
SE2	C	Watershed Connectivity	2_WSC	2_CBF	R	VALUE	0 - 100.000			1			Yes	SE2C_2CBF
SE2	C	Watershed Connectivity	2_WSC	2_HQA	N								No	SE2C_2HQA
SE2	C	Watershed Connectivity	2_WSC	2_TBF	N								No	SE2C_2TBF
WQ2	A	Watershed Water Quality	2_WQR	1_Wq	S								Yes	WQ2A_1Wq
WQ2	A	Watershed Water Quality	2_WQR	1_Ws	S								Yes	WQ2A_1Ws

[1]MODEL CONSTRUCT - RECLASS CODE

RECL	RECL_TYPE
D	Do not use
M	Missing Data
N	No Reclass
R	Reclass
S	Special Analysis

Table A-1b
SECONDARY MODEL CONSTRUCT - FINAL EQUATION

CATEGORY	ANAL_CODE	SUBANAL_CODE	ANAL_NAME	DATA_USED	DATA_NAME	WEIGHT	DATA_DEFINED
General	GE2	A	Development Risk	1_De	Proposed development	3	2_DER
General	GE2	A	Development Risk	1_Lu	Landuse	1	2_DER
General	GE2	A	Development Risk	1_Ow	Ownership categories (public, private, municipal)	3	2_DER
General	GE2	A	Development Risk	1_Zo	Zoning	1	2_DER
General	GE2	A	Development Risk	2_MNB	Management emphasizes biodiversity	-2	2_DER
General	GE2	A	Development Risk	2_MND	Management prohibits development	-1	2_DER
General	GE2	B	Floodable Elevations	1_Ch	Channel location	0	2_CER
General	GE2	B	Floodable Elevations	1_El	Sensitive elevation data	0	2_CER
General	GE2	C	Management - No Development	1_Lu	Landuse	1	2_MND
General	GE2	C	Management - No Development	1_Re	Recreation and parks	1	2_MND
General	GE2	D	Management - Biodiversity	1_Ma	Management Type from GAP Data	1	2_MNB
General	GE2	E	Channel Buffers	1_Ch	Channel location	0	2_CBF
Improve Habitat	IH2	A	Exotic Plant Communities	1_Ht	Verified/detailed habitat type mapping (including wetland/riparian)	1	2_HEX
Improve Habitat	IH2	B	Habitat Value Dissolved	2_HQA	Habitat quality	1	2_HFA
Improve Habitat	IH2	C	Habitat Value	1_Ht	Verified/detailed habitat type mapping (including wetland/riparian)	1	2_HQA
Improve Habitat	IH2	C	Habitat Value	1_Wt	Wetland type and mapping	1	2_HQA
Improve Habitat	IH2	D	Habitat Risk	2_DER	Development risk	2	2_HRK
Improve Habitat	IH2	D	Habitat Risk	2_HFR	Habitat fragmentation	1	2_HRK
Improve Habitat	IH2	E	Habitat Fragmentation	2_HFA	Habitat quality dissolved	0	2_HFR
Improve Habitat	IH2	F	Wetland Buffers	1_Wt	Wetland type and mapping	0	2_WET
Recreation	RE2	A	Park Need - Population	1_Po	Population and population density	0	2_PDN
Recreation	RE2	A	Park Need - Population	1_Re	Recreation and parks	0	2_PDN
Recreation	RE2	B	Park Need - Landuse	1_Lu	Landuse	1	2_PNL
Recreation	RE2	C	Park Needs	2_PDN	Park acreage per population density	1	2_PAG
Recreation	RE2	C	Park Needs	2_PNL	Park need based on landuse (residential)	1	2_PAG
Recreation	RE2	D	Trail Buffers	1_Tr	Trails (horse, bike, hike, walk)	1	2_TBF
Recreation	RE2	E	Park Buffers	1_Re	Recreation and parks	0	2_PBF
Social and Economic Development	SE2	A	SocioEconomic Index	1_Dm	Demography	1	2_SOC
Social and Economic Development	SE2	A	SocioEconomic Index	1_Ec	Economic conditions	1	2_SOC
Social and Economic Development	SE2	B	SocioEconomic Conditions and Park Gaps	2_PAG	Park gaps	1	2_SPG
Social and Economic Development	SE2	B	SocioEconomic Conditions and Park Gaps	2_SOC	Social conditions (percent white)	3	2_SPG
Social and Economic Development	SE2	C	Watershed Connectivity	1_Re	Recreation and parks	2	2_WSC
Social and Economic Development	SE2	C	Watershed Connectivity	2_CBF	Channel buffers	0	2_WSC
Social and Economic Development	SE2	C	Watershed Connectivity	2_HQA	Habitat quality	5	2_WSC
Social and Economic Development	SE2	C	Watershed Connectivity	2_TBF	Trail buffers	5	2_WSC
Water Quality Improvement	WQ2	A	Watershed Water Quality	1_Wq	Water quality	0	2_WQR
Water Quality Improvement	WQ2	A	Watershed Water Quality	1_Ws	Watersheds and Subwatersheds	3	2_WQR

Table A-1c
TERTIARY MODEL CONSTRUCT - PRELIMINARY DATA MODIFICATION

ANAL_CODE	SUBANAL_ CODE	ANAL_NAME	DATA_ USED	RECL[1]	RECL_FIELD	RECL_CODE1	RECL_CODE2	RECL_CODE3	VAL1	VAL2	VAL3	NODATA	RECL_GRID
IH3GHP	A	General Habitat Preservation	1_Ow	D	VALUE	PUBLIC	PRIVATE	UNKNOWN	-3	3	0	FALSE	IH3GHPA_1Ow
IH3GHP	A	General Habitat Preservation	1_Pp	N								FALSE	IH3GHP_1Pp
IH3GHP	A	General Habitat Preservation	1_WET	R	VALUE				3	0	0	FALSE	IH3GHP_2WET
IH3GHP	A	General Habitat Preservation	2_DER	N	VALUE	1	0		3	0		FALSE	IH3GHPA_2DER
IH3GHP	A	General Habitat Preservation	2_HFR	R	VALUE	10 - 99.9	100 - 999.9	1000 - 100000	1	2	3	TRUE	IH3GHPA_2HFR
IH3GHP	A	General Habitat Preservation	2_HQA	R	VALUE	1	2	3-6	1	2	3	TRUE	IH3GHPA_2HQA
IH3GHP	A	General Habitat Preservation	2_HRK	M									IH3GHPA_2HRK
IH3GHP	A	General Habitat Preservation	2_MNB	R	VALUE	2	1	0	-6	-3	0	FALSE	IH3GHPA_2MNB
IH3GHP	A	General Habitat Preservation	2_MND	R	VALUE	1	0		-3	0		FALSE	IH3GHPA_2MND
IH3RHE	A	Riparian Habitat Enhancement	1_Lu	R	VALUE	1,5	10	3,7,9	1	2	3	TRUE	IH3RHEA_1Lu
IH3RHE	A	Riparian Habitat Enhancement	2_CBF	R	VALUE	0 - 100			1			TRUE	IH3RHEA_2CBF
IH3RHE	A	Riparian Habitat Enhancement	2_CER	N									IH3RHEA_2CER
IH3RHE	A	Riparian Habitat Enhancement	2_HEX	R	VALUE	1			1			TRUE	IH3RHEA_2HEX
RE3NPP	A	New Passive Parks	1_Lu	R	VALUE	3, 7, 10			1			TRUE	RE3NPPA_1Lu
RE3NPP	A	New Passive Parks	1_Po	R	Denclass10	1 - 7	8 - 9	10	1	2	3	FALSE	RE3NPPA_1Po
RE3NPP	A	New Passive Parks	2_PAG	D	VALUE	1,2	3,4	5	1	2	3	FALSE	RE3NPPA_2PAG
RE3NPP	A	New Passive Parks	2_PBF	R	VALUE	1	0		0	1		FALSE	RE3NPPA_2PBF
RE3NPP	A	New Passive Parks	2_PDN	R								FALSE	RE3NPP_2PDN
RE3NPP	A	New Passive Parks	2_SOC	N	VALUE	0 - 1							RE3NPPA_2SOC
SE3CIS	A	Watershed Connectivity - Signage	1_Lu	R	VALUE	1	5,7	9	1	2	3	TRUE	SE3CISA_1_Lu
SE3CIS	A	Watershed Connectivity - Signage	1_Re	D									SE3CISA_1Re
SE3CIS	A	Watershed Connectivity - Signage	2_CBF	R	VALUE	0 - 50						TRUE	SE3CISA_2CBF
SE3CIS	A	Watershed Connectivity - Signage	2_HQA	D									SE3CISA_2HQA
SE3CIS	A	Watershed Connectivity - Signage	2_TBF	N									SE3CISA_2TBF
WC3GNB	A	New Onsite Infiltration and Basins	1_El	R	VALUE	0 - 150			0			TRUE	WC3GNBA_1El
WC3GNB	A	New Onsite Infiltration and Basins	1_Gw	R	VALUE	1			1			TRUE	WC3GNBA_1Gw
WC3GNB	A	New Onsite Infiltration and Basins	1_Lu	R	VALUE	1,2,4	8	3,5,7,9,10	1	2	3	FALSE	WC3GNBA_1Lu
WC3GNB	A	New Onsite Infiltration and Basins	1_St	D									WC3GNBA_1St
WC3GNB	A	New Onsite Infiltration and Basins	2_CBF	D									WC3GNBA_2CBF
WC3GNB	A	New Onsite Infiltration and Basins	2_CER	D									WC3GNBA_2CER
WQ3TWC	A	Treatment Wetland Creation	1_El	R	VALUE	-10 - 200			0			TRUE	WQ3TWCA_1El
WQ3TWC	A	Treatment Wetland Creation	1_Lu	R	VALUE	2,4	1,5,8,9	3,7,10	1	2	3	FALSE	WQ3TWCA_1Lu
WQ3TWC	A	Treatment Wetland Creation	2_CBF	R	VALUE	0 - 200			1			TRUE	WQ3TWCA_2CBF
WQ3TWC	A	Treatment Wetland Creation	2_CER	N									WQ3TWCA_2CER
WQ3TWC	A	Treatment Wetland Creation	2_WQR	R	VALUE	1	2	NO DATA	2	1	0	FALSE	WQ3TWCA_2WQR

[1]MODEL CONSTRUCT - RECLASS CODE

RECL	RECL_TYPE
D	Do not use
M	Missing Data
N	No Reclass
R	Reclass
S	Special Analysis

Table A-1d
TERTIARY MODEL CONSTRUCT - FINAL EQUATION

CATEGORY	ANAL_CODE	SUBANAL_CODE	ANAL_NAME	DATA_USED	DATA_NAME	WEIGHT
Improve Habitat	IH3GHP	A	General Habitat Preservation	2_DER	Development risk	1
Improve Habitat	IH3GHP	A	General Habitat Preservation	2_HFR	Habitat fragmentation	1
Improve Habitat	IH3GHP	A	General Habitat Preservation	2_HQA	Habitat quality	1
Improve Habitat	IH3GHP	A	General Habitat Preservation	2_HRK	Habitat risk	1
Improve Habitat	IH3GHP	A	General Habitat Preservation	2_MNB	Management emphasizes biodiversity	1
Improve Habitat	IH3GHP	A	General Habitat Preservation	2_MND	Management prohibits development	1
Improve Habitat	IH3GHP	A	General Habitat Preservation	1_Ow	Ownership categories (public, private, municipal)	1
Improve Habitat	IH3GHP	A	General Habitat Preservation	1_Pp	Proposed watershed projects	1
Improve Habitat	IH3RHE	A	Riparian Habitat Enhancement	2_CBF	Channel buffers	1
Improve Habitat	IH3RHE	A	Riparian Habitat Enhancement	2_CER	Channel elevation range (i.e. within range of invert)	1
Improve Habitat	IH3RHE	A	Riparian Habitat Enhancement	2_HEX	Habitat exotic species	1
Improve Habitat	IH3RHE	A	Riparian Habitat Enhancement	1_Lu	Landuse	1
Recreation	RE3NPP	A	New Passive Parks	2_PAG	Park gaps	1
Recreation	RE3NPP	A	New Passive Parks	2_PBF	Park buffers	1
Recreation	RE3NPP	A	New Passive Parks	2_PDN	Park acreage per population density	1
Recreation	RE3NPP	A	New Passive Parks	2_SOC	Social conditions (percent white)	1
Recreation	RE3NPP	A	New Passive Parks	1_Lu	Landuse	1
Recreation	RE3NPP	A	New Passive Parks	1_Po	Population and population density	1
Social and Economic Development	SE3CIS	A	Watershed Connectivity - Signage	2_CBF	Channel buffers	1
Social and Economic Development	SE3CIS	A	Watershed Connectivity - Signage	2_HQA	Habitat quality	1
Social and Economic Development	SE3CIS	A	Watershed Connectivity - Signage	2_TBF	Trail buffers	1
Social and Economic Development	SE3CIS	A	Watershed Connectivity - Signage	1_Lu	Landuse	1
Social and Economic Development	SE3CIS	A	Watershed Connectivity - Signage	1_Re	Recreation and parks	1
Water Conservation	WC3GNB	A	New Onsite Infiltration and Basins	2_CBF	Channel buffers	1
Water Conservation	WC3GNB	A	New Onsite Infiltration and Basins	2_CER	Channel elevation range (i.e. within range of invert)	1
Water Conservation	WC3GNB	A	New Onsite Infiltration and Basins	1_El	Sensitive elevation data	1
Water Conservation	WC3GNB	A	New Onsite Infiltration and Basins	1_Gw	Groundwater basin - permeable areas	1
Water Conservation	WC3GNB	A	New Onsite Infiltration and Basins	1_Lu	Landuse	1
Water Conservation	WC3GNB	A	New Onsite Infiltration and Basins	1_St	Soil types	1
Water Quality Improvement	WQ3TWC	A	Treatment Wetland Creation	2_CBF	Channel buffers	1
Water Quality Improvement	WQ3TWC	A	Treatment Wetland Creation	2_CER	Channel elevation range (i.e. within range of invert)	1
Water Quality Improvement	WQ3TWC	A	Treatment Wetland Creation	2_WQR	Water quality risk	1
Water Quality Improvement	WQ3TWC	A	Treatment Wetland Creation	1_El	Sensitive elevation data	1
Water Quality Improvement	WQ3TWC	A	Treatment Wetland Creation	1_Lu	Landuse	1

Table A-1e

QUATERNARY MODEL CONSTRUCT - PRELIMINARY DATA MODIFICATION

ANAL_CODE	SUBANAL_ CODE	ANAL_NAME	DATA_USED	RECL[1]	RECL_FIELD	RECL_ CODE1	RECL_ CODE2	RECL_ CODE3	VAL1	VAL2	VAL3	NODATA
CP4	A	Composite 1 - Habitat Parks (Riparian)	IH3GHPA	R	VALUE	0 - 2	3 - 5	6 - 9	1	2	3	FALSE
CP4	A	Composite 1 - Habitat Parks (Riparian)	IH3RHEA	R	VALUE	3 - 4	5	6	1	2	3	FALSE
CP4	A	Composite 1 - Habitat Parks (Riparian)	RE3NPPA	R	VALUE	4 - 6	7 - 9	10 - 12	1	2	3	FALSE
CP4	A	Composite 1 - Habitat Parks (Riparian)	SE3CISA	R	VALUE	1	2	3 - 4	1	2	3	FALSE
CP4	B	Composite 2 - Habitat Parks (Watershed)	IH3GHPA	R	VALUE	0 - 2	3 - 5	6 - 9	1	2	3	FALSE
CP4	B	Composite 2 - Habitat Parks (Watershed)	SE3CISA	R	VALUE	1	2	3 - 4	1	2	3	FALSE
CP4	C	Composite 3 - All	IH3GHPA	R	VALUE	0 - 2	3 - 5	6 - 9	1	2	3	FALSE
CP4	C	Composite 3 - All	IH3RHEA	R	VALUE	3 - 4	5	6	1	2	3	FALSE
CP4	C	Composite 3 - All	RE3NPPA	R	VALUE	4 - 6	7 - 9	10 - 12	1	2	3	FALSE
CP4	C	Composite 3 - All	SE3CISA	R	VALUE	1	2	3 - 4	1	2	3	FALSE
CP4	C	Composite 3 - All	WC3GNBA	R	VALUE	2 - 3	4	5	1	2	3	FALSE
CP4	C	Composite 3 - All	WQ3TWCA	R	VALUE	2 - 3	4 - 5	6 - 7	1	2	3	FALSE
CP4	D	Composite 4 - Infiltration Parks	IH3RHEA	R	VALUE	3 - 4	5	6	1	2	3	FALSE
CP4	D	Composite 4 - Infiltration Parks	RE3NPPA	R	VALUE	4 - 6	7 - 9	10 - 12	1	2	3	FALSE
CP4	D	Composite 4 - Infiltration Parks	SE3CISA	R	VALUE	1	2	3 - 4	1	2	3	FALSE
CP4	D	Composite 4 - Infiltration Parks	WC3GNBA	R	VALUE	2 - 3	4	5	1	2	3	FALSE
CP4	E	Composite 5 - Treatment Wetland Parks	IH3RHEA	R	VALUE	3 - 4	5	6	1	2	3	FALSE
CP4	E	Composite 5 - Treatment Wetland Parks	RE3NPPA	R	VALUE	4 - 6	7 - 9	10 - 12	1	2	3	FALSE
CP4	E	Composite 5 - Treatment Wetland Parks	WQ3TWCA	R	VALUE	2 - 3	4 - 5	6 - 7	1	2	3	FALSE

[1]MODEL CONSTRUCT - RECLASS CODE

RECL	RECL_TYPE
D	Do not use
M	Missing Data
N	No Reclass
R	Reclass
S	Special Analysis

Table A-1f
QUATERNARY MODEL CONSTRUCT - FINAL EQUATION

ANAL_CODE	SUBANAL_ CODE	ANAL_NAME	DATA_USED	ANAL_NAME	WEIGHT
CP4	A	Composite 1 - Habitat Parks (Riparian)	IH3GHPA	General Habitat Preservation	1
CP4	A	Composite 1 - Habitat Parks (Riparian)	IH3RHEA	Riparian Habitat Enhancement	1
CP4	A	Composite 1 - Habitat Parks (Riparian)	RE3NPPA	New Passive Parks	1
CP4	A	Composite 1 - Habitat Parks (Riparian)	SE3CISA	Watershed Connectivity - Signage	1
CP4	B	Composite 2 - Habitat Parks (Watershed)	IH3GHPA	General Habitat Preservation	1
CP4	B	Composite 2 - Habitat Parks (Watershed)	RE2NPPA	Riparian Habitat Enhancement	1
CP4	B	Composite 2 - Habitat Parks (Watershed)	SE3CISA	Watershed Connectivity - Signage	1
CP4	C	Composite 3 - All	IH3GHPA	General Habitat Preservation	1
CP4	C	Composite 3 - All	IH3RHEA	Riparian Habitat Enhancement	1
CP4	C	Composite 3 - All	RE3NPPA	New Passive Parks	1
CP4	C	Composite 3 - All	SE3CISA	Watershed Connectivity - Signage	1
CP4	C	Composite 3 - All	WC3GNBA	New Onsite Infiltration and Basins	1
CP4	C	Composite 3 - All	WQ3TWCA	Treatment Wetland Creation	1
CP4	D	Composite 4 - Infiltration Parks	IH3RHEA	Riparian Habitat Enhancement	1
CP4	D	Composite 4 - Infiltration Parks	RE3NPPA	New Passive Parks	1
CP4	D	Composite 4 - Infiltration Parks	SE3CISA	Watershed Connectivity - Signage	1
CP4	D	Composite 4 - Infiltration Parks	WC3GNBA	New Onsite Infiltration and Basins	1
CP4	E	Composite 5 - Treatment Wetland Parks	IH3RHEA	Riparian Habitat Enhancement	1
CP4	E	Composite 5 - Treatment Wetland Parks	RE3NPPA	New Passive Parks	1
CP4	E	Composite 5 - Treatment Wetland Parks	WQ3TWCA	Treatment Wetland Creation	1

Table A-2			
Coyote Creek Project Opportunities Analysis - Third Order Analysis			
Code	**Issues (3rd Order)**	**Analysis Solution**	**Approach/Criteria**
Improve Habitat			
IH3RHE	Riparian habitat degraded by exotic vegetation;	Riparian Habitat Enhancement	adj to channels; existing exotics; existing open space; within channel invert elevation range;
IH3GHP	Development pressure on existing habitat	General Habitat Preservation	high quality, unfragmented habitat; unprotected by land status; privately held; specifically in areas proposed for development;
Water Quality Improvement			
WQ3TWC	Water quality issues (non-point; nutrients, metals, pesticides, etc.)	Treatment Wetland Creation	Storm drain/channel adjacency; prefer areas of water qual impairment; land use categories; invert elevation parameters; elevation below 200 m
Recreation			
RE3NPP	Lack of parks, open space; key population needs (young, underprivileged, aesthetic, environmental education, nature opportunities, biking, hiking, walking, horseback)	New Passive Parks	Open, vacant land use; park need - low park per capita; socio factors (high % of minorities); lack of existing parks (one-half mile);
Water Conservation			
WC3GNB	Limited water supply; water lost to runoff;	New Onsite Infiltration and Basins	over gw basin; soil types suitable; avoid lg clay lense w of Firestone; out of hills (elev factor); open space/schools; landuse affects suitability
Social and Economic Development			
SE3CIS	Loss of connectivity with water courses or watershed;	Watershed Connectivity - Signage	SE2C-like analysis; certain land uses (education, recreation, public); adjacent to channels; also trails near channels

Figure A-3a
DATA SOURCE FOR FIGURES AND LEGEND PARAMETERS

Item	Figure No	Figure Name	Data Displayed	Database Model Code	Modeling Data File (Directory Path: \\Data\MODELING\ MODEL_LAYERS\)	Breakline Value on Legend			
						Out	Low	Medium	High
1	2-1	Habitat Quality	Habitat quality	2_HQA	hab_qual	0	1	2	3-6
2	2-2	Habitat Continuity	Habitat continuity	2_HFR	hab_blkacre	<10	10 - 99.9	100 - 999.9	1000 - 10000
3	2-3	Existing Land Management	Land managed for preservation	2_MNB	lndmgttype	---	2	1	0
4	2-4	Potential Habitat Preservation Opportunities	HP model results	IH3GHPA	ih3ghp		1	2	3
5	2-5	Exotic Plant Communities	Exotic vegetation	2_HEX	exotics	0	---	---	1
6	2-6	Land Use Suitability for Ripariian Enhancement	Reselected landuse	1_Lu	n/a (in general data)		See Figure A-2b - Landuse reclassification		
7	2-7	Channel Elevation Suitability for Riparian Enhancement	Low lying elevations along channel	2_CER	acelev10ftadj	0	---	---	1
8	2-8	Potential Riparian Enhancement Opportunities	RE model results	IH3RHEA	ih3rhe		1	2	3
9	2-9	Population Density	Population density	1_Po	n/a (in general data)	0	1-7	8-9	10
10	2-10	Areas Greater Than 1/2 Mile of Existing Parks	Outside of park zones	2_PBF	parkbuffer_onehalfmile.shp	1	---	---	0
11	2-11	Predominantly Minority Areas	> 50 percent minority	2_SOC	soc_50pctwt	0	---	---	1
12	2-12	Land Use Suitable for Passive Parks	Reselected landuse	1_Lu	n/a (in general data)		See Figure A-2b - Landuse reclassification		
13	2-13	New Passive Park Opportunities	PP model results	RE3NPPA	re3npp		1	2	3
14	2-14	Channel Buffers	Channel buffers	2_CBF	chaneucdist	>50	---	---	0-50
15	2-15	Existing Trails and Bikeways Buffer	Trails and bikeways buffer	2_TBF	hikbikb20m	0	---	---	1
16	2-16	Land Use Suitability for Watershed Connectivity	Reselected landuse	1_Lu	n/a (in general data)		See Figure A-2b - Landuse reclassification		
17	2-17	Potential Watershed Connectivity Opportunities	WC model results	SE3CISA	se3cis		1	2	3
18	2-18	Permeable Area within Watershed	Permeable areas	1_Gw	n/a (in general data)	0	---	---	1
19	2-19	Low Elevation Areas within Watershed	Low lying elevations along channel	2_CER	acelev10ftadj	0	---	---	1
20	2-20	Potential Onsite Infiltration Value Based on Land Use	Reselected landuse	1_Lu	n/a (in general data)		See Figure A-2b - Landuse reclassification		
21	2-21	Potential New Onsite and Infiltration Basin Opportunities	IB model result	WC3GNBA	wc3gnb		1	2	3
22	2-22	Land Use Suitability for Treatment Wetland Creation	Reselected landuse	1_Lu	n/a (in general data)		See Figure A-2b - Landuse reclassification		
23	2-23	303d Watershed Impament Level	303d listed waters watersheds	2_WQR	wq_subwatersheds.shp	---	0	1	2
24	2-24	Potential Treatment Wetland Creation Opportunities	TW model results	WQ3TWCA	wq3twca		1,2	3,4,5	6,7
25	2-25	Composite Model: Habitat Parks (Riparian)	Composite model 1 results	CP4A_COMP1	comp1		1-5	5-9	9-20
26	2-26	Composite Model: Habitat Parks (Watershed Wide)	Composite model 2 results	CP4B_COMP2	comp2		1-3	3-6	6-17
27	2-27	Composite Model: Infiltration Parks	Composite model 4 results	CP4D_COMP4	comp4		2	2-3.121154	3.121154-23
28	2-28	Composite Model: Treatment Wetland Parks	Composite model 5 results	CP4E_COMP5	comp5		1-4	4-6	6-24
29	3-1	Potential Habitat Preservation Project Areas	Project Boundary	n/a	CoyoteCrk_pgdb.mdb	n/a	n/a	n/a	n/a
30	3-2	Potential Treatment Wetland Project Areas	Project Boundary	n/a	CoyoteCrk_pgdb.mdb	n/a	n/a	n/a	n/a
31	3-3	Potential Passive Park Project Areas	Project Boundary	n/a	CoyoteCrk_pgdb.mdb	n/a	n/a	n/a	n/a
32	3-4	Potential Infiltration Basin Project Areas	Project Boundary	n/a	CoyoteCrk_pgdb.mdb	n/a	n/a	n/a	n/a
33	3-5	Potential Watershed Connectivity Project Areas	Project Boundary	n/a	CoyoteCrk_pgdb.mdb	n/a	n/a	n/a	n/a
34	3-6	Potential Habitat Parks (Riparian) Project Areas	Project Boundary	n/a	CoyoteCrk_pgdb.mdb	n/a	n/a	n/a	n/a
35	3-7	Potential Habitat Parks (Watershed Wide) Project Areas	Project Boundary	n/a	CoyoteCrk_pgdb.mdb	n/a	n/a	n/a	n/a
36	3-8	Potential Infiltration Parks Project Areas	Project Boundary	n/a	CoyoteCrk_pgdb.mdb	n/a	n/a	n/a	n/a
37	3-9	Potential Treatment Wetland Parks Project Areas	Project Boundary	n/a	CoyoteCrk_pgdb.mdb	n/a	n/a	n/a	n/a

Table A-3b
Landuse Crosswalk and Generalization - Los Angeles and Orange County Data

Los Angeles County Data	Orange County Data	Generalized Category Used in Modeling
Horse Ranches	Animal Farm, Ranch	Agriculture/Ranch
Dairy, Intensive Livestock, and Associated Facilities	Dairy Farm	Agriculture/Ranch
Other Agriculture	Farm & Ranch (General Category)	Agriculture/Ranch
Orchards and Vineyards	Orchard	Agriculture/Ranch
Irrigated Cropland and Improved Pasture Land	Truck Crops, Vegetable Crops	Agriculture/Ranch
Abandoned Orchards and Vineyards	Vacant Farmland, Agricultural, Rural	Agriculture/Ranch
Low- and Medium-Rise Major Office Use	Ofiice Building	Commercial
High-Rise Major Office Use	Ofiice Building	Commercial
Modern Strip Development	Shopping Arcade, Strip Commercial	Commercial
Older Strip Development	Shopping Arcade, Strip Commercial	Commercial
Retail Centers (Non-Strip With Contiguous Interconnected Off-Stree	Shopping Center	Commercial
Regional Shopping Center	Shopping Center	Commercial
Open Storage	Storage, Open Storage	Commercial
Commercial Storage	Storage, Open Storage	Commercial
Chemical Processing	Chemical, Cement	Industrial
Manufacturing, Assembly, and Industrial Services	Industrial, Manufacturing (General Category)	Industrial
Maintenance Yards	Light Industrial	Industrial
Mixed Commercial and Industrial	Mixed Commercial and Industrial	Industrial
Wholesaling and Warehousing	Warehouse Building	Industrial
Solid Waste Disposal Facilities	Waste Disposal	Industrial
Cemeteries	Cemetary	Public/Semi-public
Colleges and Universities	College, University	Public/Semi-public
Trade Schools and Professional Training Facilities	College, University	Public/Semi-public
Special Care Facilities	Convalescent Hospital	Public/Semi-public
Major Medical Health Care Facilities	Hospital	Public/Semi-public
Nurseries	Private School, Nursery, Day Care Center	Public/Semi-public
Pre-Schools/Day Care Centers	Private School, Nursery, Day Care Center	Public/Semi-public
Other Public Facilities	Public	Public/Semi-public
Elementary Schools	Public School	Public/Semi-public
Senior High Schools	Public School	Public/Semi-public
Junior or Intermediate High Schools	Public School	Public/Semi-public
Correctional Facilities	Public Semi Public	Public/Semi-public
Government Offices	Public Service, Public Building, Post Office, Fire	Public/Semi-public
Fire Stations	Public Service, Public Building, Post Office, Fire	Public/Semi-public

Los Angeles County Data	Orange County Data	Generalized Category Used in Modeling
Police and Sheriff Stations	Public Service, Public Building, Post Office, Fire	Public/Semi-public
Religious Facilities	Religious, Religious Building, Church	Public/Semi-public
Golf Courses	Golf Course	Recreational
Developed Regional Parks and Recreation	Park, Picnic Ground, Camp Ground	Recreational
Developed Local Parks and Recreation	Park, Picnic Ground, Camp Ground	Recreational
Undeveloped Local Parks and Recreation	Park, Picnic Ground, Camp Ground	Recreational
Commercial Recreation	Recreational	Recreational
Other Special Use Facilities	Recreational	Recreational
Low-Rise Apartments, Condominiums, and Townhouses	Condominium	Residential
Medium-Rise Apartments and Condominiums	Condominium Project	Residential
High-Rise Apartments and Condominiums	Condominium Project	Residential
Duplexes, Triplexes and 2-or 3-Unit Condominiums and Townhouses	Duplex	Residential
Hotels and Motels	Hotel	Residential
Trailer Parks and Mobile Home Courts, High-Density	Mobile Home Park, Trailer Park	Residential
Mixed Residential	Residential	Residential
High-Density Single Family Residential	Single Family Residential	Residential
Low-Density Single Family Residential	Single Family Residential	Residential
Electrical Power Facilities	Electrical Facility	Transportation/Utility
Natural Gas and Petroleum Facilities	Gas Production, Gas Storage	Transportation/Utility
Freeways and Major Roads	Highway, Street	Transportation/Utility
Non-Attended Public Parking Facilities	Parking Lot	Transportation/Utility
Park-and-Ride Lots	Parking Lot	Transportation/Utility
Mineral Extraction - Oil and Gas	Petroleum	Transportation/Utility
Petroleum Refining and Processing	Petroleum	Transportation/Utility
Railroads	Railroad Facility, Railroad	Transportation/Utility
Communication Facilities	Telephone Facility, Communication Facility	Transportation/Utility
Mixed Transportation	Transportation, Communications	Transportation/Utility
Base (Built-up Area)	Transportation, Communications	Transportation/Utility
Truck Terminals	Truck Terminal, Bus Terminal, Vehicle Station	Transportation/Utility
Bus Terminals and Yards	Truck Terminal, Bus Terminal, Vehicle Station	Transportation/Utility
Improved Flood Waterways and Structures	Utilities/Water Canal, Pipeline	Transportation/Utility
Water, Undifferentiated	Utilities/Water Canal, Pipeline	Transportation/Utility
Water Storage Facilities	Utilities/Water Canal, Pipeline	Transportation/Utility
Water Transfer Facilities	Utilities/Water Canal, Pipeline	Transportation/Utility
Under Construction	Under Construction	Under Construction

Los Angeles County Data	Orange County Data	Generalized Category Used in Modeling
Vacant Undifferentiated	Vacant Land	Vacant
Other Open Space and Recreation	Vacant Land	Vacant

Figure A-3c
LANDUSE CLASSIFICATION FOR MODELING[1]

		MODEL						
		N/A	N/A	IH3RHE	WQ3TWC	RE3NPP	WC3GNB	SE3CIS
LAND_USE	VALUE	IMPERVIOUS	OPEN_SPACE	RIPARIAN ENHANCEMENT MODEL	TREATMENT WETLAND MODEL	PASSIVE PARK MODEL	ONSITE INFILTRATION AND BASINS	WATERSHED CONNECTIVITY - SIGNAGE
No data	0	0	0	0	0	0	0	NO DATA
Commercial	4	1	0	0	1	NO DATA	1	NO DATA
Industrial	2	1	0	0	1	NO DATA	1	NO DATA
Transportation	8	1	0	0	2	NO DATA	2	NO DATA
Education and Religion	5	2	1	1	2	NO DATA	3	2
Public	7	2	1	3	3	1	3	2
Residential	1	2	0	1	2	NO DATA	1	1
Agricultural	10	3	2	2	3	1	3	NO DATA
Vacant Land	3	3	3	3	3	1	3	NO DATA
Recreational	9	3	3	3	2	NO DATA	3	3

[1]SUITABILITY

NO DATA =	excluded from model
0 =	no suitability
1 =	low
2 =	medium
3 =	high

Project Opportunities Location Matrix

Coyote Creek Watershed Management Plan

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Figure 3-6: Potential Habitat Parks (Riparian) Project Areas…… 22

Figure 3-7: Potential Habitat Parks (Watershed Wide) Project Areas…… 23

Figure 3-8: Potential Infiltration Parks Project Areas……24

Figure 3-9: Potential Treatment Wetland Parks Project Areas……25

L.A. Uninc.	O.C. Uninc.	Anaheim	Artesia	Brea	Buena Park	Cerritos	Chino Hills	Cypress	Diamond Bar	Fullerton	Hawaiian Gdns	La Habra	La Habra Hgts	Lakewood	La Mirada	La Palma	Long Beach	Los Alamitos	Norwalk	Placentia	Santa Fe Spr	Seal Beach	Whittier	Map ID	PROJECT NAME	PROJECT DESCRIPTION
STORMWATER / WATER QUALITY																										
										■														10	Brea Canyon Treatment Wetland Project Area	Treatment Wetland, Open Space, Mixed Woodland, Shrub Habitat
					■					■														11	Buena Park Treatment Wetland Project Area	Treatment Wetland and Open Space
																		■						12	Bolsa Chica Channel Treatment Wetland Project Area	Treatment Wetland Project
■																								13	La Canada Verde Crk Treatment Wetland Project Area	Treatment Wetland Project
													■										■	14	Villaverde Treatment Wetland Project Area	Treatment Wetland Project
					■	■								■	■	■								37	Coyote Creek Treatment Wetland Project Area	Treatment Wetland Project and Open Space
												■												46	La Habra Treatment Wetland Project Area	Treatment Wetland Project
■	■																							65	Chino Hills Treatment Wetland Park	Riparian Enhancement, New Passive Parks, Treatment Wetland, Open Space, Shrub and Woodland Habitat
				■						■														66	Brea Treatment Wetland Park	Riparian Enhancement, New Passive Parks, Treatment Wetland, Open Space, Shrub and Woodland Habitat
■												■	■		■						■		■	67	La Mirada Creek Treatment Wetland Park	Riparian Enhancement, New Passive Parks, Treatment Wetland and Open Space
																							■	68	Whittier Hills Treatment Wetland Park	Riparian Enhancement, New Passive Parks, Treatment Wetland, Open Space, Shrub and Woodland Habitat

L.A. Uninc.	O.C. Uninc.	Anaheim	Artesia	Brea	Buena Park	Cerritos	Chino Hills	Cypress	Diamond Bar	Fullerton	Hawaiian Gdns	La Habra	La Habra Hgts	Lakewood	La Mirada	La Palma	Long Beach	Los Alamitos	Norwalk	Placentia	Santa Fe Spr	Seal Beach	Whittier	Map ID	PROJECT NAME	PROJECT DESCRIPTION
											■			■		■	■	■				■		69	South Coyote Creek Improvements Park	City of Los Alamitos is developing a plan to create a natural park along Coyote Creek, behind their community center. The park will have a treatment wetland, trails & native habitat.
		■																						*	Anaheim Treatment Wetland	Treatment Wetland; Construct a BMP to treat dry weather flows
												■												*	La Habra Channel Water Quality	Watershed Connectivity; Biological assessment and abatement of channels/bike trail throughout watershed
																						■		*	Dry Weather Diversion	Treatment Wetland; Dry water diversion for West Seal Beach pump station to sewage treatment plant
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Stream Water Quality Treatment Strategies	Riparian Enhancement, New Passive Parks, Treatment Wetland, Infiltration Basin Projects; Downstream containment strategies and/or facilities for sanitary sewer overflows (SSOs) and other non-compliant liquids to protect water quality.
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Natural Treatment System (NTS)	Watershed-wide system of BMPs designed to treat all urban runoff low-flows; modeled after Irvine Ranch Water District's San Diego Creek Watershed NTS
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Sanitary Sewer Overflow Study	Treatment Wetland, Infiltration Basin Projects; SSO quantity and frequency information from the LA County area that impacts the watershed/water quality; evaluate impacts generated from LA vs. Orange County to pinpoint actual sources and allocate resources for resolving the issue appropriately.
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Source-Tracking Study	Water quality opportunities assessment, source-tracking, MSDS issues, where are uses of chromium & other pollutants
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	General Plans – Watershed Integration	Integrate regional watershed plan goals into General Plan updates for maximum regional consistency for each City/County

L.A. Uninc.	O.C. Uninc.	Anaheim	Artesia	Brea	Buena Park	Cerritos	Chino Hills	Cypress	Diamond Bar	Fullerton	Hawaiian Gdns	La Habra	La Habra Hgts	Lakewood	La Mirada	La Palma	Long Beach	Los Alamitos	Norwalk	Placentia	Santa Fe Spr	Seal Beach	Whittier	Map ID	PROJECT NAME	PROJECT DESCRIPTION
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	TMDL Collaboration	Identify regional strategies for implementing TMDLs in a collaborative manner
																	■	■						*	Confluence Park	Habitat and Open Space and Estuary and Wetland Restoration Project; Highlight confluence of San Gabriel River and Coyote Creek with a park, trail & signage
																	■							*	El Dorado Regional Park Wetlands	Riparian Enhancement, New Passive Parks, Treatment Wetland; Plan to create treatment wetlands within the park
	■																	■						*	Regional Flood Control/Wet Weather Retention Basins	Assess the feasibility of creating regional treatment wetlands or wet weather retention basins located within the Los Alamitos Basin & Rossmoor Basin that can treat flows from the Coyote Creek Watershed
																	■					■		*	Los Cerritos Wetlands Restoration	Riparian Enhancement, New Passive Parks, Watershed Connectivity, Estuary and Wetland; Project to restore saltwater estuary on both sides of the San Gabriel River, including Hellman Ranch and Bixby properties. Newly formed JPA consists of California Coastal Conservancy, Rivers & Mountains Conservancy, City of Seal Beach and City of Long Beach; this would include a brownfield restoration of the former oil fields
WATER CONSERVATION																										
														■									■	22	La Canada Verde Creek Infiltration Project Area	Infiltration Basin, Open Space and Shurb Habitat
														■									■	23	La Serna Infiltration Project Area	Infiltration Basin
				■						■														24	Brea Canyon Infiltration Project Area	Infiltration Basin and Open Space
															■									25	LA Mirada Infiltration Project Area	Infiltraton Basin
					■					■														26	Buena Park Infiltration Project Area	Infiltraton Basin and Open Space

L.A. Uninc.	O.C. Uninc.	Anaheim	Artesia	Brea	Buena Park	Cerritos	Chino Hills	Cypress	Diamond Bar	Fullerton	Hawaiian Gdns	La Habra	La Habra Hgts	Lakewood	La Mirada	La Palma	Long Beach	Los Alamitos	Norwalk	Placentia	Santa Fe Spr	Seal Beach	Whittier	Map ID	PROJECT NAME	PROJECT DESCRIPTION
					■					■		■			■									27	Coyote Creek Infiltration Project Area	Infiltration Basin, Open Space and Shurb Habitat
										■														28	West Coyote Hills Infiltration Project Area	Infiltration Basin, Open Space and Shrub Habitat
										■														43	CSU Fullerton Infiltration Project Area	Infiltration Basin
		■																						44	Edison Infiltration Project Area	Infiltration Basin
										■														60	Fullerton Infiltration Park	Riparian Enhancement, New Passive Parks, Watershed Connectivity Projects, New Infiltration Basins
										■														61	Coyote Hills Infiltration Park	Riparian Enhancement, New Passive Parks, Watershed Connectivity Projects, New Infiltration Basins
															■									62	La Mirada Infiltration Park	Riparian Enhancement, New Passive Parks, Watershed Connectivity Projects, New Infiltration Basins
■																					■			63	La Canada Verde Creek Infiltration Park	Riparian Enhancement, New Passive Parks, Watershed Connectivity Projects, New Infiltration Basins
																							■	64	La Canada Verde Infiltration Park	Riparian Enhancement, New Passive Parks, Watershed Connectivity Projects, New Infiltration Basins
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Conservation Grants Opportunity	???
OPEN SPACE / HABITAT																										
■													■										■	1	W. Puente Hills Project Area	Shrub Habitat Preservation and Open Space Project
■													■											2	Reposado Project Area	Shrub Habitat Preservation and Open Space Project

L.A. Uninc.	O.C. Uninc.	Anaheim	Artesia	Brea	Buena Park	Cerritos	Chino Hills	Cypress	Diamond Bar	Fullerton	Hawaiian Gdns	La Habra	La Habra Hgts	Lakewood	La Mirada	La Palma	Long Beach	Los Alamitos	Norwalk	Placentia	Santa Fe Spr	Seal Beach	Whittier	Map ID	PROJECT NAME	PROJECT DESCRIPTION
					■					■		■			■									3	W. Coyote Hills Open Space & Nature Reserve (with Pacific Homes Development)	As part of the project being developed by Pacific Homes (Chevron), 350 acres of open space will be protected with trails and coastal sage scrub habitat. This project will be reviewed by the Fullerton City Council in early 2007. This area includes the James E. Ward Nature Preserve.
					■					■		■			■									3a	W. Coyote Hills Open Space & Nature Preserve (without development)	580 acres open space is currently undeveloped. If funding were to become available for land acquisition, this patch of coastal sage scrub could be preserved in perpetuity. This area includes the James E. Ward Nature Preserve.
■	■			■									■											4	E. Puente Hills Project Area	Shrub and Woodland Habitat Preservation and Open Space Project
■	■			■			■		■															5	Chino Hills Project Area	Shrub and Woodland Habitat Preservation and Open Space Project
■							■		■															6	Tonner Canyon Project Area	Wildlife Corridor, Habitat Preservation and Open Space Project
										■														7	E. Coyote Hills Project Area	Habitat Preservation and Open Space Project
■	■												■											54	Puente/Chino Hills Habitat Park Area	Habitat Preservation, New Passive Parks, Watershed Connectivity, Open Space and Woodland And Shrub Habitat
■													■										■	55	Puente Hills Habitat Park Area	Habitat Preservation, New Passive Parks, Watershed Connectivity, Open Space and Woodland And Shrub Habitat
					■					■		■			■									56	Coyote Hills Habitat Park Area	Habitat Preservation, New Passive Parks, Watershed Connectivity, Open Space and Shrub Habitat
										■														57	Brea Habitat Park Area	Habitat Preservation, New Passive Parks, Watershed Connectivity, Open Space and Woodland And Shrub Habitat
		■			■			■																58	Western Habitat Park Area	Habitat Preservation, New Passive Parks, Watershed Connectivity
																	■					■		59	San Gabriel River Habitat Park Area	Habitat Preservation, New Passive Parks, Watershed Connectivity

L.A. Uninc.	O.C. Uninc.	Anaheim	Artesia	Brea	Buena Park	Cerritos	Chino Hills	Cypress	Diamond Bar	Fullerton	Hawaiian Gdns	La Habra	La Habra Hgts	Lakewood	La Mirada	La Palma	Long Beach	Los Alamitos	Norwalk	Placentia	Santa Fe Spr	Seal Beach	Whittier	Map ID	PROJECT NAME	PROJECT DESCRIPTION
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Open Space Acquisition Plan	Develop a plan to identify & acquire open space
■	■			■			■		■															*	Tonner Canyon Freeway Bypass	Ensure that with the design of future Tonner Canyon Freeway Bypass the critical wildlife linkage under the 57 freeway remains open. Ensure impacts to habitat in Tonner Canyon are properly mitigated.
■	■			■			■		■															*	Tonner Canyon Recreation/Open Space Plan	A recreation/open space master plan is currently in development by the City of Industry for their Tonner Canyon property. Plan elements are not known at this time.
																								*	Brea Oil Company Land Reclamation	Reclaim oil fields as wells dry up for potential open space or other economic development project
									■															*	Brea Canyon Trail/Sycamore Canyon Park	City of Diamond Bar is developing a trail that will connect up to a future Tonner Canyon Trail and possibly the northern end of the Coyote Creek Bike Trail.
■							■																	*	Chino Hills State Park	Connection to Chino Hills State Park Currently Closed
												■											■	*	Lambert Avenue Wildlife Corridor	Riparian Enhancement, Habitat Preservation, New Passive Parks, Infiltration Basin, Open Space; Include channel (tributary to Fullerton Creek)
■	■			■			■		■															*	Tonner Canyon Wildlife Corridor	Protection of wildlife habitat for foraging, nesting and movement through Tonner Canyon.
										■														*	West Coyote Hills Community & Open Space	Habitat Preservation, New Passive Parks, Watershed Connectivity and Open Space; 200 acres of development of the Pacific Coast Homes, 350 acres of open space, trails, nature center for public access
										■														*	West Coyote Hills Open Space	Habitat Preservation, New Passive Parks, Watershed Connectivity and Open Space; Protect over 500 acres from development, preserve as open space habitat with public access

L.A. Uninc.	O.C. Uninc.	Anaheim	Artesia	Brea	Buena Park	Cerritos	Chino Hills	Cypress	Diamond Bar	Fullerton	Hawaiian Gdns	La Habra	La Habra Hgts	Lakewood	La Mirada	La Palma	Long Beach	Los Alamitos	Norwalk	Placentia	Santa Fe Spr	Seal Beach	Whittier	Map ID	PROJECT NAME	PROJECT DESCRIPTION
										■		■											■	*	West Coyote Hills to Puente Hills Habitat Connectivity	Habitat Preservation, New Passive Parks, Watershed Connectivity and Open Space; Develop plan to connect the West Coyote Hills, which are a habitat island, to the Puente Hills
	■																					■		*	Lower San Gabriel Habitat Park	Partner with SCE to plant native vegetation in their easement North of 405 Freeway and South of El Dorado Park, potential Treatment Wetland Location as well. Oak woodland/Coastal Sage Scrub Opportunity
■	■			■			■		■			■	■										■	*	Puente-Chino Hills Open Space District Feasibility Study	Assess the feasibility of an open space district to fund and manage the Puente-Chino Hills and associated resources
■	■			■			■		■			■	■										■	*	Regional Hills Open Space Management Plan	Develop an regional open space management plan for the hills complex that includes the Puente-Chino, San Jose and Coyote Hills as well as Santa Ana Canyon
■	■											■	■										■	*	Whittier Ecological Reserve Plan	Description needed (Proposed by stakeholder)
■	■			■			■		■			■	■										■	*	NCCP Feasibility Assessment for the Puente-Chino Hills and Santa Ana Canyon	Assess feasibility of adding the Puente-Chino Hills to the Natural Community Conservation Planning (NCCP) program that currently exists in central and south Orange County. NCCP takes a broad-based ecosystem approach to planning for the protection and perpetuation of biological diversity for coastal sage scrub plant communities, and may also include oak woodland, riparian woodlands, grasslands and chaparral. An NCCP identifies and provides for the regional or area wide protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity.

L.A. Uninc.	O.C. Uninc.	Anaheim	Artesia	Brea	Buena Park	Cerritos	Chino Hills	Cypress	Diamond Bar	Fullerton	Hawaiian Gdns	La Habra	La Habra Hgts	Lakewood	La Mirada	La Palma	Long Beach	Los Alamitos	Norwalk	Placentia	Santa Fe Spr	Seal Beach	Whittier	Map ID	PROJECT NAME	PROJECT DESCRIPTION
CREEKS / WETLANDS																										
																	■							8	Los Cerritos Wetlands Restoration Project	Significant estuarine habitat restoration opportunity in southern California, project is lead by the Los Cerritos Wetlands JPA, which includes the Coastal Conservancy, Rivers & Mountains Conservancy, City of Seal Beach & City of Long Beach. Property acquisition is ongoing. May be a part of the U.S. Army Corps of Engineers Lower San Gabriel River-Coyote Creek Feasibility Study.
																		■				■		9	Los Alamitos Channel	Habitat Preservation and Water Quality Project
■							■		■															47	Tonner Canyon Riparian Habitat Park Area	Riparian Enhancement, Habitat Preservation, New Passive Parks, Watershed Connectivity and Open Space
									■															48	Brea Canyon Riparian Habitat Park Area	Riparian Enhancement, Open Space, Woodland Habitat
■									■															49	Rincon de la Brea Riparian Habitat Park Area	Riparian Enhancement, Habitat Preservation, New Passive Parks, Watershed Connectivity and Open Space
■													■											50	Northern Riparian Habitat Park Area	Riparian Enhancement, Habitat Preservation, New Passive Parks, Watershed Connectivity and Open Space
				■						■														51	Pacific Riparian Habitat Park Area	Riparian Enhancement, Habitat Preservation, New Passive Parks, Watershed Connectivity
		■			■																			52	Western Riparian Habitat Park Area	Riparian Enhancement, Habitat Preservation, New Passive Parks, Watershed Connectivity
															■									*	La Mirada Park Creek Restoration	Naturalize concrete stretch of La Mirada Creek in La Mirada Park.
										■					■									*	La Mirada/Fullerton Creek Restoration	Riparian Enhancement; Concrete removal and creek restoration (?)
										■														*	Stream Restoration (?)	Riparian Enhancement Projects

L.A. Uninc.	O.C. Uninc.	Anaheim	Artesia	Brea	Buena Park	Cerritos	Chino Hills	Cypress	Diamond Bar	Fullerton	Hawaiian Gdns	La Habra	La Habra Hgts	Lakewood	La Mirada	La Palma	Long Beach	Los Alamitos	Norwalk	Placentia	Santa Fe Spr	Seal Beach	Whittier	Map ID	PROJECT NAME	PROJECT DESCRIPTION
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Creek Daylighting Study	Riparian Enhancement, Passive Parks, Treatment Wetland; Assessment of all opportunities to daylight buried creeks, currently underground as part of the stormwater conveyance system
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Creek Improvements Master Plan	Riparian Enhancement, New Passive Parks, Treatment Wetland; Develop Master Plans to re-green flood control channels, restore flood plains, riparian habitat, trail amenities, & improve visual quality
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Natural Vs. Improved Channel Inventory	Inventory of natural vs. lined channels; public works has hard copy maps for natural and concrete channels
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Wetlands, Riparian & Floodplain Enhancement Feasibility Opportunities Study	Over-capacity stretches, soft-bottom restoration opportunities: Floodplain restoration opportunities; Stretches of the creek where open space exist, expand creek levees and install terraced floodplains; Multiple-step projects that combine water cleansing/filtration treatment wetlands (non-habitat) that flow into habitat wetlands.
PARKS																										
				■																				15	Brea Park Project Area	Passive Park
										■														16	Fullerton Park Project Area	Passive Park
		■																						17	Western Park Project Area	Passive Park
		■																						18	Anaheim Park Project Area	Passive Park
										■														19	Commonwealth Park Project Area	Passive Park
■																								20	Aera Park Project Area	Passive Park, Shrub Habitat, Wildlife Corridor Critical Connection in La Puente Hills
		■																						21	Carbon Creek Park Project Area	Passive Park

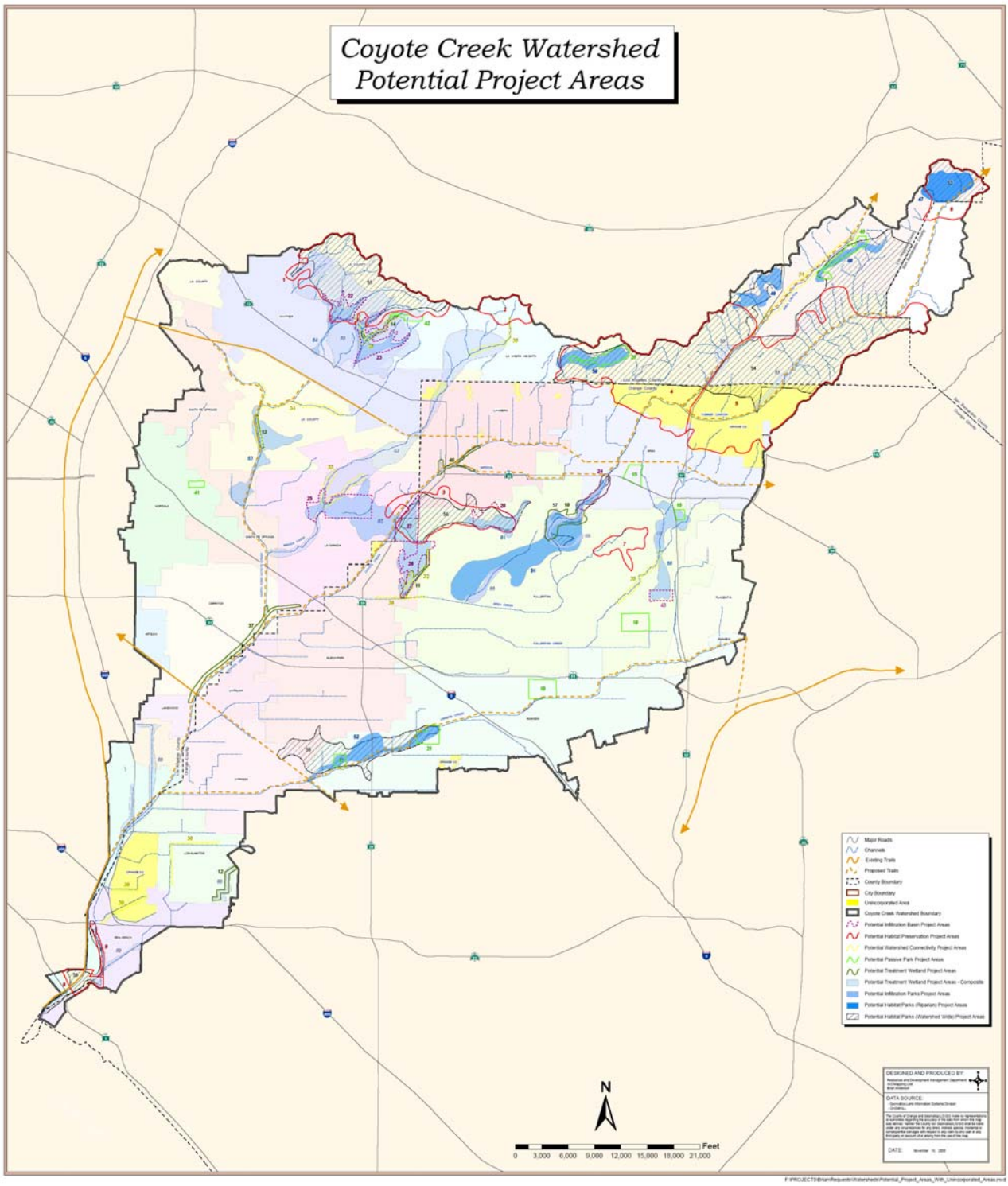
L.A. Uninc.	O.C. Uninc.	Anaheim	Artesia	Brea	Buena Park	Cerritos	Chino Hills	Cypress	Diamond Bar	Fullerton	Hawaiian Gdns	La Habra	La Habra Hgts	Lakewood	La Mirada	La Palma	Long Beach	Los Alamitos	Norwalk	Placentia	Santa Fe Spr	Seal Beach	Whittier	Map ID	PROJECT NAME	PROJECT DESCRIPTION
									■															40	Brea Canyon Park Project Area	Passive Park, Open Space, Woodland Habitat
																			■					41	Norwalk Park Project Area	Passive Park
■													■										■	42	San Miguel Park Project Area	Passive Park, Woodland and Shrub Habitat, Wildlife Corridor Critical Connection in La Puente Hills
																				■				45	Placentia Park Project Area	Passive Park
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Park Opportunities Study	Assess all opportunities to create new park land in heavily urbanized areas; i.e., convert industrial or commercial land into parks
TRAILS																										
															■									*	North Fork Coyote Creek Bike Trail	Develop a plan for future improvements such as grade separations, access and connections to the community and other trails such as the Coyote Creek Bike Trail and Whittier Greenway.
																						■		*	Seal Beach Open Space-Trail Study	Habitat Preservation, Watershed Connectivity Projects; RMC-funded project
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Greenway Projects Opportunity Study	Riparian Enhancement, New Passive Parks, Recreation and Open Space; Aesthetics—remove concrete channels, remove trash
					■					■		■												*	Coyote Bikeway to West Coyote Hills Trail Connection	Coyote Bikeway to West Coyote Hills trail connection.
												■											■	*	Coyote Bikeway to Whittier Greenway Expansion	Coyote Bikeway to Whittier Greenway Expansion Connection
					■										■									*	Skyline Trail Connection	Watershed Connectivity and Open Space

L.A. Uninc.	O.C. Uninc.	Anaheim	Artesia	Brea	Buena Park	Cerritos	Chino Hills	Cypress	Diamond Bar	Fullerton	Hawaiian Gdns	La Habra	La Habra Hgts	Lakewood	La Mirada	La Palma	Long Beach	Los Alamitos	Norwalk	Placentia	Santa Fe Spr	Seal Beach	Whittier	Map ID	PROJECT NAME	PROJECT DESCRIPTION
■	■																							B	Tonner Canyon Trail	Future public trail through Tonner Canyon.
■	■			■					■															D	Brea Creek-Coyote Creek Bikeway	Watershed Connectivity, Passive Parks and Recreational; Coyote Creek Bikeway extension & connector
		■			■			■		■										■				E	Carbon Creek Bikeway	Develop a plan to improve the trail along Carbon Creek, owned by the Orange County Flood Control District
	■				■			■		■	■	■		■	■	■	■	■						F	Coyote Creek Bikeway	Trails4All is leading this RMC-funded project to develop a Bikeway Master Plan for improvements to the trail and to implement signage. RMC grant funds the planning and signage, but additional funding is needed to implement recommendations for trail improvements like bridges, grade separations and additional access points. The Coyote Creek Bike Trail extends from the confluence with the San Gabriel River to Imperial Highway.
		■	■		■	■		■						■		■								H	West Branch MTA Greenway Expansion	Watershed Connectivity, Open Space, Passive Parks and Recreation; Extension of the bike path currently underway in Bellflower, across the San Gabriel River
				■								■											■	*	Whittier Greenway Expansion	Watershed Connectivity, Open Space, Passive Parks and Recreation; Extend Railroad Right-of-Way trail through north Orange County into La Mirada, La Habra & Brea
EDUCATION / OUTREACH																										
■																							■	29	La Serna Interpretive Opportunity Project Area	Watershed Connectivity, Shrub Habitat
													■											30	La Mirada Creek Interpretive Opportunity Project Area	Watershed Connectivity, Shrub Habitat
									■															31	Brea Canyon Interpretive Opportunity Project Area	Watershed Connectivity

L.A. Uninc.	O.C. Uninc.	Anaheim	Artesia	Brea	Buena Park	Cerritos	Chino Hills	Cypress	Diamond Bar	Fullerton	Hawaiian Gdns	La Habra	La Habra Hgts	Lakewood	La Mirada	La Palma	Long Beach	Los Alamitos	Norwalk	Placentia	Santa Fe Spr	Seal Beach	Whittier	Map ID	PROJECT NAME	PROJECT DESCRIPTION
					■					■														32	Los Coyotes Interpretive Opportunity Project Area	Watershed Connectivity
															■									33	La Mirada Interpretive Opportunity Project Area	Watershed Connectivity and Open Space
■																								34	La Canada Interpretive Opportunity Project Area	Watershed Connectivity and Open Space
										■														35	Fullerton Creek Interpretive Opportunity Project Area	Watershed Connectivity and Open Space
					■					■														36	Brea Creek Interpretive Opportunity Project Area	Watershed Connectivity and Open Space, Woodland Habitat
	■																					■		38	Rossmoor Interpretive Opportunity Project Area	Watershed Connectivity
																		■						39	Los Alamitos Interpretive Opportunity Project Area	Watershed Connectivity
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Environmental Justice Program	Improve access to Park, Open Space and Recreation, watershed connectivity, parks; Understand & address EJ needs (i.e., W. Coyote Hills)
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	"Idea House" Demonstration Project	Develop a house, store or office building where people can get ideas on greening and improving the watershed through low impact site development ideas
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Incentive Programs to Implement WMP Goals	Incentive programs
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Watershed Education & Outreach for the Public	Education programs for the public/individual citizens about native plants in landscaping, solar power, water quality/conservation & other watershed issues

L.A. Uninc.	O.C. Uninc.	Anaheim	Artesia	Brea	Buena Park	Cerritos	Chino Hills	Cypress	Diamond Bar	Fullerton	Hawaiian Gdns	La Habra	La Habra Hgts	Lakewood	La Mirada	La Palma	Long Beach	Los Alamitos	Norwalk	Placentia	Santa Fe Spr	Seal Beach	Whittier	Map ID	PROJECT NAME	PROJECT DESCRIPTION
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Watershed Education Program for Schools	Curriculum-based educational programs in schools
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Watershed Stewardship Program	Create next generation of stewards through programs
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Citizen Watershed Commissions	Develop citizen commissions for each City to learn about and disseminate information regarding the watershed.
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	*	Colleges & Universities Outreach and Volunteer Programs	Tie programs, research, plan implementation into colleges and universities. Tap into students for volunteer efforts

Summary Map of Project Opportunities - Spatially Derived (GIS)



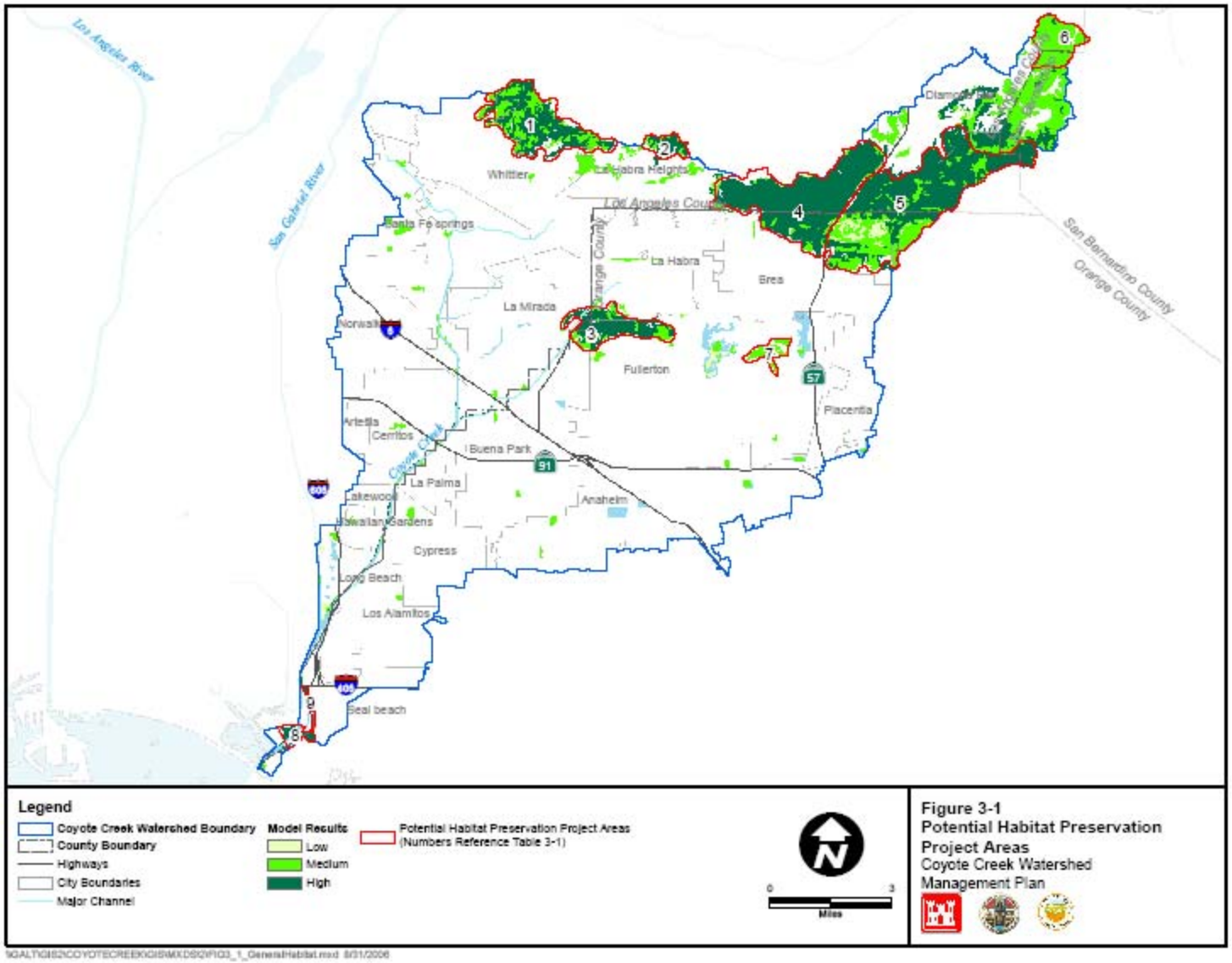


Figure 3-1
Potential Habitat Preservation Project Areas
Coyote Creek Watershed Management Plan

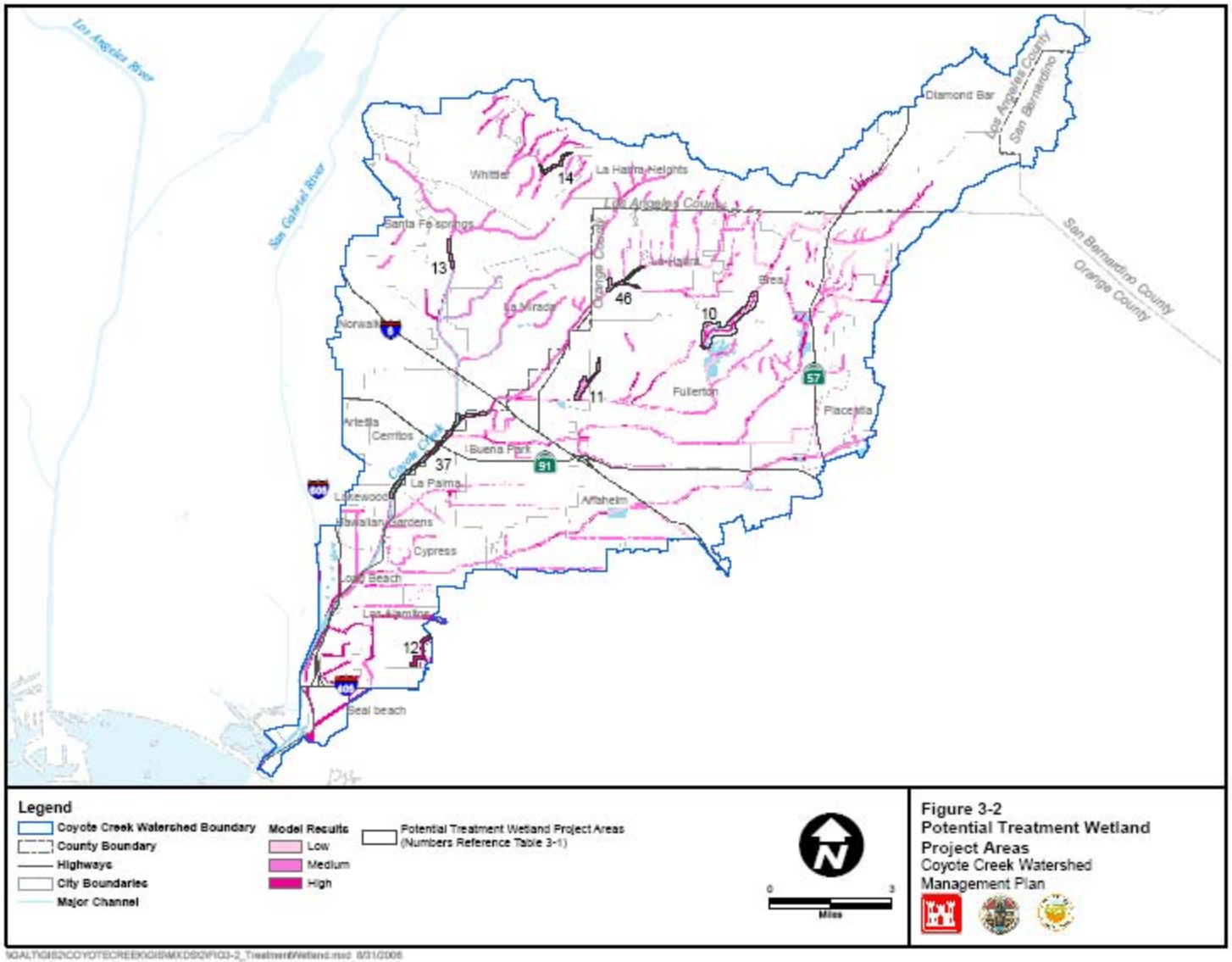
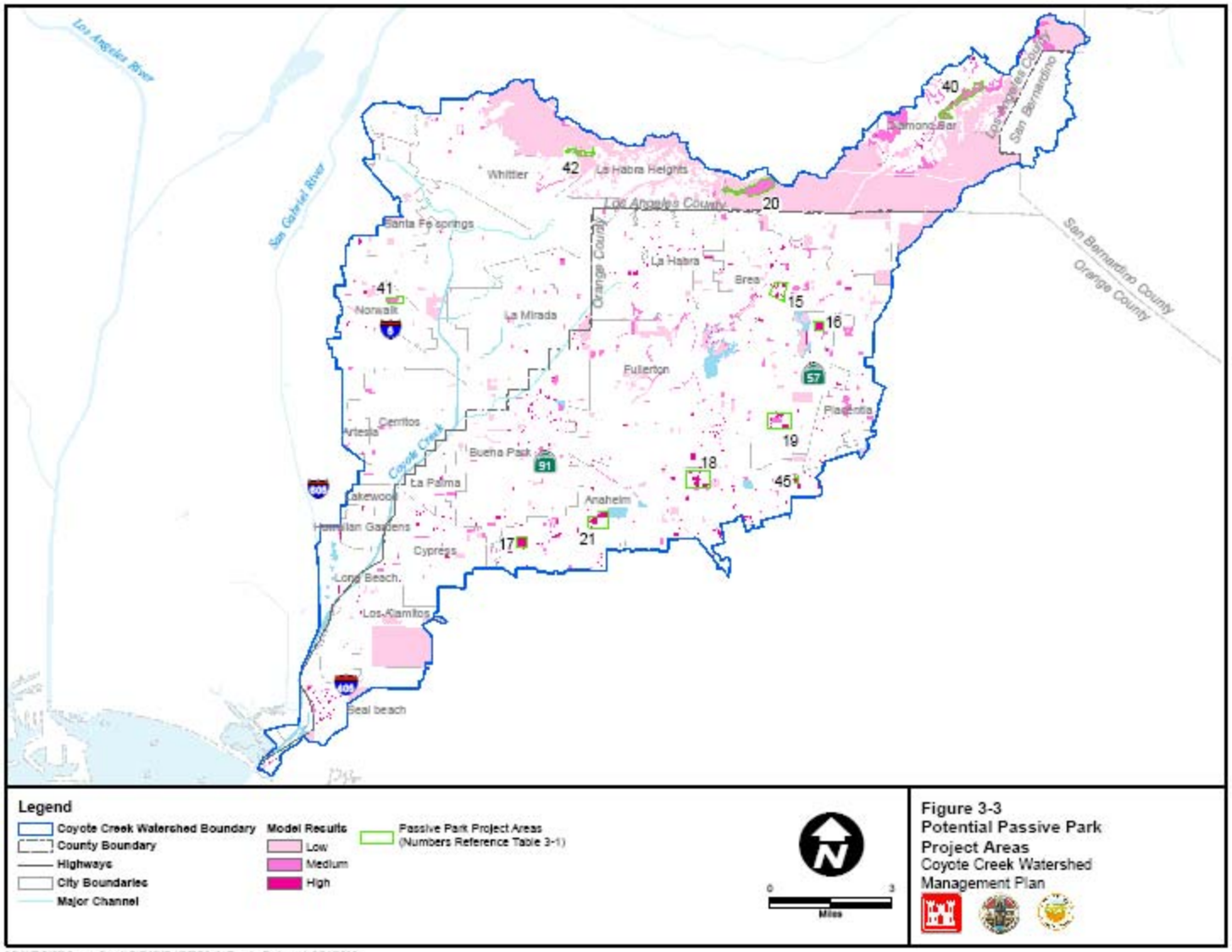


Figure 3-2
Potential Treatment Wetland Project Areas
Coyote Creek Watershed Management Plan


Los Angeles River
San Gabriel River
Coyote Creek
Whittier
La Habra Heights
Los Angeles County
Orange County
San Bernardino County
Los Angeles County
San Bernardino
Diamond Bar
Santa Fe Springs
La Habra
Brea
Norwalk
La Mirada
Fullerton
Placentia
Cerritos
Artesia
Buena Park
La Palma
Lakewood
Anaheim
Hawaiian Gardens
Cypress
Long Beach
Los Alamitos
Seal beach
40
42
20
41
15
16
19
18
45
17
21
Legend
Coyote Creek Watershed Boundary
County Boundary
Highways
City Boundaries
Major Channel
Model Results
Low
Medium
High
Passive Park Project Areas
(Numbers Reference Table 3-1)
N
0
3
Miles
Figure 3-3
Potential Passive Park
Project Areas
Coyote Creek Watershed
Management Plan

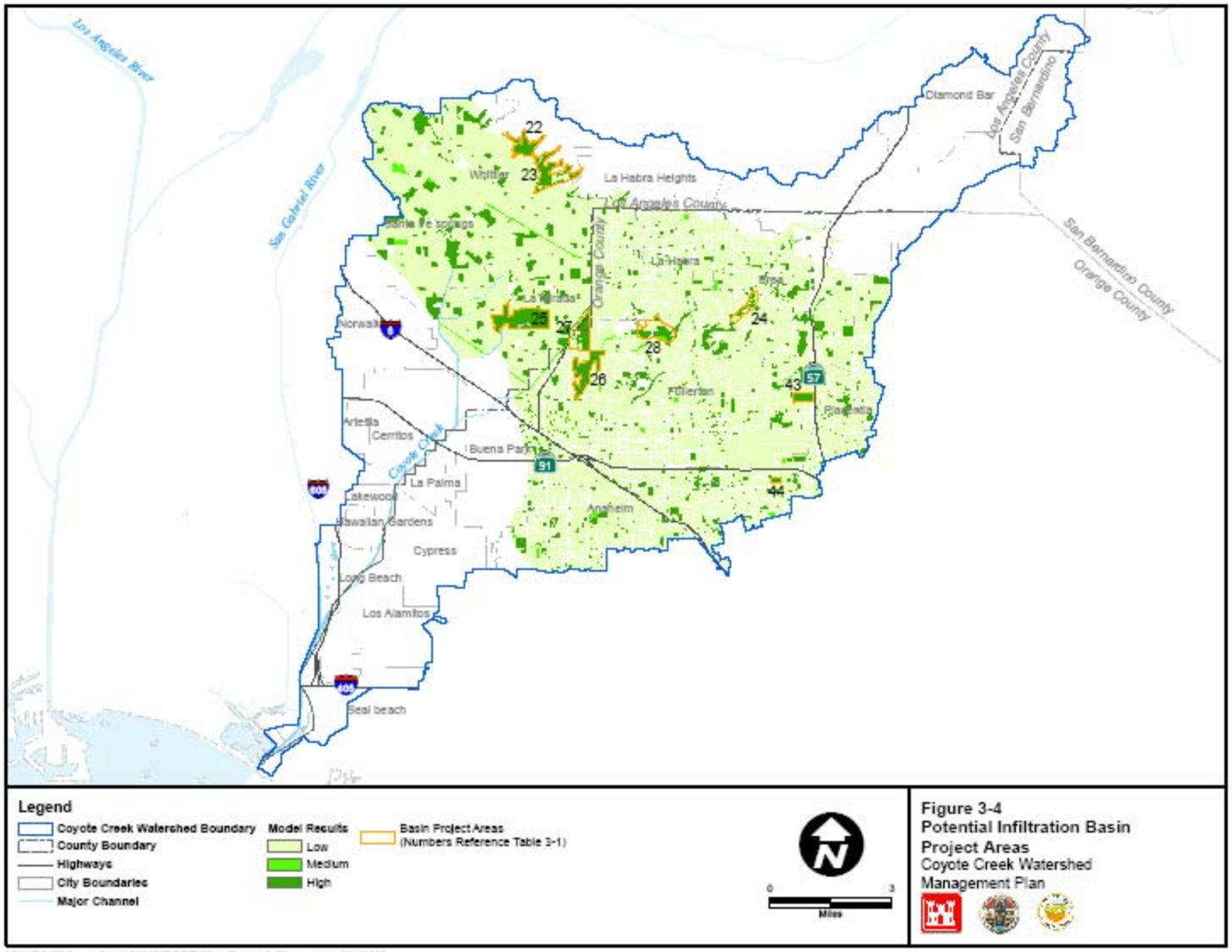
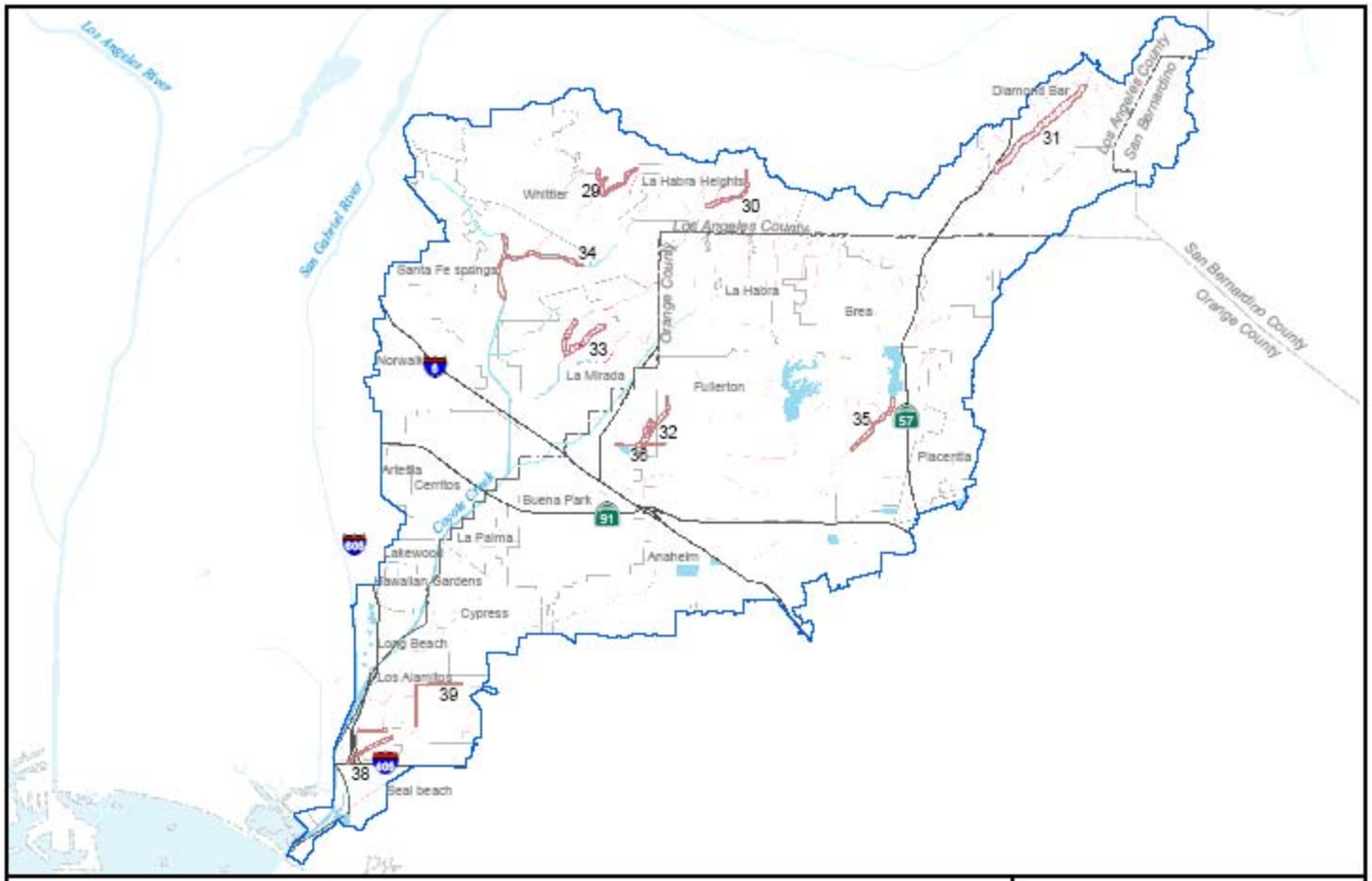


Figure 3-4
Potential Infiltration Basin Project Areas
Coyote Creek Watershed Management Plan



Legend

- Coyote Creek Watershed Boundary
- County Boundary
- Highways
- City Boundaries
- Major Channel

Model Results

- Low
- Medium
- High

Connectivity Project Areas (Numbers Reference Table 3-1)

0 3 Miles

Figure 3-5
Potential Watershed Connectivity Project Areas
Coyote Creek Watershed Management Plan

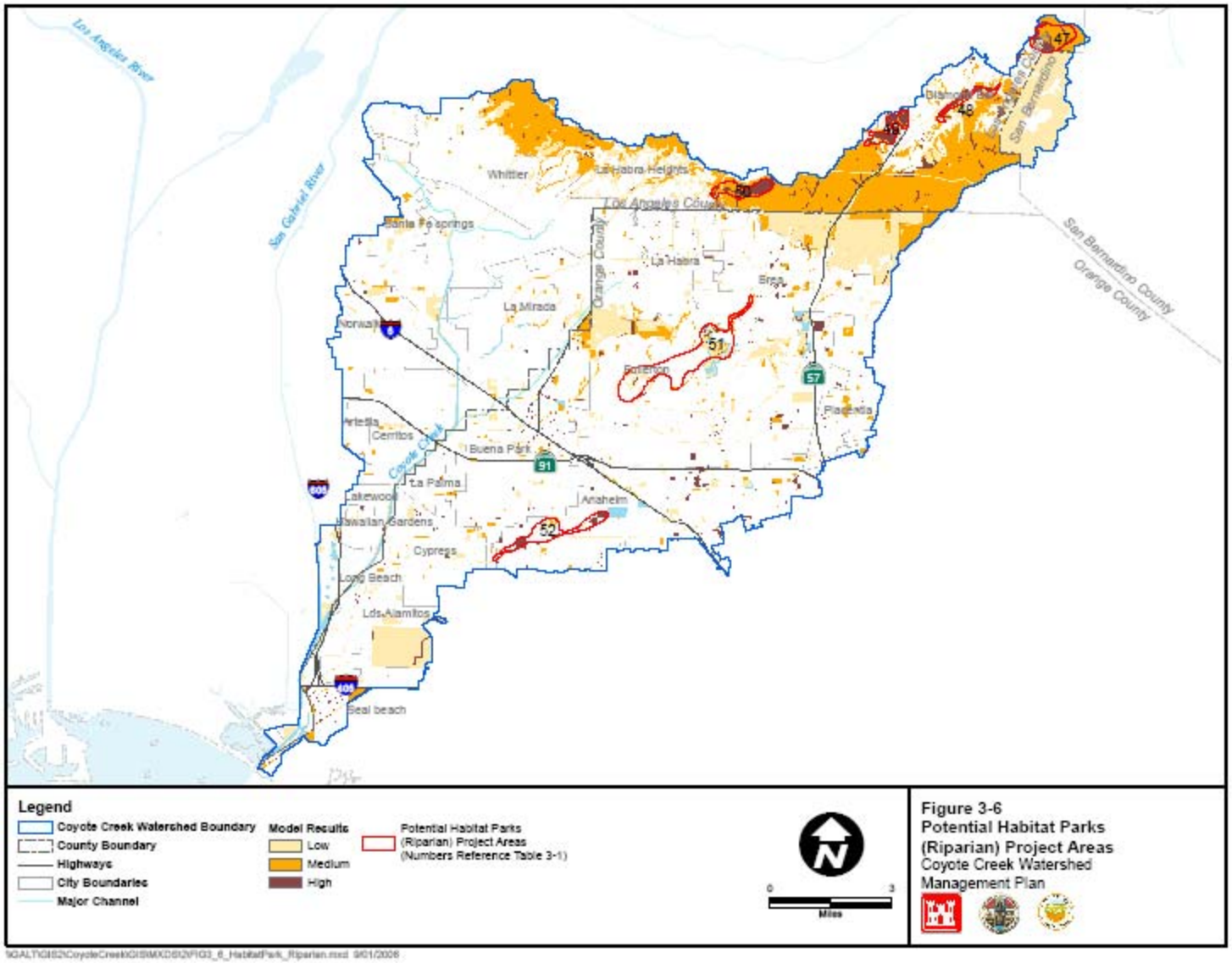


Figure 3-6
Potential Habitat Parks (Riparian) Project Areas
Coyote Creek Watershed Management Plan

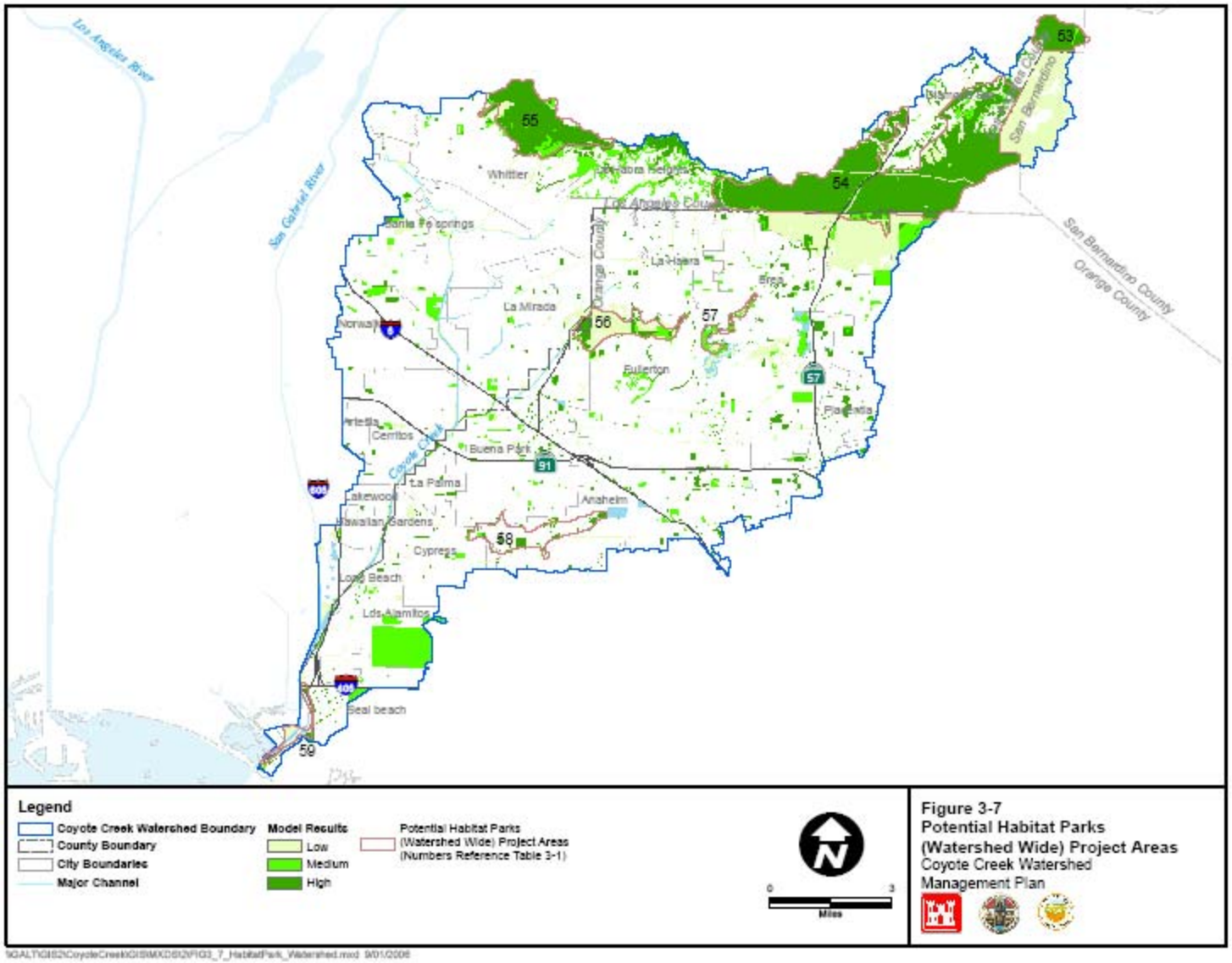


Figure 3-7
Potential Habitat Parks (Watershed Wide) Project Areas
Coyote Creek Watershed Management Plan

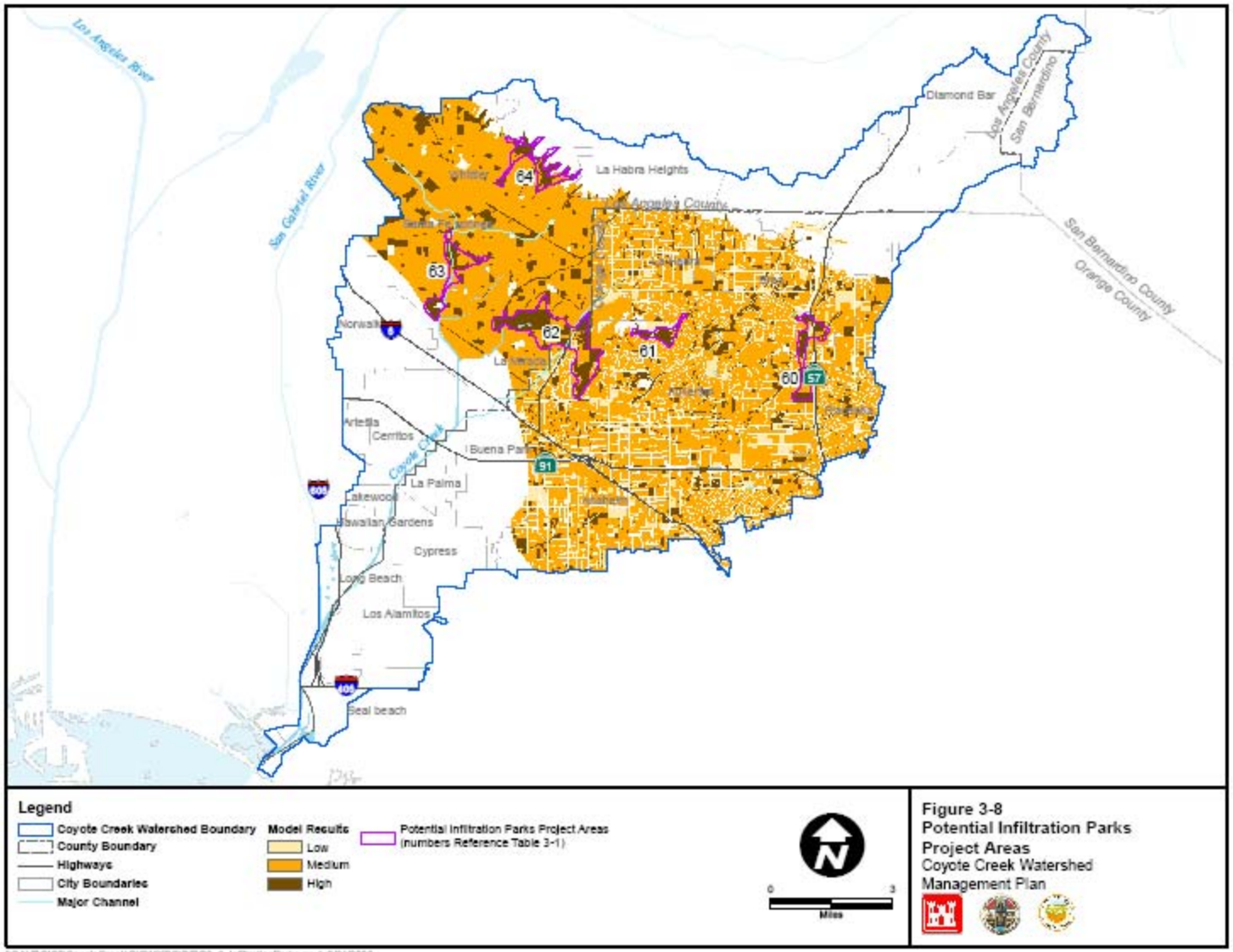


Figure 3-8
Potential Infiltration Parks Project Areas
Coyote Creek Watershed Management Plan

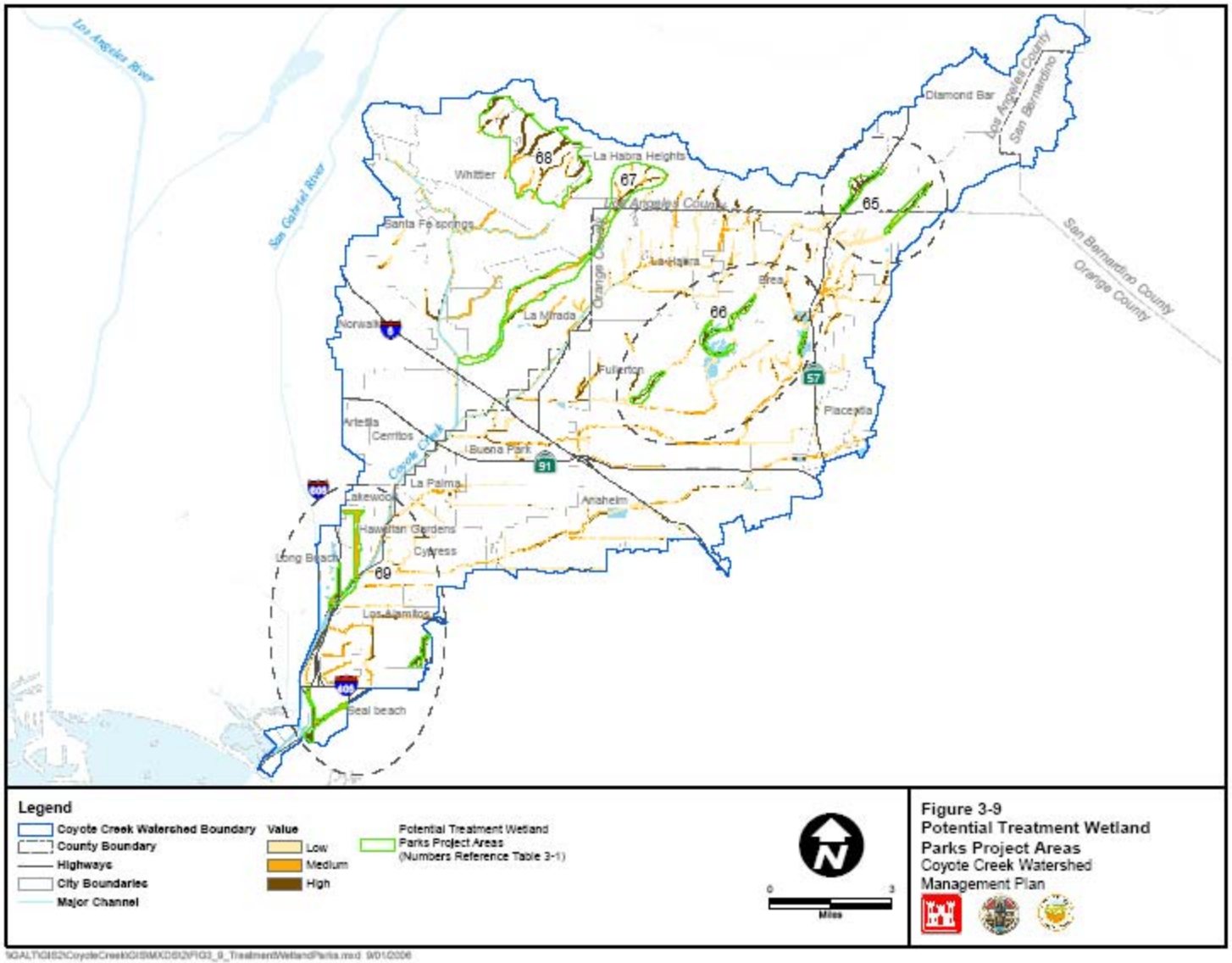


Figure 3-9
Potential Treatment Wetland Parks Project Areas
Coyote Creek Watershed Management Plan

Recommended General Plan Policy Strategies Technical Memo

Coyote Creek Watershed Management Plan

Prepared by:
URS Corporation
915 Wilshire Blvd., Suite 700
Los Angeles, CA 90017

November 30, 2006

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Introduction

This technical memo presents potential strategy recommendations for local governments to consider adopting. This is an example of implementation of Coyote Creek Watershed Management Plan (CCWMP) goals for local governments. The implementation process will be complete when local governments (cities and counties) evaluate the recommended strategies listed in this document and adopt them as policies which are integrated into their general plans, specific plans, or other planning documents.

Methodology

The strategies contained in this document are a result of a comprehensive review of general plans of local jurisdictions within the Coyote Creek Watershed. The Watershed includes 3 counties and 22 cities. A list of these cities and counties within the Coyote Creek Watershed is given in Table 1-1.

TABLE 1-1: POLITICAL JURISDICTIONS WITHIN THE STUDY AREA

Orange County		Los Angeles County		San Bernardino County	
1	Anaheim	1	Artesia	1	Chino Hills
2	Brea	2	Cerritos		
3	Buena Park	3	Diamond Bar		
4	Cypress	4	Hawaiian Gardens		
5	Fullerton	5	La Habra Heights		
6	La Habra	6	Lakewood		
7	La Palma	7	La Mirada		
8	Los Alamitos	8	Long Beach		
9	Placentia	9	Norwalk		
10	Seal Beach	10	Santa Fe Springs		
		11	Whittier		

General Plans from the twenty-two cities and three counties within the Coyote Creek Watershed were reviewed to compare the respective plans to the CCWMP objectives. The exact policies from the general plans that closely matched the goals and objectives of the CCWMP were recorded. The selected general plan policies had to match the intention or spirit of the CCWMP objectives rather than word-for-word. In that regard, some subjective evaluations were made.

The intent of this exercise was to find existing best policy examples from within the watershed as well as suggest additional policies for fulfilling plan goals. The assumption is that there is a better chance of buy-in from local cities and counties if the suggested strategies already exist within the watershed. There is also a greater chance of these strategies getting implemented as policies if they are already being implemented in a neighboring jurisdiction. An entirely new set of policies would create a new layer of

governance for the cities and counties to comply with. It should be noted that the language of the recommended strategies has been modified to make them applicable to the entire watershed.

This exercise was summarized in the form of a matrix comparing the existing 'best' policies against the CCWMP goals and objectives and gaps were identified (see Appendix A). The identified policies and the matrix were presented to the Coyote Creek Watershed Council in February 2006 and were further short-listed based on the input received at this meeting.

The Project Team, with the input received from the Coyote Creek Watershed Council (CCWC), compiled additional strategies for the identified gaps. The set of strategies presented below are, therefore, a mix of existing general plan policies, strategies developed from the input provided by the CCWC, as well as new strategies researched and developed by the Project Team.

The strategies developed by the Project Team are focused on water quality and conservation, open space and aquatic habitat, as well as smart growth and new urbanism principles. Many of these strategies are an adaptation of the 'Ahwahnee Water Principles for Resource-Efficient Land Use' adopted in 2005, the 'Ahwahnee Principles for Resource-Efficient Communities' adopted in 1991, and the Ahwahnee Principles forEconomic Development adopted in 1997 by the Local Government Commission. These smart growth or low impact development principles are considered important in the context of watershed management because of the following reasons:

- Compact urban form means a smaller footprint and more protected watershed land, recharge areas, natural drainages, and less impervious surfaces
- Higher density means less landscaping per capita and therefore less water use per capita
- Public open spaces, parks and plazas means opportunities for large land scape water conserving design and space for innovative surface runoff management
- Narrower streets and less surface parking lots means less impervious cover per capita
- Less vehicle miles traveled should result in less pollutants per capita.[1]

Recommended General Plan Strategies

The strategies presented below are grouped by general plan element mandated by the State of California. These mandatory elements are: Land Use, Circulation & Infrastructure, Housing, Noise, Open Space, Conservation, and Safety. As watershed principles relate more directly to Land Use, Circulation and Infrastructure, Open Space, Conservation, and Safety elements, strategies are presented for these elements. Strategies are also presented for the optional Economic Development Element The sources of the

[1] Based on Prof. Jeff Loux's (University of California, Davis) research on the relationship between 'Water and Land Use'

strategies below are notes in parentheses. Strategies with no notation were derived from either CCWC or project team input.

LAND USE

- **STRATEGY 1:** Establish an urban growth boundary and promote compact development.
- **STRATEGY 2:** Promote infill development and facilitate redevelopment of existing neighborhoods to preserve greenfields and open spaces by using innovative zoning tools, such as overlay zones.
- **STRATEGY 3:** Adopt Smart Growth codes to parallel conventional development codes.
- **STRATEGY 4:** Locate as many activities as possible within easy walking distance of transit stops and multi-modal trails to reduce dependence on the automobile. *(adapted from the Ahwahnee Principles for Resource Efficient Communities)*
- **STRATEGY 5:** Equitably distribute potentially undesirable sites such as wastewater treatment facilities throughout the City. *(San Bernardino County General Plan, reworded)*
- **STRATEGY 6:** Work closely with regional and local agencies to ensure a balanced land use pattern furthering land use objectives common to the community, its neighbors and larger communities of interest. *(City of Fullerton General Plan)*
- **STRATEGY 7:** Community design should be compact, mixed use, walkable and transit-oriented to minimize automobile-generated urban runoff pollutants and preserve the open lands that absorb water. *(adapted from the Ahwahnee Water Principles for Resource Efficient Land Use)*
- **STRATEGY 8:** Water holding areas such as creek beds, recessed athletic fields, ponds, cisterns, and other features that serve to recharge groundwater, reduce runoff, improve water quality and decrease flooding should be incorporated in the urban landscape. *(adapted from the Ahwahnee Water Principles for Resource Efficient Land Use)*
- **STRATEGY 9:** Permeable surfaces should be used for hardscape. Impervious surfaces such as driveways, streets, and parking lots should be minimized so that land is available to absorb storm water, reduce polluted runoff, recharge groundwater and reduce flooding. *(adapted from the Ahwahnee Water Principles for Resource Efficient Land Use)*

CIRCULATION AND INFRASTRUCTURE

- **STRATEGY 1:** Plan neighborhood streets, pedestrian walks, and bicycle paths as a system of fully connected multi-modal trails.

- **STRATEGY 2:** Employ strategies and design features that will reduce the amount of impervious surfaces (i.e. paved area) for new development projects. *(City of Brea General Plan)*
- **STRATEGY 3:** Support and coordinate the development and maintenance of local trails in conjunction with the County's regional bikeway plans.
- **STRATEGY 4:** Encourage pedestrian and bicycle use to reduce vehicular trips. Design safe and efficient pedestrian and bicycle routes by being compact, providing trees and lighting, and by discouraging high speed traffic. *(adapted from the Ahwahnee Principles for Resource Efficient Communities)*
- **STRATEGY 5:** Create and maintain linkages between open spaces and pedestrian access that serve the entire community.
- **STRATEGY 6:** Encourage multi-purpose development along waterfronts, where safe to do so.
- **STRATEGY 7:** Designate flood control channels, maintenance roads, transportation right-of-ways, abandoned railroad lines and fire control roads as major elements of the open space/recreation network to provide a link with other open spaces and recreational areas within a community and adjacent city and county recreation plans. *(San Bernardino County General Plan)*
- **STRATEGY 8:** Encourage the planting of trees and other vegetation, especially native species, to enhance the environment, and promote visually pleasing landscaped corridors throughout the community.*(City of Cypress General Plan)*

OPEN SPACE

- **STRATEGY 1:** Develop a high-quality network of parks and recreational facilities that meet the needs of families, young adults, seniors, children and disabled individuals.
- **STRATEGY 2:** Adopt a parkland standard (e.g. three acres of parkland per 1,000 residents) and require new development and redevelopment to provide recreational opportunities, especially in park-poor areas, for their residents in accordance with the local park standard.
- **STRATEGY 3:** Provide ample supply of specialized open space in the form of squares, greens and parks whose frequent use is encouraged through placement and design. *(adapted from the Ahwahnee Principles for Resource Efficient Communities)*
- **STRATEGY 4:** Review opportunities to combine active and passive open space resources that also serve as buffer zones. Maintain existing and create new open space buffers adjacent to flood control facilities and utilities.
- **STRATEGY 5:** Protect new and reestablished natural habitats and ecological preserves including wetlands, woodlands, native plant communities. *(City of Long Beach General Plan)*
- **STRATEGY 6:** Work with regional agencies, other public agencies, including other parks and recreation departments and school districts, and the public in developing cooperative park and recreation programs and establish agreements

for the joint use of recreation and open space facilities. *(City of Cypress General Plan, reworded)*

- **STRATEGY 7:** Actively pursue the acquisition of open space areas for recreation activities and to preserve environmental features that are valuable for their scientific, educational, conservation, wildlife linkage, scenic, agricultural, and cultural values. *(City of La Habra Heights General Plan)*
- **STRATEGY 8:** Encourage the conservation of opens space lands which prevent erosion, siltation, flood, and drought, and discourage the early conversion of open space to some other land use. *(Orange County General Plan)*
- **STRATEGY 9:** Create or restore wetlands and environmental ecosystems that contribute to the regional system of open spaces. *(City of Seal Beach General Plan)*
- **STRATEGY 10** Identify creative new park creation opportunities through land use conversion of underutilized streets, commercial, or public utility lots.

CONSERVATION

- **STRATEGY 1:** Conserve sensitive species, plant communities and wildlife habitats through open space dedication and easements, creative site design, and other workable mitigation actions.
- **STRATEGY 2** Work with local water districts to ensure that adequate water resources are available to meet demands of current and future development and reduce the demand for non-local water resources through the utilization of local groundwater resources. *(City of La Mirada General Plan)*
- **STRATEGY 3** Encourage the use of native landscapes in new developments and promote the replacement of existing water consumptive landscapes to reduce per capita water consumption. *(City of Hawaiian Gardens General Plan)*
- **STRATEGY 4** Reduce urban run-off from existing development and strive to achieve zero-runoff from new development. *(City of Anaheim General Plan)*
- **STRATEGY 5:** Protect and enhance the quality of water in local rivers and wetlands from "non point[2]" source pollutants. *(City of Seal Beach General Plan)*
- **STRATEGY 6:** Protect water quality through cooperative management and enforcement efforts. *Orange County General Plan)*
- **STRATEGY 7:** Mitigate runoff from all land uses, especially commercial and industrial land uses, and guard against the pollution of ground water resources. *(City of La Habra Heights General Plan)*
- **STRATEGY 8: E**ducate the public regarding the need for water conservation, energy conservation, techniques which can be employed, and systems which are reliable. *(City of Hawaiian Gardens General Plan)*

[2] Nonpoint source (NPS) pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water *(Definition from the U.S. Environmental Protection Agency (EPA) at http://www.epa.gov/owow/nps/qa.html.)*

- **STRATEGY 9:** Work with school districts to incorporate water conservation and watershed awareness in the curriculum.
- **STRATEGY 10:** Protect, enhance, restore, and maintain natural drainage courses in their existing state, and explore day-lighting and restoring of concrete-lined channels and allowing habitat to grow, where safe to do so. *(City of La Habra Heights General Plan)*
- **STRATEGY 11:** Natural resources such as wetlands, flood plains, recharge zones, riparian areas, open space, and native habitats should be identified, preserved and restored as valued assets for flood protection, water quality improvement, groundwater recharge, habitat, and overall long-term water resource sustainability. *(adapted from the Ahwahnee Water Principles for Resource Efficient Land Use)*
- **STRATEGY 12:** All aspects of landscaping from the selection of plants to soil preparation and the installation of irrigation systems should be designed to reduce water demand, retain runoff, decrease flooding, and recharge groundwater. *(adapted from the Ahwahnee Water Principles for Resource Efficient Land Use)*

SAFETY

- **STRATEGY 1:** Design public parks and trails to encourage the attention and presence of people at all hours of the day and night. *(adapted from the Ahwahnee Principles for Resource Efficient Communities)*
- **STRATEGY 2:** Apply federal and state water quality standards and wastewater discharge requirements in the review of development proposals that relate to type, location and size of the proposed project, for surface and groundwater to safeguard public health. *(San Bernardino County General Plan)*
- **STRATEGY 3:** Design flood hazard mitigation measures that advances multi-purpose goals of recreation, resource conservation, preservation of natural riparian vegetation and habitat and the preservation of the scenic values of streams and creeks while maintaining flood protection. (San Bernardino County General Plan)

ECONOMIC DEVELOPMENT

- **STRATEGY 1:** Work together with the local governments, businesses, schools, and communities to create a vibrant local economy, through a long-term investment strategy that: encourages local enterprises; serves the needs of local residents, workers, and businesses; promotes stable employment and revenues by building on local competitive advantages; protect the natural environment; increases social equity; and is capable of succeeding in the global marketplace. *(adapted from the Ahwahnee Principles for Economic Development)*
- **STRATEGY 2:** Visioning, planning and implementation efforts should continually involve all sectors, including the voluntary civic sector and those traditionally left out of the public planning process. *(adapted from the Ahwahnee Principles for Economic Development)*

- **STRATEGY 3:** Support and pursue economic development that maintains or improves, not harms, the environmental and public health. *(adapted from the Ahwahnee Principles for Economic Development)*
- **STRATEGY 4:** Enterprises should work as civic partners, contributing to the communities and regions where they operate, protecting the natural environment, and providing workers with good pay, benefits, opportunities for upward mobility, and a healthful work environment. *(adapted from the Ahwahnee Principles for Economic Development)*
- **STRATEGY 5:** Protect the natural environment and increase quality of life, neighborhoods, communities and regions should have compact, multi-dimensional land use patterns that ensure a mix of uses, minimize impact of cars, and promote walking, bicycling, and transit access to employment, education, recreation, entertainment, shopping, and services. Economic development and transportation investments should reinforce these land use patterns, and the ability to move people and goods by non-automobile alternatives wherever possible. *(adapted from the Ahwahnee Principles for Economic Development)*
- **STRATEGY 6:** Communities and the private sector should cooperate to create regional structures that promote a coherent metropolitan whole that respects local character and identity. *(adapted from the Ahwahnee Principles for Economic Development)*

Next Steps

California state law requires each city and county to adopt a general plan "for the physical development of the county or city, and any land outside its boundaries which bears relation to its planning" (§65300). The California General Plan Guidelines suggest that cities and counties should update their general plan every 10 years. The Governor's Office of Planning and Research (OPR) is required to notify a city or county when its general plan has not been revised within eight years. If a city or county has not revised its general plan within ten years, OPR must also notify the Attorney General. This notification does not necessarily mean the plan is out of date, but may serve as a reminder to comprehensively review the general plan if the city or county has not already done so.[3]

The following table lists general plan adoption dates for cities and counties within the Coyote Creek Watershed. General plans that have not been updated for 10 years or more are the best candidates for an update in the short-term, followed by general plans that have not been updated for 5-10 years. These cities and counties can consider including the above mentioned strategies as policies while updating their general plans. General plans that have recently been updated can include the suggested strategies as policies through a general plan amendment.

TABLE 1-2: GENERAL PLAN UPDATE TIMEFRAME

	Adoption Date	Recommendation
General Plans Not Updated for 10 Years or more:		

[3] State of California General Plan Guidelines, October 2003, Governor's Office of Planning and Research

	Adoption Date	Recommendation
City of Los Alamitos	1/1/1989	Adopt policies as part of the General Plan Update Update in the General Plan in the short-term (1-2 years)
City of La Habra	7/31/1990	
City of Hawaiian Gardens	1/1/1993	
City of Fullerton	1/1/1994	
City of Chino Hills	9/13/1994	
City of Buena Park	11/21/1994	
City of Diamond Bar	7/25/1995	
General Plans Not Updated for 5 to10 years:		
City of Lakewood	1/11/1996	Adopt policies as part of the General Plan Update Update in the General Plan within 3-5 years
City of Norwalk	2/29/1996	
City of La Palma	3/16/1999	
City of Cypress	1/1/2000	
City of Long Beach	10/15/2002	
City of Placentia	12/1/2002	
General Plans Updated within last 5 years:		
City of Seal Beach	1/12/2003	Include policies through a GP Amendment
City of La Mirada	3/25/2003	
City of Brea	8/19/2003	
City of Cerritos	1/1/2004	
City of La Habra Heights	1/1/2004	
Orange County	4/20/2004	
City of Anaheim	5/25/2004	
San Bernardino County	7/1/2006	

Other Recommendations

Adoption of Ahwahnee Principles

Ahwahnee Principles for Resource-Efficient Communities address how existing patterns of urban and suburban development seriously impair the quality of life. Adoption of the Ahwahnee Principles would help plan communities that would more successfully serve the needs of those who live and work within them. These principles should be incorporated into the general plans of all the cities and counties within the watershed. The Ahwahnee Principles for Resource-Efficient Communities are included in Appendix A of this document.

Optional Water Element

The California General Plan Guidelines does not include a water element as one of the seven mandatory elements. However, state law offers considerable flexibility to go beyond the mandatory elements of the general plan, and once adopted, an optional element carries the same legal weight as any of mandatory elements. Water-related information, including policies, resource inventories, and supply and demand analysis, are typically fragmented throughout various chapters of the general plan. Given the importance of water, a community would be well served to create a separate water element, in conjunction with the appropriate water supply and resource agencies, in which each aspect of the hydrologic cycle is integrated into a single chapter of the

general plan. A water element should consider the entire hydrologic cycle, which includes: water supply and demand, water quality, wastewater treatment and disposal, watershed features and processes, flood management, stormwater management, and interagency coordination and collaboration. An integrated water management element will help with other regulatory and planning functions, such as water quality discharge permits, wetland protection requirements, floodplain management, water supply assessment needs, and the preparation of CEQA documents. A single water management element might increase the visibility of water and highlight its importance in the future of the community.

References

1. The Ahwahnee Principles for Resource-Efficient Communities, Adopted in 1991, Local Government Commission (http://www.lgc.org/ahwahnee/principles.html)

2. The Ahwahnee Water Principles for Resource Efficient Land Use, Adopted in 2005, Local Government Commission (http://www.lgc.org/ahwahnee/h2o_principles.html)

3. The Ahwahnee Principles for Economic Development, Adopted in 1997, Local Government Commission (http://www.lgc.org/ahwahnee/econ_principles.html)

4. Getting to Smart Growth, 100 Policies for Implementation, International City/County Management Association and Smart Growth Network

5. Policy Guide on Planning for Sustainability, 2000, American Planning Association

6. Policy Guide on Environment: Water Resource Management, 2002, American Planning Association

7. California's General Plans: Crafting Sustainability, Community, Culture, Course Material, UCLA Extension Public Policy Program

8. State of California General Plan Guidelines, October 2003, Governor's Office of Planning and Research

9. City of Anaheim General Plan, adopted May 25, 2004

10. City of Brea General Plan, adopted August 19, 2003

11. City of Buena Park General Plan, adopted November 21, 1994

12. City of Cerritos General Plan, adopted 2004

13. City of Chino Hills General Plan, adopted September 13, 1994

14. City of Cypress General Plan, adopted 2000

15. City of Diamond Bar General Plan, adopted July 25, 1995

16. City of Fullerton General Plan, adopted 1994

17. City of Hawaiian Gardens General Plan, adopted 1993

18. City of La Habra General Plan, adopted July 31, 1990

19. City of La Habra Heights General Plan, adopted 2004

20. City of La Mirada General Plan, adopted March 25, 2003

21. City of La Palma General Plan, adopted March 16, 1999

22. City of Lakewood General Plan, adopted January 11, 1996

23. City of Long Beach General Plan, adopted October 15, 2002

24. City of Los Alamitos General Plan, adopted 1989

25. City of Norwalk General Plan, adopted February 29, 1996

26. City of Placentia General Plan, adopted December 1, 2002

27. City of Seal Beach General Plan, adopted January 12, 2003

28. County of Orange General Plan, adopted April 20, 2004

29. County of San Bernardino Draft 2006 General Plan Program

Report Preparation Personnel

COUNTY OF ORANGE

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Quality Assurance Review	Brian R. Smith, AICP
Urban Planner	Christopher Chavez

#	Strategies	Coyote Creek Watershed Goals and Objectives																			
		Land					Water					People					Management			
		Habitat	Recreation	Open Space	Economic Development	Trails/Mobility	Water Supply	Impervious Surfaces	Water Quality	Flood Protection/Sedimen nt Management	Wetland Protection	Aesthetics	Education & Outreach	Environmental Justice	Health and Safety	Citizen Participation and Stewardship	Organization	Collaboration	Communication	Multiple Objective Projects
LAND USE																				
1	Establish an urban growth boundary and promote compact development.			●		●														
2	Promote infill development and facilitate redevelopment of existing neighborhoods to preserve greenfields and open spaces by using innovative zoning tools, such as overlay zones.	●		●		●	●		●											●
3	Adopt Smart Growth codes to parallel conventional development codes.			●		●														
4	Locate as many activities as possible within easy walking distance of transit stops and multi-modal trails to reduce dependence on the automobile. (adapted from the Ahwahnee Principles for Resource Efficient Communities)					●									●					
5	Equitably distribute potentially undesirable sites such as wastewater treatment facilities throughout the City. (San Bernardino County General Plan, reworded)													●						
6	Work closely with regional and local agencies to ensure a balanced land use pattern furthering land use objectives common to the community, its neighbors and larger communities of interest. (City of Fullerton General Plan)													●			●			

#	Strategies	Coyote Creek Watershed Goals and Objectives																			
		Land					Water					People					Management			
		Habitat	Recreation	Open Space	Economic Development	Trails/Mobility	Water Supply	Impervious Surfaces	Water Quality	Flood Protection/Sedimen nt Management	Wetland Protection	Aesthetics	Education & Outreach	Environmental Justice	Health and Safety	Citizen Participation and Stewardship	Organization	Collaboration	Communication	Multiple Objective Projects
7	Community design should be compact, mixed use, walkable and transit-oriented to minimize automobile-generated urban runoff pollutants are minimized and preserve the open lands that absorb water. (adapted from the Ahwahnee Water Principles for Resource Efficient Land Use)			●		●	●	●	●											
8	Water holding areas such as creek beds, recessed athletic fields, ponds, cisterns, and other features that serve to recharge groundwater, reduce runoff, improve water quality and decrease flooding should be incorporated in the urban landscape.	●		●			●		●	●										●
9	Permeable surfaces should be used for hardscape. Impervious surfaces such as driveways, streets, and parking lots should be minimized so that land is available to absorb storm water, reduce polluted runoff, recharge groundwater and reduce flooding. (adapted from the Ahwahnee Water Principles for Resource Efficient Land Use)						●	●		●										

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		Land					Water					People					Management			
		Habitat	Recreation	Open Space	Economic Development	Trails/Mobility	Water Supply	Impervious Surfaces	Water Quality	Flood Protection/Sedimen t Management	Wetland Protection	Aesthetics	Education & Outreach	Environmental Justice	Health and Safety	Citizen Participation and Stewardship	Organization	Collaboration	Communication	Multiple Objective Projects
	CIRC. AND INFRASTRUCTURE																			
1	Plan neighborhood streets, pedestrian walks, and bicycle paths as a system of fully connected multi-modal trails.					•									•					
2	Employ strategies and design features that will reduce the amount of impervious surfaces (i.e. paved area) for new development projects. (City of Brea General Plan)						•	•	•	•										
3	Support and coordinate the development and maintenance of local trails in conjunction with the County's regional bikeway plans.					•									•			•		
4	Encourage pedestrian and bicycle use to reduce vehicular trips. Design safe and efficient pedestrian and bicycle routes by being compact, providing trees and lighting, and by discouraging high speed traffic. (adapted from the Ahwahnee Principles for Resource Efficient Communities)					•						•			•					
5	Create and maintain linkages between open spaces and pedestrian access that serve the entire community.			•		•									•					
6	Encourage multi-purpose development along waterfronts, where safe to do so.																			•

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		Habitat	Recreation	Open Space	Economic Development	Trails/Mobility	Water Supply	Impervious Surfaces	Water Quality	Flood Protection/Sedimen nt Management	Wetland Protection	Aesthetics	Education & Outreach	Environmental Justice	Health and Safety	Citizen Participation and Stewardship	Organization	Collaboration	Communication	Multiple Objective Projects
7	Designate flood control channels, maintenance roads, transportation right-of-ways, abandoned railroad lines and fire control roads as major elements of the open space/recreation network to provide a link with other open spaces and recreational areas within a community and adjacent city and county recreation plans. (San Bernardino County General Plan)		●	●		●				●					●					●
8	Encourage the planting of trees and other vegetation, especially native species, to enhance the environment, and promote visually pleasing landscaped corridors throughout the community. (City of Cypress General Plan)	●				●	●					●								
	OPEN SPACE																			
1	Develop a high-quality network of parks and recreational facilities that meet the needs of families, young adults, seniors, children and disabled individuals.		●	●																
2	Adopt a parkland standard (e.g. three acres of parkland per 1,000 residents) and require new development and redevelopment to provide recreational opportunities, especially in park-poor areas, for their residents in accordance with the local park standard.		●	●										●	●					

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		Habitat	Recreation	Open Space	Economic Development	Trails/Mobility	Water Supply	Impervious Surfaces	Water Quality	Flood Protection/Sedimen nt Management	Wetland Protection	Aesthetics	Education & Outreach	Environmental Justice	Health and Safety	Citizen Participation and Stewardship	Organization	Collaboration	Communication	Multiple Objective Projects
3	Provide ample supply of specialized open space in the form of squares, greens and parks whose frequent use is encouraged through placement and design. (adapted from the Ahwahnee Principles for Resource Efficient Communities)		●	●											●					
4	Review opportunities to combine active and passive open space resources that also serve as buffer zones. Maintain existing and create new open space buffers adjacent to flood control facilities and utilities.		●	●						●										●
5	Protect new and reestablished natural habitats and ecological preserves including wetlands, woodlands, native plant communities. (City of Long Beach General Plan)	●		●			●				●									
6	Work with regional agencies, other public agencies, including other parks and recreation departments and school districts, and the public in developing cooperative park and recreation programs and establish agreements for the joint use of recreation and open space facilities. (City of Cypress General Plan, reworded)		●	●											●		●	●		

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7	Actively pursue the acquisition of open space areas for recreation activities and to preserve environmental features that are valuable for their scientific, educational, conservation, wildlife linkage, scenic, agricultural, and cultural values. (City of La Habra Heights General Plan)	●	●	●								●	●							
8	Encourage the conservation of opens space lands which prevent erosion, siltation, flood, and drought, and discourage the early conversion of open space to some other land use. (Orange County General Plan)	●		●			●		●	●										●
9	Create or restore wetlands and environmental ecosystems that contribute to the regional system of open spaces. (City of Seal Beach General Plan)	●		●							●							●		
10	Identify creative new park creation opportunities through land use conversion of underutilized streets, commercial, or public utility lots.			●				●												●
	CONSERVATION																			
1	Conserve sensitive species, plant communities and wildlife habitats through open space dedication and easements, creative site design, and other workable mitigation actions.	●		●								●								

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2	Work with local water districts to ensure that adequate water resources are available to meet demands of current and future development and reduce the demand for non-local water resources through the utilization of local groundwater resources. (City of La Mirada General Plan)						●											●		
3	Encourage the use of native landscapes in new developments and promote the replacement of existing water consumptive landscapes to reduce per capita water consumption. (City of Hawaiian Gardens General Plan)	●					●													
4	Reduce urban run-off from existing development and strive to achieve zero-runoff from new development. (City of Anaheim General Plan)							●	●											
5	Protect and enhance the quality of water in local rivers and wetlands from “non point ” source pollutants. (City of Seal Beach General Plan)						●		●											
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7	Mitigate runoff from all land uses, especially commercial and industrial land uses, and guard against the pollution of ground water resources. (City of La Habra Heights General Plan)						●		●											

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8	Educate the public regarding the need for water conservation, energy conservation, techniques which can be employed, and systems which are reliable. (City of Hawaiian Gardens General Plan)						●						●							
9	Work with school districts to incorporate water conservation and watershed awareness in the curriculum.						●						●			●				
10	Protect, enhance, restore, and maintain natural drainage courses in their existing state, and explore day-lighting and restoring of concrete-lined channels and allowing habitat to grow, where safe to do so. (City of La Habra Heights General Plan)	●	●				●								●					
11	Natural resources such as wetlands, flood plains, recharge zones, riparian areas, open space, and native habitats should be identified, preserved and restored as valued assets for flood protection, water quality improvement, groundwater recharge, habitat, and overall long-term water resource sustainability. (adapted from the Ahwahnee Water Principles for Resource Efficient Land Use)	●					●	●	●	●										

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		Land					Water					People					Management			
		Habitat	Recreation	Open Space	Economic Development	Trails/Mobility	Water Supply	Impervious Surfaces	Water Quality	Flood Protection/Sediment Management	Wetland Protection	Aesthetics	Education & Outreach	Environmental Justice	Health and Safety	Citizen Participation and Stewardship	Organization	Collaboration	Communication	Multiple Objective Projects
12	All aspects of landscaping from the selection of plants to soil preparation and the installation of irrigation systems should be designed to reduce water demand, retain runoff, decrease flooding, and recharge groundwater. (adapted from the Ahwahnee Water Principles for Resource Efficient Land Use)	●					●	●	●	●										
	SAFETY																			
1	Design public parks and trails to encourage the attention and presence of people at all hours of the day and night. (adapted from the Ahwahnee Principles for Resource Efficient Communities)		●	●		●									●					
2	Apply federal and state water quality standards and wastewater discharge requirements in the review of development proposals that relate to type, location and size of the proposed project, for surface and groundwater to safeguard public health.								●						●					
3	Design flood hazard mitigation measures that advances multi-purpose goals of recreation, resource conservation, preservation of natural riparian vegetation and habitat and the preservation of the scenic values of streams and creeks while maintaining flood protection. (San Bernardino County General Plan)	●	●				●			●		●			●					●

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	ECONOMIC DEVELOPMENT																			
1	Work together with the local governments, businesses, schools, and communities to create a vibrant local economy, through a long-term investment strategy that: encourages local enterprises; serves the needs of local residents, workers, and businesses; promotes stable employment and revenues by building on local competitive advantages; protect the natural environment; increases social equity; and is capable of succeeding in the global marketplace. (adapted from the Ahwahnee Principles for Economic Development)	•			•														•	
2	Visioning, planning and implementation efforts should continually involve all sectors, including the voluntary civic sector and those traditionally left out of the public planning process.				•													•		
3	Support and pursue economic development that maintains or improves, not harms, the environmental and public health. (adapted from the Ahwahnee Principles for Economic Development)	•			•										•					

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4	Enterprises should work as civic partners, contributing to the communities and regions where they operate, protecting the natural environment, and providing workers with good pay, benefits, opportunities for upward mobility, and a healthful work environment. (adapted from the Ahwahnee Principles for Economic Development)	●			●										●			●		
5	Protect the natural environment and increase quality of life, neighborhoods, communities and regions should have compact, multi-dimensional land use patterns that ensure a mix of uses, minimize impact of cars, and promote walking, bicycling, and transit access to employment, education, recreation, entertainment, shopping, and services. Economic development and transportation investments should reinforce these land use patterns, and the ability to move people and goods by non-automobile alternatives wherever possible. (adapted from the Ahwahnee Principles for Economic Development)	●			●	●								●						
6	Communities and the private sector should cooperate to create regional structures that promote a coherent metropolitan whole that respects local character and identity. (adapted from the Ahwahnee Principles for Economic Development)				●												●		●	

Green Infrastructure Site Design Guidelines

Coyote Creek Watershed Management Plan

PURPOSE

The *Green Infrastructure Site Design Guidelines* (Guidelines) are a series of eight (8) fact sheets for use by developers and municipalities in urban renewal projects. They are designed to encourage and inspire conversion of our traditional infrastructure to multi-objective landscapes. The *Guidelines* provide design suggestions for some of the most common urban land use types including streets, rooftops, schools, parks, underutilized spaces and single family homes. The cumulative benefits of these green infrastructure guidelines would result in improved water quality, increased local water supplies, enhanced urban habitat, improved pedestrian experiences and increased educational opportunities.

In addition to site-specific designs for developers and property owners, these fact sheets provide planning methods for consideration by city planners for adoption into General Plan policies and zoning ordinances. These can be part of an overall program for National Pollutant Discharge Elimination System (NPDES) compliance as well as various urban renewal efforts. In their current form the *Guidelines* do not specifically refer to potential beneficial uses, which would aid in meeting water quality goals set by the Regional Water Quality Control Boards. These fact sheets need to undergo technical review for inclusion in future revisions of the CASQA BMP Handbook.

BACKGROUND

Green infrastructure is a watershed-friendly approach to stormwater management. It is the network of water harvesting landscapes and hardscapes that conserves water, reduces flood risk, protects aquatic habitat, supports native landscapes, improves air quality and contributes to healthy communities and a higher quality of urban life. *Green infrastructure* reveals natural processes instead of hiding them, providing opportunities for increased public education and interpretive opportunities.

Green infrastructure (GI) is accomplished by retrofitting existing public works projects over time including streets, parking lots, stormdrains, channels and utilities. Future revitalization efforts for single buildings, commercial centers, blighted zones or residential neighborhoods are additional opportunities to integrate *green infrastructure* principles. The following eight (8) *Green Infrastructure Site Design Guidelines* (*Guidelines*) provide general guidance for selecting and implementing Best Management Practices (BMPs) for improved stormwater management.

Stormwater runoff is part of the hydrologic cycle of rainfall, surface flows, percolation and evaporation. Urbanization, agriculture and other human activities have altered the natural drainage patterns resulting in unmitigated pollutants entering rivers, lakes, and streams as well as coastal bays and estuaries, and ultimately, the ocean. Dark, heat-absorbing, impervious surfaces -- namely roofs, roads and parking lots -- are the quintessential hallmark of urbanization. Combined, all of the impervious surfaces of concrete and asphalt have cumulatively detrimental effects on the ecological and chemical processes in our watersheds. In addition to water pollution, impervious surfaces contribute to increased flood flows which stress creek systems and decreased groundwater recharge resulting in the need for expensive imported water supplies.

The concept of *GI* design incorporates the ecological processes that will ensure that negative watershed impacts from runoff are managed through improved community planning and site designs. The format of these *GI Guidelines* is loosely based on the California Stormwater Quality Association's (CASQA) Stormwater Best Management Practices Handbook (BMP Handbook). These *Guidelines* are a quick reference tool to jump-start and integrate GI concepts into site planning and design. For a comprehensive understanding of stormwater pollution control techniques, it is recommended that readers become familiar with the CASQA BMP Handbook.

NEXT STEPS

The next steps for the *Guidelines* are:

- Technical advisory committee review
    - To address Beneficial Uses for Regional Water Quality Control Board standards (Region 4 and Region 8)
    - To meet CASQA Stormwater BMP Handbook standards
    - conversion to CASQA BMP Fact Sheet
- Adoption by City/County
- Identification of green infrastructure conversion opportunities by City or community
- Implementation over time

GI FACT SHEETS

GI-1 Green Streets
Conversion from traditional stormwater to water conservation design to water conservation design

GI-2 Urban Greenways
Network of lineal open spaces to provide linkages of community resources, trails and habitats

GI-3 Urban Park Creation
Activate under-utilized land to become functional open spaces and parks

GI-4 Go "Native" Landscape Conversion
Conversion from conventional and thirsty landscapes to multi-beneficial native plants

GI-5 Schoolyard Ecosystem
Landscapes for learning to teach sustainability and stewardship

GI-6 Parking Lot Aquifers
Harvest dry weather runoff and storm flows for filtration and groundwater recharge benefits

GI-7 Green Roofs
Utilize rooftops as a resource for energy efficiency, stormwater management and visual benefits

GI-8 Green Home Garden
Green infrastructure practices for residential landscape and site design

GREEN INFRASTRUCTURE SITE DESIGN GUIDELINES DEFINITIONS

The *Guidelines* are 2-page fact sheets that provide design and application guidelines or Best Management Practices (BMP) to retrofit eight types of existing sites for improved stormwater management. The following are definitions of the various sections found in each *Guideline* fact sheet*:*

Design Objectives list specific design criteria that should be achieved in order to provide potential water quality, stormwater protection and groundwater recharge benefits. These are derived from the CASQA BMP Handbook. Objectives that enhance communities are also listed.

Description briefly describes the BMP and the cumulative natural and community benefits it will provide.

Approach provides a summary of the process and strategies for implementing the specific BMP.

Suitable Applications are examples of land use types to which the BMPs can be applied. Most examples imply retrofitting of existing sites.

Design Considerations are detailed descriptions of design recommendations to consider for implementation.

Consistent With items identify other stormwater or watershed-related plans in the region that the BMP is consistent with.

Supplementation Information provides case studies and resources for additional information. Where feasible, local projects are listed to that they can be visited**.**

GREEN STREETS

DESIGN OBJECTIVES

- ☑ Conserve water
- ☑ Filter urban runoff
- ☑ Reduce peak flows
- ☑ Minimize impervious surfaces
- ☑ Improve pedestrian experience
- ☑ Enhance educational and interpretive opportunities

Opportunity to create curb cuts to direct runoff into planter beds

Photo source: Kevin Perry, City of Portland

Examples of curb cuts and impervious surfaces

Photo source: Kevin Perry, City of Portland

SUITABLE APPLICATIONS

- Downtown and other redevelopment projects
- New development projects
- Street/utility repairs
- Streetscape improvements
- Land use conversion
- Commercial or industrial property upgrades

SW 12th Avenue Green Street, Portland, OR

Stormwater slows as it enters the landscape area, water infiltrates, and wetland plants filter pollutants.

Photo source: www.asla.org/awards/2006/06winners/341.html

DESCRIPTION

Green Streets contribute to a comprehensive stormwater and urban streetscape redevelopment program for municipalities. Green Streets involve the conversion from traditional stormwater to a water conservation design of streets and parking lots. Greening the infrastructure can be coupled with aesthetically pleasing designs and native landscapes to celebrate 'streets as public open spaces'. The use of pervious surfaces, bio-swales, curb cuts and rain gardens can help recharge the groundwater and reduce peak flows. Native or low-water use plants and trees conserve water and provide shade. Green Streets are a visible component of a system of "green infrastructure" that can enhance the aesthetics and livability of a community. Implemented over time, the cumulative benefits of Green Streets would be to provide clean water and create more attractive streetscapes for pedestrians and businesses. The City of Irvine's Redevelopment Agency has developed Green Streets design guidelines (see Resources) which are available online and ready to adopt. They are considered an upstream component of a comprehensive water quality "treatment train" system for the Newport Bay Watershed.

APPROACH

The basic approach is to retrofit existing streets, driveways and parking lots to reduce impervious surfaces while capturing and intercepting runoff at strategic locations. This fact sheet is not a proposal to replace 100% of all existing impervious surfaces with pervious surfaces. These design guidelines call for strategic retrofitting of existing streets and parking lots when redevelopment projects, utility repairs or upgrades are planned for the near future. Directing street runoff into planter beds would provide filtration. Landscapes should be thoughtfully integrated with the movement of water. Green Streets are meant to happen over time or chosen strategically where they can provide the most benefit based on a watershed-based assessment. Critical locations could include streets within industrial or commercial areas or in areas of known localized flooding.

SUPPLEMENTAL INFORMATION

Case Studies:

- Portland, Oregon's SW 12th Avenue won the American Society of Landscape Architecture 2006 Professional Award for its "green street" project converting the previously underutilized landscape area between the sidewalk and street curb into a series of landscaped stormwater planters designed to capture, slow, cleanse, and infiltrate street runoff.

Resources:

- City of Santa Monica has started a Landscape Water Efficiency Competitive Grant Program to provide incentives for innovative water conservation features in the landscape such as rain catchment and stormwater management systems.
- City of Downey has implemented the BMP Strategy for Managing Stormwater Runoff program with the overall goal of decreasing runoff and increasing infiltration. Infiltration devices that Downey is implementing include planters, swales, basins, porous surfaces, inverted street/parking lot cross sections, surface/underground rock trenches, perforated pipe, and French drain systems.
- The City of Irvine's Redevelopment Agency developed the Sustainable Travel-ways "Green Street" Administrative Guidelines, May 3, 2006. The Agency is considering adoption of Green Streets policies for all Great Park/Heritage Homes projects.
- Portland's Metro Green Street Handbook describes stormwater management strategies with detailed illustrations of "green" street designs that allow infiltration and limit stormwater runoff, updated 2005 (www.metro-region.org).
- Seattle's Sustainable Infrastructure/ Building's May 13, 2004 Regional Forum: Sustainable Streets and Streetscapes (seattle.gov/ environment/building.html).

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WATERSHED & COASTAL RESOURCES DIVISION

DESIGN CONSIDERATIONS

- Key design features include *permeable gutters*, *curb cuts, below grade planters, overflow pipe and decorative drainage grates.*
- Engineer stormwater harvesting to replenish groundwater where appropriate and to treat water onsite.
- Increase biodiversity and conserve water with use of native plants and the installation of low volume irrigation and evapo-transpiration controllers where appropriate to reduce water consumption, runoff and pollution.
- Engineer proper soil preparation to increase permeability of soil and improve water percolation, water storage, optimize aeration, organic productivity and increase survival rate of vegetation.
- Use light colored surfaces to reduce pavement temperatures, minimize reflective glare on wet surfaces and improve visibility of crosswalks and bikeways for public safety and aesthetics.
- Increase and maintain tree canopy for shade and heat reduction, improve air and water quality and visually improve the streetscape.
- Integrate pedestrian amenities such as wayfinding signage, kiosks, shade trees, benches, trash receptacles, lighting and public transportation shelters.
- Install appropriate lighting fixtures to reduce energy demand and glare, eliminate light pollution and improve safety.
- Reduce pavement widths for traffic calming and reduction of the heat-island effect.
- Widen parkways to filter runoff, plant shade trees and create a pedestrian-friendly environment.

Traditional method of directing stormwater runoff straight to storm drain that leads to creeks and bays

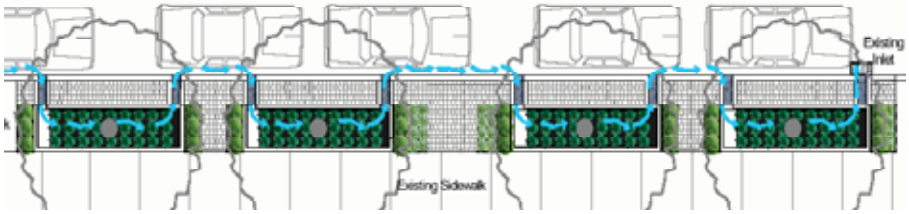

Photo source: www.asla.org/awards/2006/06winners/341.html

Stormwater runoff flows in and out of consecutive stormwater planters, designed to capture, slow, and infiltrate

CONSISTENT WITH:

- ☑ Orange County Stormwater Program, 2003 Drainage Area Management Plan (DAMP) - Section 7, New Development/Significant Redevelopment, September 24, 2003
- ☑ Green Visions Plan for 21st Century Southern California – San Gabriel and Los Angeles Rivers and Mountains Conservancy, 2003
- ☑ Common Ground, from the Mountains to the Sea: Watershed and Open Space Plan, San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy, October 2001
- ☑ Proposition 50, Chapter 8 Integrated Regional Water Management Plan Guidelines; Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002
- ☑ The Ahwahnee Water Principles for Resource Efficient Land Use, Local Government Commission, Adopted in 2005

URBAN GREENWAYS

DESIGN OBJECTIVES

- ☑ Conserve water
- ☑ Filter urban runoff
- ☑ Reduce peak flows
- ☑ Minimize impervious surfaces
- ☑ Improve pedestrian experience
- ☑ Provide open space and/or recreational opportunities
- ☑ Enhance educational and interpretive opportunities

Coyote Creek, Lower San Gabriel River
Opportunity to create greenway along a flood channel.

Los Angeles River Bikeway
A park along the Bikeway provides seating and interpretive signage.

Source: North East Trees.

Great Heron Gates at Rattlesnake Park
An artistic interpretation of the wildlife of the Los Angeles River, the gates welcome visitors to the Greenway and its series of river parks.

Source: North East Trees.

SUITABLE APPLICATIONS

- Railway and utility corridors
- Flood channel right-of-way or creek corridors
- Network of green roofs
- Network of parks along trails
- Linkages and greening of existing trails
- Neighborhood streets
- Commercial/retail streets
- Redevelopment and urban renewal projects

Santa Ana River Greenway/Bikeway
Recreation opportunities for bicycling, jogging, golfing and equestrian trail use..

Source: dan slater

DESCRIPTION

Greenways are linear open space corridors that provide community linkages through, around and across urbanized regions. Greenway corridors often follow creeks and flood channels, abandoned railroad right-of-ways, or transportation corridors. Greenways can be used for recreation, as a transit corridor, or be managed for habitat conservation. A greenway system is composed of large hubs, links and smaller sites made up of natural, historical, cultural, and recreational features. The hubs anchor the system and provide an origin or destination for people and wildlife moving to or through it. Urban greenways can improve and/or restore natural water processes through a combination of floodplains, riparian habitats. Greenways also serve to improve the 'livability' of communities by providing river frontage and recreational amenities. Urban greenway networks benefit human and wildlife movement by the linkages they form. Implemented over time, the potential cumulative benefits to a community include aesthetic improvements, economic return, improved ecological health and more sustainable infrastructure systems.

APPROACH

Greenways by their nature connect places, people and wildlife and thus require a plan and the cooperation of interested and involved parties. Greenway systems can be designed and implemented at many different scales; local, regional, state, national. They can be implemented by any level of government or even by community groups where suitable opportunities exist and multiple landowners can come together. Prime opportunity areas for the creation of greenways can be found in existing utility, transportation and stream corridors. Implementation strategies may include plans to meet a variety of objectives such as restoration, habitat, sediment management or multi-modal transportation.

SUPPLEMENTAL INFORMATION

Case Studies:

- The Santa Ana River Mountains to Sea Bike Trail will extend from the San Bernardino Mountains to Huntington Beach. This tri-county effort includes the creation of multiple Blue Ribbon Task Forces to foster regional cooperation and integration.
- The Los Angeles River Revitalization Master Plan aims to transform the famous concrete river into a continuous 51-mile recreational greenway from Canoga Park to Long Beach. The existing Los Angeles River Bikeway is a component of the greenway, extending from Victory Boulevard in Burbank to Riverside Drive. in Cypress Park, Los Angeles. A series of mini-parks along the Bikeway showcase native plants, seating, drinking fountains, interpretive signage, whimsical sculptures, fences and gates.
- The San Gabriel River Master Plan, created by the Los Angeles County Department of Public Works is a stakeholder-driven vision for a 39-mile multi-purpose greenway with parks, regional bike trails, habitat restoration, gateways, treatment wetlands and interpretive centers.
- Trails4All non-profit organization is currently developing the Coyote Creek Bike Trail Master Plan with funding from the Rivers and Mountains Conservancy. This trail will extend from the confluence with the San Gabriel River Bike Trail up to Brea and the Puente-Chino Hills.

Resources:

- The National Park Service provides technical assistance to local municipalities and organization through their Rivers, Trails & Conservation Assistance Program (www.nps.gov/rtca) specifically for the development of multi-jurisdictional trail and river corridors.
- Rails-to-Trails Conservancy works with communities to transform unused rail corridors into trails that enhance the health of the environment, economy and neighborhoods (www.railtrails.org).

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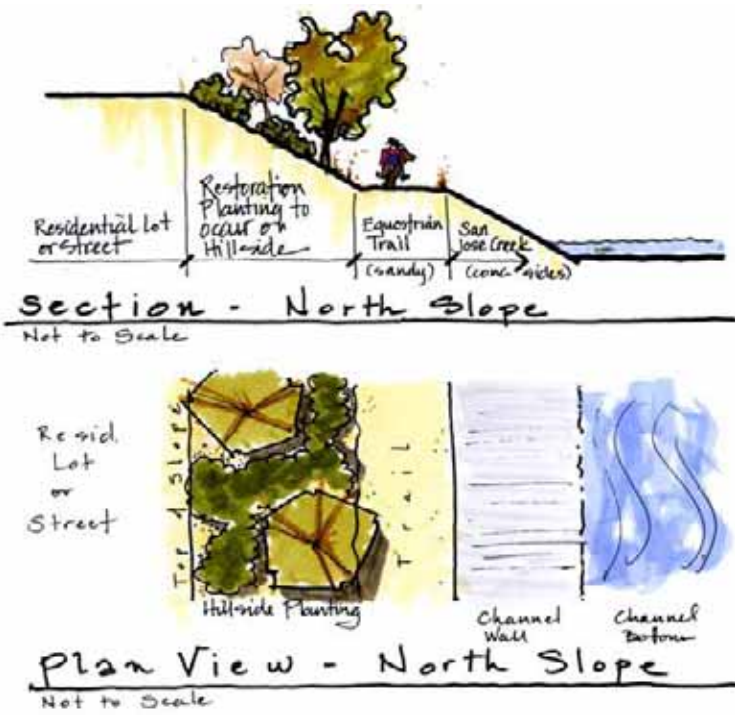
WATERSHED & COASTAL RESOURCES DIVISION

DESIGN CONSIDERATIONS

- Develop a comprehensive plan that addresses access to multi-modal trails, riparian habitat, bikeways, bridges and pocket and linear parks.
- Provide informational and interpretive way-finding signage to increase public awareness, educational outreach and facilitate access.
- Evaluate the benefit of "day-lighting" creeks to regenerate natural floodplain functioning and increase aesthetics.
- Implement linked trails and a bike path network throughout the watershed.
- Employ green infrastructure methods that integrate stormwater management with habitat and recreational use.
- Plant additional trees along streets connected to greenways to multiply the benefits derived from an increased tree canopy and provide continuity throughout the corridor.
- Provide amenities for pedestrians, equestrians and bicyclists such as benches, drinking fountains, trash cans, signage, bike racks, lighting and comfort facilities.
- Involve communities and promote activation of spaces through public art installations.
- Employ sustainable construction methods through the use of recycled materials, energy efficient lighting, low volume irrigation systems and Green Street components.
- Use native plant materials to decrease water consumption and enhance biodiversity.



Source: North East Trees.

San Jose Creek Trail, City of Industry, California

CONSISTENT WITH:

- ☑ Orange County Stormwater Program, 2003 Drainage Area Management Plan (DAMP) - Section 7, New Development/Significant Redevelopment, September 24, 2003
- ☑ Green Visions Plan for 21st Century Southern California – San Gabriel and Los Angeles Rivers and Mountains Conservancy, 2003
- ☑ Common Ground, from the Mountains to the Sea: Watershed and Open Space Plan, San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy, October 2001
- ☑ Proposition 50, Chapter 8 Integrated Regional Water Management Plan Guidelines; Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002

URBAN PARK CREATION

DESIGN OBJECTIVES

- ☑ Conserve water
- ☑ Filter urban runoff
- ☑ Reduce peak flows
- ☑ Minimize impervious surfaces
- ☑ Improve pedestrian experience
- ☑ Provide open space and/or recreational opportunities
- ☑ Enhance educational and interpretive opportunities
- ☑ Habitat creation

Along Coyote Creek, Lower San Gabriel River
Opportunities for transformation to urban parks.

Steelhead Park, LA River Bikeway
Former burnt-out crack house in Cypress Park, LA. The park provides a small outdoor amphitheater against the backdrop of the river.

Source: North East Trees.

SUITABLE APPLICATIONS

- Public Schools 'Open the Gates' after-hour park program
- Blighted and/or vacant properties
- Abandoned commercial or industrial properties
- Underutilized corners of commercial or industrial properties
- Underutilized Parking Lots
- Utility, flood, road or railroad easements
- Publicly owned property
- Underutilized, low traffic volume streets
- Brownfield and landfill sites
- Redevelopment and urban renewal projects

Bimini Slough Ecology Park
The park covers what was previously Second Street between S. Bimini Place and Juanita Avenue. In this part of Los Angeles, parks are in short supply -- 1,000 residents for every 1/3 of an acre of green space.

Photo source: Bresee Foundation

DESCRIPTION

Lack of park space is a common health and social equity issue in many cities. Scarcity of available land may require creative approaches to urban park creation. Potential land uses that may serve as parks in the future include the redevelopment of underutilized and/or vacant lots, corners of commercial properties, parking lots and even the conversion of low volume streets. "Open the Gates" programs that allow after hour use of public schools are another opportunity. The creative transformation of underutilized urban spaces benefit human health through access to recreational opportunities, while improving habitat opportunities, improved water quality and providing aesthetic improvements to the community. Parks may also serve as educational outlets to showcase the benefits of native plants, permeable surfaces and recycled materials. Community building can be achieved through incorporation of local artwork by artists or children, and 'place-making' signage. Increasing the quantity and quality of parks over time will result in a host of socio-economic benefits to a city, including improved property values, economic opportunities and healthier lifestyles of its residents.

APPROACH

Urban Park Creation can take many forms and approaches. A potential first step is considering the viability of 'Open the Gates' opportunities in underserved, park poor areas. This stop-gap measure can be implemented quickly over the near-term while longer-term, more permanent park opportunities are identified. Conversion of underutilized publicly owned properties, such as Caltrans right-of-ways (ROW), Utility easements, and City lots, can serve as park creation opportunity sites. Joint use agreements can be negotiated with industrial or commercial property owners. Cities can actively reclaim vacant land, blighted and abandoned properties and underutilized streets and commercial lots and converting them to urban parks and public spaces. Accessibility is improved by identifying park opportunities adjacent to greenways, trails and residential neighborhoods. Local leadership is required to facilitate the process of developing new parks and maintenance agreements. Community involvement is a key component to successful park creation, maintenance, active use and safety.

SUPPLEMENTAL INFORMATION

Case Studies:

- Bimini Slough Ecology Park used to be what was previously Second Street between South Bimini Place and Juanita Avenue in Los Angeles, California. It is now a community park with an exposed storm drain, native plants, a tot lot, benches and wireless access.
- Steelhead Park, the site of a former burnt-out crack house, is now a vital part of the Los Angeles River Bikeway and neighborhood park. Features include an outdoor amphitheater which also doubles as an overflow basin and whimsical fencing decorated with "jumping" steelhead trout. Other features include recycled broken concrete retaining walls for seating and planter beds, native plants including sycamores for shade, paths of decomposed granite which is a permeable yet accessible surface, and a yarrow "lawn" which can also serves as a meadow and requires minimal watering.
- Cornfields State Park is a community effort to transforming the Southern Pacific's River Station railroad yard into a 32-acre park, Los Angeles, California.

Resources:

- North East Trees' mission is to restore nature's services in resource challenged communities, through urban forestry, urban park creation, employing at-risk youth, and stewardship program (northeastrees.org). They developed the LA River Bikeway mini-parks including Steelhead Park, as well as Bimini Slough.
- Trust for Public Land's Parks for People LA is an initiative to partner with diverse communities in order to create new parks in Los Angeles County (www.tpl.org).

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WATERSHED & COASTAL RESOURCES DIVISION

DESIGN CONSIDERATIONS

- Identify park and recreation gaps for each community, then locate all possible future park sites using land use criteria from "Suitable Applications" list. Pursue funding for parks in areas of greatest need and most willing landowners.
- Program appropriate level of park amenities, services and functions depending on community needs, park location and primary objective of site – recreation or habitat.
- Design in water harvesting features including vegetated swales to filter stormwater run-off and reduce pollutants before reaching stormdrains and creeks.
- Increase biodiversity and conserve water with use of native plants and the installation of low volume irrigation to reduce water consumption, runoff and pollution.
- Include quality pedestrian amenities such as benches, drinking fountains, shade trees, lighting, bike racks.
- Integrate child and dog-friendly design to encourage wide range of users.
- Inspire communities to develop their own future parks with interpretive exhibits located on newly developed park sites.
- Encourage public participation in the long-term stewardship of parks.
- Ensure appropriate public health and safety mitigation actions are undertaken when converting brownfield or landfill sites to park or habitat use.

Los Angeles State Historic Park Conceptual Plan

Source: California State Parks, www.parks.ca.gov

CONSISTENT WITH:

- ☑ Orange County Stormwater Program, 2003 Drainage Area Management Plan (DAMP) - Section 7, New Development/Significant Redevelopment, September 24, 2003
- ☑ Green Visions Plan for 21st Century Southern California – San Gabriel and Los Angeles Rivers and Mountains Conservancy, 2003
- ☑ Common Ground, from the Mountains to the Sea: Watershed and Open Space Plan, San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy, October 2001
- ☑ Proposition 50, Chapter 8 Integrated Regional Water Management Plan Guidelines; Water Security, Clean Drinking Water, Coastal and Beach Protection Act of 2002
- ☑ The Ahwahnee Water Principles for Resource Efficient Land Use, Local Government Commission, Adopted in 2005

GO "NATIVE" LANDSCAPE CONVERSION

DESIGN OBJECTIVES

- ☑ Conserve water
- ☑ Filter urban runoff
- ☑ Reduce peak flows
- ☑ Minimize impervious surfaces
- ☑ Improve pedestrian experience
- ☑ Provide open space and/or recreational opportunities
- ☑ Enhance educational and interpretive opportunities
- ☑ Habitat creation

Rancho Santa Ana Botanical Gardens, Claremont, CA
Douglas iris naturalized at the edge of a pool.

Photo source: Rancho Santa Ana Botanical Garden

PLANT COMMUNITY	NEW CALIFORNIA NATIVES	REPLACE - EXOTICS
	TREE LIST	TREE LIST
Mediterranean	Retain existing non-native tree	Canary Island Pine *Pinus canariensis*
Woodland	Catalina Cherry *Prunus ilicifolia 'lyonii'*	Evergreen Pear *Pyrus kawakami*
Chap, CSS, Woodland	Toyon *Heteromeles arbutifolia*	Hollywood Juniper *Juniperus chinensis 'Torulosa'*
Chaparral Woodland	Western Redbud *Cercis occidentalis*	Japanese Maple *Acer palmatum*
Mediterranean	New Herb Garden	Fern Pine *Podocarpus gracilior*
Chap, CSS Woodland	Catalina Cherry *Prunus ilicifolia ssp. lyonii*	Purple-leaf Plum *Prunus cerasifera 'Atropurpurea'*
Riparian Woodland	White Alder *Cercis occidentalis*	White Birch *Betula pendula*
	SHRUB LIST	SHRUB LIST
CSScrub Woodland	Howard McMinn Manzanita *Arctostaphylos densiflora 'Howard McMinn'*	Armstrong Juniper *Juniperus chinensis 'Armstrongi'*
Riparian	Giant Chain Fern *Woodwardia fimbriata*	Armstrong Juniper *Juniperus chinensis 'Armstrongi'*
Woodland	Oregon Grape 'Golden Abundance' *Mahonia 'Golden Abundance'*	Camellia *Camellia japonica*
Chap, Woodlnd Riparian	Bush Anemone *Carpenteria californica*	Camellia *Camellia sasanqua*
Chap, CSS Woodland	Coast Silktassel *Garry elliptica*	Glossy Abelia *Abelia x grandiflora*
Chap, CSS Woodland	Coffeeberry *Rhamnus californica*	Heavenly Bamboo *Nandina domestica*
Chaparral Woodland	Hollyleaf Cherry *Prunus ilicifolia*	Hibiscus *Hibiscus rosa-sinensis*
CSScrub Woodland	Howard McMinn Manzanita *Arctostaphylos densiflora 'Howard McMinn'*	Indian Hawthorn *Rhaphiolepis indica*
Chap, CSS	Lemonade Berry *Rhus integrifolia*	Japanese Privet *Ligustrum japonicum 'Texanum'*
Woodland	Oregon Grape 'Golden Abundance' *Mahonia 'Golden Abundance'*	NCN *Ternstroemia gymnanthera*
Chap, CSS Woodland	Mountain Mahoghany *Cercocarpus betuloides*	NCN *Ternstroemia gymnanthera*

Examples of exotic plant replacement to natives

SUITABLE APPLICATIONS

- Single-family and multi-family residential lots
- Road and freeway plantings, street medians and parkways
- Park buffer and transitional zones
- Homeowner association common areas
- Cemeteries, golf courses, corporate campuses
- Schools and universities
- Parking lots
- Commercial or industrial parks

Southern California native plant gardens

Adapted from: CSU, Pomona 606 Studio - San Diego Creek& Upper Newport Bay

DESCRIPTION

Go "native" landscape conversion promotes the transformation of "thirsty" landscapes to water-use efficient landscape where feasible. Turf is the number one user of water in our landscapes with the highest potential for conversion. Runoff from over-watering brings pollutants such as pesticides and fertilizers to our creeks and the ocean. Significant benefits can be attained through the transformation of turf based landscapes to native and water efficient planting designs. Natives are preferred, but not always practical. Implemented over time and throughout the watershed, native plants could contribute to increased biodiversity in urban areas. Native plants, once established, result in reduced maintenance costs through reduced requirements for water, fertilizers, pesticides and lawn maintenance equipment.

APPROACH

Anywhere there is turf, the opportunity exists to convert to a more sustainable and water efficient native landscape. Many turf-intensive landscapes are functionally passive and exist primarily to be green in color. Residential front yards, street medians, parkways and community association common areas are some examples of passive open space opportunities for conversion. Parks present another great opportunity to save water through conversion of 50% or more of the grass to water efficient landscapes. For example, active recreation zones could remain as turf while the perimeter and transitional areas of the park are re-zoned to become low water-use landscapes. In lieu of native plants, if not appropriate to the application, drought tolerant exotics can be suitable alternatives. Use of artificial turf for active recreational zones is another viable alternative to water dependant turf.

Turf in the parkway is replaced with drought tolerant native plants; Island Alum Root, Pacific Coast Iris and shredded bark mulch.

Adapted from: CSU, Pomona 606 Studio - San Diego Creek& Upper Newport Bay

SUPPLEMENTAL INFORMATION

Case Studies:

- Alondra Community Regional Park, Lawndale, California has a California native plant garden that is also an attractant for native butterflies and wild birds.
- Rancho Santa Ana Botanical Garden, Claremont, California, has extensive gardens for education and inspiration on native plants.
- Sam Maloof Garden, Rancho Cucamonga, California, is a six acre, low-water use, home garden with many native plants.
- Landscapes Southern California Style, Western Municipal Water District Offices, Riverside, California, is a one-acre water conservation demonstration garden (mostly non-native), designed to encourage public acceptance, desire for, and use of water-efficient landscapes.

Resources:

- California Native Plant Society has an extensive inventory and background information online (www.cnps.org).
- Audubon Cooperative Sanctuary Program certifies golf courses as habitat-friendly landscapes (www.audubonintl.org).
- National Wildlife Federation has the "Habitat Certified Backyard" program for homeowners who want to encourage native wildlife and birds in their backyards (www.nwf.org).
- Theodore Payne Foundation's Care and Maintenance of Southern California Native Plant Gardens by Bart O'Brien, Betsey Landis, Ellen Mackey is published by Metropolitan Water District of Southern California, 2006.
- www.bewaterwise.com has tips and water use calculators for creating water efficient landscapes.
- Landscape Plants for Western Regions: An Illustrated Guide to Plants for Water Conservation by Bob Perry provides color photographs and description of plant suitability.

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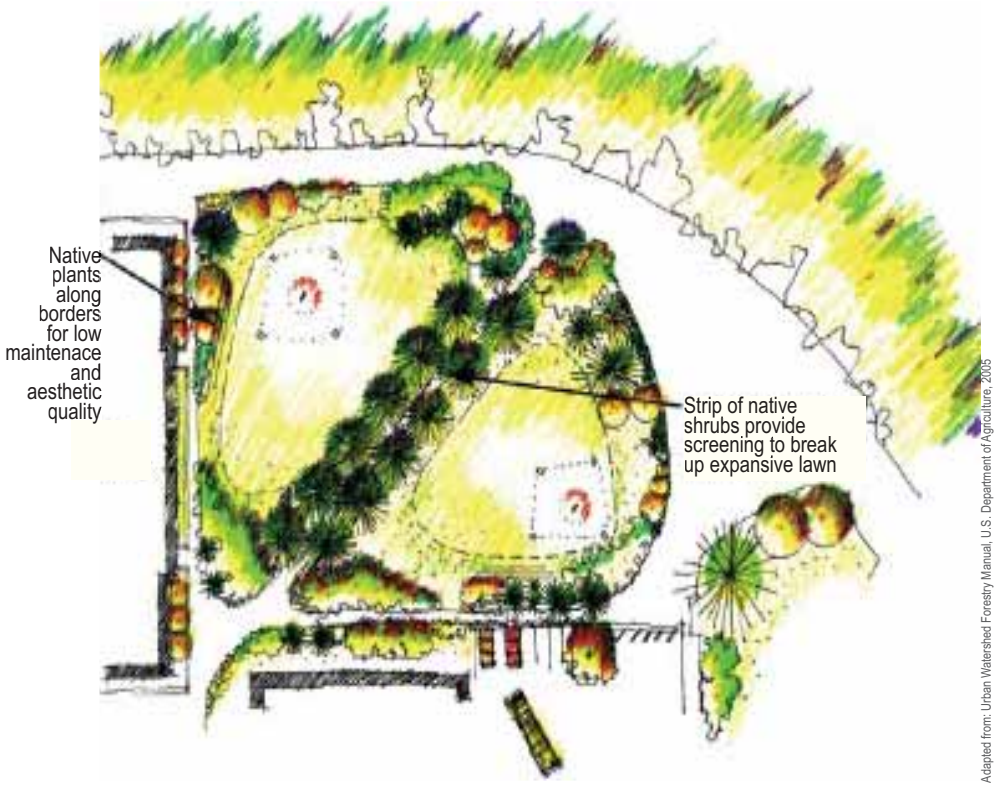
www.ocwatersheds.com

WATERSHED & COASTAL RESOURCES DIVISION

DESIGN CONSIDERATIONS

- Develop appropriate native plant lists and design guidelines for different landscape types such as residential, streetscape, recreation or commercial applications.
- Encourage the use of native plants by providing plant lists to landowners.
- Train landscape maintenance personnel in the proper care of water efficient and native plant landscapes.
- Convert exotic, water thirsty turf grass species (fescues) with water efficient more hardy native grass species (sedges) and alternatives (artificial turf) where appropriate.
- Successful native landscape requires careful planning and soil preparation to minimize weeds. Soil must be prepared properly to add proper nutrients and ensure adequate drainage.
- Integrate sustainable landscape maintenance practices including use of compost and mulching.



Adapted from: Urban Watershed Forestry Manual, U.S. Department of Agriculture, 2005

Example of converting 100% turf to 50% turf and %50% native

CONSISTENT WITH:

- ☑ Orange County Stormwater Program, 2003 Drainage Area Management Plan (DAMP) - Section 7, New Development/Significant Redevelopment, September 24, 2003
- ☑ Green Visions Plan for 21st Century Southern California – San Gabriel and Los Angeles Rivers and Mountains Conservancy, 2003
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SCHOOLYARD ECOSYSTEM

DESIGN OBJECTIVES

- ☑ Conserve water
- ☑ Filter urban runoff
- ☑ Reduce peak flows
- ☑ Minimize impervious surfaces
- ☑ Provide open space and/or recreational opportunities
- ☑ Enhance educational and interpretive opportunities
- ☑ Habitat creation

Opportunity to convert a schoolyard into a native habitat while treating stormwater runoff

Photo source:CSU, Pomona 606 Studio - Coyote Creek Watershed

Garden Schools - Students involved in community gardens.

North East Trees' reading garden

Photo source:CSU, Pomona 606 Studio - Coyote Creek Watershed

SUITABLE APPLICATIONS

- Public and private schools
- Daycare facilities
- Colleges and universities
- Libraries and museums
- Parks and other public open spaces
- Civic and community centers
- Demonstration gardens and installations

Kids playing in a natural setting

DESCRIPTION

Schoolyard ecosystem is a hands-on learning opportunity to educate children on the importance of watershed health and the benefits of environmentally friendly and sustainable landscapes. Through innovative teaching tools, students experience natural environments and stewardship in their own schoolyard. Garden design and programs should be based on curriculum and science standards for maximum learning potential. School ecosystem projects provide students with a dynamic environment to observe, discover, experiment, nurture and learn from. Observing and interacting with the garden through the seasons enhance students understanding of the dynamics of an ecosystem. In addition, the garden reveals the origin of food and enhances knowledge of plant and animal life cycles. Implemented over time, the cumulative watershed health benefits to a city would be multiplied as school children pass their own learning experiences and knowledge onto their parents and the seeds of sustainability and environmental responsibility begin to take root in the community.

APPROACH

Watershed health may very well start with our schools. By converting asphalt play areas into schoolyard ecosystems not only reduces heat island effect and storm runoff but also educates students on how they can participate in ensuring a healthy watershed. By replacing asphalt play areas with pervious surfaces, native plant and food gardens schools are investing in the future. Use of pervious surfaces allows water filtration while still providing durable surfaces for active play areas. The use of underground cisterns under parking lots and grassy playing fields can provide water for reuse as irrigation for sports fields.

SUPPLEMENTAL INFORMATION

Case Studies:

- 24th Street Elementary School, Los Angeles, California is a joint use project between Los Angeles Unified School District (LAUSD) and the Garden School Foundation to create a community garden, park space, and outdoor classroom shared with a local elementary school.
- LAUSD teamed with local non-profits to design and build two "Sustainable Schools":
  - o Broadus Elementary School in Pacoima, California was designed to protect the school from flooding during major storms. Up to a half-million gallons of rainfall is captured and reclaimed, while the value produced by flood prevention and groundwater recharge paid for a new soccer field. Implemented by TreePeople.
  - o Multnomah Street Elementary School, Los Angeles, is one of the first LAUSD "Sustainable Schools" program designed and installed by North East Trees. A cistern system underneath the kindergarten yard captures rainfall and provides recycled water for irrigation . Many opportunities for learning have been integrated into the school's campus.
- For the "Cool Schools" program, LAUSD teamed up with Los Angeles Department of Water and Power (LADWP) and four local non-profit groups to implement and promote tree planting around schools to provide shade, reduce electricity costs and involve children in an educational process.

Resources:

- Trust for Public Land's creation of joint use school campuses is a program for developing community spaces on LAUSD campuses (www.tpl.org).
- The Garden School Foundation has a community partnership with LAUSD dedicated to bringing verdant traffic buffers, sports facilities, native gardens, science gardens, kitchen gardens and teaching kitchens to public schools (gardenschoolfoundation.org).

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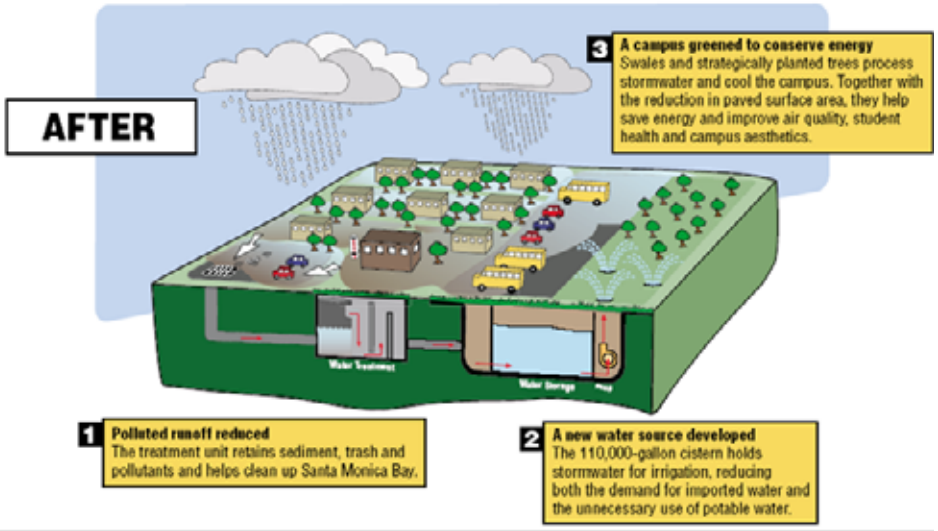
WATERSHED & COASTAL RESOURCES DIVISION

DESIGN CONSIDERATIONS

- Reduce the quantity of impervious surface, such as asphalt playgrounds, by converting to more permeable construction materials and the installation of gardens where appropriate.
- Install cisterns, rain barrels, rain gardens and swales into the landscape to capture rainwater for irrigation reuse.
- Additional design opportunities include the use of stormwater retention basins, parking lot aquifers and sport field floodplains.
- Design and install interactive learning elements and art installations.
- Build reading gardens into the design to encourage literacy and life-long learning.
- Develop a school curriculum around experiential interpretative exhibits and activities focusing on ecology and watershed lessons, experiments in biology, chemistry, geology, engineering, landscape architecture and other environmental fields.
- Design and install community food production gardens and native plant gardens to encourage community participation and educational outreach opportunities.
- Design native gardens to encourage the establishment of bird and butterfly habitats.

Most schools are paved-over with impervious surfaces for play areas



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PARKING LOT AQUIFERS

DESIGN OBJECTIVES

- ☑ Conserve water
- ☑ Filter urban runoff
- ☑ Reduce peak flows
- ☑ Minimize impervious surfaces
- ☑ Provide open space and/or recreational opportunities
- ☑ Enhance educational and interpretive opportunities

Rio Hondo Golf Course, Downey, CA
Inveted parking lot

Photo source:City of Downey

Permeable pavers along street parking

Photo source: Fuscoe Engineering

SUITABLE APPLICATIONS

- Commercial and industrial sites
- Residential
- Public Facilities
- Schools
- Overflow parking
- Sport venues
- Beaches and parks
- Storage facilities

Parking lot in a shopping area, Portland, OR
An artistic water feature that utilize stormwater runoff from buildings into a below grade planter median

Photo source: www.portlandonline.com

DESCRIPTION

Transportation-related hard surfaces account for 60% of total impervious surfaces. This includes parking lots: a one-acre parking lot produces sixteen times more runoff than an undeveloped meadow. Parking lot aquifers integrate use of pervious surfaces, swales, curb cuts, rain gardens and other green infrastructure methods to control and hold dry weather and storm runoff for ground water recharge in parking lots and other impervious surfaces.

APPROACH

Local road buffers and median strips are ideal locations to treat stormwater runoff from parking lots. Vegetation planted in landscaped islands can be used to intercept rainwater and treat stormwater runoff from the surrounding pavement. Bio-retention and bio-infiltration facilities may be well suited to cul-de-sac islands. In addition, permeable paving in at the edges of parking lots, driveways and street parking can increase permeable surfaces that allow infiltration and reduce runoff.

Opportunity to create vegetated buffers in parking lots

Photo source: Urban Watershed Forestry Manual

SUPPLEMENTAL INFORMATION

Case Studies:

- City of Downey implemented BMP strategies for managing stormwater runoff in parking lots. Infiltration devices used include planters, swales and basins, porous surfaces, inverted street/parking lot cross sections, and surface/underground rock trenches.

- Glencoe Elementary School Parking Lot Retrofit at 825 SE 51st Street. This is an institutional parking lot retrofit – demonstration project that uses vegetated infiltration swale with check dams. The impervious area of the parking lot was reduced by almost 30% and just 3 parking spaces were lost (out of 38 original spaces). The swale helps reduce local surcharging of the combined sewer, helps reduce Combined Sewer Overflows (CSO's), and improves runoff water quality.

- The City of Vancouver is working to reduce the amount of rainwater that flows into the sewers during storms. One feature the City is experimenting with, the Rain Garden, allows storm water from the street to be channeled into the planted areas behind curbs.

Resources:

- City of Los Angeles, Department of Public Works, Bureau of Sanitation -- Stormwater Program (www.LAstormwater.org).

- Lessons Learned: The Caltrans Storm Water Best Management Practice Retrofit Pilot Study. California State University, Sacramento, University of California, Davis, and California Department of Transportation, 2000.

- Green Visions Plan for 21st Century Southern California, Chapter 10. Stormwater Quality Control through Retrofit of Industrial Surfaces Santa Monica Mountains Conservancy and Mountains Recreation and Conservation Authority, April 2006.

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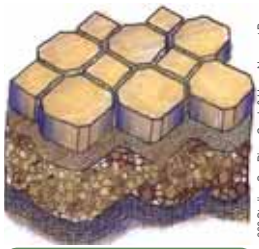
WATERSHED & COASTAL RESOURCES DIVISION

DESIGN CONSIDERATIONS

- Reduce the overall imperviousness associated with parking lots by providing compact car spaces, minimizing stall dimensions, incorporating efficient parking lanes, and using pervious materials in spillover parking areas where possible.
- Wherever possible, provide stormwater treatment for parking lot runoff using bioretention areas, filter strips, and/or other practices that can be integrated into required landscaping areas and traffic islands.
- Eliminate 6" curbs and incorporate curb cuts to direct stormwater runoff into bio-swales. Bio-swales should be engineered to retain, filter & percolate stormwater runoff and improve water quality.
- Planter beds in parking lots can also provide trees for shade to decrease heat island effect of asphalt surfaces.
- Use California friendly or native plants to conserve water, reduce costs, and improve aesthetics.

Photo source:City of Downey

Rio Hondo, Downey, CA
Rock surrounded drainage inlet in parking lot



Adapted from: CSU, Pomona 606 Studio- San Diego Creek & Upper Newport Bay

Using pavers in place of concrete without mortars to allow for water to infiltrate

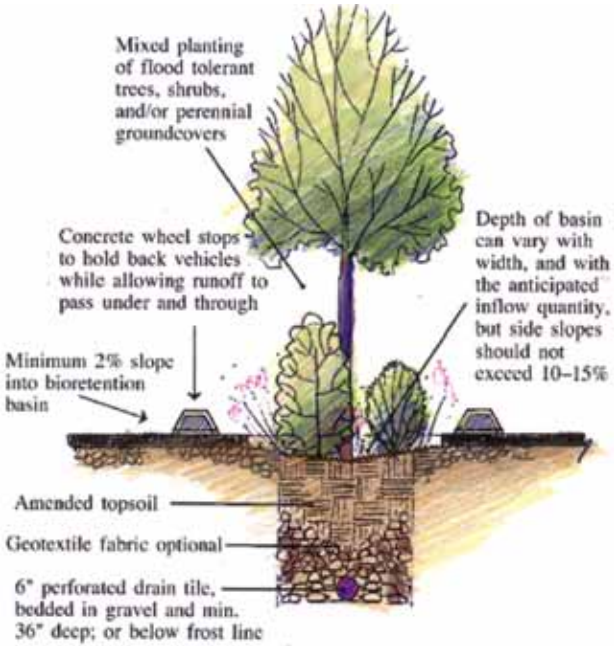


Photo source: www.urbanext.uiuc.edu/ccr/LGIEN2002-0017.html

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GREEN ROOFS

DESIGN OBJECTIVES

- ☑ Conserve water
- ☑ Filter urban runoff
- ☑ Reduce peak flows
- ☑ Minimize impervious surfaces
- ☑ Provide open space and/or recreational opportunities
- ☑ Enhance educational and interpretive opportunities
- ☑ Habitat creation

Opportunity for a green roof to cool building and capture rainfall.

Photo source: Michigan State University, Department of Horticulture, Green Roof Research Program

Silvercup Studios, New York, NY
Largest green roof in New York City, covering over 35,000 square feet of rooftop with self-sustaining vegetation

Photo source: www.greenroofs.com

GAP Headquarters, San Bruno, CA
Planted with native grasses and wildflowers.

Photo source: William McDonough + Partners

SUITABLE APPLICATIONS

- Commercial and industrial
- Residential
- Parking structures
- College, university and schools
- Public and municipal facilities
- Corporate campuses

Ford Motor Co. Premiere Automotive Group, Irvine, CA
The multi-story green roof is planted with Sedum, Echeveria, Lampranthus, Delosperma, Agave, and Aloe.

Photo source: Orange County Register

DESCRIPTION

A *Green roof* turns unused, blighted and impervious rooftops into a landscaped and attractive building feature. They typically consist of specially engineered soil planted with vegetation over a waterproof membrane. *Green roofs* provide a variety of benefits including the reduction of the urban heat island effect, improved building insulation, habitat for birds, improved air quality through additional plants and trees, and improved water quality through the absorption of pollutants and reduction of urban runoff. Green roofs serve a stormwater management function, reduce energy requirements and provide aesthetic benefits to the watershed.

APPROACH

Green roofs are appropriate for use on most building types. Plant selection and irrigation requirements will vary depending on site location and local climatic conditions. Gray water systems can be incorporated into design to provide supplemental water required during dry, hot weather conditions. There are two main types of green roof systems: extensive (1-5 inches of soil, minimal maintenance) and intensive (minimum 12 inch soil depth, invites use of larger plants and more human interaction). Installation costs are higher for *Green roofs* than for traditional roofing systems. Additional costs include appropriate substrate materials, special roof preparation and installation practices. Savings are achieved over the long-term and when implemented en masse in energy use reduction, a healthier environment and newly discovered landscaped areas. Green roofs are recognized in the Leadership in Energy and Environmental Design (LEED) program of the U.S. Green Building Council. Building designs incorporating a green roof covering at least 50% of the roof area can earn one LEED rating point for urban heat island reduction and one point for stormwater management.

SUPPLEMENTAL INFORMATION

Case Studies:

- The Ford Motor Company's Premiere Automotive Group offices in Irvine, California are the first LEED-certified building in Orange County. A meadow-like "green" roof is part of its advanced energy-efficient features. The multistory roof levels are planted with arid-climate plants that lower internal temperatures and soak away water runoff. A 2004 study found the building is 35 percent more efficient than other buildings.

- The green roof at the Theodore Alexander Jr. Science Center School, Los Angeles, California, has rows of Gold Coast Juniper that grow a foot high. The junipers shade the roof while a layer of carefully chosen soil mixture insulates the building, trimming cooling costs.

- The courtyard roof atop the 10th at Hoyt Apartments, designed by Koch Landscape Architecture in Portland, Oregon, complied with the City of Portland's guidelines for on-site stormwater runoff. Innovative design features include water channels, cascades, and fountains that are activated for about 30 hours after a rainstorm. The water is cycled into and through shallow detention basins, cisterns, and lighted boxes, and then it's slowly released into the city stormwater system.

Resources:

- Green Roofs - Cooling Los Angeles: A Resource Guide by the Environmental Affairs Department, City of Los Angeles, 2006.

- Design Guidelines for Green Roofs by Steven Peck and Monica Kuhn.

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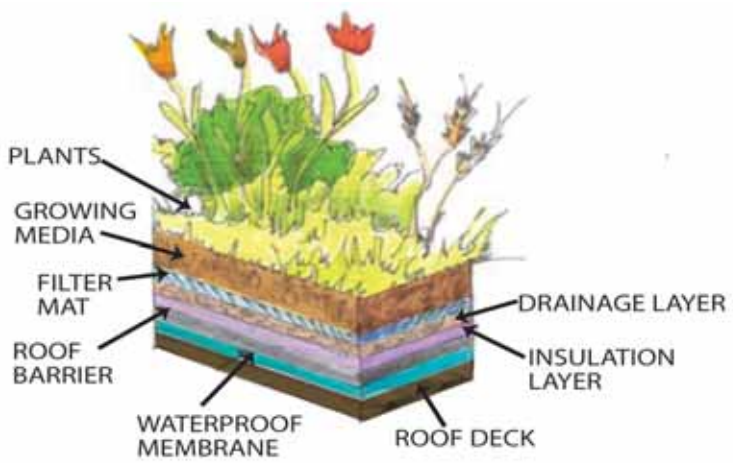
WATERSHED & COASTAL RESOURCES DIVISION

DESIGN CONSIDERATIONS

- Assess maximum roof load limits, accessibility, and the rooftop microclimate which influences plant selection and watering needs for new construction or retrofit.
- Increase water use efficiency with a drip irrigation system utilizing gray water system or recycled rain water.
- Harvest rainfall with cisterns or rain barrel technology. These can be either on the roof or pumped up from a location near the building, either above ground or underground.
- Ensure appropriate soil depth is maintained to meet roots, water and nutrient needs. Employ root and waterproof membranes to protect building envelope from moisture.
- Use mulch to prevent wind and rain erosion prior to plants becoming fully established.
- Identify key plant characteristics that are most suitable for use in an extensive green roof system. Examples include plants that are perennial or self-sowing, drought tolerant, wind tolerant, able to withstand temperature extremes, require little to no trimming, fertilizers or pesticides, are fire resistant, provide good ground coverage and have shallow root structures.



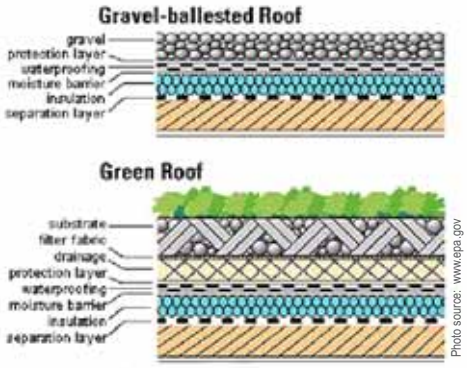


Photo source: www.epa.gov

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DESIGN OBJECTIVES

- ☑ Conserve water
- ☑ Filter urban runoff
- ☑ Reduce peak flows
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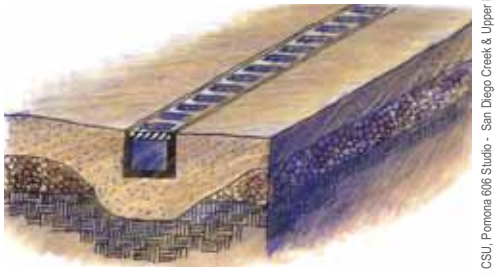
- ☑ Habitat creation

Opportunity to convert a concrete backyard with a residential detention basin to collect and infiltrate stormwater from roofs and paved surfaces



A trench drain is a shallow linear drain to capture raunoff at the bottom of a driveway

Adapted from: CSU, Pomona 606 Studio - San Diego Creek & Upper Newport Bay,

SUITABLE APPLICATIONS

- Single family residential
- Multi-family residential
- Home Owners Associations (HOA)
- Senior and assisted-living housing

A native garden in bloom at a residence

Photo source: Agi Kehoe, GNTGI

DESCRIPTION

Single family residential lots offer the greatest opportunity for improving watershed health and yet may be the most difficult to convert as a whole. In urbanized watersheds, residential properties are the most common land use type, often covering over 50% of urbanized areas. The sheer numbers of individual properties present a challenge as most homeowners may not be aware of the landscape alternatives available. Most single family homes have turf-based landscapes that require high quantities of water, energy and fertilizers to maintain. These inefficient landscape systems contribute to an increased reliance on imported water and are a major contributor to dry weather urban runoff and associated pollutants entering into streams and impairing water bodies. These exotic, high maintenance turf-based systems are also vulnerable to failure during times of disruption, such as droughts and budget constraints over time. By converting turf-based landscapes to more water efficient designs that promote low water consumptive plant materials, including natives, swales, rain barrels, use of gray water irrigation systems many of the negative impacts would be mitigated and the entire watershed would benefit and become much more sustainable. Outreach and incentive programs may be the best opportunity to encourage owners to convert their properties to a more sustainable and environmentally friendly design.

APPROACH

Develop and implement a cohesive public outreach, education and incentive program which encourage private owners to convert water consumptive landscapes to a more water efficient and multi-objective design. Perhaps the number one hurdle to adoption is current public perception of what constitutes an aesthetically pleasing yard. Other implementation hurdles include the need to educate and train landscape professionals in the use and maintenance of natives, cost to convert or retrofit existing home infrastructure and the amendment of codes and Homeowner Association tenants to permit gray water reuse, use of artificial turf, cisterns, rain barrels, swales, native plant materials and green roofs. New residential development can be designed and constructed to hold water, reduce energy costs, prevent water pollution, and cut the consumption of potable water. The good news is that the retail plant industry has begun inclusion of native plants in their inventories. However, locating native plants are still a challenge as retail centers tend to stock “thirsty” plants that cater to demand for known exotic plant species.

SUPPLEMENTAL INFORMATION

Case Studies:

- Single-Family Home demonstration project, designed and built by Tree People, Crenshaw District near Western and Vernon, South Los Angeles, California.
- Los Angeles magazine's Design House 2005: The Green Home, designed by James Chuda, Hollywood Hills, Los Angeles, California.
- Village Green, San Fernando Valley, California.
- Living Homes Model Home, Santa Monica, California (First LEED Platinum Home) incorporated a native landscape and rooftop garden designed by Richard Grigsby of The Great Outdoors.

Resources:

- Leadership In Energy and Environmental Design (LEED) Rating System for Homes developed by the United States Green Building Council (USGBC) (www.usgbc.org).
- Trans-Agency Resources for Environmental and Economic Sustainability's (TREES) goal is to retrofit Los Angeles as a living watershed. They developed a series of best management practices (BMPs) for industrial sites, commercial buildings, schools, apartments and single-family homes (www.treepeople.org/trees/PBsite1.htm).

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WATERSHED & COASTAL RESOURCES DIVISION

DESIGN CONSIDERATIONS

- Develop comprehensive public education and outreach program with incentives to encourage private property owners to convert to more water efficient landscapes.
- Implement incentives and codes that maintain native plant cover and mature trees in design and development of new housing construction projects.
- Offer incentives to reduce lot imperviousness by promoting alternative driveway surfaces (pavers) and shared driveways that connect two or more homes together.
- Amend building codes to encourage/incentive installation of water harvesting technology in both new construction and remodel retrofits.
- Offer assistance programs that promote the removal of turf and support the installation and use of green roofs, permeable paving, rain barrels, cisterns, swales, rain gardens and drip and gray water irrigation systems.
- Develop programs and policies that encourage landscape professional industry to become properly trained in the selection, installation and maintenance of low water and native plant landscapes.

Rain barrels are containers that store rain water harvested from rooftops. It is important to use a filter or bypass valve to remove contaminants prior to entering the sealed system.

Adapted from: CSU, Pomona 606 Studio - San Diego Creek & Upper Newport Bay

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Coyote Creek Watershed Master Plan – Appendix H-1
Habitat Restoration Master Plan

Prepared For

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Resources & Development Management Department
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Appendix H-7: Five-page excerpt from Oak Revegetation Strategy for Los Angeles County (Lyle &Safford 1997) 114

Executive Summary

As a highly urbanized watershed, the Coyote Creek watershed offers limited spatial opportunities for conservation and restoration of wildlife habitat and related watershed functions. These limitations emphasize the need to conserve and restore what opportunities remain. To ensure the sustainability of existing local and regional biodiversity, core habitat areas as large as feasible must be established within and adjacent the watershed. The three opportunities for core habitat areas are 1.) the Puente-Chino Hills continuum, 2.) the Coyote Hills, and 3.) Los Cerritos Wetlands. To enhance the effective size of these core habitat areas and reduce the impacts of habitat fragmentation, connectivity for wildlife movement must be restored through wildlife movement corridors and associated "stepping stone" habitat patches.

Habitat restoration plans must be developed for each core habitat area and each subwatershed. But more immediate actions are needed to sustain sensitive wildlife species in core habitat areas, so interim habitat enhancement measures are called for until more systematic habitat restoration can occur. Habitat restoration plans and designs should target the specific habitat needs of focal wildlife species appropriate for each site/environment, as summarized in Appendix H-3, Focal Species & Habitat Needs. Tables listing suitable focal species by general vegetation/environment type are provided as Appendix H-2 .

Habitat conservation/restoration correlates closely with the conservation and restoration of watershed functions that benefit humans, as well as wildlife. With impending water shortages looming on the near horizon, responsibility to current and future populations mandates efforts to conserve existing watershed functions and to restore detention and infiltration functions lost to past land development patterns. Native plant associations can, over time, greatly enhance watershed detention functions while serving important wildlife habitat functions. Among the most effective opportunities for infiltration and groundwater recharge are the very drainage channels we have paved over. Removal of impermeable channel surfaces, and their replacement by biotechnical bank stabilization measures, offers a quick route to enhance water storage capacity while providing riparian and alluvial wildlife habitats. Watershed-wide green infrastructure can reduce the need for channel capacity, making floodplain restoration possible.

Just as native wildlife need our help to be sustained within our urban matrix, urban humans benefit from contact with wild nature. Programs are recommended to restore the connections of humans to nature through provision of urban wildlife habitats for common but locally dwindling native species, development of environmental education programs at all grade levels, and provision of opportunities and resources for community stewardship.

An overview of habitat enhancement and restoration strategies is provided, along with the 5Ps for habitat restoration: Projects, Plans, Programs, Policies & Partnerships. Geographic coordinates for potential flloodplain/riparian habitat restoration sites are also provided.

Goals & Strategies

1. **Maintain existing regional biodiversity by restoring habitats for focal species currently extant but declining within the Puente-Chino Hills system, primary source habitats**

- Secure vital core habitat areas within the Puente-Chino Hills system
- Implement interim habitat creation/enhancement measures in order to sustain existing populations of amphibians, reptiles, birds and butterflies, and monitor habitat use
- Document habitat features and monitor changes at ecological reference sites that serve as models for habitat restoration – within Chino Hills State Park or other local habitat sites
- Re-establish native habitat structure and community composition through removal of invasive pest animals and plants, along with strategic restoration of native plant associations

2. **Restore sequential habitat connectivity necessary for repatriation of the watershed by species whose habitats were historically eliminated**

- Secure key habitat linkages and "stepping-stone" habitat areas
- Develop an interconnected network of site-appropriate native plant associations throughout the watershed, using ecological reference sites and the focal species' habitat needs as guides

3. **Restore processes (or their surrogates) integral to natural habitat development & dynamics**

- Implement watershed restoration measures, including water retention, filtration and infiltration, that will enable restoration of habitat-shaping hydrological processes
- Restore hydrological functions where feasible, including fluvial sediment transport
- Establish aquatic habitat features and hydrologic processes sufficient to support the Arroyo Chub throughout as much of the watershed as is feasible
- Provide for the natural development of alluvial scrub habitats as a function of fluvial sediment transport

- Restore ecological connectivity between Coyote Creek and the greater San Gabriel River ecosystem

- Restore estuary structure and processes at Los Cerritos Wetlands and integrate them with habitats of the San Gabriel/Coyote Creek watersheds

4. Restore the human relationship with wild nature, including a stewardship ethic

- Provide opportunities for students to learn about focal species and watershed functions, and to engage in restoration of native plant associations

- Provide opportunities for children to experience wild nature on a daily basis

- Provide opportunities for adults to experience wild nature on a daily basis, including at work and other places of business

- Provide opportunities for community stewardship of neighborhood natural resources

- Adopt your local state park – partner with the California Department of Parks and Recreation to encourage active stewardship of regionally significant ecological reference sites at Chino Hills State Park

5. Restore habitats suitable for historic native species extirpated from the region

- Restore vital estuary habitats at Los Cerritos Wetlands

- Set the stage for rewilding by securing within the Coyote Creek watershed important areas of intact aquatic, riparian woodland, alluvial scrub, coastal sage scrub, oak/walnut woodland, and grassland habitats, to serve as source populations for native wildlife species in portions of the watershed planned for restoration

- Investigate the causal factors in the local extirpation/decline of native wildlife species and incorporate applicable knowledge into habitat restoration efforts

6. Achieve essentially self-sustaining landscapes, partly supported through community stewardship

- Implement ecological restoration of native plant associations that do not require ongoing irrigation, fertilization, pest control or regular pruning

- Apply adaptive management, including the monitoring necessary to inform it, to ensure the sustainability of restored habitats

- Encourage development of community stewardship networks

Introduction

Habitat restoration offers direct and indirect benefits to water resources conservation. Certain wildlife species can serve as indicators of water quality, as well as of the health of ecohydrological systems on land, transitioning here into the Pacific Ocean. So habitat restoration is a natural component of a watershed management plan.

Habitat Restoration Master Plan Format

To help encourage readership in this age when no one has enough time, much of this document has been set up in brief text or bullet-point format, and to improve readability by a general audience, citations have been kept to a minimum. References consulted in developing this habitat restoration master plan are provided at the end of this document and should be considered resources for future planning efforts

Definition of Habitat in a Restoration Context

While the term has increasingly become part of modern lexicon, a clarification of what is meant by the word *habitat* is appropriate. Most of us now understand *habitat* as *home*. And just as Habitat for Humanity indicates, the term is species-specific. An illustrious source in the field of wildlife habitat restoration, Michael Morrison, offers the following elaboration:

> I define *habitat* as the resources and conditions present in an area that affect occupancy by a species. Habitat is organism-specific: it relates the presence of a species, population, or individual (animal or plant) to an area's physical and biological characteristics. Habitat involves more than vegetation or vegetation structure; it is the sum of the specific resources needed by a species. Whenever an organism is provided with resources that affect its ability to survive, that is habitat. Migration corridors, dispersal corridors, and the land that animals occupy during breeding and nonbreeding seasons – all are habitat. Thus, habitat is not equivalent to *habitat type*, a term coined by Daubenmire (1968:27-32) that refers only to the type of vegetation association in an area or the potential of vegetation to reach a specific climax stage. Habitat is much

> more than an area's vegetation (such as pine-oak woodland). The term *habitat type* should not be used when discussing wildlife/habitat relationships. When we want to refer only to the vegetation that an animal uses, we should say *vegetation association* or *vegetation type* instead.
>
> The confusion between habitat and habitat type has led to a general misconception about how to restore an area for wildlife. If habitat is species-specific, then any plot of land has numerous habitats; each habitat corresponds to specific species. As you gaze across an area, therefore, you are viewing numerous habitats of likely different quality. Thus the definition of habitat as species-specific is an absolutely critical concept. It means that restoring vegetation, regardless of how well it matches some desired condition, can easily fail to restore the desired assemblage of wildlife. Failure to plan simultaneously for plant and animal restoration results in a hit-or-miss strategy for animals and it clearly falls under the Field of Dreams hypothesis – "if you build it they will come" (Palmer et al. 1997: 295). Restoring vegetation restores wildlife habitat for *some* species, but not necessarily the species desired. Poor planning for wildlife may create an ecological trap in which an undesired species kills or harasses a desired species or its young. (Morrison 2002: 44)

Morrison goes on to define a series of other terms concerning habitat, and the interested reader is encouraged to obtain that text.

Focal Species Approach

With this shared understanding that habitat is species-specific, our approach of selecting focal wildlife species for habitat restoration may be more meaningful. In order to achieve habitat restoration we must have one or more wildlife species in mind. We need to understand how those species relate to their environments – how they respond to physical processes and how they access resources. So we select focal species whose habitat needs we can begin to home in on. It makes sense to select focal species that serve as indicators of some kind. They could be indicators of physical conditions, such as water quality. Ideally they will serve as physical environment indicators and also serve as stand-ins or representatives for other wildlife species with similar habitat needs. This may be sort of a hybrid Field of Dreams approach – "if we build it for species *x*, then *y* and *z* may come". At least they'll have a better chance. But, assuming we learn as much as we can about the habitat needs of species *x*, with this focal species strategy we stand a better chance of achieving habitat restoration for at least one native wildlife species than if we just began planting native plants.

We have selected suites of species to serve as foci for and indicators of successful habitat restoration within general vegetation/habitats. Since this work is part of a watershed planning process, we have emphasized focal species whose habitat needs are associated with watershed functions. Focal species selection was also influenced by the predominately urban character of

the Coyote Creek watershed, along with the existence of a series of reports documenting the status and conservation issues of an array of wildlife species in the Puente-Chino Hills system.

Fish are obvious indicators of water quality issues that can impact public health in ways that may not always be obvious. Arroyo Chub is a native fish species whose habitat requirements are not as demanding as some species in terms of water quality, and thus likely more readily achievable in a heavily urbanized watershed like Coyote Creek. But if those habitat requirements were met it would indicate local water quality that better supports human health than what is typical today. In addition to the obvious transmission of water pollutants to aquifers from which we may derive water for human uses, in coastal watersheds like Coyote Creek there is additional potential exposure to water pollutants where humans recreate in or near water at the beaches and rivermouth/estuary. Less obvious is that water pollutants can become air pollutants when they reach the dynamic wave environment near the shoreline – in a phenomenon referred to as marine bubble bursting (Prather Lab 2006), wherein pollutants become incorporated into sea salt aerosols that, once airborne, can impact people along the beaches, but can also be transmitted across regional and global distances, affecting the air we breath, as well as global climate change (Prather 2007). Downstream of the Coyote Creek confluence with the San Gabriel River, habitat restoration at Los Cerritos Wetlands could support California Killifish, which would serve as an indicator of water quality at the near-shore estuary, among other ecosystem issues.

Similarly, amphibians and certain reptiles, like Southwestern Pond Turtle, also indicate watershed health, including the quality of water headed for aquifers. A less obvious indicator of watershed health is Coastal Western Whiptail, who finds most of its insect prey underground and is thus impacted by widespread use of pesticides that can cumulatively degrade water quality as rainfall percolates through the soil on its way to streams and aquifers. Butterflies can serve as indicators of the health of riparian zones – whether they are clothed in riparian vegetation and, in the case of Fatal (Dusky) Metalmark, even whether the plant species composition matches the historical ecosystem they coevolved with – perhaps a subtle indication that only a botanist could love? On the contrary, this serves as a profound indicator of changes in fluvial (flood-associated) dynamics that structure the riparian areas. Such changes have impacted the entire ecohydrological system and it may be some time before we completely understand how they impact our own health and survival.

Amphibians and reptiles also serve as indicators of site-scale habitat connectivity/ fragmentation that are particularly useful for assessing ecosystem integrity in urbanized areas where wider-ranging mammals may have dropped out. Many native bird species are also useful indicators of habitat fragmentation, as these scrub-adapted species may fly only short distances among habitat patches. Other focal bird species are indicators of the quality of riparian habitats, which play important roles in watershed function. For detail on the selected focal species, please refer to Appendix H-3, Focal Species & Habitat Needs.

Green Visions Plan Focal Species

Considering the watershed context of this master plan and the highly urbanized nature of the watershed, we have not emphasized mammalian focal species, but the availability of the regional Green Visions Plan http://www.greenvisionsplan.net/ allowed us to easily cross-reference the applicability of focal species treated there, including mammals, for incorporation into this plan. The Green Visions Plan has a broader focus in terms of both regional scale and ecosystem context, but it offers an excellent complement to this document, and the various report components of the plan should be used as resources in implementing the habitat restoration component of this watershed management plan. Green Visions cross-references are included throughout the Focal Species & Habitat Needs document.

Background

Brief Overview of Prehistoric & Historic Human-Induced Landscape Changes

This plan calls for habitat restoration throughout the watershed, including in open space areas for which conservation set-asides alone might superficially appear to suffice. To understand the need for habitat restoration throughout the watershed it is important to understand the changes wrought by prior human land use in historic and prehistoric times.

Prehistoric Landscape, Burning & Other Land Management by First Nations Peoples

Only within the past forty years have we come to recognize that First Nations peoples actually did manage their landscapes in ways that were not apparent to the European newcomers who assumed they were "discovering" these lands on behalf of civilization and that the indigenous folk were simple hunter-gatherers. In actuality, the indigenous occupiers of these lands used fire extensively to manage the grasslands whose seeds were a primary food source (not unlike the use of grains the world over), as well as to flush game for hunting. A panoply of other techniques were used to manage various plant species and associations of economic importance. [Lewis 1993 (1973), Blackburn and Anderson 1993; also see other more recent works by Kat Anderson in particular.]

The prehistoric landscape cannot be fully known but glimpses are available through the diaries of the first European explorers. Most notable among these are the journals of Father Juan Crespí, member of the Portolá expedition into California in 1769-1770, which have been rendered particularly accessible for historical ecology research in the recent translation by Brown (2001). Fray Crespí was singular in offering more detailed description than his compatriots on other expeditions, although we can only wish he'd recorded more of what he witnessed.

According to Crespí's writings, the Portolá expedition passed through what is now La Habra on July 29, 1769, having enjoyed a few nights with the native inhabitants adjacent the Santa Ana River (which at that time still flowed heavily in late July). Crespí's limited description notes the flat on the north side of the river as "overgrown with prickly pear and sage; [and as they ventured on] shortly it became grass-grown with dry grass, plainly all very good soil . . ." The party camped that night on a very grassy knoll (Coyote Hills?) above the "small, very green hollow with a small pool of water" that was the only source of water at that time for a large village of natives, and thus while the human travelers were offered drink, it could not be used to water their horses. "Immediately upon coming down from the knoll there is a large valley of some leagues of very good grass-grown soil, but with no more water than in the aforesaid little pool."

The next day, July 30th, they pressed on: "Across this valley here we went up a pass, and came to hollows with very large live oaks and sycamores . . ." (La Habra Heights area?) Eventually coming to the vicinity of La Puente/City of Industry, "we came down to a very wide-reaching, spacious valley of very dark friable soil, all burnt off by the heathens. Going about a good league through this valley we came to the water the scouting soldiers had found; it is quite a large stream flowing through the midst of a swamp here in this large level, which is not burnt off here by the swamp, for it is very green with tall grass clumps, wild grapevines looking as though planted *[perhaps they were!]*, countless rose of Castile (wild rose) bushes, so much cumin that double-hundredweights' worth could have been gathered, a great deal of it being in seed and a great deal in flower., and all kinds of very lush plants that we could not recognize. . . ." (Brown 2001)

Mentioned numerous times in the Crespí' journal is the "refreshing" sage gruel typically offered to the travelers by the natives, and of those along what we now know as the Santa Ana River, he also specifically notes the "parched grass seeds that they consume". The party was also offered bear meat there. Clearly the sages were important in the local economy, as were the native grasses and even in this early account evidence abounds that the natives were intentionally burning their grasslands to enhance the seed crop and/or to flush game. (In other locations, and possibly here as well, they also used fire to manage oak woodland understories and specifically to control insect borers into acorns that were another primary food source.) If the grassy knoll on which the Portolá group camped in the La Habra area was the Coyote Hills, which now tend toward recovering coastal sage scrub vegetation, it is possible that frequent burning on the coastal prairie may have unintentionally or intentionally resulted in the conversion of some coastal sage scrub patches into grasslands. Such effects may have extended some distance into the Puente Hills.

Spanish Mission/Rancho Periods & Pivotal Drought in 1820s

Those early meetings of Europeans and indigenous Californians were soon followed by the establishment of missions and conversion of the natives into a more European model of agrarian life, with crops tended in neat rows and irrigated with diversions from perennial water sources, but mostly centered around the missions. The mission period led to the Spanish ranchos, on which cattle were raised primarily for hides, since the meat would have rotted before reaching European markets. During the rancho period the Spanish cattlemen burned off chaparral and other scrub associations to favor pasture, and also introduced the Mediterranean annual grasses and some associated species that now dominate the majority of California rangelands. But evidence suggests that it was a pivotal series of drought years around the early 1820s that may have finalized the conversion from the original native, mostly perennial, grasses to the nonnative annual grasslands we know today, the Mediterranean annuals enjoying a competitive advantage under repeated seasonal drought conditions. It must also be assumed that significant mature trees were consumed to build the missions and rancho structures.

Anglo Period, Agricultural Expansion and Recent Land Uses

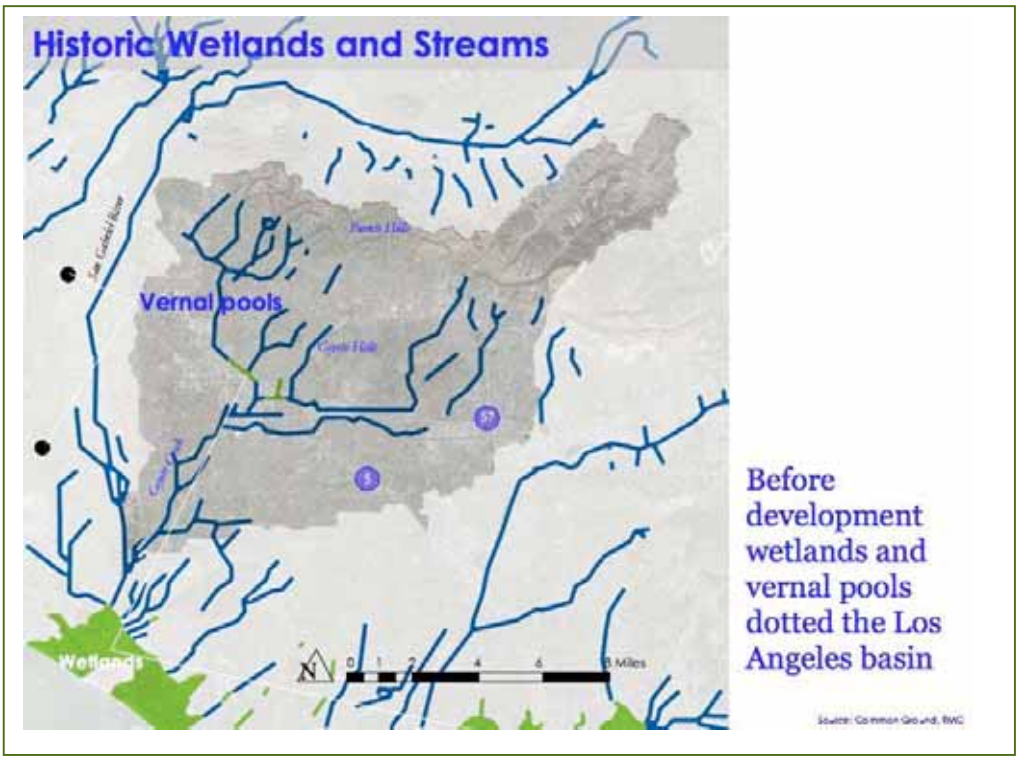
Soon after came the Anglo-Americans and agricultural expansion that consumed much, if not all of the former coastal prairie along with undoubtedly extensive woodlands. This pattern continued through the twentieth century. By the time of the Weislander Vegetation Type Maps (1940s) the vast majority of the Coyote Creek watershed, including virtually all of the Coyote Hills, was mapped as under cultivation. Oil extraction activities have disturbed land cover while sustaining some open space through the present. And cattle and sheep grazing have been more or less continuous on some lands through the recent past.

More Historical Ecology

Greater insight into the watershed's historical ecology and ecohydrology could substantially enlighten implementation of this habitat restoration master plan. Because historical ecology studies are necessarily interdisciplinary and can involve some digging through records, this type of study may be most effectively accomplished by teams of students and their advisors/ consultants. Historical Ecology study is included in the Plans section of the watershed 5 Ps for Habitat Restoration.

Soil Patterns as Tool to Understand Suitable Vegetation for Restoration

Soil profile pattern analysis can reveal prehistoric vegetation patterns and should be considered an important part of historical ecology evaluation. While a soil map has been generated for this project that could reveal some general patterns, the legend accompanying that GIS layer does not correspond to the map. That error has prevented us from identifying optimum locations for wetland and other habitat restoration, in this master plan. Resolution of the soils map should be considered a priority for future work.



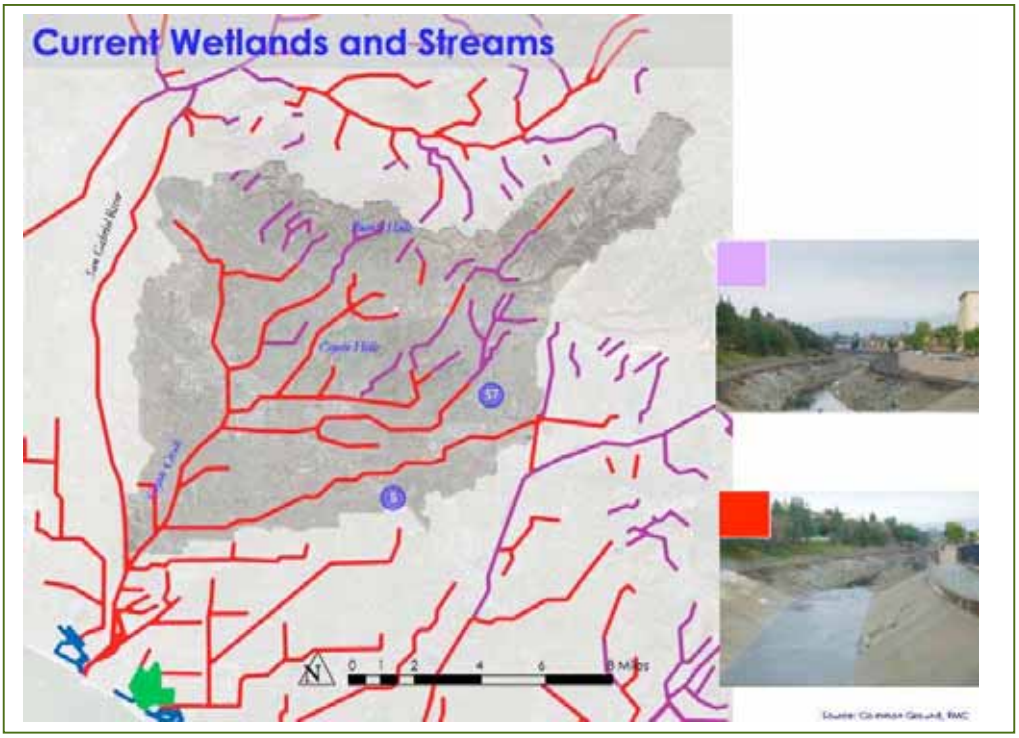


Figure 1: Historic vs. Current Wetlands & Streams

These images convey historic alterations to the ecohydological system.
Source: WMP Appendix J: "Seeing Green: Grounds for a Renewed Urban Infrastructure", 606 Studio, Cal Poly Pomona Thesis Report

Restoration Implications of Past Human-Induced Landscape Changes

Recognizing the legacy of past human-induced landscape changes is important to understanding baseline conditions and the need for habitat restoration even on lands that have remained as open space through the present. For example, it is likely that most of the annual grassland patches in the Puente-Chino Hills complex were prehistorically covered in the local variants of coastal sage scrub, interspersing with and serving, along with perennial grassland patches, as partial understory for oak, walnut and sycamore woodlands. This is evidenced by local declines of scrub-requiring birds species, among others. The prehistoric extent of woodlands in the hills and along riparian or alluvial scrub environments has also without doubt been reduced, and considering how long it will take to reclaim the prehistoric maturity of native woodlands that supported certain focal species, the restoration process can hardly begin too soon.

The Coyote Hills situation is particularly intriguing from a historical ecology perspective. Clearly the open spaces there now support some coastal sage scrub species – suggesting that as the original land cover. But given the apparent historic and even prehistoric human-induced land cover alterations, it is very likely that much of the original biodiversity has been lost, including herbaceous plant species and their associated fauna. Historical ecology may never yield enough information to identify all the species that once occurred there and hence may be appropriate for reintroduction efforts, necessitating extrapolation from more intact lands with similar physiographies, along with some experimentation and adaptive management.

As for the large extents of coastal prairie witnessed by Fray Crespí, nearly all that land is now covered with human land uses. This is why we did not select focal grassland wildlife species for this master plan. Native grassland species generally require large extents of prairie, which can no longer be accommodated in this watershed.

Current Patterns

Habitat Restoration Local Reference Documents

Extensive information on current local conditions is available in the Existing Conditions section of the watershed master plan, along with Spencer 2005, Hass et all 2004, Cooper 2000, Scott and Cooper 1999, all of which we used extensively to develop these master plan documents. To date we've had access to very limited information on existing conditions in the Coyote Hills & Los Cerritos Wetlands area.

Summary of Aerial Observations

To complement the GIS analyses developed for the master plan we have used aerial photos and especially Google Earth to inform our understanding of current conditions in the watershed. Google Earth in particular has enabled the pinpointing of smaller potential spatial opportunities to support the master plan. While especially the lower portion of this watershed is decidedly urban or otherwise spoken for, several key opportunities for habitat restoration along drainageways, including stormwater treatment, are apparent from our Google Earth investigations. Their geographic coordinates are listed in Appendix H-4.

Habitat Conservation Priorities

Core Habitat Opportunities

Conservation of significant core habitat areas is essential to maintaining the remaining biodiversity in the watershed (and the region), as well as for making habitat restoration truly effective. Native wildlife species are sensitive to human land use patterns to varying degrees and some species require significant buffering from human activities. Furthermore, most wild species and populations have minimum area requirements for access to resources and/or for population dynamics. For these reasons, large intact habitat blocks are necessary to maintain a full range of native biodiversity.

Within the Coyote Creek watershed per se there remain only two opportunities to conserve core habitat areas – the Puente and Coyote Hills. Downstream from the confluence of Coyote Creek with the San Gabriel River, a third opportunity for core estuary habitats is presented in Los Cerritos Wetlands.

Puente Hills

The open spaces of the Puente Hills serve important watershed, as well as habitat functions. While most of these lands are not areas of high infiltration rate, they nevertheless **serve critical functions in absorbing and detaining stormwater**, so that it doesn't all reach the floodplain at once, allowing a longer period for potential infiltration downstream. After all, that is among the prime functions of a healthy watershed. Habitat restoration in the Puente Hills will only enhance those detention functions, especially over time, as leaf litter from restored areas builds an absorbent soil profile.

Furthermore, the Puente Hills along with the Chino Hills, constitute the last outpost of significant biodiversity along the San Gabriel River floodplain, and the linkage they form with the Santa Ana Mountains is critical to ensuring that future generations have the chance to experience wild nature in close proximity to where they live, learn and work. From the standpoint of regional biodiversity conservation, we cannot afford to lose another piece of the Puente-Chino Hills continuum, and restoration of habitat and connectivity is called for throughout the Puente-Chino Hills system to the Whittier Hills.

But also from a watershed perspective, further loss of the water-absorbing functions of these lands will likely cost future downstream residents in terms of lost infiltration opportunities and likely flood damage.

"A sustainable policy for the exploitation of shallow aquifers should be based not on the existing volume, but on the basin's recharge capacity." (Ponce, V. M. 2006)

Coyote Hills

Similarly, the Coyote Hills serve important watershed, as well as habitat functions, both of which can only be further compromised by additional habitat loss and fragmentation. If conserved, Coyote Hills will constitute the most significant natural open space within a vast sea of humanity in the Coyote Creek watershed. While significant in itself, conserving Coyote Hills also provides a nucleus from which wildlife habitat restoration can radiate outward along the drainages that flank or course through them, enabling a synergy that will enhance the entire system; whereas further loss and degradation of habitats in the Coyote Hills will limit the ability of restoration efforts along the drainages to support the greatest diversity of native species.

Los Cerritos Wetlands

In contrast with the other two core habitat opportunities, Los Cerritos Wetlands are recipients of all that the watershed delivers – good or ill. Restoration there offers the promise of key wildlife habitat functions but implies a commitment on the part of watershed residents and businesses to ensure that the water that ends up there is fit to support life.

Implement Interim Habitat Enhancement Measures

Habitat for declining populations of certain focal species is in such short supply in the watershed that artificial habitat enhancement measures are warranted to sustain these populations until more ecosystematic restoration (that may require many years for fruition) can be accomplished. Such interim habitat enhancement measures are appropriate only in core habitats and must be aimed at the most sensitive wildlife species, but certain generalist wildlife species populations may also benefit from these measures. Specific measures are summarized in the following section, Interim Habitat Enhancement Measures, under Habitat Enhancement & Restoration Strategies.

Habitat Connectivity Strategies

Along with outright destruction of wildlife habitat, habitat fragmentation has taken a toll on many native species. While the opportunities for core habitat areas have shrunk considerably over recent decades, the "effective size" of remaining core areas may be enhanced through connectivity with other core areas and habitat patches.

Focal Species "Umbrella" Indicators of Habitat Connectivity

Several focal species serve as indicators of habitat connectivity at different, complementary scales and spatial considerations. Restoring habitat connectivity for these species will accomplish connectivity for many other species with similar or less demanding needs. Thus, these species serve as "umbrella" indicators of habitat connectivity. For greater detail on focal species, refer to Appendix H-3, Focal Species and Habitat Needs.

- Bobcat – landscape-scale connectivity in areas too fragmented for Mountain Lion
- Amphibians & Reptiles – indicators of terrestrial connectivity at fine scales
- Birds – scrub-requiring bird species tend not to fly far and thus are indicators of connectivity in habitats that are becoming fragmented
- Arroyo Chub; if San Gabriel River system is included Southern Steelhead would be the ultimate indicator of aquatic habitat connectivity restoration

Stepping Stone Habitat & Key Linkage Opportunities

- Chino-Puente Hills connector from Carbon Canyon Regional Park – Note that Map 1 from Missing Middle report (Spencer 2005) indicates part of this linkage as protected; Parcels on west side of Valencia intersection with Carbon Canyon Road, both north and south of that road, will be ideal stepping stones with appropriate habitat restoration, including remediation of potential soil contaminants; created pools and wetlands here could facilitate stepping stone habitat functions for amphibians and certain reptiles
- Tonner Canyon choke point area, Tonner Canyon itself
- Cross-reference to Missing Middle & related documents – aim for functional habitat "peninsula" from Whittier Hills to Chino Hills
- Brea Creek floodplain through Brea & Fullerton Golf Courses
- West Coyote Hills, East Coyote Hills
- El Dorado Park & Nature Center – just out of our watershed per se, but like Los Cerritos Wetlands is part of our watershed system

Drainageway Connectors Through Urban Environments

- Brea Creek from Brea Canyon
- Carbon Canyon Regional Park vicinity to Fullerton Reservoir/ Creek: With cooperation of industrial property owners adjacent the parcels west of Valencia, noted above, industrial open space areas could be revegetated to support habitat connectivity with the nearby drainageway that, after passing through Birch Hills Golf Course, continues on and under the 57 freeway to connect with Fullerton Reservoir/ Creek
- La Habra Heights/Whittier Hills through La Mirada Creek
- Terrestrial connections among Coyote Creek & tributaries – this can be accomplished by establishing corridors vegetated with native, drought tolerant plant species
- Coyote Creek to San Gabriel River
- San Gabriel River to Los Cerritos Wetlands

Coastal Sage Scrub for Near Term General Habitat Connectivity

Coastal sage scrub (CSS) vegetation is adaptable to most existing conditions such as floodway channel rights of way, and is an ideal choice for rapid establishment of habitat connectivity for many species, especially through urban areas. But especially in urban areas, soil remediation is likely needed in many cases where space is available, and soil analyses should be among the first steps in designing and implementing habitat connectivity restoration projects.

Restoration of Stream/Floodplain Processes or their Surrogates

Examination of Figure 1, Historic vs. Current Wetlands & Streams, reveals a decided increase in drainage density over the historic period. What this means is that water that once infiltrated into aquifers and supported wetlands and their associated ecosystems is being prematurely shunted off to the ocean. Not only has the drainage density increased, but also the vegetative cover that would have helped detain water in the watershed has been vastly reduced. Furthermore, the floodplain dynamics that once shaped riparian and alluvial scrub habitats over time have long ago been tamed by dams and other flood control structures, and human land uses have encroached upon the floodplains. PMP 2-8 (pdf 14) rightly calls for "Beach nourishment from sources in the Coyote Creek watershed" because the cumulative loss of sediment transport reaps a downstream, downcoast result of beach erosion.

Perhaps a less obvious impact of all the channelization is the significant infiltration capacity lost when potential infiltration surfaces were paved over. Compelling evidence exists to suggest that removal of impermeable surfaces along drainage channels may be the most effective measure in increasing groundwater recharge. (see Ponce et al. 1999, online) In fact, infiltration rates over alluvial floodplains are highest during high flows, perhaps due to the increased volumetric pressure.

So what would it take to restore these vital processes or their surrogates?

- Watershed-wide green infrastructure & strategic land acquisition can help detain stormwater, reducing peak flows and corresponding need for channel capacity

- Reclamation of floodplain functions where space permits, and removal of concrete to allow for riparian vegetation, which, over time, will help shape floodplain form; along with vastly increased infiltration opportunities along alluvial plains

- Strategic "flushing flows" (see Kondolf 1996) implemented at control structures/dams

Some potential sites along channels for restoration of floodplain functions and/or interim low flow channels, along with water filtration functions, are identified by longitude/latitude coordinates using Google Earth (not checked for ownership, zoning, etc.) in Appendix H-4 Potential Floodplain/Riparian Habitat Restoration Opportunities.

Urban Wildlife Habitats – Connecting People & Nature

Conservation biologists study (when funding permits) the problems associated with "sink" habitats (e.g., Howe et al. 1991) – habitats that may draw individuals, but not support viable populations over time, thus lessening the health of a population or metapopulation. Therefore, some balk at the notion of extending wildlife habitats through cities, and rightly so. It probably is important that we not attract sensitive wildlife species into potential harms way. But most urban humans need to be reintroduced to wild nature in order that they may appreciate it, and thus support it, wherever it occurs. Moreover, **humans need wild nature!** Refer to: A Few References on Nature-Deficit Disorder, end of Habitat Restoration & Related References. A popularly accessible book that comes highly recommended is:

Louv, R. 2005. Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder. Algonquin Books of Chapel Hill.

Drainageways through urban areas offer opportunities to restore habitats for common (as contrasted with sensitive) native wildlife species. Several common focal wildlife species, represented in Appendices H-2 and H-3, are appropriate goals for habitat restoration in wholly urban areas.

Carbon Creek

- Isolated, and apparently not an historic drainage, its characteristics are determined by an entirely urban subwatershed – a strategic approach to watershed management is warranted to ensure functional habitat for Fatal Metalmark butterflies

North Fork Coyote Creek

- Options for connecting with other habitat areas appear limited, but potential for urban greenway alongside channel through industrial areas could offer opportunities for lunchtime retreats

- Heavy industrial land use in much of this subwatershed suggests it may be a good candidate for treatment wetlands; it appears there may be a spatial opportunity at the confluence with La Mirada Creek, just north of 1-5, **but opportunities dispersed throughout the subwatershed should be sought to treat runoff nearer its source, e.g., street ends, parking lot swales, etc.** Such dispersed strategies should be considered a best management practice to reduce cumulative concentrations of pollutants at any one site

Schools Throughout the Watershed

The California Education Code, Sections 8700-8781 (Appendix H-5) promised to boost our state's commitment to environmental education, but was not fully funded. Nevertheless, this legislation laid out a sound foundation for nature/ecological and watershed education needed in the Coyote Creek watershed.

- Provide preschool to graduate school ongoing opportunities to learn about watershed processes, wildlife, habitat restoration
- Work with educators to develop pertinent curricula at all educational levels
- Provide opportunities for high school students to earn community service credits through habitat restoration and stewardship programs

Identify habitat restoration opportunities near schools and use these as outdoor labs for learn-by-doing habitat restoration and stewardship training.

Cultivate Community Stewardship

While much environmental education can occur in or near schools, opportunities for students to draw their parents in, and for other interested community members, should be sought to engage the community and encourage citizens to take charge of their own environments.

- Identify suitable sites throughout the watershed and potential sponsor groups – nonprofits, homeowners' associations, business teams
- Permit community stewardship groups to adopt potential urban wildlife habitats near their residences or places of business – including industrial areas!
- **Just Do It** initiative – provide general guidelines, appropriate plant palettes, other support materials, and necessary oversight, but otherwise allow community groups to install and steward native plantings and interpretive features
- Watershed-wide competitions could provide incentives with categories such as: documented occupancy by focal species, most beautiful, volunteer hours, pounds of or most unusual trash removed, water quality improvements, etc.
- Encourage community stewards to support natural resource management of State and regional parklands

- Provide one or more facilities for storing records/sharing information relevant to stewardship; establish bulletin boards/list serves to coordinate volunteer projects

- Consider bulk purchases of stewardship tools and equipment

Habitat Enhancement & Restoration Strategies

Habitat enhancement and restoration strategies must begin with the objective of providing habitat for specific focal species identified in this master plan (refer to Appendices H-2 and H-3), or potentially identified through directed research. Known habitat features are provided for each of the focal species in Appendix H-3. Additional information should be collected and compiled as it becomes available.

Interim Habitat Enhancement Measures

- Breeding pools for amphibians, potential interim habitat for Southwestern Pond Turtle, in Puente Hills vicinity, including Chino-Puente Hills connector

- Experimental Cactus Wren nesting habitat creation through: mature cactus translocation or grafting (Bowler et al. 2000) or artificial nesting structures (Robert A. Hamilton pers. com.)

- Artificial nesting structures for certain birds – e.g., Tree Swallow, Western Bluebird

- Other?

Control Invasive Pest Plants & Animals

- Invasive plant control is applicable to essentially all sites – plenty of ongoing information available through CalIPC, whose research efforts merit public support

    - Caution is warranted regarding use of even herbicides previously considered safe for aquatic habitats (e.g., glyphosate) as ongoing research reveals potential impacts to amphibians, rainbow trout, aquatic macrophytes and even birds (e.g., Coyner et al. 2001, Filkowski et al. 2003, Howe et al. 2004, Relyea 2005, Hayes et al. 2006, Kjaer et al. 2006, and Tierney et al. 2007) – Phasing of restorative tasks could potentially overcome some conflicts, but knowledge is the best means of avoiding unwanted side effects. The Weed Management Area team should be responsible for staying on top of the latest research and adapting methods accordingly.

  - Where habitat is to be reestablished on "fresh" (currently unvegetated) sites, the safest course is to prevent the establishment of incipient invasions by monitoring, identification and timely management responses. Community stewards could assist the monitoring process if provided with appropriate instruction and tools, such as photos and/or color photocopies of pressed specimens of invasive weeds, along with mapping and other record-keeping resources.

  - Prior to restoring riparian habitats and floodplains in areas of existing concrete channels, identify potential watershed sources of invasive plant species in the surrounding urban/suburban landscape that could enter the drainages through storm drains. Implement management actions to control weed source populations. In cases where potential contamination may occur from legitimate sources (e.g., homeowners' palm or other landscape trees), outfit storm drains with devices to filter out invasive plant seeds or other propagules.

- Control of invasive aquatic pest animals will require an intensive public education program (re-programming in the case of "crawdads" especially that evoke popular memories for many); probably best initiated at the grade school (preschool?) level

- Remove invasive aquatic pest animals prior to reestablishing habitats for amphibians & Arroyo Chub and implement monitoring to ensure their populations do not return.

  - Initial fragmentation of aquatic habitats may facilitate the aquatic pest removal program

  - Again, properly educated community stewards could serve as site monitors.

- Control invasion of habitat restoration sites by nonnative Argentine Ant by establishing non-irrigated buffer zones (broad as possible) and encouraging xeriscaping in nearby landscapes

  - Community gardens and other irrigated landscapes should be well-buffered – at least 1,000 feet distant – from habitats of sensitive reptile species

Establish Native Plant Associations

Coastal Sage Scrub

- Strategic restoration techniques likely required to ensure historic biodiversity, including the historic/prehistoric herbaceous component (e.g., Allen et al. 2000)

Oak & Walnut Woodlands

Most sustainable oak woodlands established from locally-collected acorns

- Acorn collection, storage and planting could be accomplished by student and/or community groups. Refer to Appendix H-6, the California Oak Foundation's, How to Collect, Store and Plant Acorns, also available at http://www.californiaoaks.org/html/oak_tree_care.html

- Refer to Appendix H-7: five page excerpt from Oak Revegetation Strategy for Los Angeles County (Lyle and Safford 1997), indicating appropriate planting locations for coast live oaks (*Quercus agrifolia*) on all slope aspects

- Historical ecology study may reveal whether canyon live oaks (*Quercus chrysolepis*) ever occurred naturally within the watershed, and thus might be appropriate for restoration

Riparian Woodlands & Scrublands

Facilitated by green infrastructure to restore watershed detention functions

- Prior to replacement of concrete channels, allow native riparian species to colonize soft-bottom channels where channel capacity permits but note cautions of Kondolf and Matthews (1993) – the position of trees in the channel will likely structure fluvial flows and channel development. It is probably ideal to just remove the concrete and establish vegetation in patterns that facilitate the desired channel reformation. Vigilance against invasive pest plants will pay off in reduced long-term maintenance costs; corollary plantings along channel rights of ways can cumulatively enhance stream bottom habitats

- Identify key watershed sources of exotic plants that invade riparian habitats and retrofit/outfit pertinent storm drain systems to filter out propagules of invasive pest plants

- Provide the means for fluvial structuring of riparian landscapes – e.g., flooding, flushing flows

- Much riparian woodland/scrubland can be established in the process of biotechnical slope stabilization; plant propagules can float downstream to establish in new areas (as does the invasive pest *Arundo donax* – monitor and nip infestations in the "bud")

- Install strategically positioned woody debris as part of restoration projects to simulate natural channel and habitat development

Alluvial Scrub

- As for the riparian woodlands and scrublands, provide the means for fluvial structuring of riparian landscapes – e.g., flooding, flushing flows

- Seeding onto fluvially-positioned sands likely most efficient for most AFS species ; in most cases no fertilization of sterile sands is recommended as this could facilitate invasive pest plant encroachment

- Occasional sycamores and cottonwoods could be planted from small containers or established in biotechnical applications

- Variations of alluvial scrub plant associations are suitable for infiltration areas but can become weedy without episodic flooding

Vegetated Swales & Other Storm Water Treatment Facilities

- Employ suitable native plant species to vegetate stormwater runoff swales and other biofiltration features

Reestablish Floodplain Connectivity, Aquatic Habitat Structure & Functions

- Replace hard channel control structures & bridge abutments with biotechnical slope stabilization (Li 2005, Riley 2002)

- Employ a geomorphic approach to stream habitat restoration – resume fluvial sediment transport and the "flushing flows" needed to accomplish it

- Initial installation of woody debris to help engender natural aquatic habitat structure

Estuarine Marsh Restoration Considerations for Los Cerritos Wetlands

- Complex tidal creek networks (per Desmond et al. 2000)
- Measures to control urban mesopredator (feral cat, domestic pet) access to marsh habitats
    - Moats?
    - Bobcat, Coyote

Vector Control Issues

- Mosquitofish (*Gambusia affinis*) incompatible with habitat restoration for native fish and amphibians
- Tidal circulation ditches for salt marsh mosquito control
- Strategic placement of woody debris or other deflectors to initiate stream currents (mosquitoes require still water for breeding)
- Native fish for vector control – stickleback (Tim Hovey, CDFG pers. com.)
- Methoprene, an insect growth regulator, and *Bacillus thuringiensis israelensis* (Bti), a bacterial larvicide, have been considered among the safest tools for controlling mosquito populations. However, one study indicated significant impacts on nontarget organisms after two to three years of repeated use, due to both direct and indirect effects, such as depletion of food webs for predacious insects (Hershey et al. 1998). Evaluation of alternative vector control strategies on the restoration of wetland ecosystems must be considered part of the restoration program.
- Agreements may be arranged with vector control agencies to use more eco-friendly approaches for designated habitat areas

Public Education

- Integrated pest management education for general public to reduce negative impacts of pesticides, herbicides on wildlife
- Backyard wildlife habitat, wildlife-friendly public landscape design for business and

industrial areas

- Cumulative watershed impacts, including disposal of pharmaceuticals into sewage treatment systems

Adaptive Management & Requisite Monitoring

- Adaptive management is the only approach that makes sense as we forge into new territories – ecological restoration remains a developing science/art; urban wildlife habitats that support native biodiversity will be novel ecosystems

- Adaptive management relies upon effective monitoring – rarely receives adequate funding. How may this disparity be resolved?

    - Case example: Natural Reserve of Orange County recently suspended certain planned/ongoing monitoring studies, due to fiscal concerns

- Tiered levels of monitoring could focus the most statistically rigorous monitoring on the most sensitive species, but a strategic approach is warranted to detect critical trends

- Develop urban habitat monitoring programs to be implemented by students & other community members

- Offer incentives for college students, possibly Advanced Placement (AP) high school students, to implement scientific monitoring programs at Chino Hills State Park (collection permit required for all research) and other sensitive species' habitats. Note that while Chino Hills State Park lies just outside the Coyote Creek watershed, it serves as an important ecological reference area, and what students and researchers learn there can be applied to other areas of the watershed

    - Small grants program

    - AP credits

    - Fund training program for students and resource oversight/management positions

- Project monitoring should document the presence or absence of target focal species as indicated for each type of project

- The success or failure of restored habitat sites to attract focal wildlife species will be an indicator of the degree of adaptive management called for

- Qualified resource management professionals should be funded to design and oversee monitoring programs, especially for sensitive species, and to develop appropriate adaptive management responses.

Habitat Restoration Project Prioritization Scheme

Categories relate to different potential funding sources:

Potential to host sensitive focal species, including Missing Middle and/or Green Visions focal species

Potential to host generalist (common) focal species

Habitat linkage/sequential stepping stone habitat

Invasive plant and/or animal control needed

Opportunity to restore floodplain/riparian habitat

Opportunity to restore hydrologic function benefiting habitat

Proximity to school

Known opportunity for community stewardship

Urban Wildlife & Parkland Issues

Inviting wildlife into urban habitats and parklands poses potential conflicts. Many of these issues have been summarized in Green Visions Plan documents (Seymour 2005, Seymour et al. 2006) and the interested reader is encouraged to access those resources.

Habitat Restoration 5 Ps: Projects, Plans, Programs, Policies & Partnerships

Projects
Secure Chino-Puente Hills Connector
Secure as much land as feasible around the Tonner Canyon choke point area, with a vision for restoration of terrestrail habitat connectivity, floodplain functions, riparian habitat and pretreatment/bioremediation of stormwater runoff from 57 Freeway
Secure the Puente-Whittier Hills core habitat peninsula
Secure the Coyote Hills core habitat area
Secure sufficient lands in Los Cerritos Wetlands area to enable a self-sustaining ecosystem to emerge through habitat restoration
Note: Many other projects are proposed that must first go through additional planning processes, indicated under Plans, below

Plans
Resolve existing soils map / locate accurate legend
Design & Implement appropriate interim habitat enhancement measures in vicinity of Chino-Puente Hills Connector, Tonner Canyon area, including soil analyses
Historical Ecology Study(ies), including soil pattern analysis
Plan, Design & Implement habitat/watershed restoration for Chino-Puente Hills Connector & Tonner Canyon & its subwatershed
Develop habitat restoration master plans for the Puente-Whittier Hills, Coyote Hills & Los Cerritos Wetlands core habitat areas
Evaluate opportunities for floodplain & riparian habitat restoration on Fullerton, Brea & La Mirada Creeks, along with the Coyote Creek mainstem. Develop restoration plans for each, integrated with watershed management strategies. Explore & tap potential nexes among habitat restoration projects & nearby school programs.
Develop strategies to provide terrestrial habitat connectivity among the core habitat areas via restored floodplain/riparian habitat/drainageway corridors through the urban matrix
Develop plans for urban wildlife habitat, integrated with watershed management strategies for North Fork Coyote Creek & Carbon Creek
Identify & permit suitable sites & develop resource materials for the Just Do It initiative: general guidelines, appropriate plant palettes, other support materials, & strategy for necessary oversight

Programs
Workshop program for educators at all education levels to heighten awareness of watershed & habitat restoration education needs & discuss how we might work together to establish the requisite education programs
Program to engage school groups in habitat restoration projects near their schools.
Provide opportunities for high school students to earn community service and/or Advanced Placement (AP) credits through habitat restoration & stewardship programs
Offer incentives (e.g., small grants program) for college students, possibly AP high school students, to implement scientific monitoring programs at Chino Hills State Park (collection permit required for all research) & other sensitive species' habitats on public lands
Fully fund natural resource management professionals to oversee scientific monitoring programs, including training volunteers, compiling results & developing appropriate adaptive management responses
Develop outreach program to identify & engage potential community stewards
Just Do It initiative to encourage community stewardship & urban wildlife habitat restoration
Develop community stewardship support system, including facilities for storing records/sharing information relevant to stewardship; Establish bulletin boards/list serves to coordinate volunteer projects & expedite education; Train community stewards to recognize & ideally (properly) treat incipient invasions of pest plants & animals

Programs (continued)
Public education regarding being good neighbors to the native wild inhabitants of the watershed
Public education regarding invasive pest plants & animals
Public education regarding integrated pest management & avoidance of potentially toxic substances in or near habitat areas
Public education regarding cumulative watershed impacts, including disposal of pharmaceuticals into waste water treatment systems
Public education regarding backyard habitat & habitat-friendly landscaping for business & industrial landscapes

Policies
Conserve & restore core habitat areas
Restore sequential habitat connectivity necessary for repatriation of the watershed by species whose habitats were historically eliminated
Restore processes (or their surrogates) integral to natural habitat development & dynamics
Restore watershed & related habitat functions of open space lands & human land uses
Treat urban runoff near its source to reduce cumulative concentrations of pollutants at any one site
Use native plant associations to restore wildlife habitat & watershed functions, including BMPs like swales, & other detention, filtration & infiltration features
Restore the human relationship with wild nature, including a stewardship ethic
Work with legislators to provide funding for environmental education (see Appendix H-5)
Promote environmental education & community stewardship
Stay abreast of research on the impacts of herbicides & pesticides on nontarget species & adapt methods to minimize ecological impacts

Partnerships
Partner with other regional agencies & public /private entities to effect watershed & habitat restoration/conservation that transcends jurisdictional boundaries
Partner with local/regional water management agencies to evaluate & implement measures to improve watershed function & associated beneficial uses, including wildlife habitat
Work with legislators to provide funding for environmental education (see Appendix H-5)
Work with educators to improve environmental education
Partner with other agencies & public /private entities on a Weed Management Area to expedite local education & management efforts
Partner with businesses & community groups to encourage community stewardship & funding of restoration projects from local sources

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Habitat Restoration Appendices:

Appendix H-2: Focal Species Matrices

Appendix H-3: Focal Species & Habitat Needs

Appendix H-4: Potential Floodplain/Riparian Habitat Restoration Opportunities

Appendix H-5: California Education Code Sections 8700-8784

Appendix H-6: California Oak Foundation's How to Collect, Store &Plant Acorns

Appendix H-7: Five-page excerpt from Oak Revegetation Strategy for Los Angeles County (Lyle &Safford 1997)

Coyote Creek Watershed Habitat Restoration Master Plan
Wetland/Riparian Habitats

Focal Species & Habitat Restoration Feasibility

Generally riparian/wetland breeding habitat but most otherwise associated with uplands (pond turtle aquatic but uses uplands for breeding, aestivation) Near term species include habitat generalists	**Near-Term 1-7 years**	**Mid-Term 8-25 years**	**Long-Term > 25 years**
Allen's Hummingbird	√		
Common Yellowthroat	√		
Song Sparrow	√		
Western Tiger Swallowtail	√		
California/Western Toad w/ interim enhancement	Puente Hills	√	
Pacific Treefrog w/ interim enhancement	Puente Hills	√	
Western Spadefoot w/ interim enhancement	Puente Hills	√	
Southwestern Pond Turtle w/ interim enhancement	Puente Hills	√	
Downy Woodpecker		√	
Bullock's Oriole		√	
American Goldfinch		√	
California/Western Toad w/ ecosystem restoration		√	
Pacific Treefrog w/ ecosystem restoration		√	
Fatal (Dusky) Metalmark		√	√
Lorquin's Admiral		√	√
Western Spadefoot w/ ecosystem restoration		Puente Hills	√
Southwestern Pond Turtle w/ ecosystem restoration		Puente Hills	√
California Red-legged Frog			√
Least Bell's Vireo			√
Yellow Warbler			√
Yellow-breasted Chat			√

Coyote Creek Watershed Habitat Restoration Master Plan

Aquatic & Alluvial Scrub Habitats

Focal Species & Habitat Restoration Feasibility

Assumes provision for fluvial sediment transport	Near-Term 1-7 years	Mid-Term 8-25 years	Long-Term > 25 years
Aquatic – Mid to Long-Term			
Arroyo Chub		√	√
Santa Ana Sucker GVSM p. 217 (pdf 223)			√
Threespine Stickleback GVSM p. 224 (pdf 230)			√
Rainbow Trout GVSM p. 224 (pdf 230)			√
Alluvial Scrub – Mid to Long-Term			
California Legless Lizard		√	√
Western Skink		√	√
Behr's Metalmark Butterfly		√	√
Desert Woodrat GVSM p. 54 (pdf 60)		√	√
Coast Horned Lizard			√

Coyote Creek Watershed Habitat Restoration Master Plan

Oak/ Walnut Woodlands

Focal Species & Habitat Restoration Feasibility

Time required to achieve suitable habitat:* Near term species include habitat generalists	Near-term 1-7 years	Mid-Term 8-25 years	Long-term > 25 years
Bushtit	✓		
Western Scrub-Jay	✓		
Lesser Goldfinch	✓		
Hutton's Vireo		✓	
House Wren		✓	
Spotted Towhee		✓	
California Dogface Butterfly		✓	
California Sister Butterfly		✓	✓
Nuttall's Woodpecker			✓
Ash-throated Flycatcher			✓
Western Bluebird			✓
Arboreal Salamander			✓
Big Brown Bat GVSM p. 30 (pdf 36)			✓

* Time required may be expedited in locations where faster-growing western sycamores are suitable and can offer interim woodland features while the oaks are maturing

Coyote Creek Watershed Habitat Restoration Master Plan

Coastal Sage Scrub

Focal Species & Habitat Restoration Feasibility

Time required to achieve suitable habitat: Near term species include habitat generalists	Near-term 1-7 years	Mid-Term 8-25 years	Long-term > 25 years
Mourning Dove	√		
Anna's Hummingbird	√		
Northern Mockingbird	√		
Behr's Metalmark	√		
Western Fence Lizard	√		
Western Skink	Puente Hills	Whittier Hills	√
Side-blotched Lizard	Puente Hills	Whittier Hills	√
Costa's Hummingbird		√	
Bewick's Wren		√	
California Towhee		√	
Coastal Western Whiptail		√	
Cactus Wren – with interim enhancement		Puente Hills	Coyote Hills
Cactus Wren – with systemic restoration			√
Coastal California Gnatcatcher		Puente Hills	√
Orange-crowned Warbler			√
Coast Horned Lizard		Puente Hills	√
Coastal Banded Gecko			√

Coyote Creek Watershed Habitat Restoration Master Plan

Green Visions Cross-Reference

Los Cerritos Wetlands
Red-winged Blackbird GVSM p. (pdf 111)
Burrowing Owl GVSM p. 118 (pdf 124)
Northern Harrier GVSM p. 133 (pdf 139)
Marsh Wren GVSM p. 137 (pdf 143)
White-tailed Kite GVSM p. 141 (pdf 147)
Western Meadowlark GVSM p. 163 (pdf 169)
California Killifish GVSM p. 221 (pdf 227)
Coyote GVSM p. 17 (pdf 23)
Bobcat GVSM p. 40. (pdf 46)
California Vole GVSM p. 45 (pdf 51)
Long-tailed Weasel GVSM p. 50 (pdf 56)
Little Pocket Mouse GVSM p. 68 (pdf 74)
Wide-Ranging, Ecosystem-Regulating Mammals
Mountain Lion GVSM p. 85 (pdf 91)
Bobcat GVSM p. 40. (pdf 46)
Coyote GVSM p. 17 (pdf 23)
Long-tailed Weasel GVSM p. 50 (pdf 56)
American Badger GVSM p. 90 (pdf 96)
Gray Fox GVSM p. 100 (pdf 106)

Coyote Creek Watershed Master Plan – Appendix H-3
Habitat Restoration Focal Species & Habitat Needs

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Introduction to Focal Species & Habitat Needs

We have selected suites of species to serve as foci for and indicators of successful habitat restoration within general vegetation associations. The focal species approach is used to ensure that restorative actions are aimed toward actual wildlife habitats, which are species-specific, in contrast to simple revegetation or even restoration of natural processes. Since this work is part of a watershed planning process, we have given special emphasis to focal species whose habitat needs are associated with watershed functions. Focal species selection was also influenced by the predominately urban character of the Coyote Creek watershed, along with the existence of a series of reports documenting the status and conservation issues of an array of wildlife species in the Puente-Chino Hills system. We especially incorporated into our focal species selection process the results and recommendations of Hass et al. (2004), Cooper (2000), and Scott and Cooper (1999).

Generally, we did not address the target species identified in the "Missing Middle" report (Spencer 2005) because they are well covered there, and there is no need to duplicate that work. Furthermore the habitat/connectivity needs of the focal species addressed there transcend the boundaries of the Coyote Creek watershed, illustrating why multiple contexts are needed to address regional conservation issues. One species not addressed in that report that we considered is California Quail. While it was not specifically addressed in Spencer's report, at least some of its habitat connectivity needs would be met by measures aimed at Greater Roadrunner, which was included in Spencer's report. It appears that the spatial needs of both of those ground-dwelling bird species can no longer be met within the Coyote Creek watershed boundaries and habitat restoration efforts aimed at those species will need to come from a more regional perspective. But the Missing Middle target species' habitat and connectivity needs within the Coyote Creek watershed are well represented by the combined needs of the focal species specified herein.

Also, because we understand that conservation efforts are well underway at Los Cerritos Wetlands, we have not described focal species habitat requirements for the area, although we have included pertinent cross-referencing notes and have included general habitat restoration considerations in the master plan.

The availability of documents published through the Green Visions Plan http://www.greenvisionsplan.net facilitates extending watershed planning to include an array of focal species representing conservation issues beyond the watershed/habitat restoration indicators described herein. We have cross-referenced species whose Green Visions habitat suitability maps indicate a potential presence in the watershed, by page numbers in the Green Visions Target Species Habitat Mapping document (Rubin et al. 2006), abbreviated GVSM. While the Green Visions habitat suitability models are species-specific, it is important to understand that the Wildlife Habitat Relations (WHR) mapping on which they are based is necessarily generalized and may not reflect the true distributions of GVSM target species at a

fine level of detail. However, they serve as models of the land potential to be aspired to if the will to restore functioning ecosystems becomes fully actualized.

Please refer to the accompanying focal species matrices. We have grouped the focal species by the following general vegetation/ physiography types: wetland/riparian, freshwater aquatic, alluvial scrub (sometimes abbreviated AFS for alluvial fan scrub), coastal sage scrub (CSS), and oak/walnut woodlands. Chaparral plant species should be understood as components of the woodlands. Grassland patches may be associated with all general vegetation types. Most focal species use different vegetation types at different times of the year. For example, most of the amphibian species use wetland/riparian/aquatic habitats for breeding but are otherwise associated with uplands – they are grouped according to their critical breeding habitats. The converse is true for Southwestern Pond Turtles that breed on land but spend the rest of their time in aquatic habitats. The California Sister butterfly occupies oak woodlands but flies over riparian zones.

We have defined time frames during which managers of restoration sites should expect to see occupancy by sequences of indicator species: Near Term: 1-7 years; Mid-Term: 8-25 years; Long-Term: longer than 25 years. Many of the near term species are habitat generalists, more or less adapted to human presence, but they are nevertheless realistic indicators of habitat development – in the urban context of the majority of the watershed.

Certain sensitive amphibian and reptile species are identified for the near term with interim habitat enhancement measures in areas where the species currently have a presence. Experimental habitat enhancement measures may be worth exploring for other focal species such as the Cactus Wren. Otherwise, we equate habitat restoration with ecosystem, including watershed restoration. Several of the amphibian focal species, along with the Arroyo Chub serve as obvious, direct indicators of water quality, while other species serve as indirect indicators of watershed health, such as the Coastal Western Whiptail's need for pesticide-free soil environments.

A Green Visions Cross Reference table indexes focal species likely applicable to habitat restoration at Los Cerritos Wetlands, along with wide-ranging, ecosystem-regulating mammals that represent a range of requirements for area of core habitat, habitat connectivity and stepping stone habitats.

We sought ecological reference sites to guide habitat restoration efforts, but had difficulty identifying appropriate sites with comparable physiography – with the noteworthy exception of Chino Hills State Park. Aliso Creek, within the park, serves as an excellent ecological reference site for Arroyo Chub, our focal aquatic species, for whom baseline habitat descriptions have been completed. The park also hosts populations of most of the other focal species and can serve additional reference needs for habitat restoration, as well as the most likely source for recolonization. More specific ecological reference sites within the park should be identified in the future, though much of that should be considered sensitive information.

In an effort to improve this document's readability we have used citations sparingly. Sources should be discernable from the Personal Communications and References for Focal Species and Habitat Needs.

Alluvial Scrub & Relationship to Aquatic Habitat Restoration

Because a significant portion of the Coyote Creek watershed is comprised of alluvial fans, alluvial fan scrub, or alluvial scrub (AFS) habitats were undoubtedly common prior to land conversion. Today little space is available to accommodate what early settlers no doubt viewed as wasteland, but in its grandest expressions was imbued with great biological diversity and striking beauty. Prehistoric alluvial scrublands in the Coyote Creek watershed likely accommodated such breath-taking creatures as Lesser Nighthawk (*Chordeiles acutipennis*), as well as serving as alternate host and habitat linkage for coastal sage scrub species such as Cactus Wren, Greater Roadrunner (*Geococcyx californianus*) and Coast Horned Lizard. Since drainages through the alluvial fans would have been braided through continuously changing fluvial dynamics, some historic channels became terraces, isolated from flooding for decades or centuries, with unique assemblages of plants and animals developing on them over time.

Within the current spatial limitations, it is unlikely that the prehistoric character of alluvial scrublands will ever be emulated, if it could be known. However, the processes necessary to reclaim sustainable aquatic habitat for Arroyo Chub and its ecological compatriots are associated with the processes that engender alluvial scrub, and it would be natural for most aquatic/riparian areas to be flanked by zones of alluvial scrub. Within the current narrowed, but nevertheless achievable context, limited alluvial scrub could provide habitat for specialized species like the California Legless Lizard, as well as coast sage scrub focal species Western Skink, Coastal Western Whiptail and Coast Horned Lizard. It could provide vital habitat connectivity for wide-ranging, ecosystem regulating species like Bobcat, Coyote, Long-tailed Weasel and American Badger. Due to the spatial limitations, it is likely that only relatively early seral (early stage in natural succession) alluvial scrub may be achieved. However, strategic planning could result in alluvial scrublands capable of achieving greater age – potentially supporting and serving as serving as habitat linkages for Cactus Wren.

Birds – Wetland/ Riparian Habitats, Near Term

Allen's Hummingbird (*Selasphorus sasin*)

- Resident in lowlands affected by summer fog
- Birds in our region nest mostly in willows
- Feeds on tubular flowers and small insects

Common Yellowthroat (*Geothlypis trichas*)

- Resident in dense vegetation, including willows and cat-tails, often near water
- Widespread, tolerant of disturbance, and frequently among the first species to occupy regenerating and restored wetlands
- Nests in shrubs low to ground
- Feeds on variety of arthropods and other small prey items

Song Sparrow (*Melospiza melodia*)

- Resident in dense vegetation, including willows and cat-tails, near water
- Widespread, tolerant of disturbance, and frequently among the first species to occupy regenerating and restored wetlands
- Nests in shrubs low to ground
- Feeds on seeds and invertebrates.

Birds – Wetland/ Riparian Habitats, Mid-Term

Downy Woodpecker (*Picoides pubescens*)

- Resident in open riparian woodlands, favoring willows in our region
- Usually makes nest hole in dead stub of living or dead tree
- Forages in live trees and dead snags on arthropods and various other items

Bullock's Oriole (*Icterus bullockii*)

- Summer resident, present mid-March through September, that nests in open woodlands with tall trees, especially cottonwoods
- Hanging nest usually placed in outer part of tree, 10-30 feet high, often near water
- Forages primarily on insects, also fruit and nectar

American Goldfinch (*Carduelis tristis*)

- Resident in riparian woodlands, especially those dominated by willows.
- Nests primarily in willows but may move to residential neighborhoods in winter.
- Forages primarily on seeds.

Birds – Wetland/ Riparian Habitats, Long Term

Least Bell's Vireo (*Vireo bellii pusillus*)

- Summer resident, present late March through early September, that nests in open riparian scrub, especially mulefat and willows; typically found along habitat edges rather than in mature, closed-canopy forests
- Recolonizing Orange County after decades of absence due to parasitism by Brown-headed Cowbirds and loss/fragmentation of riparian habitat
- Nests low in shrubs or small trees
- Forages on arthropods; generally requires large expanses of riparian scrub

Yellow Warbler (*Dendroica petechia*)

- Summer resident, present April through early October, that nests in mature riparian woodlands, especially favoring willows and cottonwoods in our region
- Population expanding in Orange County due to control of Brown-headed Cowbirds and restoration of riparian woodlands
- Nests at varying heights in shrubs or trees; forages on arthropods
- Generally requires large expanses of mature riparian woodland

Yellow-breasted Chat (*Icteria virens*)

GVSM p. 145 (pdf 152)

- Summer resident that nests in mature riparian woodlands, especially favoring willows in our region; may forage extensively in adjacent upland scrub habitats
- Population expanding in Orange County due to control of Brown-headed Cowbirds and restoration of riparian woodlands
- Usually nests close to ground in dense vegetation
- Forages on arthropods and fruit; generally requires large expanses of riparian woodland
- Urban riparian, potentially Puente Hills, probably not Los Cerritos Wetlands

Birds – Coastal Sage Scrub, Near Term

Mourning Dove (*Zenaida macroura*)

- Resident in various habitats; very tolerant of human presence
- Nests in trees, bushes, or on ground
- Forages almost entirely on seeds

Anna's Hummingbird (*Calypte anna*)

- Resident in various habitats; very tolerant of human presence
- Nests in shrubs and trees
- Forages on nectar and small arthropods

Northern Mockingbird (*Mimus polyglottos*)

- Resident species originally found primarily in coastal sage scrub in our region, but now largely associated with residential neighborhoods.
- Usually nests near ground in dense shrubs.
- Forages mainly on arthropods but also fruit

Birds – Coastal Sage Scrub, Mid-Term

Costa's Hummingbird (*Calypte costae*)

- Summer resident, present March through mid-September, in coastal sage scrub and chaparral in our region
- Usually nests near ground
- Requires abundant tubular flowers for nectar; also feeds on small arthropods

Bewick's Wren (*Thryomanes bewickii*)

- Resident primarily in coastal sage scrub and chaparral, typically in extensive open space areas
- Nests in crevices and cavities near ground in dense shrubs
- Forages on arthropods

California Towhee (*Pipilo crissalis*)

- Resident in various habitats containing dense shrubs, but due to poor dispersal may require establishment of corridors before colonizing suitable habitat in isolated urban areas
- Nests off the ground in shrubs and trees
- Forages on seeds and arthropods

Birds – Coastal Sage Scrub, Long Term

Cactus Wren (*Campylorhynchus brunneicapillus*)

- Coastal population resident in coastal sage scrub containing cactus patches at least one meter tall
- Coastal population threatened with extirpation due to habitat loss and fragmentation, and possibly other causes; viable native habitat corridors would probably be required in order to establish new populations in the Coyote Creek watershed
- Nests exclusively in tall cactus – interim enhancement measures could include transplantation of displaced tall specimens, grafting to enhance the size of existing specimens, or artificial nesting structures
- Forages on arthropods

Coastal California Gnatcatcher (*Polioptila californica californica*)

- Resident in coastal sage scrub, particularly areas dominated by California Sagebrush (*Artemisia californica*)
- Southern California population threatened with extirpation due to habitat loss and fragmentation; viable native habitat corridors would probably be required in order to establish new populations in the Coyote Creek watershed
- Nests low to ground, primarily in California Sagebrush
- Forages on arthropods

Orange-crowned Warbler (*Vermivora celata*)

- Resident in various communities containing dense understory
- Nests on or close to ground in dense vegetation.
- Forages on arthropods

Birds – Oak / Walnut Woodlands, Near Term

Western Scrub-Jay (*Aphelocoma californica*)

- Resident in various communities, including oak and walnut woodlands as well as residential neighborhoods
- Nests dense shrubs and trees
- Omnivorous, but with a preference for acorns in our region

Bushtit (*Psaltriparus minimus*)

- Resident in various communities, including oak and walnut woodlands as well as residential neighborhoods
- Pendulous nest placed in various shrubs and trees
- Forages on small arthropods

Lesser Goldfinch (*Carduelis psaltria*)

- Resident in various communities, including oak and walnut woodlands as well as residential neighborhoods
- Nest placed in various shrubs and trees
- Feeds on seeds, often of weedy species

Birds – Oak / Walnut Woodlands, Mid-Term

Hutton's Vireo (*Vireo huttoni*)

- Resident of oak and riparian woodlands, especially in foothills and mountains
- Nest usually placed fairly high in an oak or other tree
- Forages primarily on arthropods

House Wren (*Troglodytes aedon*)

- Resident in various communities, including oak and walnut woodlands
- Nests primarily in cavities in dead wood
- Forages on arthropods

Spotted Towhee (*Pipilo maculatus*)

- Resident in various communities with dense underbrush, usually in areas connected to expansive open spaces
- Nest usually placed on or near ground under dense vegetation
- Forages mainly on arthropods during nesting season, seeds during non-breeding period

Birds – Oak / Walnut Woodlands, Long Term

Nuttall's Woodpecker (*Picoides nuttallii*)

- Resident primarily in oak/walnut woodlands, but also found in other woodlands
- Nests in cavities that it excavates in dead wood, often in willows or other soft-wood species
- Forages mainly on insects

Ash-throated Flycatcher (*Myiarchus cinerascens*)

- Summer resident, present April through September, found mainly in oak and sycamore woodlands, usually near areas of coastal sage scrub or chaparral in the foothills and mountains
- Nests in cavities excavated by other species; will use bluebird houses
- Forages on arthropods

Western Bluebird (*Sialia mexicana*)

- Resident mainly in oak woodlands of the foothills and mountains, but spreading in the lowlands due to provision of nest boxes and planting of trees
- Nests in cavities excavated by other species, but provision of bluebird houses can result in rapid colonization of areas that lack natural cavities
- Forages on arthropods during breeding season, berries during non-breeding period

Birds – Green Visions Cross-Reference

Red-winged Blackbird

GVSM p. 105 (pdf 111) Typically requires emergent marsh that may not become widely established in the Coyote Creek watershed, and also depends upon open uplands for foraging during the nesting season; thus while good nesting habitat might be developed for this species, it would likely remain unoccupied unless appropriate uplands occur nearby. That said, the occupation of an isolated created wetland along a highly urbanized section of Malibu Canyon Road by a population of Red-winged Blackbirds (Shirley Birosik pers. com.) suggests that the species may adapt to urbanization in surprising ways. So while this species may not offer a fair assessment of the success of wetland/riparian habitat restoration in most urbanized parts of the watershed, it could be a suitable focal species for the Los Cerritos Wetlands or for any emergent marsh habitat that may be established in the Puente Hills, and it just may show up in restored wetland areas in near proximity to conserved uplands like Coyote Hills.

Rufous-crowned Sparrow

GVSM p. 110 (pdf 116) Requires fairly large blocks of unfragmented habitat; seldom occurs in flatlands; potentially suitable focal species only for Puente Hills

Sage Sparrow

GVSM p. 114 (pdf 120) Occurs only rarely and locally in the Puente-Chino Hills (Cooper 2000) so not suitable as a focal species in any part of the watershed

Burrowing Owl

GVSM p. 118 (pdf 124) Only known residents in the watershed are at Seal Beach Naval Weapons Station and possibly other open lands around the Los Cerritos Wetlands; not a suitable focal species elsewhere in the watershed

California Quail

GVSM p. 123 (pdf 129) Requires fairly large blocks of unfragmented habitat for sustainability; not a suitable focal species for Los Cerritos Wetlands or for urbanized parts of the watershed, but appropriate for the Puente Hills

Mountain Quail

GVSM p. 123 (pdf 129) Does not occur within the Coyote Creek watershed

Lark Sparrow

GVSM p. 128 (pdf 134) Requires fairly large blocks of unfragmented habitat; not a suitable focal species for Los Cerritos Wetlands or for urbanized parts of the watershed, but potentially suitable for the Puente Hills

Northern Harrier

GVSM p. 133 (pdf 139) Requires large blocks of unfragmented habitat; potentially a suitable focal species for Los Cerritos Wetlands or Puente Hills, but not for urbanized parts of the watershed.

Marsh Wren

GVSM p. 137 (pdf 143) Requires emergent marsh that may not become widely established in the Coyote Creek watershed; potentially suitable focal species for the Los Cerritos Wetlands or for any emergent marsh habitat that may be established in the Puente Hills

White-tailed Kite

GVSM p. 141 (pdf 147) Requires large blocks of grassland or other open ground; potentially suitable focal species for Los Cerritos Wetlands or Puente Hills, but not for urbanized parts of the watershed

Loggerhead Shrike

GVSM p. 150 (pdf 156) Requires large blocks of open space; serious regional decline may lead to extirpation regardless of management actions; not suitable for urbanized parts of the watershed or Los Cerritos Wetlands, but potentially suitable focal species for Puente Hills

Belding's Savannah Sparrow

GVSM p. 154 (pdf 160) Requires coastal marsh vegetation; suitable focal species for Los Cerritos Wetlands only

Spotted Owl

GVSM p. 158 (pdf 164) Does not occur within the Coyote Creek watershed

Western Meadowlark

GVSM p. 163 (pdf 169) Requires large blocks of grassland or other open ground; potentially a suitable focal species for Los Cerritos Wetlands or Puente Hills, but not for urbanized parts of the watershed

Butterflies

Western Tiger Swallowtail (*Papilia rutulus rutulus*) Near Term Wetland/Riparian

- Riparian and associated woodlands and scrublands, canyons, wooded residential areas and parks, due to the popularity of sycamores in landscaping

- Caterpillar food plants: leaves of deciduous trees, especially sycamore, along with cottonwoods and related poplars, willows and alders

- Orange County flight records range from December/January through September, but the summer brood is apparently the largest

- Adults take nectar from native plants such as yerba santa (*Eriodictyon crassifolium*), woolly blue curls (*Trichostema lanatum*), various thistles, and sages (*Salvia* spp.), all of which would be expected in the Puente-Chino Hills prior to historic overgrazing, and these plant associations likely extended at least to the Coyote Hills prior to alteration for first agriculture and then land development; Salvias including especially purple sage (*S. lecophylla*) – better adapted to the more protected north and eastern slope aspects, along with occasional white sage (*S. apiana*), and black sage (*S. mellifera*); they will also visit a variety of horticultural plant species if their other habitat requirements are met nearby

- Glides majestically back & forth along the watercourse; where host plants are grown as street trees, it behaves as though the street were a watercourse (Shapiro online)

- Occasionally alights on wet sand or mud along a stream to sip water and nutrients – a phenomenon known as "puddling"

- Larvae rest in shelters made of silk and curled leaves; overwinters as pupa (chrysalis)

Fatal (Dusky) Metalmark (*Calephelis nemesis*) Mid-Long Term Wetland/Riparian

- Riparian scrublands, mixed chaparral
- Caterpillar food plants: mule fat (*Baccharis salicifolia*), bush sunflower (*Encelia californica*) and possibly virgin's bower (*Clematis ligusticifolia*)
- Flight period May-October; Santa Barbara Natural History Museum web field guide states that they may be seen flying any time of year in coastal areas
- Study of "restoration" sites on regulated sections of the Lower Colorado River compared with upstream control areas found Fatal Metalmark lacking in restored sites due to absence of mule fat (*Baccharis salicifolia*) a.k.a. seepwillow; lack of fluvial disturbance lead to its replacement by Emory baccharis (*B. emoryi)* (Nelson & Andersen 1999)
- In the above study *Baccharis salicifolia* did not occur at any of the 'restored sites, whereas at the control site it was among the species associated with the "first bottom" tier – subject to annual flooding
- Both species of Baccharis occur in our region; in the L. Colorado R. study B. emoryi was only observed blooming in Nov. there, whereas *B. salicifolia* bloomed more or less continuously; Munz and Keck (1968) give blooming times as follows for California: *B. emory* Aug-Dec.; *B. viminea* (*salicifolia*): mostly March-July, but some flower all year
- Nelson cited results of unpublished laboratory studies wherein *Calephelis nemesis* was successfully reared on *B. salicifolia*, but not on *B. emoryi* (Nelson & Andersen 1999)

Lorquin's Admiral (*Limenitis lorquini*) Mid-Long Term Wetland/Riparian

GVSM p. 198 (pdf 204) Appears to mimic the inedible California Sister, with which it often occurs (Shapiro online); since this predator-avoidance feature may be important to its conservation, we consider them together

- Riparian habitats, including moist foothill canyons & washes; orchards & parklands
- Caterpillar host plants include willows (*Salix* sp.), especially arroyo, narrow-leaved and red willows (*Salix lasiolepis, S. exigua* and *S laevigata*, respectively); wild cherry (*Prunus* sp.); cottonwoods (*Populus* sp.); and orchard trees
- Adult food: Flower nectar from plants including yerba santa (*Eriodictyon crassifolium*); bird droppings; and dung
- Flight Period: First brood usually flies from April to June; second brood ion the wing from August into October; earliest Orange County record is February 25
- Lorquin's Admiral is generally not abundant in Orange County, although one may expect to see one or two in almost any moist canyon or wash in the mountains or foothills where willow is common (Orsak 1977)
- The related species Viceroy (*Limenitis archippus*) was the other "first bottom" tier species missing from "restored" sites along L. Colorado R. – see notes under Fatal Metalmark (Nelson & Andersen 1999)

California Sister (*Adelpha bredowii californica*) Mid-Long Term Oak Woodlands/ Riparian Zones

- While Orsak (1997) notes Canyon live oak (*Quercus chysolepis*) as the larval host plant, Shapiro (online) includes coast and interior live oaks (*Q. agrifolia* & *Q. wislizenii*) and notes that the caterpillar appears to mimic a bird dropping

- Orsak (1997) noted that historic records exist for Fullerton, whether they were associated with canyon or coast live oak remains to be researched; Weislander Vegetation Type Map (mid-1940s) does not indicate canyon live oaks in the watershed (they do appear in canyons of the Santa Ana Mtns) but does indicate cultivated lands extending along canyons into the Puente Hills; while we don't associate canyon live oaks with the Puente Hills, it is possible they may have occurred there prior to human disturbance – an historical ecology investigation might reveal a historical presence of canyon live oak in the watershed

- Flight Period: Two broods: April-June; probably August-September (Orsak 1977)

- May be observed gliding over oak woodland treetops or along stream corridors

- Adults visit flowers, in our region including yerba santa (*Eriodictyon crassifolium*), goldenrod (*Solidago californica, S. confinis*), coyote brush (*Baccharis pilularis*), but also feed on dung, carrion, flowing sap, damaged fruit, etc. "– a very tropical lifestyle" (Shapiro online)

- Adults of both sexes visit wet sand or mud along a stream to sip water and nutrients – a phenomenon known as "puddling"; among most other butterfly species only the males exhibit this behavior (Shapiro online)

California Dogface (*Zerene eurydice*) Mid-Term Foothill Woodlands, Canyons

GVSM p. 198 (pdf 204)

- California State Butterfly; endemic to the state
- Orsak (1977) notes records for the foothills of Fullerton and possibly in the hills near Brea
- Larval host plants false indigo (*Amorpha californica* & less frequently *A. fruiticosa*) are generally more montane or interior species not common in the watershed; often associated with areas of floodplain or other frequent disturbance
- Adults nectar on thistles (*Cirsium* sp.), said to be especially fond of purple flowers (Emmel and Emmel 1973)
- Flight Period: Two broods Orange County records range from February to December; first brood primarily April-July, second August-October

Behr's Metalmark (*Apodemia virgulti*) Near Term Coastal Sage & Alluvial Scrub

Formerly known as *Apodemia mormo virgulti*, a subspecies of Mormon Metalmark GVSM p 194 (pdf 200)

- Coastal sage scrub, alluvial scrub, chaparral components of woodlands
- Larvae feed on perennial buckwheats, the local species being California buckwheat (*Eriogonum fasciculatum ssp. fasciculatum*); young caterpillars feed on leaves, older caterpillars eat leaves and stems
- Nectar sources for adults include California buckwheat and narrowleaf goldenbush (*Ericameria linearifolia*)
- Low and rapid flyer – from early March to late November, representing two broods with peak emergence in March and April, and again in August and September (Orsak 1977)
- Eggs laid in groups of 2-4 on lower leaves of host plant, or singly on other parts of plant; caterpillars rest during the day in shelters of leaves tied together with silk, emerging at night to feed; young caterpillars hibernate inside plant parts such as dried buckwheat flower heads
- Habitats of some subspecies have been threatened by invasive pest plant encroachment; outright habitat loss has probably been the greater factor in the Coyote Creek watershed

Invertebrates – Green Visions Cross-Reference

Callipe Fritillary

GVSM p. 206 (pdf 212) GV model includes Puente Hills, Coyote Hills; larval host plants are violet spp., e.g., Johnny jump-up (*Viola pedunculata*); Orsak (1977) observed a decline in the local Comstock Fritillary subspecies, possibly correlated with drying climatic conditions; the host violets are associated with moist conditions and may fluctuate with annual rainfall patterns, rendering them less helpful as an indicator of habitat restoration success; however, they should be considered of conservation interest and should be watched for in the Puente Hills, in particular

Riverside Fairy Shrimp

GVSM p. 201 (pdf 217) Endangered species of vernal pool habitats with nearly neutral pH, this species may have occurred within the watershed in the vernal pools historically associated with

the area of western La Mirada, Norwalk and Santa Fe Springs (Common Ground Historic Wetlands)

Amphibians

California Toad (*Bufo boreas halophilus*) Near to Mid-Term

Near Term Puente Hills Vicinity with Interim Habitat Enhancement; Mid-Term with Ecosystem Restoration – a Western Toad subspecies

Terrestrial amphibian species that uses aquatic habitats for breeding. The most common amphibian species found in the Puente-Chino Hills by Hass et al. (2004), this species is not of general conservation concern but still not abundant, likely due to habitat loss. While relatively plentiful in the hills it has presumably dwindled or been extirpated in urban portions of the watershed. Primarily heard at night, the California Toad's call is high-pitched chirp. Sound clips of this and other amphibian species' calls may be heard at http://www.californiaherps.com

- Habitat generalists able to use a wide variety of still to barely moving aquatic sites for breeding, including marshes, springs, creeks, the edges of small lakes, meadows, woodlands, forests and desert riparian areas

- Metamorphosis may occur from mid-May to late September, so relatively long-lived aquatic habitat is needed for successful breeding

- Tadpoles will feed upon filamentous algae, detritus, and may scavenge carrion, including that of their own species

- Juvenile terrestrial habitat unknown, presumed similar to that of adults, though it is thought that they stay closer to wetlands as they are more subject to desiccation, and are likely remain near their natal wetlands through the first winter

- Adults may spend 75% or more of their time on land, but apparently in or near relatively moist environments

- When temperatures descend to 3° C / 37° F these toads find overwintering habitats, which for the small juveniles may be simple cracks in the soil, but for adults may be ground squirrel burrows or in and under the root systems of evergreen trees. They may seek similar refuge during extremely hot weather but do not aestivate (become inactive during hot, dry months).

- Primary food sources include spiders, worms, ants, moths, beetles and other arthropods

- While Western Toad has no special status in California, the species is listed as Endangered in several states and is under review in several others. Factors associated with the extirpation of Western Toad in New Mexico include increased competition from, or predation by exotic

aquatic species, mortality due to natural predators, trampling of wetland habitats and individuals by livestock, and decreased hatching success due to UV-B radiation exposure

- Interim habitat enhancement measures recommended in Hass et al. (2004) include creating new breeding ponds or enhancing the depth of existing ones

- Ecosystem restoration would restore the watershed processes that result in habitat establishment and sustainability, as well as the space for those processes to unfold

Pacific Treefrog [*Pseudacris (=Hyla) regilla*] Near to Mid-Term

Near Term Puente Hills Vicinity with Interim Habitat Enhancement; Mid-Term with Ecosystem Restoration a.k.a. Pacific Chorus Frog, a common name that temporarily replaced Treefrog, but the original was reinstated. GVSM p. 177 (pdf 183)

Terrestrial amphibian species that uses aquatic habitats for breeding; The most ubiquitous frog in our region, and in California, it is somewhat startling that Hass et al. (2004) did not find a broad distribution of this species in their Puente-Chino Hills study, mentioned in relation to the absence of Two-striped Garter Snake (*Thamnopsis hammondii*), which favors the treefrog as prey. As indicated in its alternate name, the Pacific Treefrog's call has an impact disproportional to its size – a sound largely missing now from urban dwellers' evenings (excluding Disneyland). For a enlightening sound/video clip of the frog engaging in its famed chorus, with balloon-like vocal sac pumping – see the San Diego Natural History Museum's web page: http://www.sdnhm.org/fieldguide/herps/video_treefrog.html

- Habitat generalists able to use a wide variety of aquatic sites for breeding, including lakes, ponds, slow-moving streams, backwaters of large rivers, wet meadows, emergent marshes, reservoirs, supratidal pools, golf course ponds, and irrigation ditches

- Pacific treefrog tadpoles apparently prefer temperatures around 19-20˚C/ 66-68˚F, but can tolerate low temperatures of 0-2 ˚C/ 32-36˚F and high temperatures up to 33 ˚C/91˚F, with temperatures about 38 ˚C/ 100˚F; tadpoles tolerant of weakly saline conditions

- Two and half months or more may be required for metamorphosis, so breeding sites must sustain the water for that long, but they are commonly associated with ephemeral wetlands

- Aestivation (also spelled estivate – inactive period during hot, dry months) takes place in cool, moist retreats such as piles of debris, dense vegetation, rock or log crevices, mammal burrows, artificial drains, basements of homes and buildings, spring boxes, housing units for sprinkler system valves, and other protected places

- Overwintering occurs in similar cool, moist habitats
- Diet includes a wide variety of arthropods
- Breeding males may move 400 meters/437 yards or more among different wetland sites – habitat connectivity necessary to restore local populations
- Interim habitat enhancement measures recommended in Hass et al. (2004) include creating new breeding ponds or enhancing the depth of existing ones
- Ecosystem restoration would restore the watershed processes that result in habitat establishment and sustainability, as well as the space for those processes to unfold

Pacific Treefrog has no special conservation status and generally its distribution is not declining, however its presence in the watershed has presumably declined in the more than a century of land and watershed alterations. This adaptable species is potentially capable of eventually recolonizing urban habitats as long as breeding habitat and habitat connectivity are provided.

Western Spadefoot [*Spea* (*Scaphiopus*) *hammondii*] Near to Mid-Term

Near Term Puente Hills Vicinity with Interim Habitat Enhancement; Mid-Long Term with Ecosystem Restoration GVSM p. 181 (pdf 187)

California State Species of Special Concern; Federal Species of Concern
A primarily terrestrial amphibian species that uses aquatic habitats solely for breeding and larval (tadpole) development. Commonly referred to erroneously as Western Spadefoot "Toads", this species belongs to a different family (Pelobatidae) from the true toads (Bufonidae), although its superficial appearance is similar to that of toads. While this species' overall distribution remains generally intact, development of the coastal plain of Los Angeles and Orange Counties has displaced their historic habitat there. An ephemeral, nocturnally active and illusive species that spends most of its life underground, the Western Spadefoot may be difficult to detect in surveys. For that reason, restoration of suitable breeding habitat may be a more efficient measure of restoration success than survey results.

- Open areas with sandy or gravelly soils, in a variety of habitats including grasslands, mixed woodlands, coastal sage scrub, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains; Usually absent from narrow canyons and highly mesic (moist) areas; Most occur at elevations below 365 meters/ 1,000 feet
- Most frequently breed in temporary rainpools such as alkali flats, vernal playas, vernal pools, livestock tanks, and pools that form in road ruts or at the base of road and railroad grades, but

they occasionally breed in intermittent streams where larvae develop in more or less isolated pools as the streams dry.

- Breeding is apparently triggered by the impact of raindrops on the soil, is generally synchronous (most individuals breeding simultaneously) and usually occurs one to two days after late winter or early spring rains

- Typical breeding habitat has little or no aquatic or emergent vegetation; larval habitat may be turbid

- Breeding pools must be sustained a minimum of 30 days, preferably longer, to allow for metamorphosis, which may occur within a range of 3 to 11 weeks – metamorphosis is sometimes accelerated by drying of pools, but mortality is also common with early drying

- Pools absent of bullfrogs, crayfish and fish, including mosquitofish, are necessary for successful breeding – while many pools suitable for Western Spadefoot breeding are insufficient for the needs of many exotic predators, they can be washed into spadefoot habitat during high flow periods, depending on habitat context

- In the absence of exotic predators Western Spadefoot tadpoles may coexist with the larvae of California Toads and Pacific Treefrog

- Juvenile behavior remains undocumented, but it is assumed they migrate to the habitats occupied by adults soon after metamorphosis, and juveniles and adults have been observed together

- Most aestivation (inactive period during hot, dry months) habitat is treeless; sandy, gravelly or otherwise friable soils preferred for the aestivation burrows they usually dig themselves, likely what their hind spade-shaped feet were adapted for, although they have been observed emerging from the burrows of kangaroo rats

- For several months following the first autumn rains, periods of inactivity or hibernation are spent in shallow winter burrows

- Distances traveled among breeding, aestivation and overwintering habitats remain undocumented

- Hass et al. (2004) recommended the enhancement or addition of upland breeding pools, specifically "ridgelines in flat areas" to help Western Spadefoot remain viable in the Puente-Chino Hills area

- Interim habitat enhancement measures may include creating or deepening existing pools in locations where migration from existing habitats in Chino Hills State Park may occur;

ecosystem restoration may include artificially constructed pools in an ecological context that will allow the habitat to become self-sustaining

The relative simplicity of the Western Spadefoot's habitat requirements render them readily achievable objectives that, if implemented in the context of adequate habitat connectivity could eventually extend the future distribution of this species back to some of the lowland areas it presumably inhabited prior to agricultural and urban land development.

California Red-legged Frog (*Rana aurora draytonii*) – Long Term

Federal Threatened Species, California Species of Special Concern
The largest native Pacific coast frog, this species was once widespread and abundant in southern California. Decimated in the last decades of the 1800s by the appetite of a burgeoning California population for its meaty legs, the nonnative Bullfrogs (*Rana catesbeiana*) imported to replace them in the trade became predators on the remaining California red-legged frog populations, further spiraling the species' demise. Bullfrogs became successful colonizers of many of the historic California red-legged frog habitats. Ongoing habitat loss and fragmentation have severely impacted the species' distribution, while bullfrogs and other nonnative aquatic species continue to constrain the remaining suitable habitat for the native species. Other watershed issues are summarized in the master plan.

The Puente Hills study (Hass et al. 2004) did not detect this species, though they state that the species was documented historically in Carbon, Tonner and other canyons throughout the Puente-Chino Hills. The species is now believed nearly extirpated in the Transverse and Peninsular Ranges. Recolonization or reestablishment of the species in suitable restored habitats within the Coyote Creek watershed will depend on restoration of populations in the Santa Ana Mountains, which is considered a Priority 3 Core Area within the US Fish and Wildlife Service's Draft Recovery Plan for the species – essentially meaning voluntary restoration efforts are encouraged in this region of the species' historical range.

- Wide variety of habitats – sunlit ponds, slow sections of streams – usually a permanent water source – this can be as limited as a perennial plunge pool in an intermittent stream

- 92% of occurrences of California Red-legged Frogs associated with stream, as opposed to pond environments

- 99% of occurrences associated with water depth greater than or equal to 0.7 meters/ 2.3 feet

- 80% of occurrences associated with dense emergent vegetation – typically stands of cattails (*Typha* spp.) or tules (*Scirpus* spp.), and/or shoreline vegetation of overhanging willows (*Salix* spp.), other wetland species such as false loosestrife/water primrose (*Ludwigia* spp.) the other 20% associated with limited vegetation

- Coastal populations active year-round, interior populations less active during winter months
- Breeding occurs from November through March, with earlier breeding records in southern localities
- California Red-legged Frogs highly susceptible to introduced predators, especially Bullfrogs who prey on both tadpoles and sub-adults
- May leave the water at any time of year, spending time in primarily moist vegetation, including riparian areas, marshes, and around boulders, rocks or organic debris, such as logs
- Diet highly variable: larvae probably eat algae; adults most common food items are invertebrates; vertebrates, such as Pacific Treefrogs (*Hyla regilla*) and California Mice (*Peromyscus californicus*), are frequently eaten by larger frogs
- May aestivate (spend inactive period) during the hot, dry months in small mammal burrows or moist leaf litter, usually near the aquatic habitat
- Healthiest populations exist as sub-populations interconnected by dispersal corridors
- Juveniles disperse locally from their natal ponds during summer months, then disperse farther away from the breeding habitat during warm rain events
- Dispersal of up to 2.9 kilometers/ 1.8 miles from the natal pond has been documented along a stream, although many adults are relatively sedentary; variable behavior allows adaptations to varying conditions
- During rainy nights, California Red-legged Frogs may disperse up to a mile over upland habitats, without apparent regard to topography, vegetation type, or riparian corridors

Arboreal Salamander (*Aneides lugubris*) – Long Term Oak Woodlands

A fully terrestrial species that does not need water to breed, the Arboreal Salamander does require moist environments. In the Puente-Chino Hills study Arboreal Salamanders were detected at the Whittier Hills and Powder Canyon sites, but not east of there (Hass et al. 2004). It is unique among all of the North American salamanders in its arboreal activity – they can climb up to 50 feet above the ground, facilitated by expanded toes and a prehensile tail. This salamander belongs to the family Plethodontidae or Lungless Salamanders. It lacks lungs and respires completely through its skin.

- Oak, sycamore, walnut and riparian canyon woodlands, dense chaparral
- Leaf litter and downed logs are believed important habitat elements for this species
- Nocturnal and active during periods of precipitation from fall to spring; during the day, they remain hidden in moist microhabitats; inactive during the summer months when they usually retreat into tree cavities
- Nests in cavities and cracks of mature oaks, sycamores, and walnuts; most nests have been found in tree holes, with the eggs suspended from overhangs within the tree cavities
- Mating takes place during spring; eggs laid during June – July; females have been found guarding their eggs; hatching occurs late summer to fall
- No larval stage – young are miniatures of the adult form
- Diet includes a wide variety of invertebrates, occasional Slender Salamanders
- Habitat connectivity may be achieved through riparian corridors, though some upland connectivity may be necessary to help restore the species to suitable areas of the Puente-Chino Hills

Western Newt a.k.a. Coast Range Newt (*Taricha torosa torosa*) – Long Term?

California Species of Special Concern: populations south of Salinas River;
GVSM p. 185 (pdf 191) While not treated as focal species per se herein, this species is mentioned because of the apparent historic record of the species' occurrence within the watershed. The distribution map for this species, under the common name Coast Range Newt, in Jennings and Hayes (1994) shows a single (extinct) museum record, for this species within the watershed. A search of the online collection records of the California Academy of Sciences did not turn this record up, so the particulars remain for some future researcher to uncover. This species is doing relatively well in the northern part of its range, but has declined dramatically in southern California. Presently the species is apparently only flourishing within the most pristine portions of the San Mateo Creek watershed in San Diego County (Tim Hovey, pers. com.). Some populations apparently remain in the Santa Ana Mountains, from whence a restored population could potentially recolonize suitable habitats in the Puente-Chino Hills. Habitat restoration efforts directed toward the other amphibian species should benefit the Western Newt if it is able to recover portions of its historic southern California range. Further investigation is warranted.

Reptiles

Western Fence Lizard (*Sceloporus occidentalis*) – Near Term CSS

Commonly known as "blue-bellies," for the bright blue patches on the sides of the male torso, these lizards occur in a wide variety of habitats throughout California except for extreme desert environments. The fence lizard term stems from their habit of sunning themselves on rocks, fences and other high places – a habit that makes them vulnerable to many predators (including young humans). These showy lizards provide more benefits to humans than just entertainment. A protein in their blood kills the bacterium that causes Lyme disease. Western black-legged ticks (*Ixodes scapularis*) carry the bacterium, *Borrelia burgdorferi*, in their guts, which they can transfer to a human after biting and remaining attached for 24 to 48 hours. But a tick that sucks the blood of a fence lizard is cleansed of *Borrelia*, and its bite reduced to nothing more than a nuisance.

The Western Fence Lizard was the most common species found in the Puente-Chino Hills study (Hass et al. 2004). It remains common throughout its range, but requires some habitat, and connectivity to maintain its presence throughout the urbanized portions of the watershed.

- Coastal sage scrub with rocks, logs or other features for sunning
- Upland habitat connectivity to enable recolonization of urban areas

Western Skink (*Eumeces skiltonianius*) Near to Mid-Term CSS, AFS

Near Term Puente Hills Vicinity; Mid-Term Whittier Hills; Long Term elsewhere

The local subspecies, *E. s. interparietalis*, Coronado Skink is a California Species of Special Concern and a Federal Candidate for listing. A relatively common but secretive lizard that occurs in a wide variety of vegetation types, noteworthy features include its short legs and the brilliant cobalt blue tail of juveniles and young adults. This species was relatively abundant in the Puente-Chino Hills, but not found west of Powder Canyon (Hass et al. 2004).

- Generally open or early seral areas, but relatively mesic (moist) microsites – often near riparian areas; east and north-facing slope aspects of coastal sage scrub may be preferred
- Burrow into friable soil – alluvial scrub may offer ideal habitat connectivity
- Forage in leaf litter, or dense vegetation at the edges of rocks and logs, for many small invertebrates, but may selectively avoid ants
- Upland habitat connectivity will be important for recolonization of currently unoccupied areas

Side-blotched Lizard (*Uta stansburiana*) Near to Mid-Term

Near Term Puente Hills Vicinity; Mid-Term Whittier Hills; Long Term elsewhere

Considered the most common lizard species in the southwest, it is striking that the Puente-Chino Hills study (Hass et al. 2004) found no occurrences of this species west of Powder Canyon, as was also true for Western Skink. Based on is absence from Whittier Hills, it may be presumed absent from most urbanized areas.

- Many vegetation types, but generally open, with rocks or logs for sunning; habitat includes disturbed or early seral areas; insectivorous

- Upland habitat connectivity will be important for recolonization of currently unoccupied areas

Southwestern Pond Turtle [*Actinemys* (*Clemmys*) *marmorata pallida*] Near to Mid-Term Wetlands/Streams

Near Term Puente Hills Vicinity with Interim Habitat Enhancement; Mid-Long Term with Ecosystem Restoration

California Species of Special Concern, Federal Candidate Species; GVSM p. 168 (pdf 174) Aquatic turtle that leaves the water for breeding and aestivation (inactive period during hot, dry months), though it may remain active year round in warmer climates; Most active at air temperatures above 15° C / 59° F; Hatchling turtles likely emerge from nest and move to the aquatic site in spring.

- Pools within streams are preferred but habitat includes slow moving permanent or intermittent streams, small ponds, small lakes, reservoirs, abandoned gravel pits, permanent and ephemeral shallow wetlands, stock ponds, and sewage treatment lagoons

- Undercut banks, ledges and a water depth greater than 2 meters/ 6.6 feet offer cover for the turtle's secretive behavior – when alarmed they may retreat to the depths

- Systems of pools along stream corridors will best accommodate the turtle's daily movement patterns for basking and foraging

- Both aquatic and aerial basking sites required for thermoregulation: water-basking habitat is enhanced by mats of submergent vegetation, such as pondweed (*Potamogeton* spp.) and ditch grass (*Ruppia maritime*); aerial basking sites include woody debris, rocks and mud

- Nests typically dug in soils with a high silt or clay fraction; nesting sites typically on unshaded slopes with at least partially south-facing exposure, likely to ensure optimal incubation temperatures; most nest sites are on slopes of less than 25°, but may range up to a 60° angle.

- Depending on the suitability of nearby sites, nesting may occur as much as 400 meters / 437 yards from the aquatic habitat, but the majority are within 200 meters/218 yards; terrestrial habitat buffers of 500 meters or more from the aquatic site have been recommended

- Neonates or hatchlings require shallow water with relatively dense submergent or short emergent vegetation; nekton, the zooplankton fauna that can occur at high densities in standing water, are an important food of hatchlings and young juveniles

- Adult Southwestern Pond Turtles are dietary generalists and opportunistic – their diet includes slow-moving aquatic insect larvae, fish, crustaceans, snails, worms, various carrion, and coyote scat, along with the filamentous algae that hosts much of their foodweb, and other submergent and emergent plants

- Dispersal ability of juveniles and ability to recolonize following extirpation of local populations is not known but habitat connectivity with existing populations to the east and natural colonization of restored habitats in the watershed may be possible

- May be impacted by poaching – management and a serious educational effort are warranted

- Most restored habitats should be well-buffered from human activities but recreational observation could occur with well-designed observation areas/programs that minimize disturbance

- Appropriate ecological reference sites exist in Chino Hills State Park

Near term habitat expansion is possible in the Puente Hills vicinity with interim habitat enhancement measures to sustain the species and expand its local distribution until more systemic restoration is achieved. Ecosystem/watershed restoration made possible by green infrastructure could enable the development of sustainable habitat by the mid-term period.

Coastal Western Whiptail (*Aspidoscelis tigris stejnegeri*) Mid-Term CSS

Federal Candidate Species; Detected at 3 of 5 sample sites in the Puente-Chino Hills study, including in small numbers at the Whittier Hills site; most abundant in Chino Hills State Park (Hass et al. 2004)

- Open coastal sage scrub, grassland

- Insectivorous, but 88% of prey fossorial (hidden in ground) and digging is the most common form of capture; prey most abundant under perennial plants; prey detection by chemoreception

- Upland habitat connectivity, including protection of movements across trails and dirt roads

- Reduce widespread use of pesticides, promote ecologically sound alternatives

California Legless Lizard (*Anniella pulchra*) – Mid- to Long Term AFS

California Species of Special Concern
Appearing superficially like a slim, silvery snake, this fossorial species (adapted to digging or burrowing) has a shovel-shaped snout, spends most of the day beneath the soil surface, drinks soil water, is a live-bearer and can purposely detach its tail to trick predators. The distribution map in Jennings and Hayes (1994) shows both extirpated and extant records of this species for lower elevations of the Coyote Creek watershed and its confluence with the San Gabriel River, including many coastal sites.

- Areas of loose, sandy or loamy, necessarily **moist** soils, usually in sparsely vegetated areas such as alluvial scrub or stabilized sand dunes, where it has been especially vulnerable to human foot traffic

- Often found under surface objects such as old boards, logs (such as might be transported downstream by fluvial forces) rocks, and compacted debris of woodrat nests offer habitat needs

Coast Horned Lizard [*Phrynosoma coronatum (blainvillii)*] – Long Term

A.k.a. San Diego Horned Lizard; California Protected Species, California Species of Special Concern; GVSM p. 172 (pdf 178)
This distinctive lizard's appearance is so striking that one of the threats to its conservation is commercial collecting. But habitat conversion has had a huge impact, and the species has disappeared from about 45% of its former range in southern California, in particular on the coastal dunes where it was once common, and in riparian and coastal sage scrub habitats on the old alluvial fans and coastal plain. No Coast Horned Lizards were found west of Chino Hills State Park in the Puente-Chino Hills study (Hass et al. 2004), suggesting that a concerted effort is warranted to bring this species back from the brink locally.

- Many vegetation types but usually with significant open areas, or episodic disturbance and seral vegetation development – alluvial scrub and coastal sage scrub; Hass et al. (2004) found all Coast Horned Lizards in Chino Hills State Park in coastal sage scrub and usually on ridgelines, but note that they often favor chamise chaparral and trail/road edges

- Emerge from hibernation during mid- to late March; surface active only April-July, then most adults aestivate (spend inactive period); reemerge briefly in August, then by late August to October they disappear into overwintering sites

- Daytime activity involves thermoregulation, feeding, territorial displays and reproduction; often exhibit high site fidelity, as effective thermoregulation (optimum: 29-39˚C / 84-102˚F) requires familiarity with their surroundings; avoid midday temperatures over 40˚C / 104˚F by burying themselves in the substrate, reemerging in the later afternoon to resume full activities

- Up to 90% of the diet consists of native Harvester Ants (*Pogonomyrmex* spp.) – typically more than one species is consumed; does not eat nonnative Argentine Ant, which may displace the native Harvester Ant species, impacting the Coast Horned Lizard's prey base; irrigated landscapes and other land development disturbances favor proliferation of Argentine Ant, which can travel relatively great distances, extending adverse edge effects far into otherwise natural environments

- Habitat connectivity necessary for repopulation of currently unoccupied areas; with targeted habitat restoration and controls on public access Coast Horned Lizard could potentially be reintroduced to dune systems in the vicinity of Los Cerritos Wetlands

Coastal Banded Gecko (*Coleonyx variegatus abbotti*) – Long Term CSS, Chaparral

Federal Candidate Species; a naturally rare, nocturnal species believed to have declined due to habitat loss, this species was not detected in the Puente-Chino Hills study (Hass et al. 2004)

- Coastal sage scrub or chaparral with rocks for shelter; dispersal needs not known

- Most active April-October, peaking in May; primary activity period is two hours past sunset; occasional thermoregulatory behavior during afternoon

- Specific conservation needs merit further study

Amphibians & Reptiles – Green Visions Cross-Reference

Two-striped Garter Snake

GVSM p. 185 (pdf 191) Hass et al. (2004) state, "To date, the only Two-striped Garter Snakes in the Puente-Chino Hills have been detected in the Santa Ana River and Prado Basin", presumably related to the paucity of treefrogs and toads; with an increase in these prey species in the watershed, the Two-striped Garter Snake may rebound

Fish: Arroyo Chub (*Gila orcutti*) – Mid- to Long Term

The historic distribution of Arroyo Chub included the Los Angeles, San Gabriel, Santa Ana, Santa Margarita and San Luis Rey River systems, and the Malibu and San Juan Creek systems. The species was successfully introduced to several other southern California river and stream systems. It is currently abundant at only four localities within its native range: 1.) upper Santa Margarita River and its tributary De Luz Creek, 2.) San Juan Creek and its tributary Trabuco Creek, downstream of O'Neill Regional Park, 3.) Malibu Creek, and 4.) West Fork of the upper San Gabriel River below Cogswell Dam. Smaller populations remain in a few other locations. We are fortunate that one of those occurs in Chino Hills State Park – Aliso Creek, demonstrating that the geology and soil types of the Puente-Chino Hills system is capable of supporting habitat for the species.

While not pristine, Aliso Creek serves as an ecological reference site for the habitat features and watershed functions that will support the species within the local geologic context, which influences the character of streambed substrates. Another ecological reference site for Arroyo Chub habitat features that may apply to certain portions of the Coyote Creek watershed is Haines Canyon Creek, where it meets the Big Tujunga alluvial plain, in Los Angeles County.

As with several other focal species, restoration of suitable habitat for Arroyo Chub may proceed in two stages. Habitat restoration may be achieved in key locations in the watershed through techniques including timing regulated flows to mimic the natural hydrologic regime, along with provision of suitable substrates. Arroyo Chub could then be reintroduced to the system. Ecosystem restoration would also include seasonal connectivity with restored habitats on several Coyote Creek tributaries, as well as with the San Gabriel River.

Arroyo Chub General Habitat Features

- Arroyo Chubs are adapted to the relatively warm, naturally fluctuating conditions of lowland southern California rivers and streams, and thus are more tolerant of temporarily turbid conditions than cold water fish species

- Stream channel with a low gradient, approaching 1%, with seasonal connectivity to the main flow but access to backwaters or slower-moving tributaries to escape high flood flows – such escape routes would have been more common on the original braided alluvial floodplains; portions of stream can be dry part of the year

- Meanders, pool and riffle sequences, including undercut banks; at least some pools with depths of 40 cm./ 16 in. or more, and with mud or sand bottoms

- Cover of riparian vegetation to keep the stream waters below 31° C / 87.8° F, ideally 10-24° C / 50-75° F, as well as to provide organic matter, nutrients and insects to support the aquatic food web

- Aquatic dissolved oxygen content: 7.22 ppm or greater – normal for clean, natural streams in southern California; 2.0 ppm lowest tolerance limit

- Filamentous algae and other aquatic vegetation – the conditions necessary to support such growth remain to be understood but may coincide with many of the physical parameters of Arroyo chub habitat; young fish seek cover from predators in aquatic vegetation

- Fractional spawners, Arroyo Chub breed more or less continuously from February through August, although most spawning occurs in June and July

- Nesting sites: areas of gentle flow and near or within aquatic vegetation (filamentous algae); nesting habitat velocity 0 -.08 m/second; mud or sand dominated substrate with low amount of cobbles and deposited silt

- Freedom from exotic animal predators such as Largemouth Bass (*Micropterus almoides*), Mosquitofish (*Gambusia affinis*), Fathead Minnow (*Pimephales promelas*), Green Sunfish (*Lepomis cyanellus*), Bluegill (*Lepomis* macrochirus), Red Shiner (*Cyprinella lutrensis*), Bullfrog (*Rana catesbeiana*) and Red Swamp Crayfish (*Procambarus clarkii*)

Aliso Creek, Chino Hills State Park – Ecological Reference Site

In 2001 an agreement was arranged to implement the Chino Hills State Park Inventory, Monitoring, and Assessment Project (IMAP). The original project included an array of components, much of which was cut short by withdrawal of the original funding. Nevertheless, an impressive study, the Aliso Creek fish survey, Chino Hills State Park, was completed (Peregrin 2002). This document satisfies the majority of questions asked in the 'Preliminary', 'Reconnaissance', and 'Baseline' sections of the California Department of Parks and Recreation's 2001 Inventory and Monitoring Protocols for Fishes in Small Stream. It also provides the foundation for implementation of the 'Comprehensive' and 'Intensive' portions of the proposed IMAP.

Aliso Creek is a perennial stream with low-flow conditions throughout the year. In summer the low flow conditions intensify, shrinking potential fish supporting habitat to sets of pools, often isolated from one another or connected by very shallow, narrow riffles. During this period, fish movement is fairly restricted and the population relatively localized. Protection of the fish-

supporting pools, especially in the summer, is essential for a healthy Arroyo Chub population. (Peregrin 2002)

The initial IMAP work classified stream segments according to basic summer hydrologic conditions. During the 2001 Rapid Assessment Survey, 2,266 meters/ 2,477 yards (~ 30%) were found to be 'dry', 3,238 meters/ 3,540 yards (~42%) were found 'damp' and 2,138 meters/ 2,338 yards (~28%) were found 'wet'. The project also documented the following characteristics of fish-supporting pools, or pool segments:

- Substrate of sample sites was always dominated by silt with significant amounts of leaf litter, detritus and woody debris – the silt was thick, black in color and smelled of anaerobic bacteria when disturbed; silty layer estimated at .25 meter/10 inches deep; small amounts of gravel and cobble at the head and tail of each site

- At one sample site, an upper surface layer of light-colored silt was present, indicating excessive erosion, possibly from one of the park trails – the degree to which this has impacted the habitat is unknown, but is considered a management issue

- Typically 30-60% of an entire fish-supporting site benefited from some sort of riparian vegetative cover or refuge that grew from the bank, over the water surface and into the water – referred to as "riparian intrusions"

- Riparian intrusions typically composed of willow, mulefat and poison oak; cover also provided by emergent aquatic vegetation, logs and root stumps

- Fleshy roots also offered cover and, when associated with the creek bank, led to undercut banks that further enhance cover

- To a lesser degree, cover was also provided by floating aquatic vegetation, surface films and leaf litter

- At the majority of sites emergent and floating aquatic vegetation was present at the head and tail of each site, but was negatively associated with canopy cover and/or water depth; since excessive growth of aquatic vegetation can lead to anoxic conditions unsuitable for the fish, this highlights the importance of canopy cover for influencing habitat ecology

- Overstory canopy cover was nearly 70% at all sites and typically dominated by willow, oak, ailanthus and mulefat (California walnuts and western sycamore also occur along portions of Aliso Creek, though perhaps not directly associated with Arroyo Chub habitat)

- Each pool site included a sequence of riffles, run and pools; pools as deep as 0.8 m/ 31 in.

- Basic water quality parameters indicate fairly good conditions: mean temperature = 61° F ± 7.4 (s.d.); mean pH= 7.8 ± 0.13 (s.d.); mean turbidity = 0.24 JTU ± 0.73 (s.d.); mean conductivity = 3.4 micro Seimons ± 0.32 (s.d.); mean DO = 7.4 mg/L ± 0.56 (s.d.)

Because of the naturally fluctuating environment of the Arroyo Chub, annual surveys over a period of years will provide the best picture of land management effects on Arroyo Chub habitat features and will lend important insights into conditions necessary to restore the species' habitat to the Coyote Creek watershed.

Haines Canyon Creek, Big Tujunga Wash – Ecological Reference Site

While conditions on Aliso Creek best represent those potentially achievable within the Coyote Creek watershed, a few important attributes of another site bear consideration. Haines Canyon Creek is a tributary of Big Tujunga Wash. Its watershed includes some urban areas and the creek is channelized there, but where it enters the wash the stream moves underground, to reemerge (apparently due to a high water table) downstream, from whence a low gradient stream, with a high percentage of riparian vegetative cover runs a course alongside the main Tujunga channel for 3-4 kilometers / 1.9-2.5 miles along the wash until it converges with water impounded behind Hansen Dam. The upper 1.75 kilometers/1 mile of this stream lie within the area purchased in 1998 by the Los Angeles County Department of Public Works for their Big Tujunga Wash Mitigation Bank. Populations of Arroyo Chub, Santa Ana Sucker (*Catostomus santaanae*) and Speckled Dace (*Rhinichthys osculus*) were documented in this stream in 2001. Projects to remove exotic predators and invasive pest plants have since been implemented there. Features of this site that may be applicable to the Coyote Creek watershed:

- The subsurface movement of the water prior to its reemergence likely enhances water quality in the stream, which is then further protected by riparian vegetation

- Illustration of the effect a localized high water table can have on habitat suitability

- Examination of aerial photos, along with field observations, suggests that during past floods, breakout channels typical of the braided stream patterns of alluvial plains have reached over from the main Big Tujunga channel to converge with Haines Canyon Creek – the kind of seasonal connectivity Arroyo Chub populations would have experienced prior to watershed alterations

Fish – Green Visions Cross-Reference

Santa Ana Sucker

GVSM p. 217 (pdf 223) This species would likely utilize a restored confluence with the San Gabriel River, and possibly portions of the watershed, however, its preferred spawning substrates of gravels and boulders are not plentiful in the Coyote Creek watershed, whereas substrates supporting Arroyo Chub are. Habitat suitability for Santa Ana Sucker within the watershed may be better evaluated as suitability for Arroyo Chub is restored.

California Killifish

GVSM p. 221 (pdf 227) This is an excellent focal species for Los Cerritos Wetlands.

Threespine Stickleback

GVSM p. 224 (pdf 230) This species would likely utilize estuarine habitats at Los Cerritos Wetlands, a restored confluence with the San Gabriel River, and other restored portions of the watershed. Requiring reasonably good water quality, it would be an excellent indicator species and would also indicate the quality of the aquatic vegetation it needs to avoid predation.

Rainbow Trout

GVSM p. 224 (pdf 230) With restored habitat connectivity, anadromous forms of this species (Steelhead) would likely utilize estuarine habitats at Los Cerritos Wetlands and a restored confluence with the San Gabriel River. The remainder of the Coyote Creek watershed, even with widespread watershed restoration, is unlikely to attract the species due to inherently relatively warm water temperatures and sandier substrates.

Speckled Dace

GVSM p. 236 (pdf 242) In southern California this species tends to be associated with montane environments where waters are much cooler and better oxygenated, streams narrower, rockier, and with higher gradients than those in the Coyote Creek watershed, and well vegetated.

Mammals – Green Visions Cross-Reference

Coyote

GVSM p. 17 (pdf 23) GV model includes Puente Hills, Coyote Hills, and Los Cerritos Wetlands; connectivity needs similar to those of focal reptile and amphibian species; core habitat needs correspond to those of focal bird species; may serve important ecosystem regulating functions in fragmented habitats too small and/or isolated for Mountain Lion, such as at Los Cerritos Wetlands

Big Brown Bat

GVSM p. 30 (pdf 36) Puente Hills roosting sites – oak woodlands, various foraging habitats; planning for general habitat needs correlates with those of other long term oak woodlands focal species

Black-tailed Jackrabbit

GVSM p. 35 (pdf 41) Could occur in many parts of the watershed; habitat and connectivity needs should be met by efforts aimed at other focal species

Bobcat

GVSM p. 40. (pdf 46) GV model includes Puente Hills, Chino Hills connector, Coyote Hills (especially W. Coyote Hills, but probably only viable without further land development), and some suitability at Los Cerritos Wetlands; habitat connectivity needs throughout the watershed are included in the mid- to long-term planning scenarios and include AFS, CSS and riparian scrub.

California Vole

GVSM p. 45 (pdf 51) GV model includes Coyote Hills, but probably most likely for Los Cerritos Wetlands and Puente Hills, given the association with mesic grasslands; connectivity needs correlate with focal reptile and amphibian species

Long-tailed Weasel

GVSM p. 50 (pdf 56) GV model includes Puente and Coyote Hills, Los Cerritos Wetlands; sensitive to fragmentation, even by agriculture, so it may have been extirpated from the Coyote Hills by the time of the mid-1940s Weislander Vegetation Type Maps, which indicate most of the area as under cultivation, but potential repatriation of Coyote Hills possible with habitat connectivity measures aimed at other mid- to long term focal species; CSS, AFS, Riparian

Desert Woodrat

GVSM p. 54 (pdf 60) GV model includes Puente Hills, Coyote Hills, but the text indicates no urban habitats – potential CSS, AFS

Dusky-footed Woodrat

GVSM p. 59 (pdf 65) GV model includes limited suitability in Puente Hills, Coyote Hills, but probably not likely for the latter until at least the long term scenario, possibly along Brea Creek floodplain; oak/walnut and riparian woodlands with dense understories; chaparral

Little Pocket Mouse

GVSM p. 68 (pdf 74) GV model includes limited suitability in Puente Hills, Coyote Hills, and patches around Los Cerritos Wetlands, based on sandy to silty soil types; AFS; CSS; connectivity needs likely met by measures aimed at California Legless Lizard

Cactus Mouse

GVSM p. 77 (pdf 83) GV model includes limited suitability in Puente Hills, Coyote Hills; AFS, CSS

Deer Mice

GVSM p. 81 (pdf 87) Could occur in many parts of the watershed; habitat and connectivity needs should be met by efforts aimed at other focal species

Mountain Lion

GVSM p. 85 (pdf 91) Puente Hills; very limited habitat within the watershed but connectivity needs within the watershed overlap those of several focal species, and as the ultimate ecosystem regulating keystone species, its sustainability in the region is paramount to long-term conservation

American Badger

GVSM p. 90 (pdf 96) GV model includes limited soil suitability in Puente Hills, minimal in Coyote Hills; repatriation of suitable alluvial habitats along Brea Creek floodplain could potentially extend their range to Coyote Hills in the long term

Gray Fox

GVSM p. 100 (pdf 106) Could occur throughout the watershed but some sensitivity to fragmentation; can function as mesopredator on bird species associated with scrub and riparian habitats, controlled in reasonably connected urban habitat

Personal Communications

Sean Barry, University of California Davis Environmental Health and Science Remarks during short course: Special Status Amphibians and Reptiles of Northern California, University of California Davis Extension, July 20, 2006

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Coyote Creek Watershed Master Plan Appendix H-8

Potential Floodplain/Riparian Habitat Restoration Opportunities

Based on Google Earth investigations; not necessarily comprehensive; points listed on each channel flow in downstream order

	Latitude	Longitude	Notes
Fullerton Creek Channel			
1	33°54'58.58"N	117°52'5.53"W	Birch Hills Golf Course
2	33°54'25.48"N	117°52'58.73"W	Craig Regional Park
3	33°53'35.14"N	117°53'9.99"W	Biofiltration opportunity, upstream end "of soft" (?) channel that may/might support riparian
4	33°53'25.69"N	117°53'14.13"W	Extensive tree canopy here suggests riparian habitat opportunity; near CSUF
5	33°53'4.17"N	117°53'36.63"W	Acacia Park floodplain opportunity, apparent downstream end of "soft" channel that might support riparian vegetation; near CSUF
Brea Creek Channel			
1	33°55'38.50"N	117°53'54.82"W	Tamarack Park
2	33°55'1.30"N	117°54'22.91"W	Brea Municipal Golf Course upstream terminus. This opportunity for floodplain restoration extends downstream through Fullerton Golf Course to Brea Dam Park in the vicinity of point 3
3	33°53'27.89"N	117°55'35.71"W	Brea Dam, downstream end of floodplain opportunity
4	33°52'57.43"N	117°55'27.60"W	Riparian habitat opportunity(?) at base of Hillcrest Park
5	33°52'57.43"N	117°55'27.60"W	Vacant (?) lot west side of creek
6	33°52'28.60"N	117°56'15.93"W	Floodplain opportunity (?)
7	33°52'28.16"N	117°56'15.02"W	Soft bottom(?) channel – upstream end
8	33°52'32.06"N	117°57'1.92"W	Soft bottom(?) channel – downstream end
Coyote Creek Channel			
1	33°55'24.67"N	117°57'26.78"W	Soft bottom/vegetated channel – upstream end
			Soft bottom/vegetated channel – downstream

Coyote Creek Watershed Master Plan Appendix H-8

Potential Floodplain/Riparian Habitat Restoration Opportunities (cont.)

Based on Google Earth investigations; not necessarily comprehensive; points listed on each channel flow in downstream order

	Latitude	Longitude	Notes
La Mirada Creek Channel			
1	33°56'38.34"N	117°58'0.92"W	Downstream end of what appears to be riparian vegetation extending up into the Puente Hills
2	33°55'47.72"N	117°58'35.64"W	Channel underground here, below a park(?)/floodplain opportunity
3	33°55'18.87"N	117°59'39.71"W	La Mirada Creek Park, upstream end
4	33°55'1.03"N	118° 0'29.92"W	La Mirada Creek Park extension
5	33°54'19.59"N	118° 0'43.50"W	Riparian habitat opportunity adjacent Biola University
6	33°53'28.01"N	118° 1'55.80"W	Large parcel at confluence with North Fork
North Fork Coyote Creek Channel			
1	33°55'36.13"N	118° 1'58.36"W	Candlewood Country Club, Whittier
2	33°54'44.24"N	118° 2'25.89"W	Large open(?) parcels on both sides of creek channel
Carbon Creek Channel			
1	33°50'22.25"N	117°57'38.49"W	Anaheim H. G. "Dad" Miller Golf Course
2	33°49'47.18"N	117°59'12.56"W	Schweitzer Park floodplain opportunity
3	33°49'14.68"N	118° 0'53.35"W	Beat Park floodplain opportunity

EDUCATION CODE
SECTION 8700-8707

8700. The Legislature finds and declares that, throughout the state and nation, there is a growing public awareness of the benefits derived from a healthy environment and a healthy economy, and that the citizens of the State of California expect the educational institutions of this state to provide students with educational materials that are balanced and objective in their coverage of the current scientific and economic research on environmental and ecological issues to enable students to better address and assess environmental issues as we enter the 21st century.

8701. The Legislature further finds and declares that an informed public working for the common environmental good through its democratic institutions at all educational and professional levels and among all interested private parties can break the chain of destructive land use, restore land which has been improperly abused, and build balance and beauty into our cities of the future.

8702. The Legislature further finds and declares that an educational program is needed that is designed to build necessary attitudes of stewardship toward the maintenance of the quality of our common environment and to enable all citizens to use wisely, and not destructively, the resources at their disposal. These attitudes are best developed at an early age through programs that encourage personal responsibility and participation in the local community.

8703. The Legislature further finds and declares that without appropriate long-term funding, and without effective programs to encourage efforts and innovations at the school district level, and without needed materials and meaningful outdoor study opportunities, conservation education will remain a stepchild in the crowded family of public education.

8704. The Legislature further finds and declares that man has a moral obligation to understand the world in which he lives and to protect, enhance, and make the highest use of the land and resources he holds in trust for future generations, and that the dignity and worth of the individual requires a quality environment in which he can develop the full potentials of his spirit and intellect.

8705. The Legislature further finds and declares that conservation education should be a means of achieving an educational philosophy that will help each student develop a healthy attitude of personal responsibility toward his environment and its resources and provide him with the concepts, the knowledge, and the skills needed to contribute meaningfully to the decisionmaking process on issues involving the environment and its resources.

8706. The Legislature further finds and declares that in all grade levels, environmental facts should be taught as they relate to each other, rather than as isolated bits of information, and that students should become aware of the interrelated nature of living processes, gain understanding of ecological relationships and of the effect of human activities upon these relationships, and become sensitive to the interdependence of man and natural resources.

8707. It is the intent of the Legislature in enacting this chapter to encourage development of educational programs for teachers and students commensurate with the importance of protecting scarce resources and safeguarding the quality of our environment.

EDUCATION CODE
SECTION 8720-8723

8720. There is in the Department of Education the Conservation Education Service.

8721. The Conservation Education Service shall encourage the development of educational opportunities specifically related to the conservation, the interpretation, and the use of the natural resources of the State of California, including, but not limited to, the development of nature centers, the development of conservation and wildlife education camps, and the development of the educational curriculum in relation to the conservation of natural resources and factors affecting environmental quality.

8722. The Conservation Education Service shall have the following additional powers and duties:

(1) To assist school districts, community college districts, and county superintendents of schools in preparing teachers to present concepts of

conservation, the effects of pollution and major land alterations on ecological systems, and the factors affecting the quality of the environment.

(2) To cooperate with and assist community colleges, state colleges, and the University of California in the development of preservice programs designed to prepare teachers to present concepts and facts relating to conservation, the effects of pollution and major land alterations on ecological systems, and factors affecting the quality of the environment.

(3) To assist school districts, community college districts, and county superintendents of schools in the development or acquisition, or both, of materials relating to wise use of resources and environmental issues.

(4) To assist districts in the development of educational curriculum and educational opportunities for students, relating to the conservation of resources, factors affecting ecological systems and the quality of man's environment. Such opportunities may include but shall not be limited to, the development of outdoor education programs, nature centers, conservation and wildlife education camps, and participation in field trips.

(5) To establish and maintain a central library and repository for conservation education materials pursuant to Article 3 (commencing with Section 8730) of this chapter.

(6) To review and to evaluate each application for a grant to, or a contract with, institutions of higher education, state and local education agencies, regional educational research organizations, and other public and private agencies, organizations and institutions (including libraries and museums) under the terms of the Federal Environmental Education Act (Public Law 91-516), to support research, demonstration, and pilot projects designed to educate the public on the problems of environmental quality and ecological balance, except that no grant can be made other than to a nonprofit agency, organization or institution.

8723. The Conservation Education Service shall have such other powers and duties as shall be vested in it by law.

EDUCATION CODE
SECTION 8730-8734

8730. There is in the Department of Education a Central Library and Repository for conservation education materials. Such materials may be developed by private conservation groups, by industry, and by professional, scientific, and governmental sources.

8731. The purpose of the library shall be to serve as a master source of materials for the Conservation Education Service, public school districts, county superintendents of schools, and any regional conservation education centers which may be established.

8732. The department shall, in establishing the library, explore new methods in data processing, new library procedures, and new means for distributing materials to local school districts, county superintendents of schools, and any regional conservation education centers which may be established.

8733. The library shall thoroughly evaluate new materials for validity, pertinence, objectivity, and usefulness, and shall advise the state board in the adoption of textbooks in regard to meeting the requirements for conservation education.

8734. The Superintendent of Public Instruction, upon the recommendation of the Conservation Education Service, is authorized to make planning and implementation grants to individual school districts, or groups of school districts, unified school districts, county superintendents of schools, the University of California, the state universities and colleges, and the community colleges to assist such entities in the development of programs and curriculum in conservation education.

EDUCATION CODE
SECTION 8750-8754

8750. The governing board of any school district, a county superintendent of schools, the governing board of any community college district, and any regional conservation education center which may be established may apply to the Conservation Education Service for planning and implementation grants for purposes of conservation education.

8751. In applying for grants pursuant to Section 8750, the governing board of any school district, a county superintendent of schools, the governing board of any community college district, and regional conservation centers shall assign priority to programs of in-service training in conservation education for teachers through cooperation with appropriate community, state, and federal agencies and university and college teacher education programs.

8752. Public universities and colleges maintaining teacher education programs may apply to the Conservation Education Service for grants to support special programs designed to provide preservice training for teachers in environmental control and the wise use of resources.

8753. State and local agencies, including cities, counties, regional boards and commissions, and special districts may apply to the Conservation Education Service for grants for programs to enhance conservation education in the public schools.

8754. The Superintendent of Public Instruction, upon the recommendation of the Conservation Education Service, is authorized to make grants pursuant to this article. Grants may also be made for the development of materials for use in the public schools, for support of education programs, and for special assistance to school districts, any regional conservation education centers which may be established, or county superintendents of schools in conjunction with approved programs.

EDUCATION CODE
SECTION 8760-8773

8760. (a) The governing board of any school district may do the following:
(1) Conduct programs and classes in outdoor science education and conservation education within or without the boundaries of the district and for that purpose employ instructors, supervisors, and other personnel and provide necessary equipment and supplies.
(2) Acquire and maintain real or personal property needed for outdoor science education and conservation education programs and classes either within or without the boundaries of the district either by purchase, rental, lease, gift, or other means in the same manner as if the property were within the boundaries of the school district.
(3) Contract with the United States, the State of California, any city, county, city and county or school district therein, or any combination thereof, for the joint operation and maintenance of these programs and classes in outdoor science education and conservation education or for assistance in their operation and maintenance.
(4) Transport or arrange transportation of pupils, instructors, supervisors, or other personnel to or from places where these programs and classes are being

conducted, whether within or without the district; provided, the transportation is within the state.

(b) The governing board of any school district may contract with an outside provider for the services of naturalists. The services provided by the naturalists shall be under the exclusive control and management of the governing board of the school district and shall comply with all guidelines established by the Superintendent of Public Instruction relating to outdoor educational programs. Any naturalist under contract with the governing board of a school district pursuant to this section and all services provided by a naturalist shall be under the supervision of a certificated employee of the school district. Any naturalist assigned to serve school districts under an outside contract shall be subject to Sections 45125 and 49406. No person who has been convicted of any sex offense defined in Section 44010, or any controlled substance offense defined in Section 44011, shall be permitted to render service as a naturalist.

8761. Notwithstanding any other provision of this code, whenever an outdoor science program involves studies in marine science, the governing board of any school district or a county superintendent of schools may transport, or arrange transportation of, pupils, instructors, supervisors, or other personnel aboard U.S. Coast Guard approved vessels in the waters of the Pacific Ocean for distances not to exceed five miles westerly of any offshore island which is a part of the State of California.

8762. The governing board of any school district may:

(a) Conduct courses in forestry, and for that purpose employ instructors and supervisors of classes, and acquire necessary equipment.

(b) Acquire forest lands outside the boundary of the district by lease for a period not exceeding five years, or purchase or sell forest lands in the same manner as lands within the boundary of the district are purchased or sold.

(c) Afforest and reforest, and plant trees, shrubs, and vines on the lands; or upon any public lands which may be placed at its disposal, and enter into contracts and agreements with the government of the United States, the state, or any political subdivision thereof for that purpose.

(d) Transport pupils, instructors, or supervisors of classes to or from classes or places where the work is being done, whether within or without the district, in the same manner and subject to the same limitations as in transporting pupils to and from school.

8763. The county superintendent of schools may, with the approval of the county board of education, enter into agreements with the governing board of one or more school districts or private schools to provide programs and classes in outdoor science education and conservation education for pupils in the district or private school. Except as otherwise provided in this article, the agreement shall provide for the payment by the district or the private school of the actual cost of providing the programs or classes. The county superintendent of schools shall transfer from the funds of the district or the private school shall pay, as the case may be, to the county school service fund the amounts set forth in the agreement.

8764. The school district or districts entering into agreements pursuant to this article with the county superintendent of schools may agree to make capital outlay expenditures, as well as pay for the other costs of the program. Title to all property acquired by the capital outlay expenditures shall be vested in the office of the county superintendent of schools, and the participating school districts shall have no interest in the property, nor in the proceeds of any sale, lease, exchange, or other disposition of the property, unless the parties otherwise provide in the agreement which authorizes the acquisition of the property.

8765. Except as otherwise provided, all of the powers and duties authorized for governing boards of school districts by Section 8760 are powers and duties of the county superintendent of schools whenever, pursuant to this article, he or she provides programs and classes in outdoor science education and conservation education.

8766. The county superintendent of schools may, with the approval of the county board of education, acquire by gift and maintain real or personal property needed for such programs and classes with title thereto vested in the office of the county superintendent of schools. The school districts or community college districts or private schools participating in such programs and classes shall not be required to reimburse the county superintendent of schools for use of real and personal property which is acquired by gift.

8767. The county superintendent of schools may, with the approval of the county board of education, provide the coordination services authorized by Section 1703 in connection with programs and classes in outdoor science education and conservation education and the participating districts or private schools shall not

be required to reimburse the county superintendent for the cost of such coordination services.

8768. Any such agreement between the county superintendent of schools and school districts or community college districts or private schools may provide for the purchase or lease of any real property necessary to conduct classes in outdoor science education and conservation education. If real property is purchased pursuant to such an agreement, title to such real property shall be vested in the office of the county superintendent of schools and the participating school districts, community college districts, or private schools shall have no interest in such property, nor in the proceeds of any sale, lease, exchange, or other disposition of such property, unless the parties otherwise provide in the agreement which authorizes the acquisition of such property.

8769. The county superintendent of schools may, with the approval of the county board of education, lease any real or personal property for the purpose of care, teaching and training of physically handicapped or mentally retarded children at such time as the property is not required for outdoor science education and conservation education, upon such terms and conditions as are agreed upon.

8770. The county superintendent of schools may, with the approval of the county board of education, convey any real property, title to which is vested in the office of the county superintendent of schools, to the United States of America in exchange for other real property of comparable value, upon such terms and conditions as are agreed upon.

8771. The county superintendent of schools may, with the approval of the county board of education, sell, lease, exchange, or otherwise dispose of real or personal property, title to which is vested in his or her office, pursuant to the same procedures as are established by law for the sale, lease, exchange, or other disposition of real or personal property by a school district or community college district. Unless otherwise provided in the agreement which authorized the purchase of the real or personal property, the proceeds of any sale, lease, exchange, or other disposition of real or personal property shall be vested in the office of the county superintendent of schools.

8772. All proceeds from the sale, lease, exchange, or other disposition of real or personal property received by the county superintendent of schools pursuant to

the provisions of this article shall be used for the purpose of acquiring other real or personal property for use in connection with programs and classes in outdoor science education and conservation education or to pay the cost of conducting such programs and classes. The school districts, community college districts, and private schools participating in such programs and classes shall not be required to reimburse the county superintendent of schools for use of the real or personal property acquired with such funds nor shall they be required to reimburse the county superintendent of schools for any of the costs of conducting such programs and classes which are paid by the county superintendent of schools out of such funds.

8773. If during a period of five consecutive school years, no programs and classes in outdoor science education and conservation education are conducted by the county superintendent of schools pursuant to this article, all real and personal property, title to which is vested in the county superintendent of schools, and all proceeds from the sale, lease, exchange, or other disposition of such real and personal property, shall become part of the county school service fund and may be used for any purpose authorized by the laws applicable to the fund, unless the parties otherwise provide in the agreement which authorizes the acquisition of such property.

EDUCATION CODE
SECTION 8780-8784

8780. There is hereby established the Outdoor Environmental Education Program for the purpose of fostering stewardship of the environment and an appreciation of the importance of the wise use of natural resources, and showcasing the diversity of programs that fulfill that purpose.

8781. (a) The State Department of Education shall administer the program and shall select diverse entities to implement the program according to a priority scoring system based on the eligibility requirements enumerated in subdivision (b), upon application.

(b) In order to be eligible, applicants shall do all of the following:

(1) Serve primarily at-risk youth and underserved demographic groups.

(2) Encourage collaboration with other entities in the provision of services.

(3) Serve a minimum adequate number of participants.
(4) Commit a minimum adequate amount of resources to the program.
(5) Promote outdoor educational activities.
(6) Provide a curriculum that fosters stewardship of the environment and an appreciation of the importance of the wise use of natural resources.
(7) Include service-learning and community outreach components for the purpose of building partnerships between participants and local communities.

8782. The State Department of Education shall contract with an independent evaluator to evaluate the program and submit a report to the Legislature on its findings and recommendations no later than February 1, 2005.

8783. This article shall be implemented only if the Department of Finance determines that private donations sufficient to fund the program and its evaluation have been deposited with the State Department of Education. The Department of Finance shall report its findings to the Chief Clerk of the Assembly.

8784. This article shall become inoperative on July 1, 2005, and, as of January 1, 2006, is repealed, unless a later enacted statute, that becomes operative on or before January 1, 2006, deletes or extends the dates on which it becomes inoperative and is repealed.

OAK TREE CARE

How to Collect, Store, and Plant Acorns

Oak habitats in California, particularly those along streams and rivers, and those containing valley and Engelmann oaks, have been greatly reduced over the past forty years. Additionally, three species of native oaks, the valley, blue, and Engelmann, are reportedly regenerating poorly in portions of the state. Because of this habitat loss and poor natural regeneration, many Californians are concerned about the long-term fate of these species.

Concern for California's native oak heritage has generated tremendous statewide interest in planting oaks. Planting efforts can assist Mother Nature in establishing sufficient young seedlings to replace trees that die or are removed, and may ensure that the magnificent native oaks, which have graced our valleys and hillsides for thousands of years, will be around for the enjoyment of future generations.

Collecting Acorns

Acorns can be collected either directly from the trees or from the ground beneath. The healthiest acorns, however, are generally those picked from the trees because those that fall to the ground often dry out and are damaged — especially if they lay exposed for more than a few days during hot and dry weather. If you do collect acorns from the ground, leave behind those that are very small, cracked, or feel light and hollow. Acorns collected directly from the trees can be handpicked or knocked to the ground using long poles or pieces of plastic pipe. It is easy to pick them up if tarps are placed under the trees first.

The best time to collect acorns is in the early fall, when they are just starting to turn from green to brown, and when some are starting to fall. It is probably too early to collect them if they are all dark green and it is difficult to remove their caps (the cup covering the rounded end). In this case, wait a few weeks and check them again.

Acorn Sources

Many of those concerned about California's natural environment, including foresters, conservation biologists, ecologists and horticulturists, believe that using local seed is best for maintaining the integrity of local oak populations. Because local populations may have evolved certain genetic traits that favor survival at a particular site, acorns of the same species but from different locations may be genetically very different. By planting only local acorns, you maximize chances for survival and minimize damaging the local stock by introducing poorly-adapted genes.
Ideally, acorns should be collected on the intended planting site or as close to the site as possible. In considering site similarity, match the soil, slope, exposure to the sun, and elevation whenever possible. If acorns from different sites are collected, bag them separately, with species, date, and location noted. In all handling, keep these collections separate.

Storing Acorns

Before storing acorns, take off their caps. If the acorn is ripe, the cap should come off easily when

twisted. After removing the caps, rinse the acorns in cool to lukewarm water to which some bleach has been added (about 1/2 cup per gallon) as a disinfectant to reduce mold. Remove any acorns that float or have holes, cracks, or other problems, then lay the rest out on towels, newspapers, or other absorbent material to air dry. Pack into zip-lock bags labeling each bag for species, date and location. Since acorns are alive and respirating, they generate heat. If too many acorns are stored together, they can heat up even in a refrigerator. Therefore, avoid storing more than three cups of acorns in one container. Using small to medium zip-lock bags will correctly limit the number of acorns stored together.

After acorns are placed in plastic bags, they should be kept refrigerated until they are planted. Cold storage reduces metabolic activity and the depletion of stored reserves. A recent study also indicated that one month of cold storage also promotes faster and more complete germination. Acorns cannot be stored successfully, however, for more than a few months and should be planted in the growing season following collection. Store as cold as possible, but keep temperatures above freezing. Check acorns occasionally for molds. If molds do develop, take the acorns out and rinse them, then put them back in the refrigerator.

Another problem that can develop in cold storage is premature germination. Blue oak acorns are especially prone to this. The white tips emerging from the pointed end of the acorn are actually the beginnings of the new root system. Once these roots have grown for a few weeks, they can start to rot. Therefore, if you see the acorns starting to germinate, it is best to plant them as soon as possible.

Planting Acorns

Acorns can be planted from early November, after the first rains have soaked the soil, until early March. Acorns planted late in the season – March, or even February in dry years – will need to be irrigated. Another reason to plant acorns early is that the sooner they are planted after one month of storage in the refrigerator, the sooner they start to grow. Early planting maximizes root development before the arrival of dry weather, and also reduces the risk associated with premature germination.

Plant the acorns about one inch below the soil surface. Dig a hole using a hand trowel, hoe, or shovel. It is best to dig the hold several inches deeper than the acorn will be planted, then partially refill the hole with loose soil and tamp firm. This gives the new root a chance to get a good start in soft soil that is easy to penetrate. To further encourage rapid root and seedling development, use an auger to dig an even deeper hole, then refill and tamp the soil.

If the acorns have germinated, try not to break the root tip, and position in such a way that the root is pointing down. If the root is three inches or longer, its tip can be pruned back to two or three inches; usually the root will branch and regrow from this point. It is easier to trim the root than to plant a tangled root. Ungerminated acorns can be placed on their side in the hole and covered with soil.

The site where you choose to plant the acorns may be critical to the survival of the resulting seedlings. Choose a sunny spot that has loose, well-drained soil and is fairly free of weeds. Also, avoid areas where there are numerous gopher holes or evidence of ground squirrel activity. If you do feel that the acorns may be threatened by rodents such as squirrels or mice, plant them a little deeper – say, two to three inches below the surface. The deeper the acorns are planted, the harder it is for

these animals to dig them up. However, if they are planted too deep, they may exhaust themselves before reaching the surface.

The number of acorns to plant in a given area will depend on how many trees you eventually want to grow there. Unfortunately, it is very difficult to predict how many seedlings — let alone trees — will be produced from acorns planted, since this depends on a variety of uncertain factors including weather, animals, and competing vegetation. When deciding how many acorns to plant, consider spacing the acorns in a naturalistic manner, rather than orchard style, using the pattern of surrounding naturally-occurring oaks as a template. Also look at the types of oak trees growing nearby. Is there only one species or are there two or more? Does one species occur in the draws and another on drier sites? Your careful observations will help you select both safe sites for the acorns and a more natural mix of species. If the naturally-occurring trees have an average spacing of twelve to fifteen feet, in a clumped arrangement, plant your acorns every six to ten feet, also in a clumped arrangement. Not all the acorns are going to survive, and sixty to seventy percent survival with protection and irrigation is considered good.

Acorn and Seedling Care and Protection

The amount of care and protection you choose to provide acorns and seedlings will depend on your individual situation. If you are interested in establishing only a few trees around your home, you may be willing to invest the time in watering, weeding, and protecting individual plants. If you want to plant many acres, such care of each seedling is impossible. Below are some steps you can take to help improve your chances for successful seedling establishment.

Weeding and Mulching

An important factor that often limits growth and survival of young seedlings is dry soil. Competing vegetation often uses up so much water from the soil that little is left for oak seedlings. It is therefore recommended that a circle two feet in radius around planting spots be "scalped" or scraped to remove other vegetation. Placing some type of mulch, such as hay, bark chips, rice hulls, or black plastic around the seedling will help conserve moisture and eliminate competing vegetation. Some mulches, like hay, may introduce weed seed and add to eventual problems. Black plastic, on the other hand, needs to be anchored, usually with wire pins.

Irrigating

Irrigation is not always necessary, especially with acorns that were planted in the fall. However, two or three deep waterings (three to four gallons per seedling) during each of the first several summers following planting or during prolonged periods of hot, dry weather, can enhance seedling growth and survival. Remember that California's oaks are well adapted to dry conditions and after the first several years should be able to withstand dry summer conditions. Even if a seedling appears to die during drought, it may put out new shoots the following year.

Protecting seedlings

Since acorns are an important food source for a tremendous variety of animals, there is always a risk that the acorns you plant will be dug up and eaten. Also, as the seedlings start to grow in the spring, there is a chance that the tender young shoots will be eaten by livestock, rabbits, grasshoppers, or

other animals. In general, above-ground protection of some kind is necessary and will reduce the risks of injury to both acorns and seedlings. Following are descriptions of three devices that offer protection to acorns and seedlings.

1) Use an 18 x 18-inch piece of aluminum screen formed into a five-inch diameter cylinder and stapled to a wooden stake. Fold the cylinder closed at the top. Drive it into the ground so that the screen cage covers the spot where the acorn is planted. This cage will keep out rodents, insects, and deer.
2) This cage consists of a screen cylinder like the one pictured below, placed around a one-quart yogurt or cottage cheese container that is open at both ends. Place the container in the soil so that the top is at the soil surface. This protective cage will not only prevent stem damage, but will keep out burrowing animals such as gophers who often damage roots.
3) This cage is a cylinder made of quarter-inch hardware cloth. One cylinder can be placed above ground and another below ground if rodents are a problem. Although expensive, these cages can be built before going into the field and do not require staking.

Young oaks can grow fairly fast if the site is favorable and there is good weed control. If you have used cages, check them to prevent young shoots from getting "choked" in the wire. If possible, replace small cages with larger mesh hog-wire (three inches in diameter and four feet tall) or chicken-wire cylinders to protect the young oaks from deer or rabbit browsing. Once the trees are about four or five feet tall, they are on their own!

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Steps for Growing Oak Seedlings

- Collect acorns in the fall
- Store acorns for one month in a sealed plastic bag in the refrigerator
- Lay acorns on their sides and plant one-inch deep in the soil
- Keep the area around planting spots free of weeds
- If possible, water several times during the summer, and use screen cages to protect young seedlings from animals.

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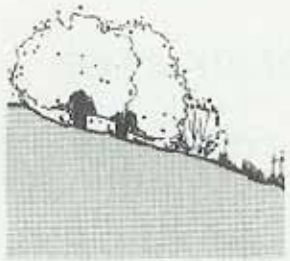

THE SITE SCALE

Defining Plant Associations

Within the area of the sites selected at the local scale for oak revegetation efforts, those carrying out planting programs must determine what species to plant and precisely where. This section provides the means for making these determinations at the site scale.

A coast live oak woodland includes more than oak trees. A healthy oak woodland displays specific characteristics and qualities, unlike those where only one oak tree has been saved or where oaks have been used as street trees. True oak woodland communities are rich communities of plants, animals and microorganisms playing important roles in the water cycle, climatic patterns and other natural processes.

Preservation in the past has concentrated on saving individual trees, often beautiful old giants deemed "heritage trees." These trees are recognized as adding property value (from a real-estate perspective) and are sometimes even boxed and moved to new locations. Land use surrounding oak trees may change, leaving them isolated in agricultural fields or open lots. While these trees are beautiful and worth saving, they no longer are part of a functioning oak woodland.

In undisturbed situations, coast live oaks exist in close association with virtually all of the major plant communities of coastal southern California. The distribution of oaks in relation to other species varies with elevation, aspect and topography as well as with location within the region.

The research team studied oak woodland plant associations in two areas, the Sunshine Canyon environs and the Malibu Creek watershed. The study section cuts across both east-west- and north-south-trending canyons. In Malibu Creek Canyon, the team did study sections in the lower, middle and upper areas of the watershed.

Appendix 3 provides discussion and illustrations showing these sections with all major species noted in detail. These sections show significant differences between associations present in the two areas and even between different parts of the same canyon.

General Plant Associations

Despite the many differences among these study sections in the location of a particular species, there are consistent patterns that offer a useful framework for defining and planting oak woodland associations. The team's observations and reviews of literature on the subject suggest that these general patterns apply throughout southern California. We might consider them consistent themes for which each particular site provides many variations. The patterns can be grouped using topographic features: each one reflects a slightly different response of oak woodland communities as shown in Figure 11, opposite. As revealed in the criteria for the Oak Woodland Potential Model, areas within the inland

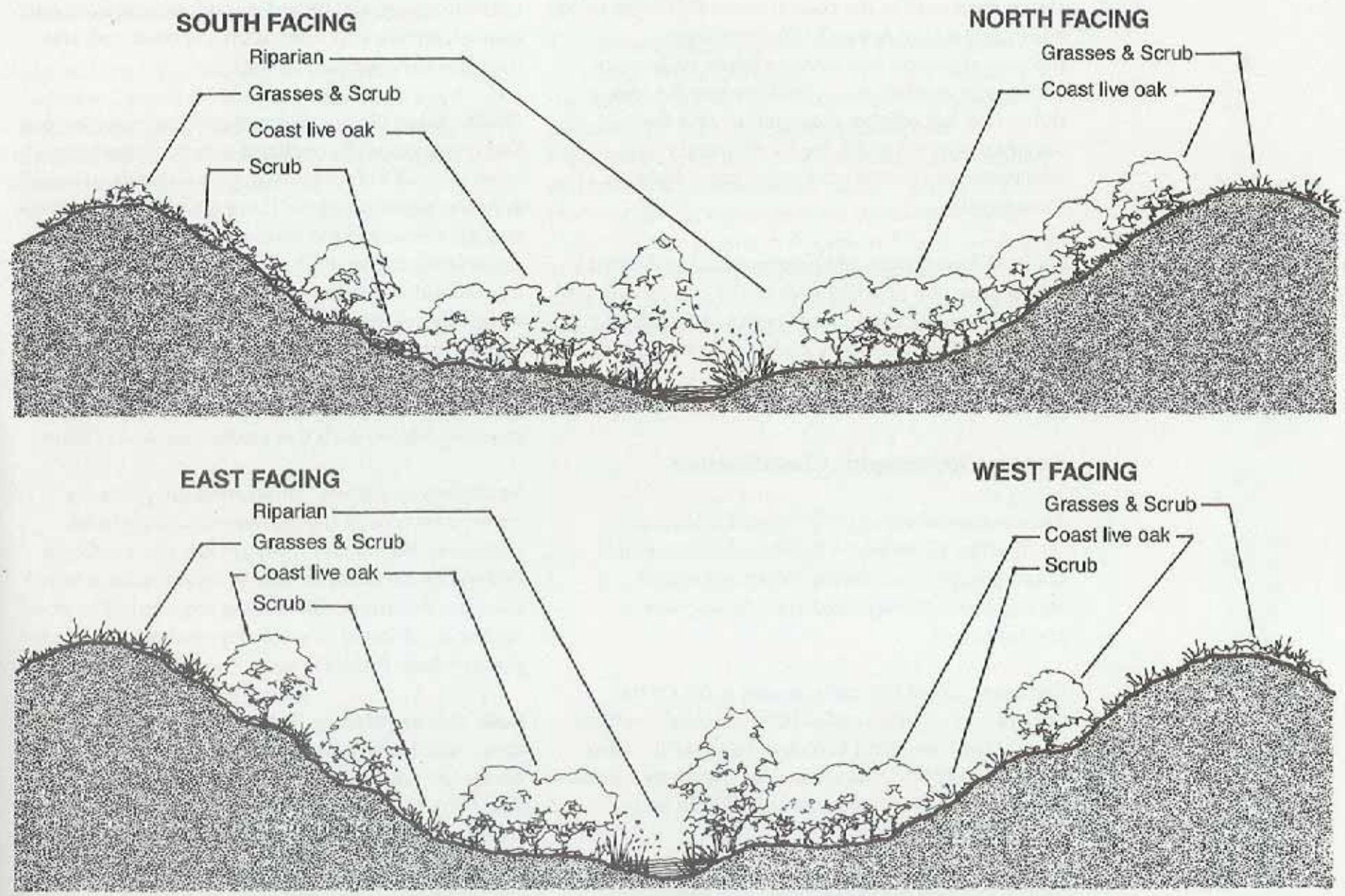

Figure 11: General Patterns of Oak Woodland Distribution in Southern California

zone show a different preference for west-trending slopes than oaks in the coastal zone. This topic needs additional future research. Distance from moderating ocean influences, airflow patterns or changes in microclimate could account for this difference, but reliable data quantifying these variables was not available for this study in a measurable form that could shed more light on these results.

General descriptions of topographic classifications follow here and describe patterns of oak growth and note major associated plant species. A full listing of overstory and understory plants can be found in Appendix 3.

General Topographic Classifications

The six general topographic classifications are (1) riparian, (2) valley bottoms and ephemeral drainages, (3) north-facing slopes, (4) south-facing slopes, (5) east- and west-facing slopes, and (6) ridges.

Riparian. Coast live oaks usually grow on the edge of true riparian zones but not actually within them. Thus, they tend to form a band with a clear edge adjacent to dense clusters of overstory riparian species, such as willow, alder, California bay, and sycamore.

Valley bottoms and ephemeral drainages. Coast live oaks tend to grow in dense clusters on the floors of valleys outside the riparian zones and in ephemeral drainages with intermittent streams. The understory usually includes shade-tolerant annual grasses, shrubs and vines such as poison oak and fuchsia-flowering gooseberry.

North-facing slopes. On north-facing slope aspects and on slopes with northeast and northwest aspects, coast live oaks often grow in dense stands, especially near the bases of slopes. There are only a few shrubs and grasses at ground level, usually growing in small areas where light penetrates the canopy. Coast live oaks also form associations near the tops of slopes having trees in the next higher plant community band. One such association includes coast live oak and bigcone Douglas fir. Here the fir grows on and just below ridgetops, with oaks growing just beneath this sheltering band of trees.

South-facing slopes. These areas are generally covered by coastal sage (lower elevations) and chaparral (higher elevations) scrub species. Coast live oaks sometimes appear as individuals or small clusters of trees spotted among the scrub. The trees are usually located in small depressions or in flatter places where water collects.

East- and west-facing slopes. Out of the coastal zone, oaks have higher densities on west-, northwest-, and southwest-facing aspects, especially near canyon bottoms. If found on upper portions of west-facing slopes, oaks are generally mixed with drier shrub communities, which sometimes predominate. In the coastal zone, west-facing slopes are generally covered by scrub communities. Coast live oaks may be spotted here and there singly or in

small clusters. Oaks and other tree species are more common on east- than on west-facing slopes.

Ridges. Coast live oaks are rarely found on ridges, which usually feature annual grasses and scrub communities. Oaks often cluster on slopes just below the ridge, most commonly where water flowing off the ridge collects.

Conclusion

The research team recommends following these general patterns for developing specific designs for distribution of coast live oaks and the species to be planted with them. It is also important to supplement with field observations, study sections and transects where possible in the vicinity of the planting site. Consult the plant association model study sections shown in Appendix 3 for more detail. More information on the distribution patterns of oaks can be found in the next section, Planting and Management Guidelines.

OAK REVEGETATION STRATEGY for Los Angeles County

Volume I · General Summary

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Analysis of Potential Environmental Factors Technical Memo

Coyote Creek Watershed Management Plan

Prepared by:

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January 16, 2007

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Introduction

This analysis is an assessment of environmental factors that may be affected by the Coyote Creek Watershed Management Plan (Plan). According to Section 15262 of the California Environmental Quality Act (CEQA) Guidelines, a project involving only feasibility and planning studies for possible future actions, which an agency has not approved, adopted, or funded, does not require the preparation of an Environmental Impact Report (EIR) or Negative Declaration but does require consideration of environmental factors.

To assess potential environmental consequences that could result from Plan implementation, the CEQA Environmental Checklist Form contained in the Appendix G of the CEQA guidelines was reviewed to identify whether the implementation of the Plan would result in positive or negative effects. This review is not intended to replace or supplant detailed CEQA review of potential environmental impacts that would occur at such time as specific projects are proposed. Rather, it is intended to provide a summary of potential positive and negative plan-specific and cumulative impacts that can be used as a basis for further project-specific decision making and analysis.

The CEQA Environmental Checklist Form contains sixteen environmental issue areas that could potentially be affected by any given project or plan. These potentially affected environmental factors include: Aesthetics, Agriculture Resources, Air Quality, Biological Resources, Cultural Resources, Geology/ Soils, Hazards and Hazardous Materials, Hydrology/ Water Quality, Land Use/ Planning, Mineral Resources, Noise, Population/ Housing, Public Services, Recreation, Transportation/ Traffic, and Utilities/ Service Systems. In addition, the checklist contains a Mandatory Findings of Significance category to assess the overall and cumulative impacts of the project.

The following are brief descriptions of each of these environmental issue areas:

1. The Aesthetics issue area addresses scenic vistas, views from scenic highways, the existing visual character of a specific site, and sources of light or glare.
2. The Agricultural Resources issue area addresses the conversion of farmland to non-agricultural use and possible conflicts with zoning or Williamson Act contracts.
3. The Air Quality issue area addresses conflicts with applicable air quality plans, violation of air quality standards, net increases of any criteria pollutant, exposure of sensitive receptors to pollutants, and creation of objectionable odors.
4. The Biological Resources issue area addresses effects related to sensitive species, riparian habitats, federally protected wetlands, interference with the movement of native wildlife, conflicts with local policies protecting biological resources, or conflicts with the provisions of an adopted habitat conservation plan.

5. The Cultural Resources issue area addresses effects on historical resources, archaeological resources, paleontological resources, and human remains.
6. The Geology and Soils issue area addresses exposing people or structures to adverse effects due to the rupture of a known earthquake fault, strong seismic ground shaking, ground failure including liquefaction, landslides, substantial soil erosion, unstable soil, expansive soil, and soils incapable of supporting the use of septic tanks or waste water disposal systems.
7. The Hazards and Hazardous Materials addresses the potential for significant hazards to the public emission of hazardous substances, development on a hazardous materials site, impairment of emergency response plans, and exposure of people or structures to the threat of wildland fires.
8. The Hydrology and Water Quality issue area addresses violations of water quality standards, depletion of groundwater supplies, alteration of existing drainage patterns, capacity of planned stormwater drainage systems, degradation of water quality, placement of housing or structures within a 100-year flood hazard area, exposure of people or structures to risk of flooding, and inundation due to seiche, tsunami, or mudflow.
9. The Land Use and Planning issues area addresses the division of an established community, conflicts with applicable land use plans, policies, and regulations, and conflict with a habitat conservation plan.
10. The Mineral Resources issue area addresses the loss of availability of a known mineral resource or locally-important mineral resource.
11. The Noise issue area addresses the exposure of persons to noise levels in excess of established standards, exposure of persons to excessive groundborne vibration, and substantial increase to permanent or temporary ambient noise levels.
12. The Population and Housing issue area addresses substantial population growth, and the displacement of people or existing housing.
13. The Public Services issue area addresses the provision of new or physically altered governmental facilities, and the maintenance of acceptable service ratios of fire protection, police protection, schools, parks, and other public facilities.
14. The Recreation issue area addresses increasing the usage of existing neighborhood or regional parks, and the creation or expansion or recreational facilities.
15. The Transportation/ Traffic issue area addresses increases in existing traffic conditions, reductions in levels of service, changes in air traffic patterns, hazards due to design features, inadequate emergency access, inadequate parking capacity, and conflicts with adopted policies.
16. The Utilities and Service Systems issue area addresses wastewater treatment requirements, construction of new water or wastewater treatment facilities, construction of new storm water drainage facilities, sufficiency of water supplies, wastewater treatment service capacity, and landfill service capacity, and compliance with statues related to solid waste.
17. The Mandatory Findings of Significance addresses the overall degradation of the quality of the environment, cumulative impacts, and environmental effects that

will cause substantial adverse effects on human beings.

Appendix A of this document contains a matrix that shows how each CEQA environmental factor correlates with the Watershed Management Plan Goals and Objectives

Considering these factors, the Plan provides major benefits to the environment compared to taking no action. The Plan would have long-term benefits and substantial positive effects on environmental factors including Aesthetics, Air Quality, Biological Resources, Hydrology and Water Quality, Public Services, Recreation, Transportation, and Utilities and Service Systems. These benefits are described in detail below, and are compared with the minor short-term and long-term negative effects that might occur.

The Plan would have modest benefits, and generally neutral net effects on the remaining environmental factors, which include Agricultural Resources, Cultural Resources, Geology and Soils, Hazards and Hazardous Materials, Mineral Resources, Noise, and Population and Housing. Since effects involving these factors would be minor, they are not discussed further.

If the Plan were not implemented, substantial negative environmental effects will continue to occur. These effects are summarized below.

Environmental Factors that Will Derive Substantial Benefits from the Plan

The proposed Plan will provide substantial benefits to the following environmental factors. Positive effects are described, and methods of reducing potential negative effects are suggested.

1. Aesthetics

Positive Effects. The issues in which the proposed plan would have a potential positive effect on Aesthetics include scenic vistas and visual character. Currently, most of the watershed is not recognized as a possible scenic resource. The proposed plan would have a positive effect on the aesthetics of the watershed. Restoring select pieces of land to natural riparian habitat would visually improve and create scenic vistas within the watershed which would increase pride of ownership throughout the watershed. In addition, restoration of habitat in portions of the watershed would improve the area’s existing visual character. Other visual improvements to the watershed, such as day-lighting concrete-lined channels or removing fences may also enhance the visual character of the watershed.

Within the watershed, ten potential Watershed Connectivity Projects have been identified. Implementation of these projects would result in a cohesive interpretive presentation at various highly visible points throughout the watershed and would contribute to connectivity through public awareness. Such displays may define a visual sense of place that is watershed-based.

Short-Term Negative Effects. No short-term negative effects are foreseen.

Long-Term Negative Effects. Possible long-term negative effects could include increased public access and use of the public places in the watershed due to trespassing and improper use could lead to litter, disturbed vegetation, and damage to watershed facilities and resources, detracting from the aesthetic quality of the watershed. However, these effects could be minimized through management actions and public education.

2. Air Quality

Positive Effects. The proposed Plan could have a positive effect on air quality. Restoring the natural vegetation in certain portions of the watershed would help remove carbon dioxide (CO2) from the air, thereby reducing effects due to the release of greenhouse gas emissions. Increased vegetation canopy and tree cover would reduce ground temperatures and the heat island effect, which reduces energy consumption and associated air quality impacts from power plants.

Reducing traffic (see below) would reduce nitrogen oxide (NOx) emissions, which would assist the region in keeping within the quantitative thresholds for ozone precursors. Increasing trees and other vegetation would remove criteria pollutants from the air including carbon monoxide, NOx, ozone, particulate matter, and sulfur dioxide.

Replacement of concrete channels with increased vegetation and water surface areas would help reduce local dust and particulate matter concentrations in the Plan area.

Short-Term Negative Effects. Possible short-term negative effects include the generation of fugitive dust and other criteria air pollutants primarily through excavation activities, exhaust from construction equipment and haul truck trips, and exhaust from construction-worker commute trips. However, these effects will be short-term in nature, and can be reduced by standard air quality mitigation measures.

Long-Term Negative Effects. No long-term negative effects are foreseen.

3. Biological Resources

Positive Effects. The proposed Plan could have a substantial positive potential effect on Biological Resources by restoring, enhancing, and expanding upland, riparian, and

aquatic habitat, and by improving the movement of migratory fish and wildlife in the Plan area. Habitat in certain portions of the watershed would be restored, bringing about a positive change for sensitive species. Introducing greenbelts along Coyote Creek could aid in the movement of wildlife species within the watershed. Access to open space would be improved.

Within the watershed, nine potential opportunity areas have been identified that can be utilized for Habitat Preservation projects. Habitat preservation is the single most important element in a strategy to preserve long-term biodiversity by conserving existing intact native habitats.

Short-Term Negative Effects. Possible short-term negative effects include the construction of projects identified in the Plan that could directly disturb native plant communities as a result of trampling, removing, or continued or repeated disruption of vegetation. Such disturbance could modify the structure, composition, and diversity of the plant community. These activities could also lead to an increase in invasive plant species. These effects will be temporary in nature and can be reduced or avoided through site-specific protection measures. The long-term benefits of Plan implementation would outweigh these temporary negative effects.

Long-Term Negative Effects. No long-term negative effects are foreseen.

4. Hydrology and Water Quality

Positive Effects. The environmental factor on which the proposed Plan could potentially have the most positive effect is the issue area of Hydrology and Water Quality. The proposed Plan helps improve ground water recharge, restore the drainage pattern of sites to reduce erosion and flooding, and improve water quality. Under the proposed Plan, opportunities for groundwater recharge will increase within the watershed as impermeable surface area within the watershed is reduced. Storm water would be treated as a resource to be harvested, partially offsetting the demand for imported water. Groundwater recharging provides an opportunity for the filtration of water as it reaches the water table. Drainage patterns within the watershed could be altered, through the alteration of the course of a stream or river, which could have a beneficial effect on erosion and flooding. Reducing erosion and flooding assists in the prevention of high turbidity levels caused by releases of sediment into the watershed. Returning portions of Coyote Creek to its natural state and restoring riparian habitat would lessen erosion, and could provide buffer zones in case of a 100-year flooding event. Restoring riparian habitat, creating new opportunities for groundwater recharge, and reducing erosion and flooding would contribute to the improvement of water quality in the project area. Improving riparian habitat increases removal of surface water pollutants. The upfront costs to convert to green infrastructure methods would be offset over the long run by a reduction in costs for imported water, flood recovery, and energy use.

Within the watershed, seven potential project opportunity areas have been identified that can be utilized to identify Treatment Wetland projects. Wetland systems have long been recognized for their capacity to remove water quality contaminants. In addition to the Treatment Wetland projects, nine potential opportunity areas have been identified for implementing Infiltration Basin projects. Groundwater basins can effectively store water for future extraction and use by municipal users to meet the ongoing demand for water in southern California.

Short-Term Negative Effects. No short-term negative effects are foreseen.

Long-Term Negative Effects. Possible long-term negative effects are that increased and more extensive public use of the watershed could indirectly affect water quality as a result of inadequate sanitation facilities, unauthorized fishing in reservoirs and creeks, unauthorized body-contact with reservoir or creek waters, unauthorized use by domestic animals, and littering. Depending on the specific activity, public use could inadvertently result in degradation of water quality, either by adding contaminants to surface runoff or to seepage that eventually reaches groundwater. These effects can be mitigated through proper planning of public use areas, linkages to infrastructure, and public education.

5. Public Services

Positive Effects. The main positive effect of the proposed Plan on Public Services involves the creation of additional park space and other potential public use facilities. The restoration of riparian habitat and greenways along Coyote Creek will provide additional park space in certain communities within the watershed. This effect is positive in terms of providing open space for certain communities. Aging infrastructure would be repaired or replaced, with the costs being partially offset by state and federal matching funds.

Within the watershed, eleven potential opportunity areas have been identified to implement Passive Park projects. Passive parks are developed to support passive recreational activities including hiking, biking, birdwatching, environmental education, or nature observation. This contrasts with active parks which may include children's playgrounds, sports fields, gymnasiums, tennis courts, or other sports related facilities.

Short-Term Negative Effects. No short-term negative effects are foreseen.

Long-Term Negative Effects. Possible long-term negative effects include the effect of increasing park space on the increased need for maintenance staff and associated costs. Conceivably, these effects would be offset by reducing maintenance needs for the facilities replaced by the proposed Plan.

6. Recreation

Positive Effects. The proposed Plan would have a positive effect on Recreation by the creation of greenways and park space along specific corridors within the watershed. The park to resident ratio would be at, or above, the national recommended level for a healthy and well served region. In addition, access to parks by poor and underserved populations could be improved. This could lead to health improvements as residents have better access to quality parks. These potential recreational areas would be considered passive recreation, and not necessarily include the construction of recreational facilities which might have an adverse physical effect on the environment.

Short-Term Negative Effects. No adverse short-term effects on Recreation are foreseen.

Long-Term Negative Effects. No adverse long-term effects on Recreation are foreseen.

7. Transportation

Positive Effects. The proposed plan could have a potential positive effect on Transportation by the creation of greenway networks and park space along specific corridors within the watershed. Greenway networks, accessibility to other alternative transportation modes, and pedestrian districts would induce transit oriented development within these corridors increasing the overall density within the watershed. These linkages would provide bike paths and walking paths that would provide a link between communities that would not require vehicular travel which would reduce the number of aggregate car trips. Providing alternative access between adjoining communities could potentially decrease the traffic levels between the adjoining communities, resulting in a positive effect on traffic.

Short-Term Negative Effects. No short-term negative effects are foreseen.

Long-Term Negative Effects. Possible long-term negative effects include an increase in new vehicular traffic associated with users traveling to the new open space and recreation facilities and an accompanying increased demand for parking. These increases can be at least partially offset by incorporating the proposed Plan into local transit, bicycle, and pedestrian circulation plans.

8. Infrastructure, Utilities and Service Systems

Positive Effects. The proposed Plan could have a potential positive effect on Utilities and Service Systems resulting from improved wastewater treatment, stormwater drainage, and availability of sufficient water supplies. Through the implementation of plan policies, the proposed Plan would assist in the treatment of wastewater. The Plan would improve stormwater drainage in several ways. Increased opportunity for

overflow at upstream locations would reduce downstream flooding. Where storm water drainage facilities are reengineered to allow water to recharge groundwater, stormwater flow volumes would decrease. By increasing available stormwater drainage capacity, the stormwater drainage system in the Plan area would not need to be expanded, reducing future stormwater capital and maintenance costs. Finally, the proposed plan would have a positive effect on water supplies in the Plan area as a result of increased water conservation and water reclamation.

Short-Term Negative Effects. No short-term negative effects on utilities or service systems are foreseen.

Long-Term Negative Effects. No long-term negative effects on utilities or service systems are foreseen.

9. Mandatory Findings of Significance

Positive Effects. With the implementation of the proposed Plan, the project would potentially improve the quality of the environment, increase the available habitat for fish and wildlife, and increase the levels of plant and animal communities. These would be positive effects. There is also the potential for a positive cumulative impact because the plan proposes environmentally friendly policy changes and calls for projects throughout the watershed that would act in synergy with the proposed Plan.

Short-Term Negative Effects. No short-term unavoidable negative effects are foreseen.

Long-Term Negative Effects. No long-term negative unavoidable effects are foreseen.

Summary

Overall, the Plan would potentially have a net direct, positive effect on human beings and the physical environment within the watershed area.

Adverse Environmental Effects that Will Continue if the Plan is Not Implemented

In the case that the proposed Plan is not implemented, the watershed would remain in its current state and the major benefits to the environmental factors listed above would not occur. Substantial adverse environmental effects would continue, which include the following:

- **Aesthetics:** If the proposed Plan is not implemented, select pieces of land would

not be restored to natural riparian habitat, which would improve aesthetic factors like scenic vistas and visual character. Other visual improvements to the watershed, like removing fences and day-lighting concrete-lined channels would not occur.

- **Air Quality:** If the proposed Plan is not implemented, air quality may become worse as development of open space and habitat spaces results in more car trips. Restoration of natural vegetation in certain portions of the watershed, which would help remove CO_2, would not occur. Ground temperatures would remain the same, or become hotter, because there would be no increase in the vegetation canopy. There would not be an increase in the number of trees and other vegetation within the watershed that would remove criteria pollutants from the air. Impermeable surfaces would remain at current levels, or increase, which would influence smog levels.
- **Biological Resources:** If the proposed Plan is not implemented, habitat in certain portions of the watershed would not be restored. Open space in the watershed would continue to be developed, potentially damaging ecosystems and habitats. In addition, introduction of greenbelts along Coyote Creek that could aid in the movement of wildlife species would not occur. Wildlife movement would be hindered and in some cases blocked by development. Opportunities for human and nature interaction would continue to be lost. Access to open space would remain limited.
- **Hydrology and Water Quality:** If the proposed Plan is not implemented, water quality would degrade further as impermeable surfaces increase and pollutants would continue to impair streams and water bodies. The ability of nature to filter polluted runoff would continue to reduce because aquatic habitat, wetlands, and marine habitat would continue to disappear. In addition, ground water recharge would not be improved and drainage patterns of sites that could reduce erosion and flooding would not be restored.. Portions of Coyote Creek would not be returned to a natural state which could provide buffer zones in case of a 100-year flooding event. The local water supply would not be improved as no new infiltration sites would be completed and storm water would continue to be managed as wastewater, rather than as a source to be harvested. Bodies of water would continue to have mandatory TMDL restrictions.
- **Human Health:** Lack of investment in quality and quantity of recreational and pedestrian spaces that promote healthier lifestyles would result in continued increases in sedentary and obesity rates. Air pollution levels would remain at current or increased levels due to development of land uses that encourages personal car use over walking and alternative transportation methods, thus asthma rates would remain constant or would increase.
- **Public Services:** If the proposed Plan is not implemented, the restoration of riparian habitat and greenways along Coyote Creek that will provide additional park space and open space will not occur.
- **Quality of Life:** Lack of access to quality public spaces, transportation options,

open space, parks, quality water and air and other general amenities and services that represent a desirable quality of life would be missing, thus economic impact to the region would be negative as would be resident perception of community, safety and general satisfaction with living conditions. Diversity of population would decline as residents that can move out of the area would do so. Overall quality of life would be at status quo levels or would have declined.

- **Recreation:** If the proposed Plan is not implemented, greenways and park space along specific corridors within the watershed, which could provide passive recreation, will not be created. The park to resident ratio would remain below the recommended level for a healthy, well served region. Access to parks would continue to be an economic and environmental justice issue for many areas within the watershed. Health impacts would be compounded by lack of access to quality recreational areas.
- **Transportation:** If the proposed Plan is not implemented, greenways and park space along specific corridors within the watershed will not be created. Traffic congestion would remain the same or increase as alternatives to personal car use through higher density, mixed-use developments with access to alternative transportation and greenways would not be provided. Pedestrian amenities and services would be scattered and lacking in quality. Therefore, there would be no alternative access between adjoining communities that could potentially decrease traffic levels.
- **Infrastructure, Utilities and Service Systems:** If the proposed Plan is not implemented, storm water drainage facilities would not be reengineered to allow water to recharge groundwater and decrease storm water flow volumes. The cost to repair and replace aging infrastructure using traditional single objective methods would result in high replacement cost with no mitigation or alleviation of negative watershed health issues.
- **Mandatory Findings of Significance:** If the proposed Plan is not implemented, the quality of the environment would not be improved, available habitat for fish and wildlife would not be increased, and the population levels of native plant and animal communities would not be increased. There would be no positive cumulative impacts because no environmentally friendly policy changes or project implementation would occur.

Summary

As shown above, the implementation of the Plan provides major benefits to the environment, particularly in the areas of aesthetics, air quality, biological resources, hydrology and water quality, human health, public services, quality of life, recreation, transportation, and infrastructure, utilities and service systems. Taking no action would provide none of these benefits, would worsen existing adverse effects, and would continue to increase the costs required to address these important factors in the watershed.

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ATTACHMENT A : Correlation of CEQA Environmental Factors to CCWMP Goals and Objectives

		Coyote Creek Watershed Goals and Objectives															
		Land					Water					People					
		Habitat	Recreation	Open Space	Economic Development	Trails/Mobility	Water Supply	Impervious Surfaces	Water Quality	Flood Protection/Sediment Management	Wetland Protection	Aesthetics	Education & Outreach	Environmental Justice	Health and Safety	Citizen Participation and Stewardship
	CEQA Environmental Factors																
1	Aesthetics											•				
2	Agricultural Resources	•		•												
3	Air Quality	•		•		•										
4	Biological Resources	•		•					•		•					
5	Cultural Resources															
6	Geology/ Soils									•						
7	Hazards & Hazardous Materials															
8	Hydrology/ Water Quality						•	•	•	•						

		Coyote Creek Watershed Goals and Objectives															
		Land					Water					People					
		Habitat	Recreation	Open Space	Economic Development	Trails/Mobility	Water Supply	Impervious Surfaces	Water Quality	Flood Protection/Sediment Management	Wetland Protection	Aesthetics	Education & Outreach	Environmental Justice	Health and Safety	Citizen Participation and Stewardship
9	Land Use/ Planning	●														
10	Mineral Resources															
11	Noise															
12	Population/ Housing															
13	Public Services		●	●												
14	Recreation		●													
15	Transportation/ Traffic					●										
16	Utilities/ Service Systems							●	●							
17	Mandatory Findings of Significance	●														

Seeing Green:

Grounds for a Renewed Urban Infrastructure

Supplement to the Coyote Creek Watershed Management Plan
Watershed & Coastal Resources Division · County of Orange, California

Riaz Adaikkalam • Jessica Bagwell • Claire Goode • Ande Lohla
606 Studio • Department of Landscape Architecture • California State Polytechnic University, Pomona • 2006

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A green redevelopment proposal

Abstract

Green redevelopment and infrastructure should spread like a ripple, from sites that have followed green principles, via streets, streams, paths, connected habitat, and the minds of site users, to sites similar in geography, climate, culture, or ecological need. Public awareness and early natural education can infuse this region with the understanding and compassion necessary to spark a green movement. Landscape architects and planners have a critical role in creating high-quality spaces for ecological, economic, and human health.

Seeing Green: Grounds for a Renewed Urban Infrastructure presents a case study project in La Habra, California, to recommend policy and design solutions to encourage green redevelopment. As a part of the County of Orange's *Coyote Creek Watershed Management Plan*, this document offers specific small-scale solutions to stormwater management that optimize urban form for ecological, economic, and human health. These solutions are applicable to Southern California, and can have broad cumulative impact. This document is a beginning approach to green redevelopment, a base to be expanded upon.

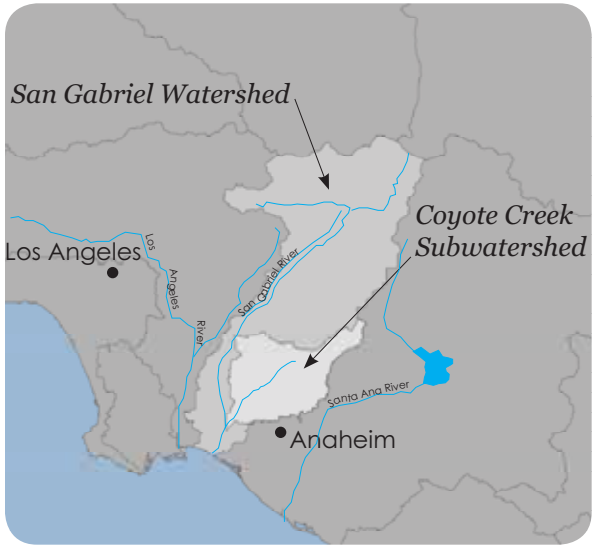
This project proposes Six Principles for Policy and Design that can be used by cities, regions, and developers to implement and measure green redevelopment projects. Start Upstream preserves what is working while planning for the future. Connect the Dots fills in the gaps of current planning to make better land use decisions and increase ecological health. Use Nature as a Guide provides quality and resource-efficient spaces for people and wildlife. All Fronts, No Backs treats all spaces as equally important, with nothing to hide. Manage for the Long Term establishes deep roots now for future health. Fulfill Multiple Objectives calls for a comprehensive approach to planning and valuing resources. These Six Principles will provide ecological, economic, and human health benefits not only in the near term, or for the life cycle of a space or place, but over the life cycles of generations.

PART ONE — SETTING THE STAGE

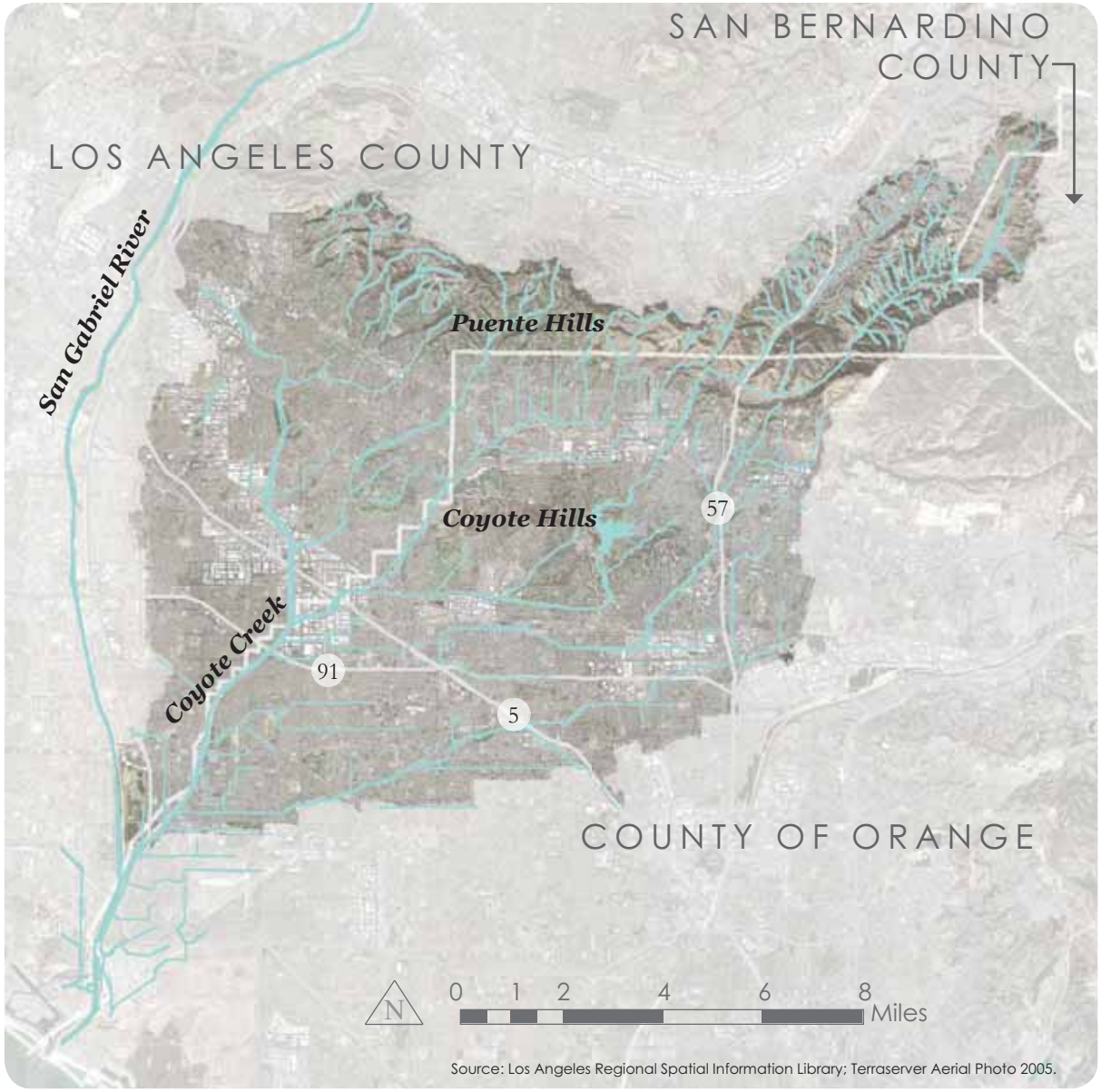
INTRODUCTION TO THE COYOTE CREEK WATERSHED
PROJECT BACKGROUND
PROJECT SCOPE
OVERVIEW OF THE CASE STUDY

Location

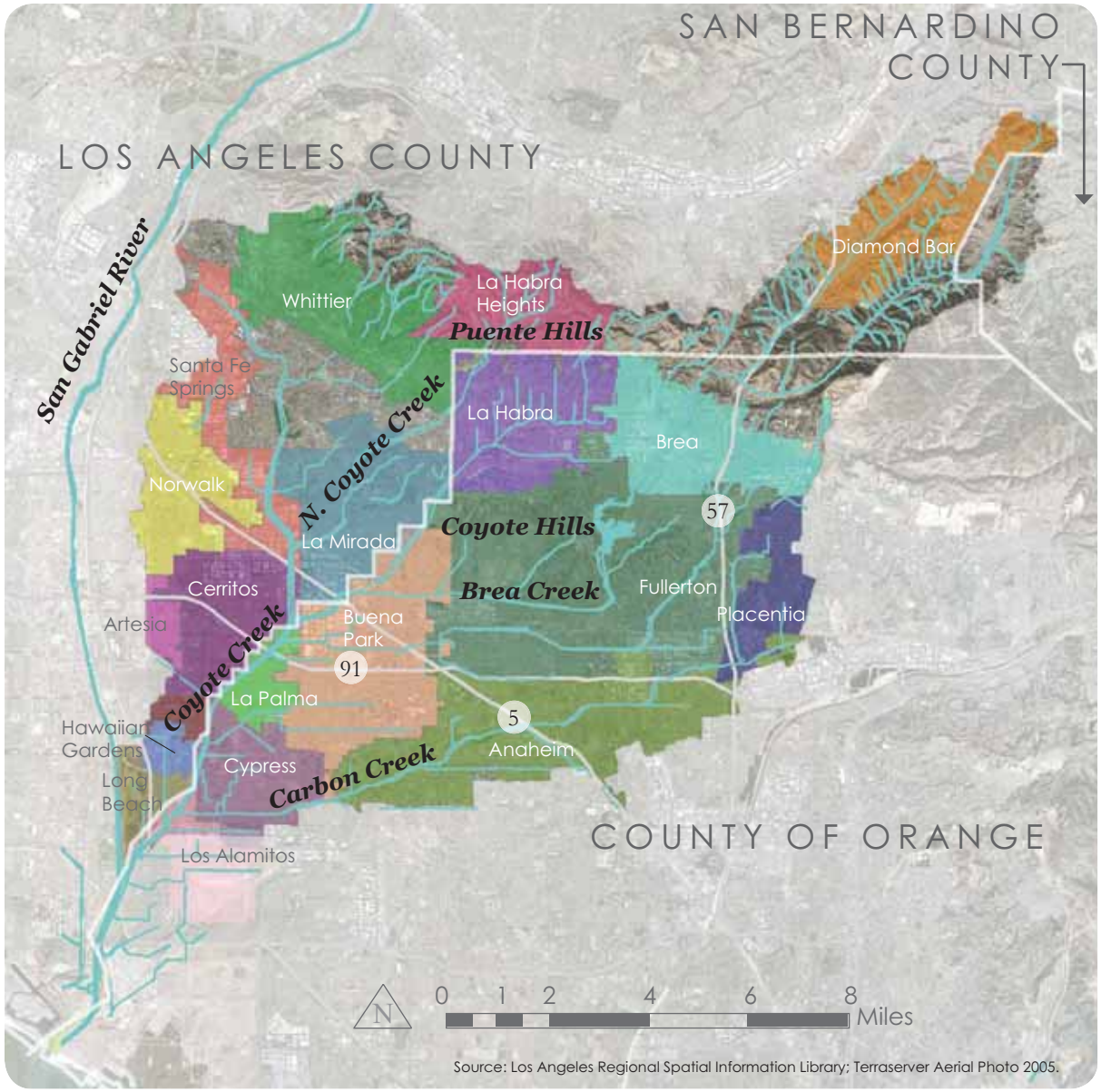
Los Angeles Basin



San Gabriel Watershed



Coyote Creek Watershed



Jurisdictions in the Coyote Creek Watershed

Physical Context

Straddling the line between Orange and Los Angeles Counties in Southern California, the Coyote Creek Watershed is emblematic of the post-World War II development boom that swept much of the United States.

Coyote Creek is one of the largest tributaries to the San Gabriel River, located in the Los Angeles basin of Southern California.

The Coyote Creek Watershed holds 165 square miles of land divided almost evenly between Orange and Los Angeles Counties, with a small corner in San Bernardino County. Coyote Creek implies the border of the two counties starting from the city of La Mirada and continuing south to Long Beach to the confluence with the San Gabriel River. North Coyote Creek, Brea Creek, Fullerton Creek, and Carbon Creek all feed Coyote Creek.

Today, the county line between Orange and Los Angeles crisscrosses Coyote Creek, and separates both the Santa Ana Regional Water Quality Control Board and the Los Angeles Regional Water Quality Control Board. All or part of 23 cities lie within the watershed. These jurisdictional boundaries have left the watershed all but forgotten in management and maintenance plans, and make it an ideal study for encouraging green redevelopment and infrastructure in a collaborative planning environment.

Policy Context

The Coyote Creek-Lower San Gabriel River Watershed Feasibility Study (Watershed Study) is currently being conducted by the US Army Corps of Engineers (Corps). Additional project partners include the Los Angeles County Department of Public Works, the Santa Ana Regional Water Quality Control Board, the Rivers & Mountains Conservancy and the Coastal Conservancy. "This Watershed Study will provide a blueprint for integrating and balancing the physical and biological systems within the watershed to enhance aquatic and terrestrial habitat, improve water quality, enhance water resources, increase trail connections, enhance passive recreation and open space, reduce sediment and erosion and aid in flood protection. In addition, the Watershed Study will encourage greater cooperation between public agencies and private organizations to leverage limited resources and improve quality of life within the watershed (Takata 2005)."

At the same time, the County of Orange Watershed and Coastal Resources Division is managing the Coyote Creek Watershed Management Plan (WMP), with an expected completion date of June 2007. This plan will become a component of the Corps' Watershed Study. The WMP will provide guidance in managing resources and planning land use in the watershed, as well as identify and prioritize projects to maintain, restore, and enhance resources to promote a healthy and sustainable watershed. Policy and management recommendations will address the underlying disconnection between existing public policy and watershed management principles.

In 1987, amendments to the federal Clean Water Act extended the National Pollutant Discharge Elimination System (NPDES) to include non-point source pollution. The Santa Ana Regional Water Quality Control Board, including the County of Orange, and the Los Angeles Regional Water Quality Control Board (Regional Boards) issue permits for stormwater to cities in the Coyote Creek Watershed. The responsibility for enforcement of violations of pollution standards falls on local governments, who are required to pay the fines imposed by the Regional Boards. Pollution control is difficult because of the non-point origins of much of the pollution, and a resolution to the problem must be broad and multi-faceted. As a result, cities need to find ways to control pollution sources and reduce the pollution load in runoff that will inevitably occur.

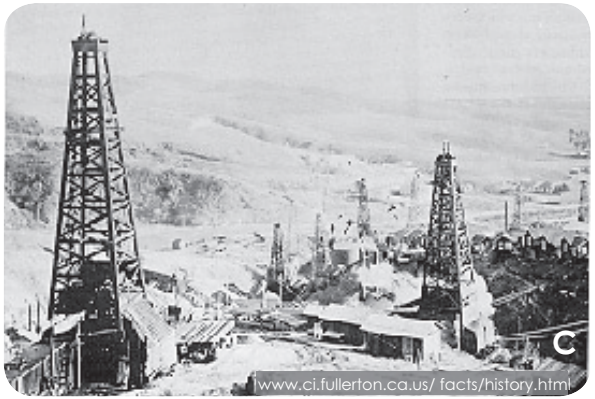
This study, *Seeing Green: Grounds for a Renewed Urban Infrastructure*, provides cities and developers in the watershed with Six Principles for Policy and Design to infuse urban form with green redevelopment for ecological, economic and human health. It provides local and watershed-scale green infrastructure plans to manage low flows of stormwater runoff, connect wildlife habitats and public places, reduce resource use, and mitigate the conventional impacts of urban form. This green redevelopment case study project is set in La Habra, California, in the County of Orange. It contributes specific policy and design recommendations to La Habra, and the County of Orange, that are applicable to Southern California in encouraging green community redevelopment. By focusing on a site scale redevelopment as it connects to a local and regional green infrastructure network, the project offers small-scale solutions to non-point source pollution that will have broad cumulative impacts on a large scale.

The 606 Studio at California State Polytechnic University, Pomona (Cal Poly) worked with the County of Orange Watershed and Coastal Resources Division as the client and contact, with funding from the San Gabriel and Lower Los Angeles Rivers & Mountains Conservancy (RMC).

A History of Redevelopment

Rancho Los Coyotes adobe house

Cattle ranching was a major land use



1880s, Brea Canyon

1890, North on Grand (now Beach) in Buena Park

1880s, what would become Fullerton

1950, Santa Fe Railroad with industry

Redevelopment happens.

Many layers are evident in the history of this region, often paralleling technological, cultural, and historical developments in the rest of the United States. However, the natural conditions present, including climate, geology, wildlife, and hydrology make this area unique and have presented particular challenges and opportunities to the people who have inhabited it.

Redevelopment has been occurring on the land of the Coyote Creek watershed since the Spanish, and later Mexican, ranchos drew the first invisible property lines on native wild lands (A). A pastoral lifestyle dominated, as sheep and cattle were grazed, and grain was grown (B). Oil extraction developed in the Puente Hills, north of Brea and La Habra, in the 1880s and 1890s (C). The oil industry brought workers and their families into the area, and the new towns and oil companies struggled to keep up with the demand for decent housing. Orange County seceded from Los Angeles in 1889 (D), and Coyote Creek was used as the western boundary of the new county (Middlebrook 2005). Real estate speculators started towns in advance of arriving railroads (E), and industry soon followed (F).

Beautification campaigns in the 1910s called for the planting of ornamental plants around buildings and the development of parks. Increasing automobile ownership and major roadway projects in the late 1910s and 1920s brought a rapid increase in paved streets.

Farming households in the watershed grew oranges, lemons, avocados, and walnuts. Water supply for both irrigation and daily use was frequently a concern. Coyote Creek itself was a water supply for properties close enough to it. Water companies formed to bring water by redwood pipeline from the San Gabriel Valley, and farm family cooperatives pooled resources to drill their own lands, prospecting for water (Cramer 1992). Concrete reservoirs in the hills stored the supply, but the concrete pipelines were prone to cracking. For lack of replenishment, there were often days when the pipes ran dry, especially in summer.

The Whittier and Norwalk faults are two known faults that pass through the watershed. Other blind faults may exist. Major earthquakes occurred in the Long Beach earthquake of 1933 (A), having a magnitude of 6.4, and the Whittier Narrows earthquake of 1987, magnitude 5.9. Each required redevelopment in some areas of the watershed.

Early devastating floods (B) prompted the channelization of streams, and the construction of dams and retention basins by the United States Army Corps of Engineers. The flood of 1862 put much of Orange County under three feet of water and buried the best pasture land under sediment, leading to high cattle death and the emigration of many cattle ranchers to San Diego and Mexico (CSU Long Beach 2006). It also led to a massive outbreak of smallpox, which was followed by two years of extreme drought (Middlebrook 2005). Another severe flood occurred in 1916, and the Flood Control Act of 1936 authorized the construction of Brea Dam, finished in 1942. As the Flood Control Act did not authorize any storage for the purpose of water conservation, Brea Dam was constructed for flood control only (USACE). The worst loss of life from flooding in the region occurred in the flood of 1938, killing 58 people and affecting much of the watershed (Pruett 1978). Coyote Creek was channelized in 1951.

Highway and housing policy at the end of World War II brought phenomenal population growth and development, auto-centric cities and suburbs slowly engulfing lands previously devoted to agriculture (C). Bedroom communities and accompanying industry spread evenly, with disregard for the watershed's hydrologic and habitat function (D). The expansion of the freeway system and the construction of regional malls changed lifestyle, employment, and consumption patterns (E). In March 2006, World Citrus West, the last orange juice processing plant operating in Orange County, closed its doors in Fullerton (F).

1933 earthquake, Buena Park

1938 flood, Buena Park

1950s, subdivision housing

Tract homes

Freeway development

Orange County's last orange juice plant

The Landscape

The Coyote Creek Watershed is a nearly built-out region, including some of the highest population density areas in California (A). It contains some of the most pressing issues in Southern California: increasing development pressures to support a growing population; impaired air and water quality; high rates and amounts of stormwater runoff; and inadequate access to quality environments. Small downtowns remain from a century ago (B), while strip malls (C), box stores, and new shopping centers (D) tell a story of constant change and redevelopment.

This watershed represents Southern California, in both appearance and its impact on human health and well-being. A dense network of freeways, buildings and urban infrastructure supports Orange County's high population density, taking the place of permeable ground covers and open space (E).

The region has industrial rooftops, freeways, wide residential streets and empty parking lots. These surfaces make the region as much as 10 degrees hotter than undeveloped areas, create higher volumes of stormwater, cause pollutants to wash directly into waterways rather than filter through plants and earth, and increase airborne contaminants from industrial and technological processes, especially from motorized vehicles (F).

A growing population pressures the region to develop further despite the already poor environmental conditions.

Photo by Jaime Yamashita

Photo by Greg Barger

With fewer opportunities to access nature, this pressure to develop remaining wild areas puts the population at higher risk of living a life apart from nature's healing properties — for both environmental and human health. Recent research connects children's close contact with nature and longer attention spans, greater sense of self, non-violent values, educational success and active living (Louv 2005, Moore 2005). Schoolyards and public parks are dominated by asphalt playgrounds, heavily fertilized and maintained turf, manufactured play equipment and ball fields (G). These landscapes over-emphasize organized and competitive sports to the detriment of creative play and exploration. With few examples of natural processes to witness and explore, how will today's children grow up to understand the importance of natural landscapes in mitigating the effects of mass urbanization (H)? The same natural processes that provide clean air, water, and habitat also provide quality places for children and adults to develop healthy minds, bodies, and spirits (I). The broadest possible citizenship can be reached by infusing public and quasi-public places with natural systems.

The automobile dominates this landscape (J). Wide streets, parking lots, and traffic define much of this suburban experience (K & L). Where travel on foot, bike, or by bus is needed or provided for, the street dominates, pulling all attention toward it.

Pedestrian comfort has taken a back seat to the convenience and necessity of car travel (A).

This results in both a highly populous region with few signs of social life, and a sense of nature being held back from the ground. The landscape is one of suspension: wires, streetlights, shop signs and particulates stay suspended above concrete (B). Turf, palms, and people in automobiles are all suspended above the natural soil, as though waiting to fall. Water runs from rooftop to gutter to sidewalk to storm drain to channel like a child running across hot asphalt pavement, holding his breath, and looking for a soft cool spot to land.

The small area of undeveloped land remaining in this watershed is in the Puente and Coyote Hills, areas still marked by oil fields and remnant vegetation, and the only portions of the watershed that can be considered non-urban (C). Streams, native vegetation, and wildlife are out of reach to most people in the region.

Streams enter the urban environment, and remain confined to channels (D), and are directed through the urban landscape's backyard (E). Industrial, commercial and home lots turn their backs on these streams and drain into them – directly or through pipes. They move through cities, mostly hidden behind walls, beneath streets or buried underground (F). Wildlife still rely on this altered state

of nature. How can redevelopment provide quality habitat for animals as well as people (A)?

As redevelopment continues, opportunities to re-evaluate the landscape and local resources are everywhere (B, C, & D). Planning for the future of this area can mitigate current conditions – by allowing natural systems to clean water, and increase quality of life for all. As Niall Kirkwood said, "At the end of this century landscape architects have the opportunity to look back and reconsider our roots in issues of health, infrastructure, and open space – the Olmstedian concept of regenerating the city (Thompson 2000) (E)."

Cities in this watershed are grappling with stricter water quality mandates and how to increase the quality of life for all residents. In Southern California, the scarcity of water is critical, as population growth continues and development prevents groundwater recharge, increases pressure on an increasingly uncertain water supply, and increases flood risk downstream.

By redeveloping with natural systems to manage stormwater runoff, providing natural lighting and cooling, and increasing visibility of natural process, one can also connect habitats, provide cleaner air, and more access to nature (F). This project focuses on integrating natural systems with policy and design, illustrated through an urban redevelopment case study site. This represents a small portion of the broad realm of green redevelopment. This document can be expanded upon with plans for local food and energy production, and participatory and collaborative planning.

The Time Is Now

On October 25, 2005, both *The New York Times* and *The Los Angeles Times* reported on Wal-Mart's intent to save energy and reduce waste, stipulating that its suppliers reduce packaging and use recyclable materials. "The company's environmental initiative includes improving energy efficiency at its 1,876 supercenters, which now consume an average of 1.5 million kilowatts of electricity annually, according to Tara Stewart, a spokeswoman for the company (Barbaro 2005)." While the Rocky Mountain Institute's Amory Lovins and the Sierra Club's Carl Pope each attested to the potential positive change of this move (Barbaro 2005), this is a small step toward the possible impact of commercial developments going green. Much research supports the human, environmental and economic benefits of green development (Hawken 1999, Johnston 2005, Vreeker 2004, Wilson 1998). "By practicing environmental responsiveness, it is possible for a new development not only to minimize damage to the local ecosystem, but actually to improve the surroundings. In fact, some see green development as an 'economic engine' for bringing about ecological restoration (Wilson 1998)." The green movement has caught on in product development, home construction, and advertising – Wal-Mart's announcement signals mainstream America's desire to help the environment.

According to the Los Angeles chapter of the United States Green Building Council (USGBC-LA), "Green building is a process for creating buildings and supporting infrastructure that: 1) minimize the use of resources, 2) reduce harmful effects on the environment, and 3) create healthier environments for people (USGBC-LA 2005)."

Wal-Mart wants its suppliers to provide more environmentally-friendly products. But why are commercial developers, big and small, not building green developments to house these products? What can cities do to green their landscape? What are the obstacles facing ecologically-minded developers? And how do green redevelopment projects relate to the surrounding landscape? Even as green materials, technical knowledge, and accreditation standards become more readily available, the planning and permitting process remains a big hurdle for green development and redevelopment. With vacant land a scarce and valuable commodity in the County of Orange and elsewhere, redevelopment of existing buildings is favored in green design standards (USGBC 2005). Re-using failed or vacant buildings can give stability to local economies by providing employment as well as goods and services, while saving undeveloped land for natural systems.

This project analyzes planning obstacles for green redevelopment and proposes green design standards and policy changes to foster healthy communities.

"Green Infrastructure is the Nation's natural life support system — a strategically planned and managed network of wilderness, parks, greenways, conservation easements, and working lands with conservation value that supports native species, maintains natural ecological processes, sustains air and water resources, and contributes to the health and quality of life for America's communities and people (Green Infrastructure 2005)." On an urban scale, green infrastructure embeds natural systems into city processes, connecting public places with streams, swales and lines of tree canopy.

Evaluations of development rarely analyze the potentials of landscape relationships, green infrastructure, and policy-based incentives for green design (County of Orange 2005, USGBC 2005, Vreeker 2004). For example, Santa Monica's much lauded Sustainable City Program looks at indicators of energy use, land use, water use, transportation, housing characteristics, and waste production. However, relationships between land use, green infrastructure, and public health are not taken into account.

Similarly, the growing awareness of the Leadership in Energy and Environmental Design Green Building Rating System (LEED) illustrates the common need for a system to define the degree of "green correctness" that an individual site exhibits. LEED allows states, municipalities, and well-meaning developers and clients to guide their own projects towards greater sustainability. Its applicability to different kinds of projects varies, and it generally fails to address the potential positive relationships among neighboring sites. The new LEED-ND, for neighborhood development, however "integrates the principles of smart growth, urbanism, and

green building (USGBC 2005)," and looks promising in addressing these issues *(See Appendix C-2)*.

Many policies at the federal, state, and regional levels have good intentions pertaining to watershed and human health. However, the local scale may hold the greatest potential for further positive action, because so many of the watershed's health and quality-of-life issues are attributable to the automobile-dominated landscape and its separation of land uses. In many ways, an individual municipality holds its future in its own hands, due to its zoning authority and the power of its General Plan, along with the impact of local codes and how they are written. This project focuses its policy analysis at the local level, and recommends changes therein. The recommended policies address transportation, land use, and other topics related to a green infrastructure, in addition to the concern of basic hydrologic function.

In Orange County, the most influential tool for managing urban hydrologic health is the Drainage Area Management Plan (DAMP), which implements the county's two permits for the National Pollutant Discharge Elimination System (NPDES). The DAMP requires certain projects to include what it calls Site Design Best Management Practices (BMPs) for stormwater, which mitigate the adverse stream system impacts of watershed urbanization by creating projects that attempt to mimic the natural hydrologic regime. These Site Design BMPs draw on approaches consistent with Low Impact Development Design (LID), including the reduction of impervious surfaces, conserving natural areas, and decreasing runoff volumes through retention and infiltration. It reverses the old engineering practices of speeding and directing stormwater flow to the city's constructed storm drain system. LID reduces runoff amounts, increases stormwater quality, and reduces pressure on stormwater infrastructure off-site and downstream.

With cities' increasing obligation to address the water quality and hydrologic impacts of urban stormwater runoff, such Site Design BMPs must be considered in the planning approval processes for qualifying projects throughout Orange County. Although the project criteria differ by land use, generally the DAMP requires Site Design BMPs for most new development and significant redevelopment above a certain size. Other properties are required to implement Routine Source Control BMPs, which include conventional practices such as limiting irrigation runoff and preventing pollutants from coming in contact with stormwater. However, LID stormwater approaches have the potential to be incorporated into an overall green infrastructure design that can connect different land uses, increase access to nature, and increase human health and comfort.

Commercial buildings impact local citizens both on site and off. The buildings themselves require massive amounts of energy to heat, cool, and power — 1.5 million kilowatts a year for Wal-Marts, according to the article cited above. Parking lots and building roofs dominate these sites, contributing huge amounts of stormwater runoff and degraded water quality downstream. The lots and their connection to the community impact environmental health, from site layout, drainage, shade and ventilation to ecological systems. A large retail store can bring thousands of customers by car through residential neighborhoods into accident-prone, hot and unwelcoming parking lots that contribute heat, dust and polluted stormwater runoff to the environment. The same retail store could be designed with safe access routes — in a car, by bus or on foot — with planted, shaded and welcoming entries for people to gather and stormwater to collect for trees and plants.

In *Public Places — Urban Spaces,* the authors describe commercial businesses as "quasi-public," or those places which are privately owned but are open to the general public (Carmona 2003). Public spaces are those areas between private land, and include streets, public schools, parks, and parking lots. Public and quasi-public places bring high visibility to a large part of the population and can act as incubator sites to spread ideas, knowledge and motivation to go green throughout a community.

The way Orange County plans for and promotes its public and quasi-public front and back yards can provide natural and human connection to the greater community to maximize ecological, economic and human health.

Environmental Policies and Their Impact on Green Redevelopment

Policy can be used to foster green redevelopment that reduces runoff, increases groundwater recharge, increases water quality, and connects people to nature. Green development in the Coyote Creek Watershed is most affected by environmental, flood control, and local land use policies. These federal, state, regional, and local policies can be improved to better foster green redevelopment. Environmental policies such as the Clean Water Act of 1972 were developed in an effort to stem the loss of natural systems, pollution of waterways, and species extinction. However, local land use policies that continue to depend upon traditional zoning and codes based upon an auto-dependent land use pattern, work against these environmental policies. Through local land use policy, parking lots are designed to have enough spaces for the Christmas rush, residential streets wide enough for fire trucks to turn around, and curbs and channels follow the edges of streets. The lack of collaboration and integration between the local zoning code and environmental policies, such as the National Storm Water program, has a great impact on the implementation of green redevelopment.

Environmental Policies that Promote Green Redevelopment

NPDES Stormwater Quality Management Programs

In an effort to comply with the National Pollutant Discharge Elimination System (NPDES) permit, Los Angeles and Orange counties are developing innovative solutions to improve water quality through planning programs required in the Water Quality Management Plans. Developers are required to consider potential pollution in runoff from their site during the early stages of the project through a Standard Urban Stormwater Mitigation Plan (SUSMP) in Los Angeles County and a Drainage Area Management Plan (DAMP) in Orange County. This encourages developers to incorporate design measures to reduce the potential for discharge of pollutants from the project site via runoff. These measures reduce adverse impacts of the development and end-of-pipe measures. These design measures can reduce impervious surfaces, send runoff to permeable surfaces, and create permanent measures that reduce pollutant load. DAMP and SUSMP increase knowledge and planning for reduction of stormwater and urban runoff and pollutant load on sites covered under the policy. Yet, excluded sites, such as average-sized residential developments, have cumulative impacts that are not currently mitigated.

TMDLs

Regional Water Quality Control Boards are required to set Total Maximum Daily Loads (TMDLs) for water bodies that are found to be impaired and include TMDLs in their Water Quality Management Plans. TMDLs set targets for loading of point and non-point source pollutants in an impaired water body based upon its beneficial uses and can limit the NPDES permit. The regional boards also must set a schedule for water quality compliance, over a 13-year period from the listing cycle. Implementation plans to reach the TMDLs include inspections, design solutions, and BMPs. In the Coyote Creek watershed, Coyote Creek and the San Gabriel River are listed on the 303(d) list of impaired water bodies, as of the 2003 listing cycle. The regional boards are currently engaged in setting TMDLs for reducing pollutants.

401 Water Quality Certification

Developments that have a federal license or permit are required to obtain a 401 Water Quality Standards Certification. The required stormwater pollution prevention plan includes a list of possible BMPs, mitigation measures, pollutants possibly associated with the development, short- and long-term water quality impacts on receiving waters and downstream waters, and a list of impacts to beneficial uses. Mitigation through BMPs and design are required for habitat, water quality impacts, and maintenance and operation (CEPA 2003). Although planning for reduced impacts to ecosystems and water bodies promotes green redevelopment, long-term maintenance and operations requirements reduce interest in BMPs and designs that seem to require greater maintenance and operations.

Army Corps of Engineers, Restoration and Recreational Projects

The United States Army Corps of Engineers (the Corps) participates in restoration and recreation projects along streams. Projects require local economic sponsors and a thorough planning process that can take years. Although the Corps prioritizes restoration projects, implementation of a project is difficult for private developers.

Environmental Policies that Can Inhibit Green Redevelopment

Army Corps of Engineers, Dredge and Fill Permit, Channel Use Collaboration

The discharge of dredged or filled material into water bodies requires a Dredge and Fill permit from the Corps. Green redevelopment can create intermittent and permanent water bodies that are protected by the Corps from discharge of dredge or fill materials. This permit process has the potential to create inflexibility regarding the form and function of green redevelopment recharge areas. Operations of stream and river channels are regulated for flood control by the Corps. County flood control districts regulate maintenance roads beside channels, reducing the level of ownership taken by cities. Barriers make human interaction with the streams difficult if not impossible. Collaboration between competing interests of the cities, counties, flood control districts, and the Corps is difficult.

United States Fish and Wildlife Service, Incidental "Take" Permit

The Incidental Take Permit is required when non-federal activities will result in "take" of threatened or endangered species. With a permit, a Habitat Conservation Plan (HCP) is required to minimize and mitigate the effects of the authorized incidental take. An HCP includes an assessment of impacts likely to result from the proposed taking, measures to monitor, minimize, and mitigate impacts, and an explanation of why alternative actions to the taking were not implemented. Also required is an Implementation Agreement, and, if appropriate, a draft National Environmental Policy Act analysis. The number of documents required lengthens the process and reduces the flexibility to change green development mitigation programs for runoff, recharge, and human nature interaction (USFWS 2005). The narrow interpretation of "take" does not allow for maintenance or actions in times of emergency and acts as a disincentive to plant native habitat, thereby motivating sterile landscapes. At times, habitat is vandalized and even eradicated in efforts to avoid continued maintenance of undesired native vegetation. Any augmentation of this law, however, should endeavor to save endangered species, as it is the only law that currently does so.

Municipal Land Use Policies

Local land use policies are based upon traditional zoning methods that separate uses and cater to automobile transportation needs. Requirements for parking amounts, street widths, curbs, walls, and runoff drainage reduce groundwater recharge, increase runoff, and decrease human interaction with natural systems. Berm requirements can inhibit groundwater recharge, and required and prohibited vegetation types can reduce native vegetation. The exemption of most single-family homes from runoff mitigation requirements decreases the effectiveness of stormwater quality management programs. Municipal policies, including those that regulate building setbacks, allowable land uses, and automobile infrastructure requirements, reduce the intended benefits of federal policies that mandate local programs for reducing water pollution.

Conclusion

Municipal policy has the greatest potential to impact green redevelopment. Federal, state, and regional policies require cities to regulate local development to a degree, but most city plans end up affecting water quality at the "end-of-the-pipe." Certifications and permits such as NPDES, implementation of water quality programs such as TMDLs, and planning programs such as DAMP, have not affected elements of local policy that determine water quality and interaction with nature. Local code and zoning represent the greatest opportunities to promote green redevelopment. Federal, state, and regional policies are beneficial frameworks that, if implemented to their full potential, would increase water quality, reduce runoff, and integrate natural systems into the urban matrix. These policies can be strengthened to keep the beneficial aspects in protecting environmental and wildlife health, while further supporting green redevelopment. Until TMDLs are set, planning should aim for the highest water quality possible.

Vision

The vision motivating this study is of a green infrastructure network as an integral part of the urban fabric.

Mission

To provide cities and developers with a design and policy model that meets water quality standards and captures low flows of stormwater runoff while optimizing urban form and function for ecological, economic, and human health.

Scope

This document presents Six Principles for Policy and Design to infuse the urban landscape with natural systems, using a case study site as a demonstration. Its focus on public and quasi-public places connected by a green infrastructure network intends to raise awareness and spread green throughout the watershed.

This plan should be accompanied and followed-up with participatory planning, plans for social justice, wildlife habitat and stream preservation and restoration, and local food and resource production plans. Communication, collaboration, and cooperation are vital to accomplish the goals of ecological, economic, and human health in any watershed.

PROJECT DEFINITIONS:

Green
Integrating natural systems to increase ecological, economic and human health.

Redevelopment
The beneficial restructuring of land use.

Green redevelopment
The restructuring of land use integrating natural systems to increase ecological, economic and human health.

Green infrastructure
Natural systems that are embedded into city processes, that connect public and quasi-public places with streams, swales and lines of tree canopy.

Nature
"The processes that shape and sustain the world and all life within it ... the processes that will continue without human intervention (Spirn 2006)."

Ecosystem services
"The conditions and processes through which natural ecosystems and the species that make them up, sustain and fulfill human life." Among them are:

- Purification of air and water
- Mitigation of floods and droughts
- Detoxification and decomposition of wastes
- Maintenance of biodiversity, from which humanity has derived key elements of its agricultural, medicinal, and industrial enterprise
- Partial stabilization of climate
- Moderation of temperature extremes and the force of winds and waves
- Support of diverse human cultures
- Providing of aesthetic beauty and intellectual stimulation that lift the human spirit

(Daily 1997)

Project Framework: How to Use This Document

This project, *Seeing Green: Grounds for a Renewed Urban Infrastructure*, illustrates an approach to green redevelopment using a case study site to demonstrate integrating a green infrastructure network into the urban fabric. Cities and counties can use this framework when updating general plans, planning new projects, and when reviewing proposed developments. Developers can use this project as a model for green redevelopment to meet higher standards for air and water quality while gaining a competitive advantage through community buy-in, decreased long term costs, and market appeal.

The introduction and project background addressed why green redevelopment needs to occur. The goals and objectives describe the scope of this project, and lead to Six Principles for Policy and Design, each of which address each of the five goals. Part Two illustrates the Principles for Policy and Design on the ground, highlighting the goals accomplished by each principle.

The project's principles and sub-principles describe where, for whom, and how to redevelop green, and are demonstrated through a case study demonstration site connected to a green infrastructure network. This plan is illustrated at the site scale, the city scale, and the watershed scale, and concludes with the implications and an evaluative framework to measure the benefits of green redevelopment.

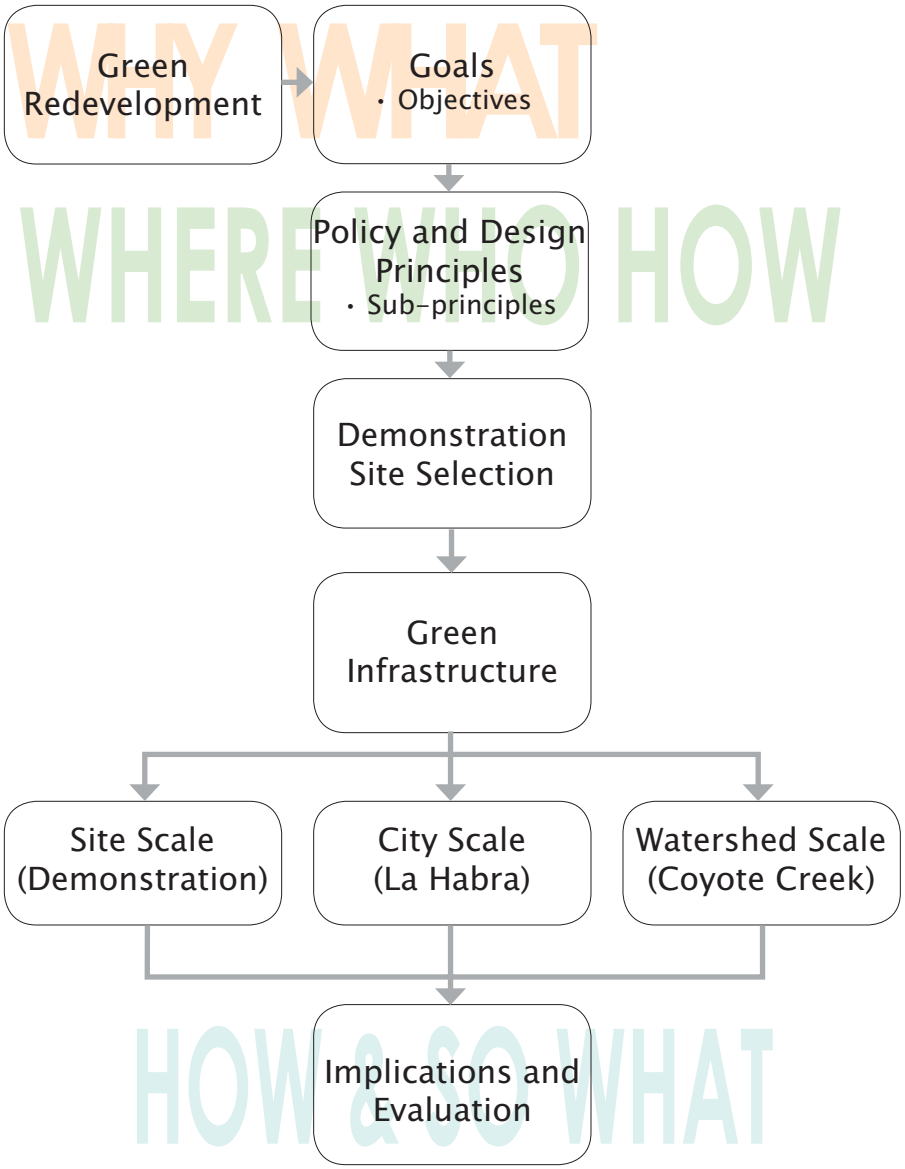


Diagram of project framework

Project Issues		Goals	Objectives for Policy and Design
• Competing development pressures threaten ecological health and connectivity		Ecosystem Health • Increase size, health and connectivity of natural systems	• Manage low flows of stormwater runoff • Preserve and restore habitat • Provide wildlife corridors between habitats
• Urban drainage systems do not address water quality and threaten water supply		Natural Hydrology • Restore natural hydrological function wherever possible	• Decrease impermeable surfaces • Decrease stormwater runoff • Increase passive groundwater recharge • Capture water on site • Improve water quality with nature's services • Manage low flows of stormwater runoff
• Current development patterns do not value nature's services		Resource Efficiency • Use nature's services to reduce resource use	• Optimize passive daylighting and cooling • Shade vehicular and pedestrian spaces • Optimize access to and comfort of using mass transportation and shared transportation • Increase pedestrian comfort and viability of bicycling for daily and recreational needs • Choose plants and materials that have long life spans and require low maintenance
• Cities lack high quality environments and adequate access to nature		Improved Access • Provide quality environments for all	• Provide access to nature in public and quasi-public places • Provide safe and comfortable public places • Provide connectivity between public spaces
• Development practices conceal natural systems from public view		Natural Education • Raise awareness about natural processes in the urban environment	• Increase visibility of natural elements • Empower community members to participate in planning and caring for ecological health • Encourage cooperation among public and private entities to foster sustainable practices

These icons and colors will be used throughout this document to show where the project objectives and goals are met by the Six Principles for Policy and Design.

Guiding Principles for Policy and Design

These principles guide this approach to planning green redevelopment and green infrastructure for ecological, economic, and human health in Southern California. A case study of a city and site demonstrates how to apply green design and gives a base for form and for policy recommendations in application across three scales: the watershed, the city, and the site.

The principles were derived by an iterative process that examined the watershed's issues and their underlying causes in form, culture, and policy. As the term *green* describes a manner of practice, rather than a particular arena or field of study, it was necessary to narrow the issues to those that pertain directly to landscape architecture. Then, the goals and objectives were refined through seeking the common roots of multiple issues. The commonalities included lack of "natural" space, an urbanized hydrologic system, and an automobile-dominated lifestyle. The conclusion that the greatest gains cannot be made through design alone, or through policy alone, led to an analysis of the intersection of design and policy, and how each can either reinforce or inhibit the intent of the other.

The principles are a crystallization of this investigation, and yet a product of the particular policies and design solutions that were selected for analysis along the way. They are a starting point upon which to expand, a yardstick against which "placemakers" and policy authors can measure their own work. They are guidelines for what to consider at the start of a project, and reminder phrases to return to periodically. They do not define prescriptive elements to include in every green undertaking. This project invites the design and policy communities to be creative in their *approach* to authoring the landscape.

Six Principles for Policy and Design

1. Start Upstream creates green demonstration sites in public and quasi-public places; educates children — the next generation of land planners and developers on natural systems; preserves remnant habitat; cleans stormwater runoff before it reaches streams, rivers and the ocean; communicates in and between planners and the community, and harnesses local knowledge.

2. Connect the Dots mitigates land use decisions that have resulted in high transportation needs and costs; and bridging public and quasi-public landscapes, and remnant habitats with a green infrastructure network to increase ecological, economic and human health.

3. Use Nature as a Guide optimizes urban form through the use of natural systems to reduce resource use; provides clean water and air and healthy habitats; and plans high-quality, flexible urban spaces that change over time.

4. All Fronts, No Backs maximizes all usable space, makes natural processes visible to the public to raise awareness and access to nature, and prioritizes pedestrian access and shared transportation.

5. Manage for the Long Term establishes deep roots by educating children, and chooses climate and space-appropriate plants and designs; "loving and leaving it" — planning for reduced maintenance in the future; and incorporating environmentally responsive maintenance plans into all projects.

6. Fulfill Multiple Objectives means collaborative planning at all scales, and values the cumulative effects of green redevelopment elements as they pertain to ecological, economic, and human health. It measures performance rather than means and evaluates projects for their ecological, economic, and human health benefits.

Six Principles for Policy and Design

This document illustrates an approach to integrating green infrastructure and green redevelopment in cities and regions of Southern California. It is very likely that severe drought, high oil prices, and/or continued population growth will price out the status quo of development. When this happens, or better yet, before, cities and regions will need a plan of action to meet redevelopment demands with urban places that use natural systems to reduce resource use, and provide quality environments.

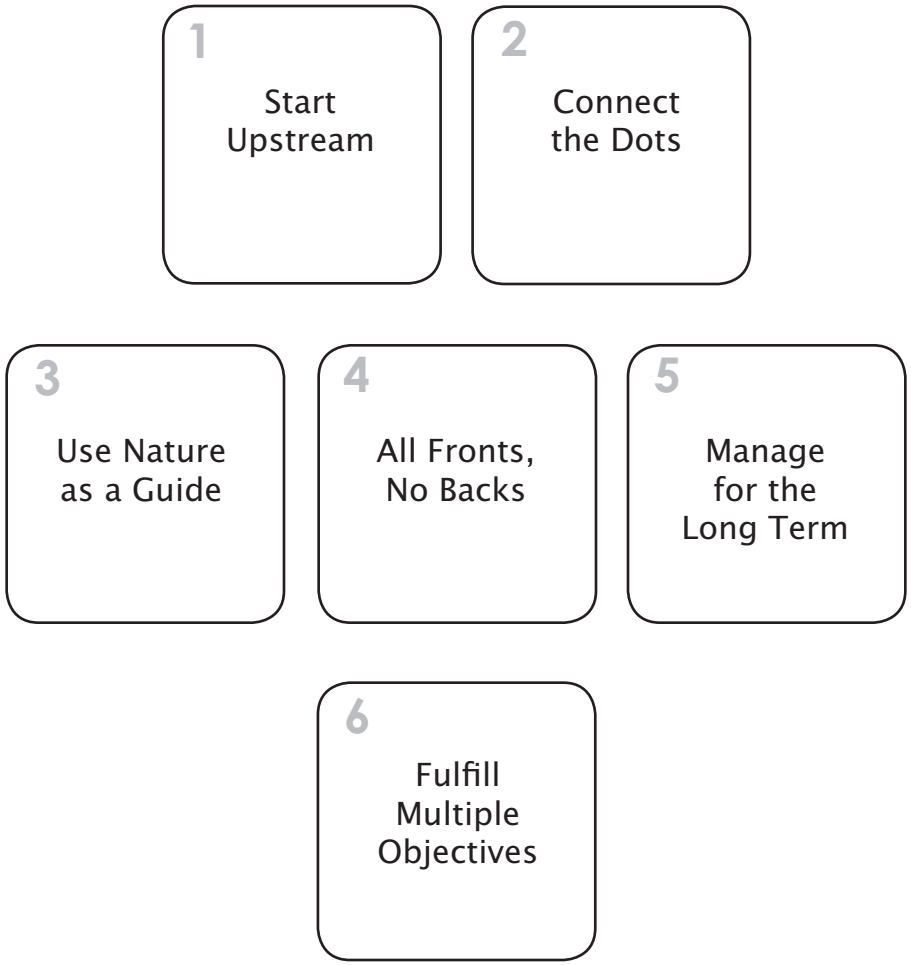
This document is an approach to planning for green infrastructure and redevelopment, using a site in the Coyote Creek Watershed as a demonstration. Six principles describe a strategy of how to plan green.

1 & 2 : provide policy and design principles on where and for whom to redevelop green at the watershed and local scales, with an example at the site scale.

3, 4, 5 : provide policy and design principles that explain how to redevelop green with examples at the site scale.

6 : provides policy and design principles regarding how to encourage green redevelopment, an evaluative framework, and a decision model.

In the Principles sections that follow the case study introduction, potential design and policy solutions are presented for each relevant sub-principle. Because of the local policy focus of this project, the policy sections for each principle present a sampling of the policies of the case study city, including those that impact implementation of the given principle in a positive, negative, or mixed way. The policy recommendations are a selection of minor to major steps that a city might take to pursue the principle or undo the negative effects of some existing policy.



Six Principles for Policy and Design: *Seeing Green*

The next seven pages are an illustrated overview of these Six Principles for Policy and Design. Start at page 23, then flip backwards one page at a time, building from 1 to 6, to see how each Principle builds upon the previous ones.

6

5

4

3

2

1

6

Fulfill Multiple Objectives

and is a place for collaborative planning for the community, developers, and city and regional planners.

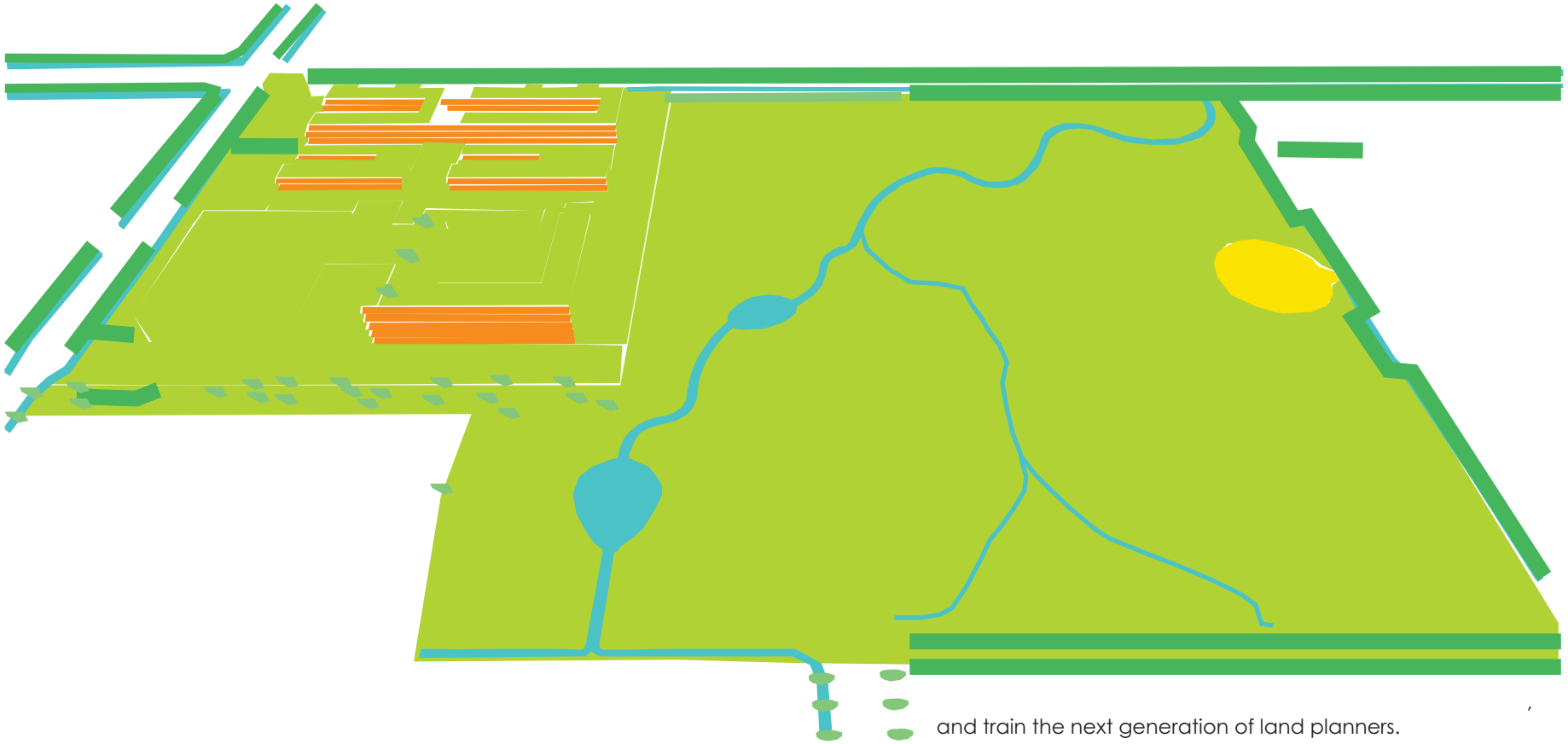
and demonstrates the importance of investing now for ecological, economic, and human health.

Manage for the Long-Term

The Green Center provides training and education on maintenance

Plants and materials are chosen to be climate and space-appropriate, to minimize irrigation and maintenance needs.

5



and train the next generation of land planners.

All Fronts, No Backs

Development includes a transit stop at one entrance, and connects to a biking and walking trail

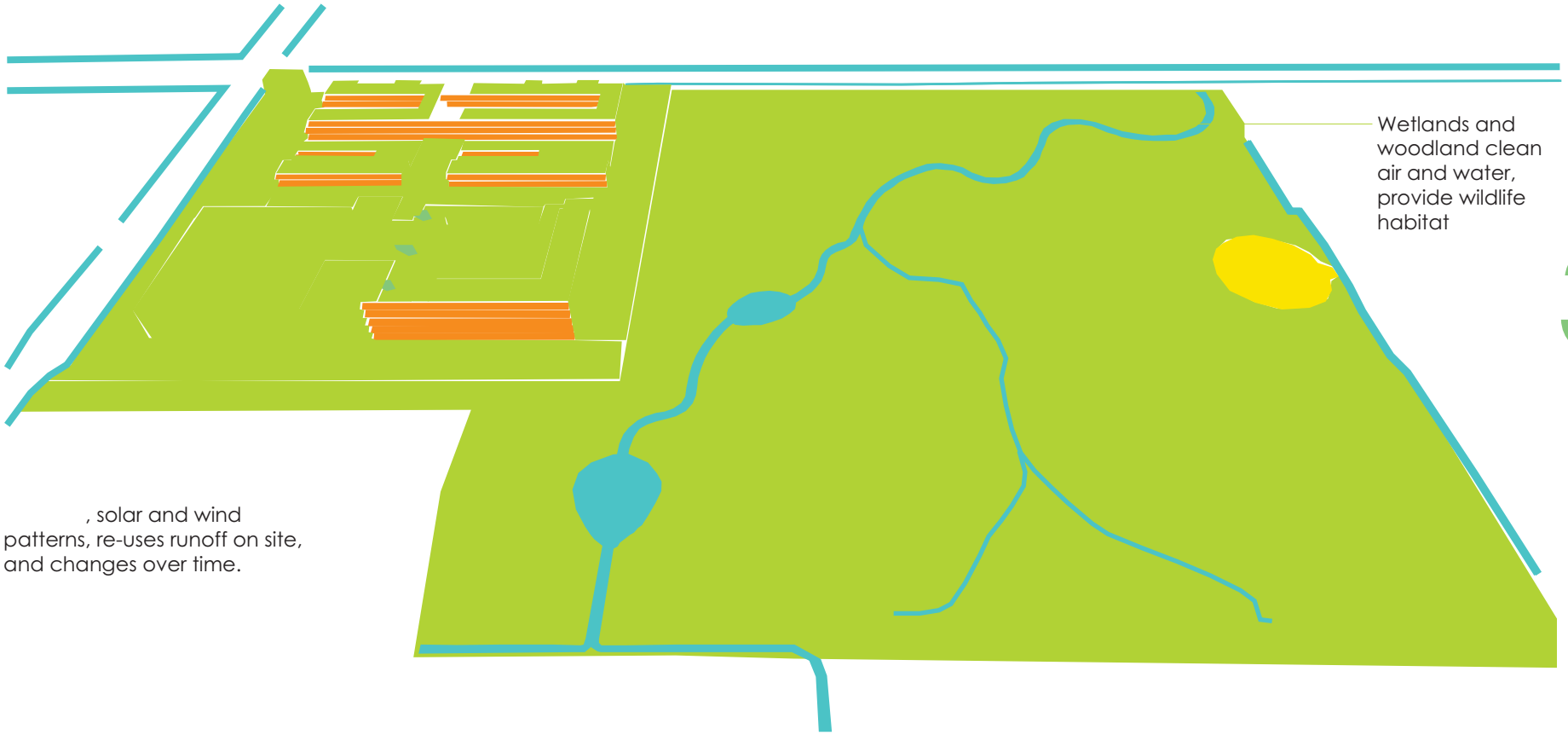
pedestrian access and comfort, and shade streets.

4

, and human access to nature.

Access on all sides maximizes space, and prioritizes pedestrian movement from neighborhood, schools, and transit.

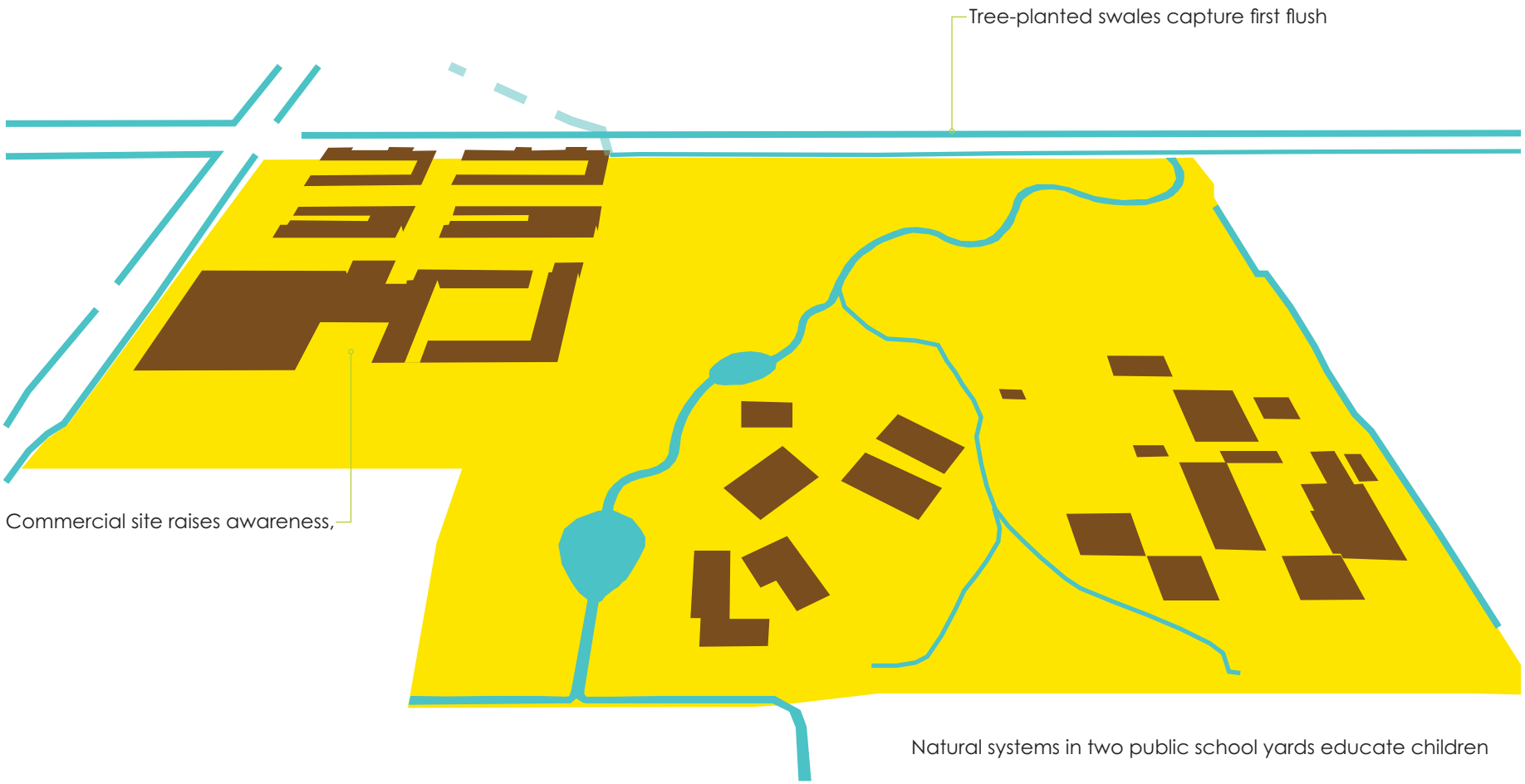
Use Nature as a Guide



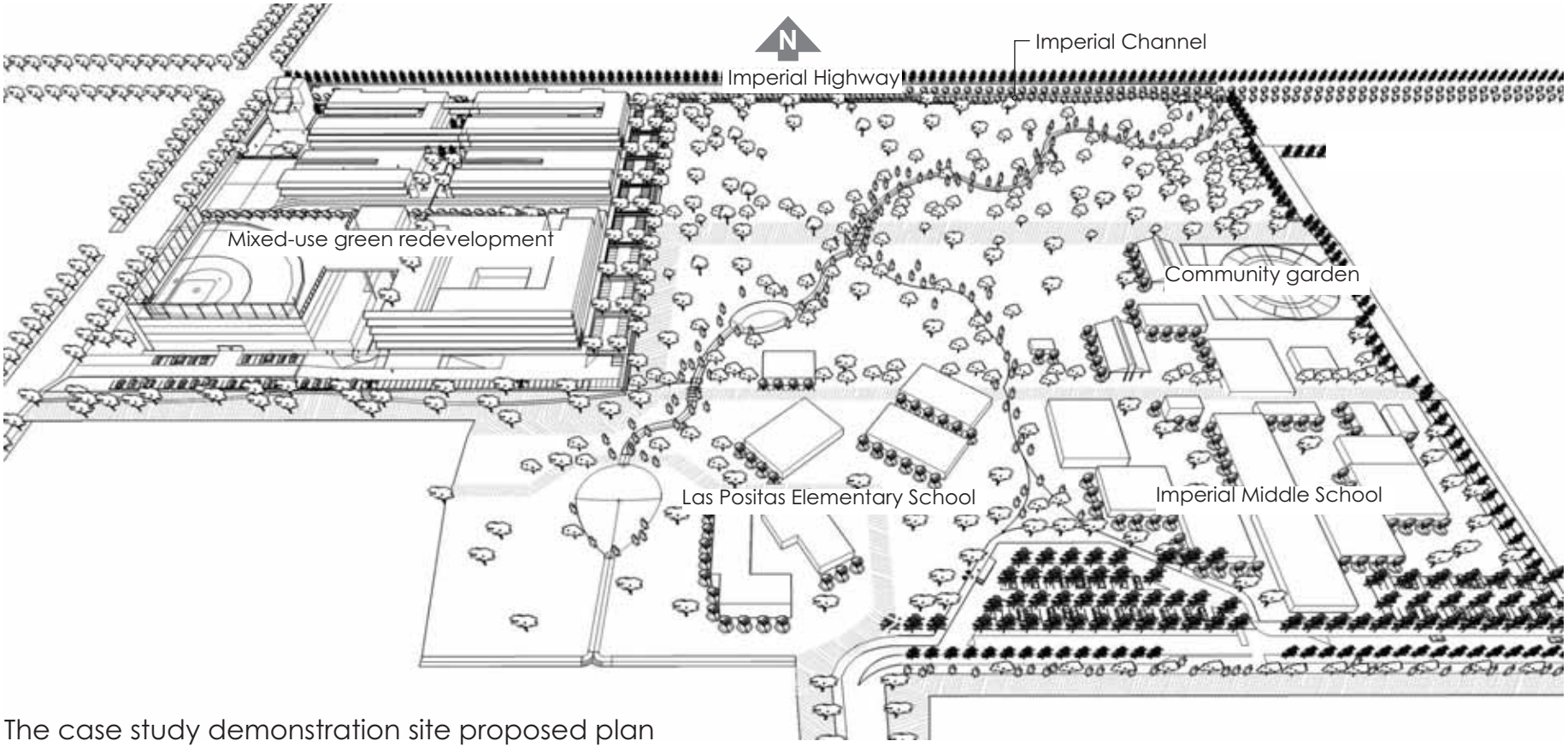
3

Connect the Dots

Start Upstream



1



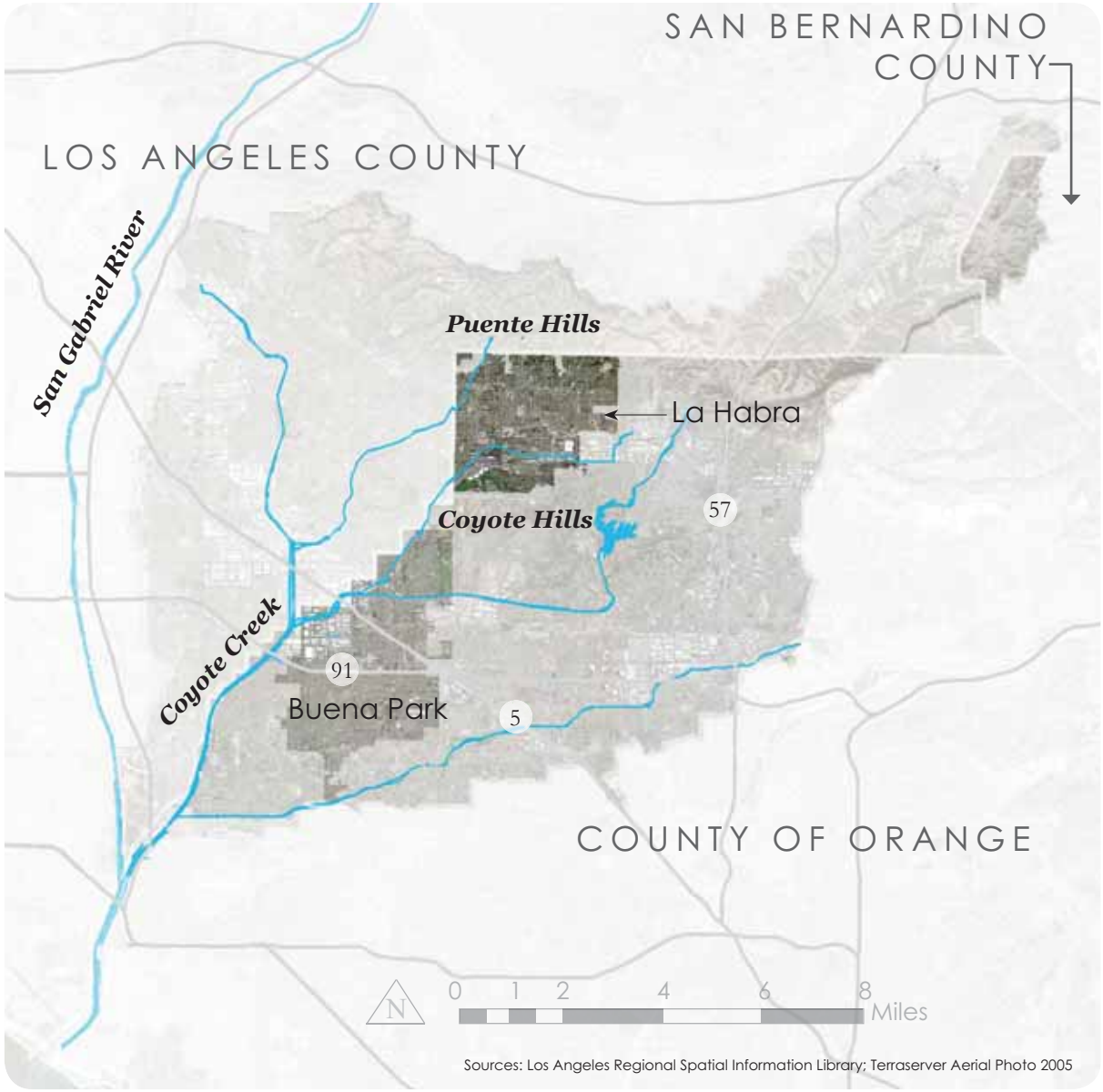
The case study demonstration site proposed plan

Case Study City Selection

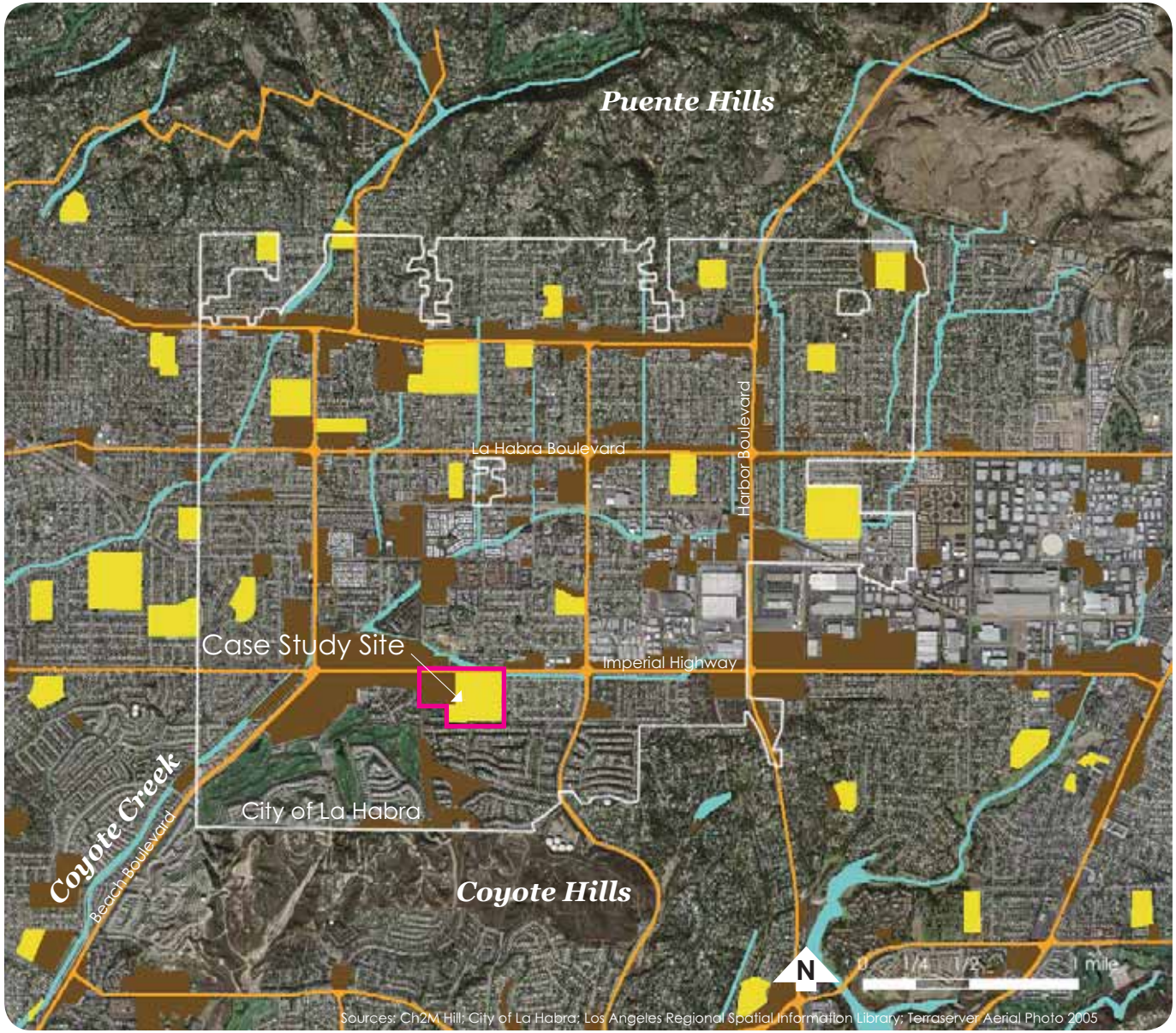
A demonstration site was chosen to ground the principles of *Seeing Green* in a physical and policy context. The case study city used to demonstrate policy and design principles on a local scale was chosen based on the following criteria:

- It is within the County of Orange (the client)
- It has not attained NPDES compliance: Buena Park and La Habra are each in need of a plan in place to meet stormwater quality standards
- It is upstream in the watershed: La Habra is upstream of Buena Park.

Based on these criteria, the city of La Habra was selected. La Habra, named for "the pass through the hills," was founded in 1896. It is located in the northwest corner of Orange County, nestled against the Puente Hills to the north and the Coyote Hills to the south. It is 7.3 square miles. Major tributaries of Coyote Creek begin their journey to the San Gabriel River here, catching up to 14 inches of rainfall per year and runoff from the highly developed areas below the hills.



Case study city selection



The demonstration site selection in the City of La Habra

Demonstration Site Selection

Within the city, a smaller site was chosen for demonstrating policy and design principles at a site scale, based on its upstream characteristics:

- It holds a quasi-public commercial parcel to raise awareness of natural systems,
- It holds two public schools to educate children,
- It fronts a major street, and the commercial site is predominantly roof and parking lot, providing an opportunity to manage runoff before reaching the stream.

Case Study Site
Public/Quasi-Public
School
Major Road
Stream

The Case Study Site

This study of design and policy illustrates the importance of physical and cultural context in green redevelopment and the potential for green infrastructure in and among settings that have a high degree of visibility to the public.

The selected demonstration site is near the southern boundary of La Habra, on the north-facing slope of the Coyote Hills (A) and just south of the Imperial Channel branch of Coyote Creek (B). The site includes two public schools (C) and a quasi-public commercial site (D), all adjacent to a high-volume state highway (E). Imperial Highway at the site carries 47,000 vehicles per weekday (OCTA 2005). The channelized creek flows west at the northeast corner of the site, before turning in a culvert under Imperial Highway and a recent housing development, and soon thereafter joining up with a northern branch of the creek, behind another retail center (F).

The schools are in the public eye through their educational mission, through informal opportunities for experiential play and passive observation by children, and through their public use for recreation by all ages. These schools have large open

Demonstration site (orange border) in relation to streets and streams

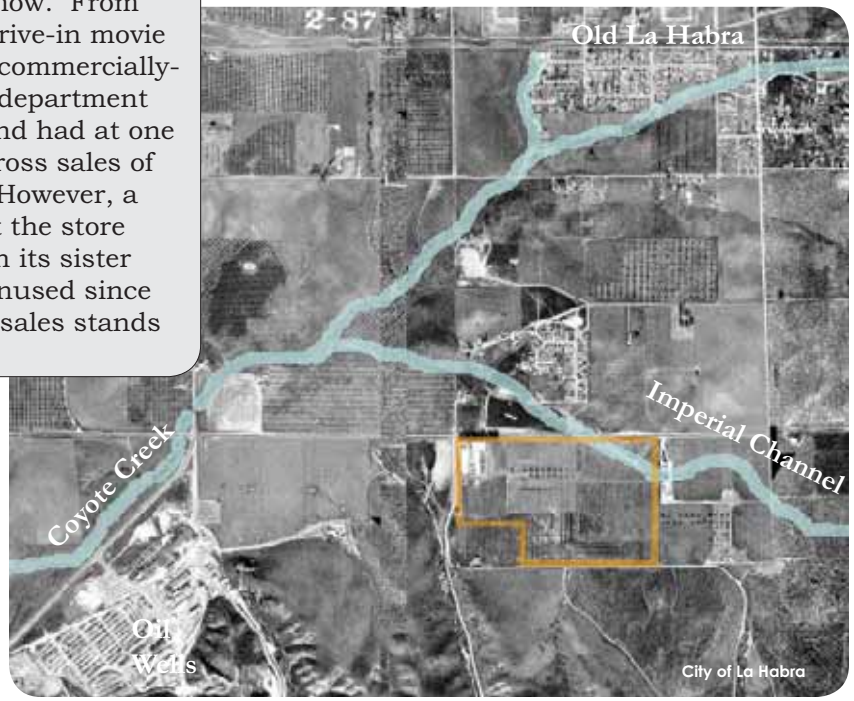
spaces that may be designed for stormwater management, community connectivity, and ecological health (G).

The sixteen-acre commercial parcel contains large parking lots (H) and roof surfaces that shed large amounts of stormwater runoff and produce ambient heat. Deep setbacks (I) contribute to a monotonous landscape experience for cars traveling the highway, and discomfort and visual tedium for pedestrians seeking access to the site. Pedestrians staying on the sidewalk are exposed to sun, wind, and the *whoosh* of passing cars. The economic value of the parcel itself is high due to its location, high visibility, and size.

The potential connections to the surrounding community are the third integral component of the demonstration site. Green redevelopment and infrastructure should spread as a ripple effect, from sites that have followed green principles, via streams, paths, roads, connected habitat, and the minds of site users, to sites similar in geography, climate, culture, or ecological need.

Site History

La Habra annexed this area in the 1950s. At that time, the land was in agricultural use, and the creek flowed unchannelized, not aligned with the Imperial Highway as it is now. From 1962 to 1989, a beloved drive-in movie theater occupied the now commercially-zoned parcel. A discount department store was built in 1994, and had at one point nearly the highest gross sales of that brand in California. However, a corporate shift meant that the store would be closed along with its sister stores. It has remained unused since 2003, except for seasonal sales stands and promotions.

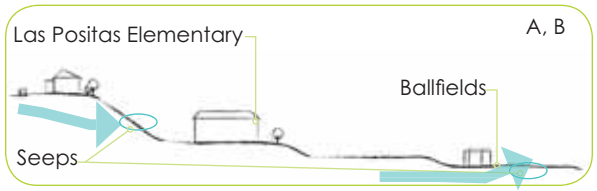


1953 aerial photo including demonstration site

Current Physical Context and Opportunities

The following lettered statements correspond to the image on the facing page:

A. The site is terraced, having steep transition zones between levels. Seeps emerge from the hillsides, as well as surface from the playing fields—evidence of the naturally high groundwater in this location, over-irrigation of landscaping in the neighborhood, and high water availability for vegetation on the case study site:

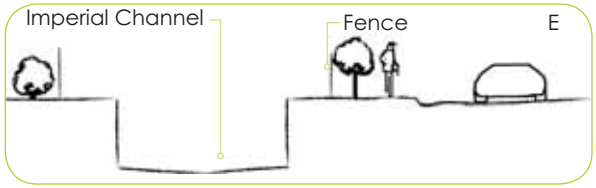


B. The frequently wet fields were once habitat for egrets and ducks. The naming of one school, Las Positas, meaning "little ponds or springs," refers to that time, much as developments are often named for what they erase. The native soil is Sorrento loam, which has good drainage and storage quality, appropriate for infiltration and retention purposes *(See Appendix A, p. 144).* Terraces flow from **1** to **2** to **3**.

C. Dry weather runoff exists most of the time, collecting at the base of slopes, and concrete gutters of street curbs. This is an opportunity to remove the curb and allow the runoff to irrigate roadside vegetation.

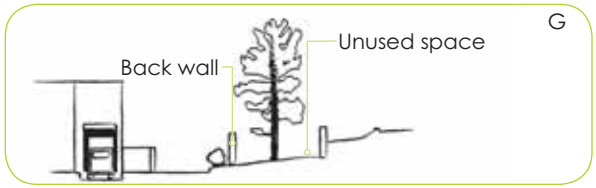
D. Schoolwood Drive hugs two sides of the school property and is used as a throughway, especially by parents dropping off children at school. High volumes and speeds should be mitigated. This stretch of road is a prime candidate for traffic calming, putting pedestrians first and allowing cars the privilege of careful use of the space.

E. Imperial Channel is lined by fences (see yellow lines), that prevent visual and physical access. Fences also prevent pedestrians from crossing the school property, for example, to walk from the neighborhood to a store.



F. The school fence a has a break here. Before and after school, students stream diagonally across the retail parking lot to reach the intersection of Imperial and Idaho, and destinations beyond. Accessibility and connectivity of systems could be improved by removing barriers.

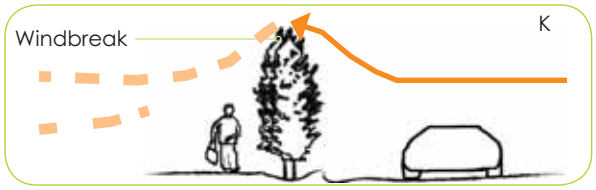
G. The "back" side of the retail building accommodates loading and facilities management. A row of tall pine trees at its edge gives it a feeling of protection and enclosure that could be put to public use, far removed from the roar of the roadways.



H. The large roof is a space with untapped potential to use nature's services. As is, it increases the heat island effect and energy use.

I. The parking lot creates large amounts of stormwater runoff to storm drain inlets (J). The lot's 864 parking spaces is 161 more than required by La Habra code for the building's 177,000 square feet. A decrease in parking spaces is not only a good idea for stormwater management, but it is also consistent with the zoning code for commercial retail use (1 per 250 square feet of floor space).

K. The wind patterns at this site include the normal pattern of coastal winds moderating inland temperatures. The seasonal "Santa Anas" (L) in late summer and fall blow hot, dry desert winds from the northeast. Clusters of trees north and east of pedestrian spaces can provide protection from their impact.



A tree row can diffuse hot winds as well as provide a traffic barrier.

Existing conditions of case study site

Current Planning Context

The schools are managed by the State, via the La Habra City School District, outside the jurisdiction of the municipal government.

The commercial site is valuable to the government of La Habra for its high retail tax-revenue potential. Pressure exists to maximize this potential in the next use of the property. Although the city considers itself built-out (La Habra General Plan), it will also continue to face the pressure of population growth, which increases the need for housing and jobs of all income levels and skill levels. A retail store cannot provide this kind of variety in jobs, and La Habra's current housing supply cannot provide affordable housing to a growing number of retail workers. Four factors combine to make mixed-use an appealing path for parts of La Habra:

1) La Habra's jobs-housing balance is heavy on the housing side *(See Appendix B, p. 152)*.
2) Housing costs are high in La Habra, as they are in surrounding areas.
3) New jobs in La Habra are mostly lower-wage, and the whole community will benefit if those workers have affordable housing options close to them.
4) High-income workers living in La Habra should also have nearby employment options.

By expanding the uses present on the commercial site to retail, commercial, and office, and by increasing the intensity of use levels, the community will benefit from more varied business services, employment opportunities, and housing choices. An important "side effect" of mixed-use is the opportunity to decrease total local traffic loads, to lower the number of daily trips by residents and workers, to combine trips, and to limit time and fuel spent on travel *(See Appendix B, p. 151)*. This will result in more discretionary personal time for individuals and families, increased kinds of incidental social interactions, decreased personal stress levels, and consequently, higher health and productivity levels. An additional benefit is the fostering of local community spirit, identity, and knowledge.

Policy Analysis and Recommendations

The selected case study city has the opportunity to follow the principles recommended by this project, implementing the city's own adaptations of these lessons in physical site design and community infrastructure planning. However, some of the design solutions presented herein could have an exponentially-greater impact if they were firmly supported by state and regional policy. Others of the design solutions are not compatible today with existing city policy. The greatest opportunities for impact occur at the municipal policy level, but the following section introduces the spectrum of policy changes that could potentially be used to advance green objectives in urban landscapes. Any of the policy categories mentioned is ripe for further study in relation to greening California cities.

Types of Policy Change to Enable and Support Green Objectives

Certainly, some of the policy changes shown are beyond the scope and power of municipal governments. These changes are the green policy umbrellas, which would have cascading effects. For the greatest impact at local levels, policy at federal, state, or regional scale would need to be radically altered. Such paradigm shifts would require popular demand, political support, and likely, years of examination and lobbying.

The municipal government has the greatest potential to change development patterns in the near term, within its bounds, as well to influence the policies and behaviors of its neighbors. Some of these policies require formal policy documents, while others would manifest themselves as city decisions to lead by example and advocate for change towards greenness. They vary by cost of implementation, by the intrinsic "inertia" of the type of policy change required, and by the current momentum of public opinion. The degree of success would be affected by the details of implementation, the degree of community involvement in formulation and execution, and the financial support and political commitment afforded to the policies.

True Integration of Transit and Land Use Planning

The most far-reaching reforms, potentially having the greatest contribution to the goals of this project, must occur at a level beyond the scope of the municipal powers. Because so many urban environmental and community maladies result from the existing automobile-dominated landscape and lifestyle, an overhaul of land use and all transportation planning is most desirable. For La Habra and other cities of Orange County, the regional and State transportation planning executed by the Orange County Transportation Authority (OCTA) and the California Department of Transportation (Caltrans) is largely independent of needs decided by the city. Likewise, the transportation planning agencies are powerless to ensure that demand for mass transit and other modes of transportation will develop how and where they are planning various levels of service.

The Southern California Association of Governments (SCAG) is the Metropolitan Planning Organization for a five-county area covering more than 15 million people. As such, it collaboratively produces the *Regional Transportation Plan (RTP)* and *Regional Transportation Improvement Plan (RTIP)*, with which transportation projects must be consistent in order to receive State or federal funds, and it also produces a *Regional Comprehensive Plan* with many forward-thinking ideas. While this plan calls for greatly improved coordination between transit and land-use planning, it lacks regulatory power (SCAG 2004b). The land use planning powers remain in the hands of cities and of counties, where the land in question is unincorporated.

Although proposing a mechanism for the implementation of this reform is beyond the scope of this project, this kind of policy change would have the most potential for positive change in urban form in California. United States doctrines of private property rights and the municipal "police power" to implement zoning are the major obstacles to this concept *(See Appendix C-4, p. 189).* Ideally, the approval of development proposals would be contingent on appropriate transportation planning, including service by mass transit, and transit planning would require user numbers that supported the particular placement of stations and service lines. Transit systems that cross city boundaries cannot currently guarantee this level of planning collaboration, nor the long-term commitment of service needed to support transit-dependent developments.

California Property and Sales Tax Reform

Similarly, land use planning for the city largely occurs in a bubble, with local policymakers most responsible to their own constituents, and the responsibility for jobs, housing, and other community provisions stopping at the city line. The need for short-term tax revenues weighs more heavily in local decision-making, than planning for the long-term social and environmental health of the community. La Habra is far from unique in this respect. Communities of California are in the predicament of fiscal zoning because of the property and sales tax structure of the state. Retail businesses bring in more money to the city than they cost in short-term infrastructure costs, and so these businesses are favored over other community needs much of the time. Neighboring communities are forced to compete with one another for the high sales numbers of big-box stores. If taxes were distributed more equitably across the state, and if individual property owners were taxed fairly for the real value of properties today, and the services afforded to them, community planning could happen in a more holistic manner. Planning could occur in an integrated manner across municipalities, sharing amenities and responsibilities, benefits and challenges.

General Plan Required Elements

Another high-level reform that would help to achieve this project's aims is the modification of elements that are required in the general plans of California municipalities. Currently, there are seven required elements: Land use, Transportation, Open Space, Conservation, Housing, Noise, and Safety (Curtin 2003). A city may choose to include as many additional elements as they wish. For some cities, the decision to stick with the original seven elements is dictated by financial constraints, but for less forward-thinking cities, policy makers are only too glad not to address additional concerns. The General Plan is a powerful document, with which all city policies must be consistent. If the state were to require additional environmental elements, it would provide for their care throughout the state. Elements that some cities have written,

and which may be considered for mandatory status, include: Environmental Justice, Impermeable Surfaces, Energy, and Water Conservation and Quality. There are more possibilities to examine.

Taxation of Fossil Fuel Consumption and Release of Other Pollutants

A final potential policy that would only work at state or national level, is a system of carbon taxation. This tax would be based on the "polluter pays" principle, whereby externalities of fuel production and consumption would be included in the price of all forms of consumer energy, be it electricity, gasoline, or ethanol. The externalities to mitigate include production of greenhouse gases, the emission of particulate pollutants to air and water, environmental damage where fuel is extracted, as well as the inefficient use of limited resources. The tax rate should be based on levels of damage, such as particulate rates, engine efficiency, or carbon emissions per unit, not based on fuel price. Tax increases generally face strong opposition, but it is possible that this tax as described could be used to shift the burden from "non-productive" taxes, such as property tax. Property tax rates could decrease, if supplanted by a carbon tax, which could have an enormous side benefit of increasing energy efficiency and decreasing pollution. Such a tax could not reasonably be implemented at the local level, as it would economically disadvantage the city to the degree that it could not compete.

Local Eco-Taxes

A city with commitments to green goals might decide to tax various impacts to sustainability. Some cities have implemented taxes on use of the stormwater system, based on runoff volumes, or decreases to runoff volumes (IUPUI 2002). Outdoor water consumption might be priced differently from indoor. The rate of impervious surface, the area, a percentage of the area, or a percentage of increase or decrease in imperviousness could be the basis for implementing it.

Comprehensive Update and Amendments to City General Plans

Individual cities can make great strides towards greener and healthier places. Starting with the aforementioned General Plan, a city can amend it on a piecemeal basis, and perform a comprehensive General Plan update at reasonable intervals. If a city has a General Plan older than ten years, it is a prime target for an update. The update process is time-consuming and expensive, and should not be undertaken lightly, but rather should take every step to involve the community in the document's reformulation. A date for the next update should also be scheduled and put into writing.

Discretionary Municipal Efforts

To lead by example, the city or county can ensure that is internal efforts are consistent with the green image it is promoting. It can resolve that all city-owned construction and redevelopment projects must be LEED-certified, and that the management, maintenance, and procurement methods of the city demonstrate the best green practices. In addition, the city can implement demonstration sites for stormwater BMPs, energy BMPs, transit stop design, water conservation landscaping, and local food production, either on city property or in partnership with privately-owned sites. Such sites would incorporate communication components such as interpretive signage or accessory websites.

Advisor/Sponsor to Partner Projects

The model of partnership for green projects can extend to projects initiated by private citizens and businesses. The city could have a staffperson available to help start projects pertaining to green roofs, photovoltaics, and energy-efficient remodeling. The staffperson could communicate information about local successes and failures in similar efforts, connecting individuals where appropriate. It would be an Extension Service for the 21st century. Another program carried out by some forward-thinking cities is the making of small grants of seed money to private entities wishing to carry out such projects (Beatley 2000).

The city could also serve as a facilitator of outside green efforts. "Green groups" have been successful in European cities, in encouraging citizens to gather to discuss their environmental impacts and support one another in changing pieces of their lifestyles (Beatley 2000). The city could send its green emissary to schools, clubs, and church groups, for example, to spread the word about green efforts and available help. The local green office

could even identify potentially symbiotic opportunities between a business that has a useful by-product and a nearby business that could use it, supporting local economic growth, reducing waste, and decreasing energy and transportation needs.

Declared Commitments to Green Goals

A formal policy statement is not required in order to begin acting consistently with green goals, but it certainly helps. If the outlook of the city council and staff includes an awareness of green practices, it cannot help but infiltrate through into action and policy. The open environment that encourages city staff members to propose green actions can go a long way towards the spread of those ideas (Beatley 2000). The example set by one city can influence its neighbors and help to form relationships among them.

Zoning Ordinances and Building Codes

Local zoning ordinances specify not only allowable uses, but specific requirements such as setbacks, parking requirements, and plant materials. There is great room to revise them not only to achieve the same objectives, but to allow some practices that are known now to be more advantageous to social, environmental, and economic goals. Some unintended effects of existing zoning codes can prevent the creation of dynamic and desirable neighborhoods with a high degree of connectivity. Building codes can even promote the use of local materials, materials of recycled or recyclable content, and materials of low embodied energy.

Permitting Process and Developer Incentives

A relatively easy and inexpensive way to encourage green redevelopment is to make it easier for the developer. A city could expedite the permitting process for projects aiming to be green or increase access to city staff to speed up the collaborative process (Jagodzinski 2006). Other possibilities include offering density bonuses or a decrease of impact fees, in return for green roofs as open space, encouragement of transit use, or conservation of habitat. Other features to encourage include public access and natural stormwater treatment, such as wetlands.

Education and Awareness Campaigns

Local publications, news outlets, and billboards can always communicate the green message, if a city is committed to furthering it. Newsletters, public events, and websites can reinforce the message, often for free, or as a public service. The community itself is a resource to be tapped in this respect.

Connection of Policy to Green Design

The following Principles sections present design solutions that will lead to green infrastructure and redevelopment in the city of La Habra. In conjunction with design solutions, this project presents an analysis of the existing policies that would affect the implementation of those designs at the local level. These may be policies that currently either support or foil the aims of green redevelopment. Policies examined are mainly found in the zoning ordinances and landscape regulations of La Habra.

A brief analysis of the impacts of specific policies, as well as recommendations for policy change, are included for each principle. The policy recommendations may be changes that would support or enable green objectives, or they may simply require the removal of existing policies that inhibit achievement of those objectives.

PART TWO — SIX PRINCIPLES FOR POLICY AND DESIGN

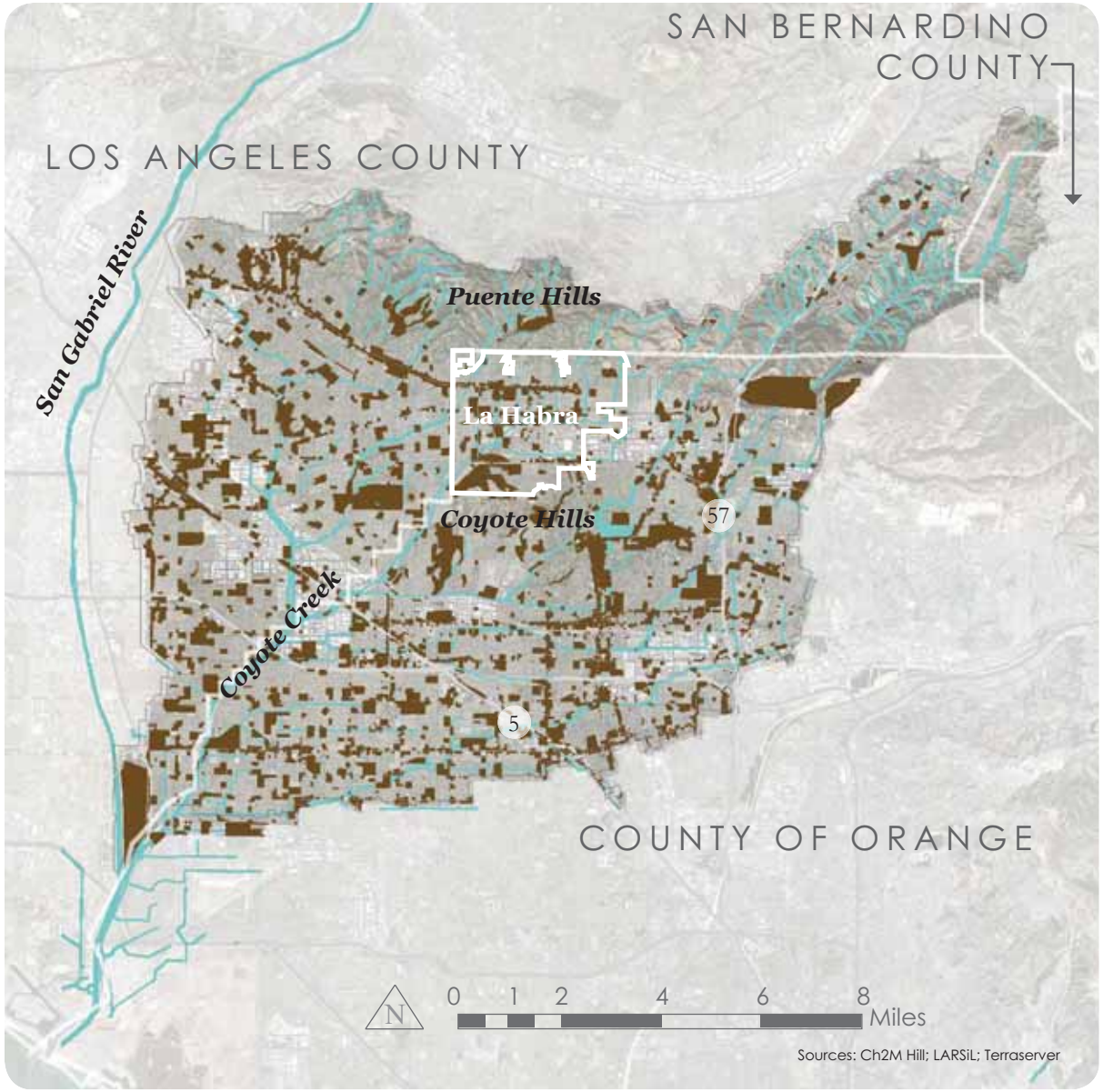
1. START UPSTREAM
2. CONNECT THE DOTS
3. USE NATURE AS A GUIDE
4. ALL FRONTS, NO BACKS
5. MANAGE FOR THE LONG TERM
6. FULFILL MULTIPLE OBJECTIVES

1. Start Upstream

Start Upstream is a principle that creates green demonstration sites in public and quasi-public places, educates children — the next generation of land planners and developers on natural systems, urges communication among and between all parties involved; preserves remnant habitat, and cleans stormwater runoff before it reaches streams, rivers and the ocean.

Sub-Principles

- Raise Awareness of Natural Systems in public and quasi-public places
- Educate the next generation of environmental stewards — Children
- Open the Channels of Communication
- Preserve Existing Habitat for Wildlife
- Treat Runoff before it Reaches Streams



Coyote Creek Watershed's public places

Raise Awareness in Public and Quasi-Public Places

Watershed-scale

Public places are opportunities to raise public awareness of natural systems in the places people visit regularly. Public places include schools, parks, libraries, and post offices.

The quasi-public realm includes commercial uses such as restaurants, shopping centers and retail stores (Carmona 2003). By using public and quasi-public spaces as green redevelopment models, they can act as incubator sites to spread knowledge and interest in green design throughout the watershed.

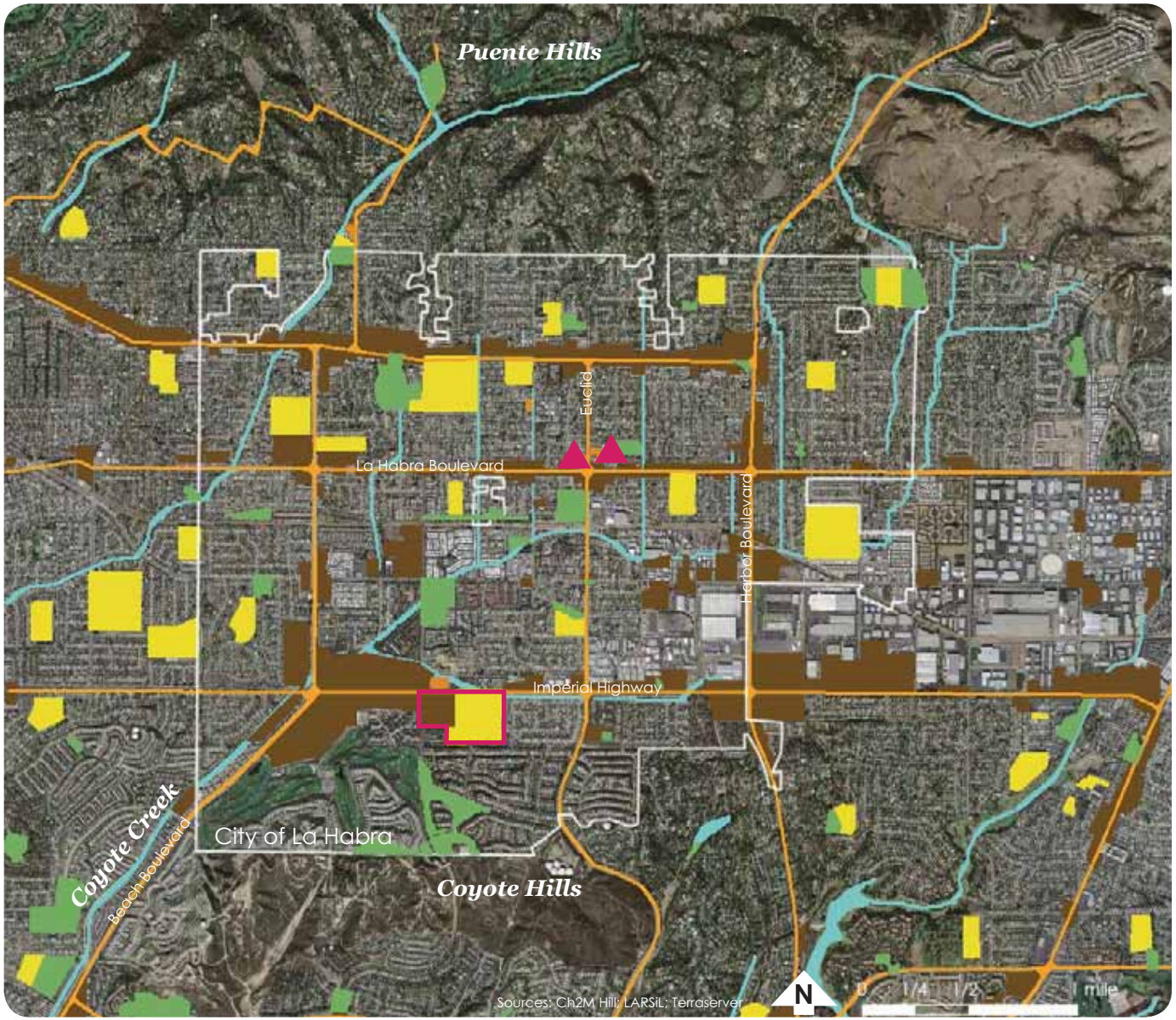
Public and Quasi-Public Places

Raise Awareness in Public and Quasi-Public Places

City-scale

La Habra's public and quasi-public places form a gridded network throughout the city. Schools, shown here in yellow, tend to be relatively evenly distributed in urban areas, and often provide large playgrounds or playing fields that are opportunities to integrate natural systems.

- Case Study Site
- Schools
- Libraries
- Government Buildings
- Parks
- Commercial Centers



La Habra's public places

Educate Children through Nature

Kids playing in a natural setting, top left. North East Trees' reading garden is shown, top right. A typical Southern California playground, above.

America's genius has been nurtured by nature — by space, both physical and mental. What happens to the nation's intrinsic creativity, and therefore the health of our economy, when future generations are so restricted that they no longer have room to stretch (Louv 2005)?

Children are the next generation of developers, environmentalists and land planners.

Schools, so frequently dominated by sub-standard buildings (Cummins 2001), asphalt playgrounds, or turf ball fields, can become landscapes for experimentation in natural systems, monitored and documented by students for furthering knowledge of urban natural processes. Recent research shows nature can relieve stress, increase attention spans, raise self-confidence and increase academic success (Herrington 2001, Louv 2005, Moore 2005). Schools are prime opportunities to integrate nature and enrich children's academic success, self-confidence, and understanding of natural processes.

FOR FURTHER REFERENCE:

- Herrington, Susan. 2001. Kindergarten: Garden Pedagogy from Romanticism to Reform. *Landscape Journal*; 20(1): 30-47.
- Louv, Richard. 2005. *Last Child in the Woods*. Chapel Hill: Algonquin Books.

Open the Channels of Communication

Thus, a truly ecological landscape architecture might be less about the construction of finished and complete works, and more about the design of 'processes,' 'strategies,' 'agencies,' and 'scaffoldings' – catalytic frameworks that might enable a diversity of relationships to create, emerge, network, interconnect, and differentiate (Corner 1997).

Open the Channels of Communication is a call to communicate and harness local knowledge. By talking to citizens, business owners, planners, and developers the importance of green redevelopment is communicated. It requires sharing information freely, and harnessing local knowledge and energy to shape and care for public places.

Community involvement early and often will help shape a place to the needs of its users, and embed community aesthetics and values into the function as well as the form of the place.

FOR FURTHER REFERENCE:

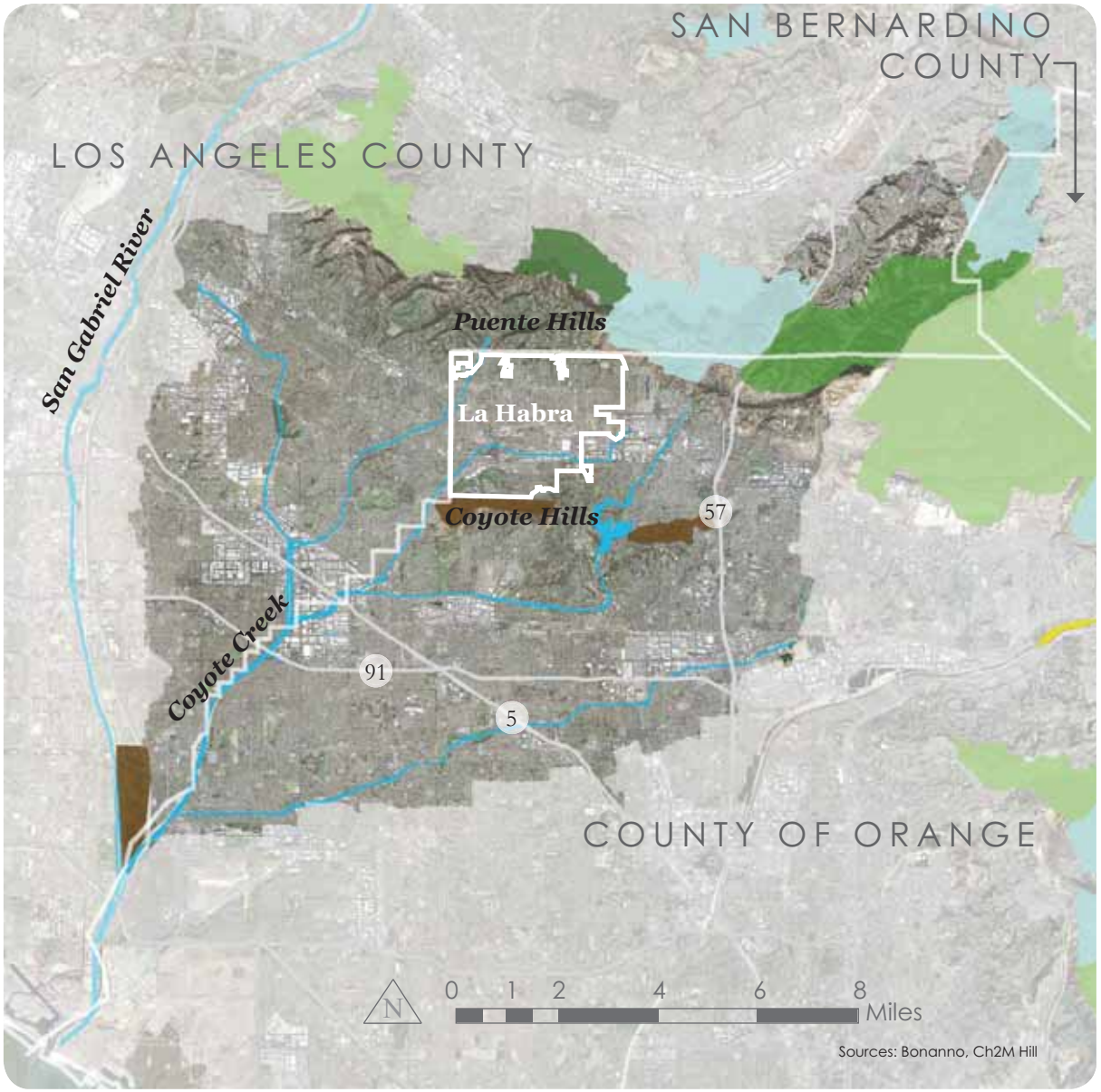
- Beatley, Timothy. 2000. *Green Urbanism: Learning from European Cities.* Washington, DC: Island Press.
- Corner. 1997. Ecology and Landscape as Agents of Creativity. In *Ecological Design and Planning*. Steiner, Ed.
- Francis, Mark. 1999. "Proactive Practice: Visionary Thought and Participatory Action in Environmental Design". In *Places;* 12, 2.
- Hester, Randolph T. 1985. "12 Steps to Community Development." In *Landscape Architecture;* Jan/Feb 1985, p. 78-85.
- Spirn, Anne Whiston. 2000. *The Language of Landscape*. New Haven: Yale University Press.

Existing La Habra Policies:

- Support public participation to the same level as most other cities.

Policy Recommendations:

- Require environmental orientations, via publications or information sessions, for business operators and residents of new developments.
- Publicize successful examples of green developments and collaboration.
- Be clear in the intent of green codes, by including a "Purpose" section for each policy, as in the landscape codes for Los Angeles (Los Angeles Municipal Code 1996).
- Communicate design and policy failures as they are experienced, so that others may learn from them.
- Enhance public participation, making full use of the Internet as a means of announcements, planning discussion, and aggregation of a database of local landscape and planning conditions.



Existing plant communities

Preserve Existing Habitat for Wildlife

Though most of the watershed is highly urban, there are important patches of native and restored vegetation that provide habitat for wildlife. Preserving habitat upstream means keeping what is existing, since it is extremely difficult to restore healthy habitat.

Plant Communities

The patches of coastal scrub in the Coyote Hills are on property used by the oil industry. Though disturbed, they are vital in their function as wildlife habitat.

Healthy plant communities not only provide habitat, they also prevent erosion, absorb runoff, and improve air quality.

- Coastal Scrub
- Annual Grassland
- Chaparral
- Coastal Oak Woodland
- Restored Habitat
- Valley–Foothill Riparian

Threatened & Endangered Species

Threatened and endangered species located in the watershed include:

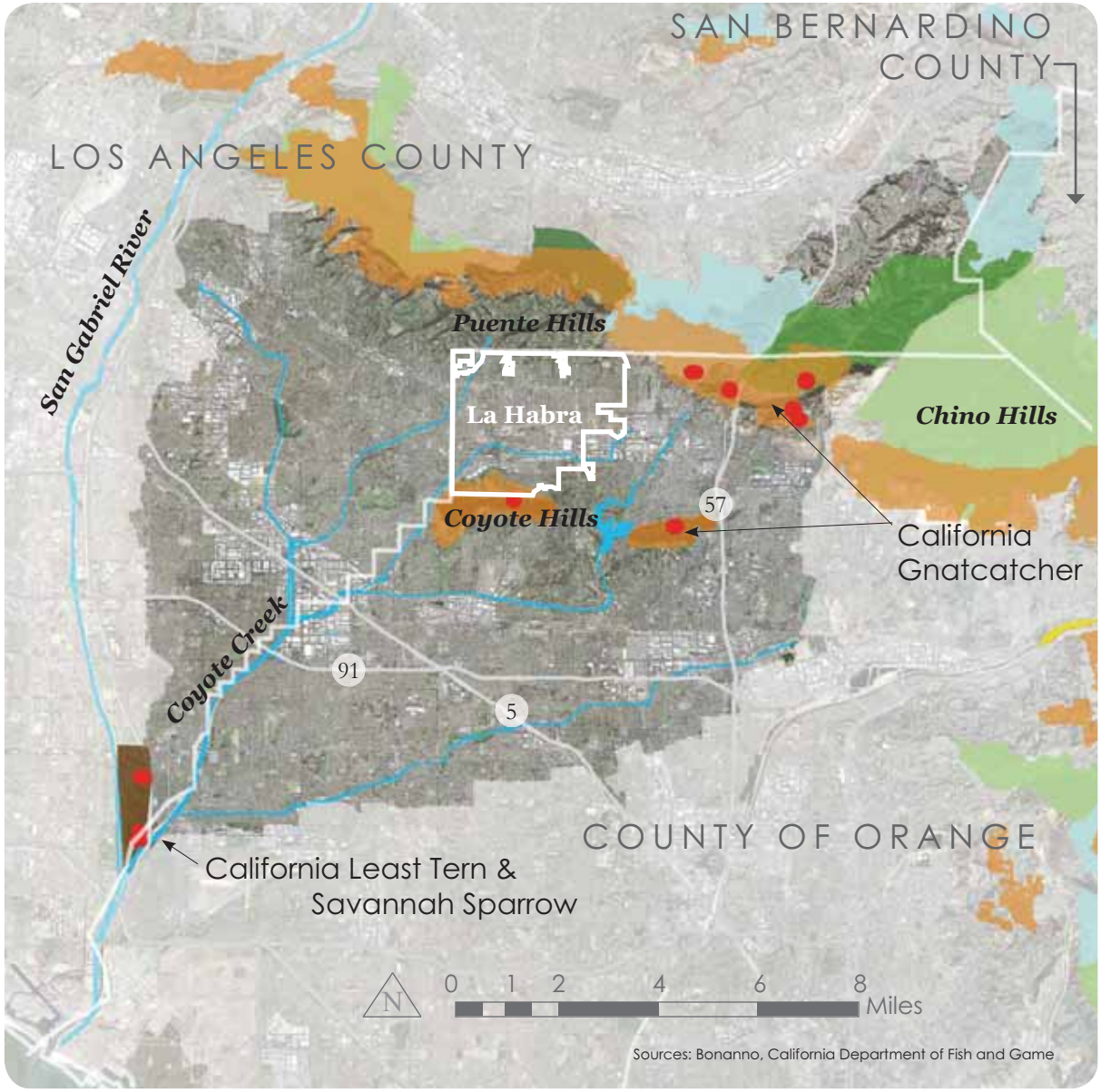
California Gnatcatcher

California Least Tern

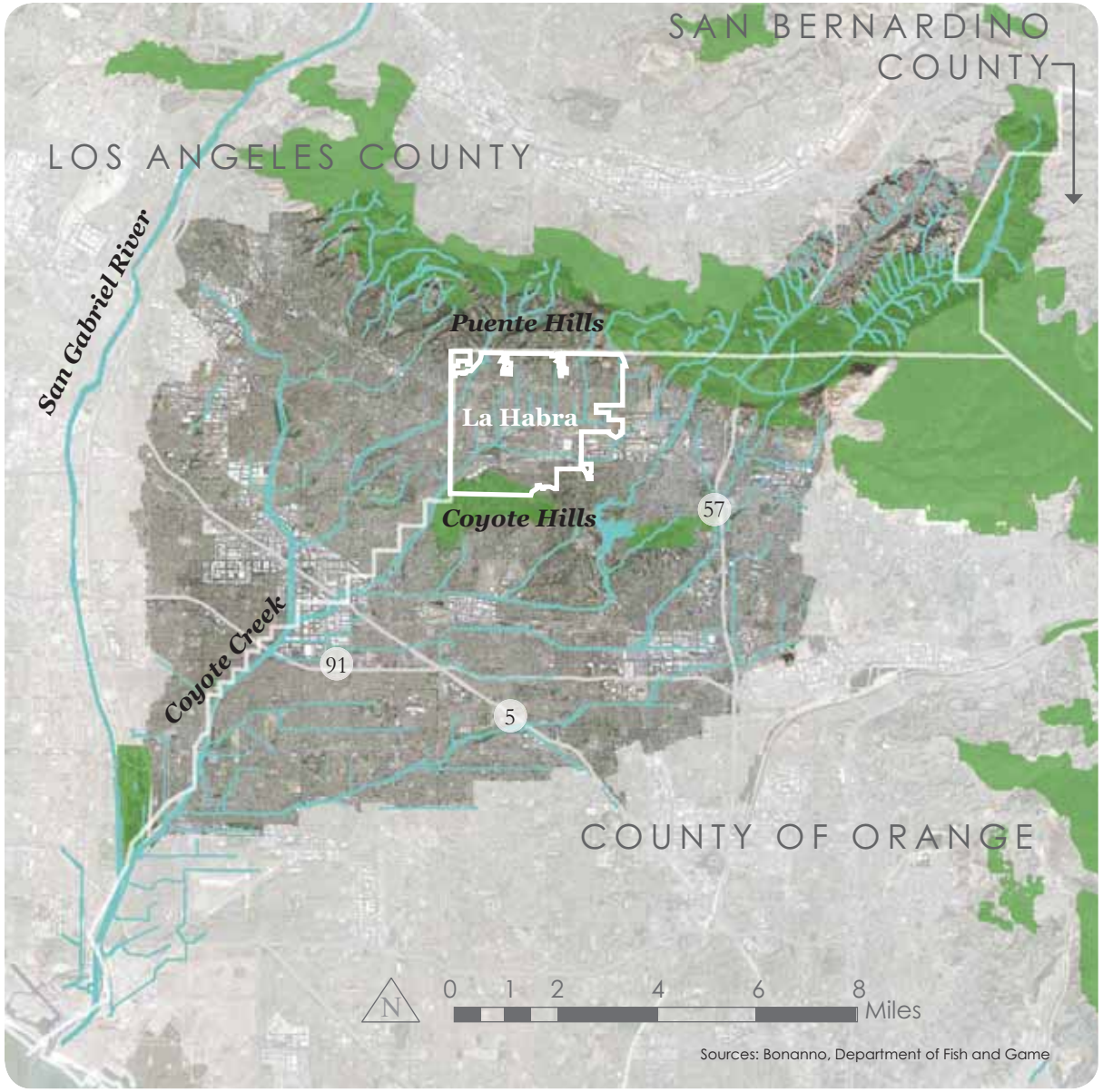
Savannah Sparrow

Notably, there are more California gnatcatcher pairs located in the Coyote Hills than any other area in Los Angeles and North Orange County (Bonanno 2006).

Threatened or Endangered Species
Gnatcatcher Areas
Coastal Scrub
Annual Grassland
Chaparral
Coastal Oak Woodland
Restored Habitat
Valley–Foothill Riparian



Threatened and endangered bird species



Areas to preserve for wildlife habitat

Wildlife Patches

Protecting and restoring habitat for native species is a concern throughout the watershed. These areas, combining habitat, vegetation, and threatened and endangered species locations, are existing wildlife patches to preserve, restore and expand upon.

Seeing Green will become a part of the Coyote Creek Watershed Management Plan, which will include plans for preserving and restoring wildlife habitat. This project, *Seeing Green*, advocates integrating wildlife habitat into urban areas. The wildlife patches shown here should be preserved and expanded upon in future planning efforts.

Wildlife Patches

Treat Runoff Before It Reaches the Stream

A spatial analysis illustrates the ratio between buildings, shown in black, and the space in between, shown in white. This identifies priorities to integrate natural systems into urban form by looking at the size and configuration of spaces between buildings. Cities with dense building patterns have more need to integrate natural systems and treat stormwater runoff on building sites.

Here the area surrounding the case study site in La Habra (opposite page) is compared to Portland, Oregon and Pasadena, California — known for being walkable cities, and the New Urbanist developments of Birkdale Village, North Carolina, and Kentlands, Maryland.

Portland and Pasadena both hold larger and denser building masses, with narrow streets and small blocks that support pedestrian comfort. Kentlands and Birkdale Village are new developments surrounded by open landscapes with many opportunities to tap into natural systems.

Portland, Oregon

0 750' 1500'

Pasadena, California

0 750' 1500'

Sources: USGS; Terraserver.

Kentlands, Maryland

0 750' 1500'

Birkdale Village, North Carolina

0 750' 1500'

Spatial analysis of La Habra, California

Opportunities to treat stormwater runoff before it reaches the stream

Treating Runoff in La Habra

La Habra's building density falls in between the older cities of Portland and Pasadena, and the New Urbanist developments. While newly developing cities have opportunities to preserve large tracts of land for natural systems and stormwater management, La Habra is nearly built out, like many Southern California cities. The large blocks of building and white space are mostly made up of commercial properties, schools, and parks.

Redevelopment can take advantage of these large spaces to both integrate natural systems, and bring buildings closer to the street for a pedestrian-scaled environment.

The yellow highlights spaces between buildings, here mostly streets and parking lots in commercial districts, and public parks and schoolyards. The large rooftops in these areas provide opportunities to slow runoff, cool buildings to save energy use, and add habitat.

These are opportune places to use natural systems to hold and treat runoff on buildings and landscapes before it reaches the stream, while at the same time increasing shade, habitat and connectivity for wildlife, pedestrian comfort, and public awareness of natural systems. The case study site is shown here outlined in pink.

Demonstrating *Start Upstream* on the Site

What is not seen is forgotten.

La Habra, as a built-out community has almost no land surface undisturbed by humans, and very little left undeveloped. It also has different land planning choices than a brand-new city, with every option still on the table. In a place such as La Habra, a "piecemeal" approach may be the most viable means of restoring natural systems, including the community that lives amongst them. To spread green tendrils, which wrap around permanent fixtures, and blossom where people engage with them, is the driving concept. These pieces of green will remind the inhabitants of La Habra of the roles that they play in the ecosystem, how other people and humans suffer or thrive based on their actions. It is also a challenge to each individual, a challenge that will strengthen the community's spirit if its members tackle it together.

Each green project in the community acts as an incubator—a functional and productive element of a system, that at the same time serves as a demonstration to neighbors and as a testbed for enhancements upon its methods. The "greenness" spreads, first occupying the corner of a site, a streetside, a roof. Then it blankets an entire site, and grows through word-of-mouth, through publicity, and through education, until its effect multiplies with simultaneous imitation and revision throughout the community.

That is why the effort must start upstream. Picking sites of prominence, of public interaction, and of importance to children will have the greatest likelihood of causing the greatest gains. These are gains in social, environmental, and economic health of the community. They occur over time, and grow exponentially, as a ripple effect, if they are pursued strategically.

Existing La Habra Policies:

- Require walls or berms to screen parking, and to separate parcels of different uses.

The walls that separate properties, especially in residential areas, prevent connected open space areas from serving as wildlife corridors. Walls at the edges of streams limit plant and animal life from prospering where they otherwise would.

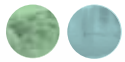
Policy Recommendations:

- Dedicate city staff to implement a "Green Center" that manages city programs related to sustainability.
- Manage demonstration sites for sustainability initiatives.
- Create "jobs" or a club for local children in relation to the "Green Center," to encourage stewardship of the environment.
- Protect all existing stream buffers, and prohibit redevelopment to rebuild on them.

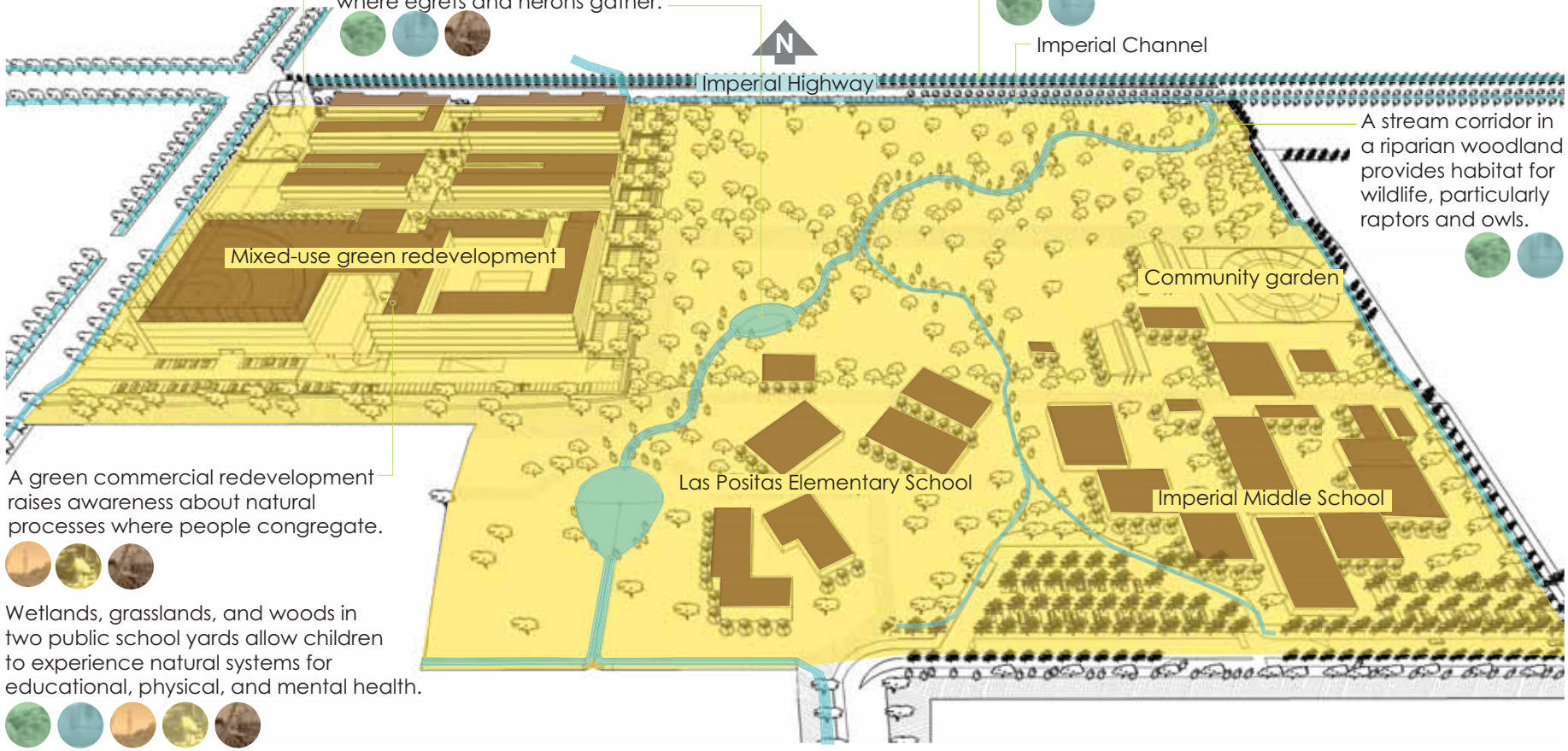
Building form, such as green roofs, and constructed wetlands capture and treat runoff before reaching the stream, decreasing the need for end-of-the-pipe solutions.

Design reflects the history of the site, and its users input, including a movie screen on the former drive-in site, and wetlands where egrets and herons gather.

Tree-planted swales capture first flush of runoff from streets.



Imperial Channel



A stream corridor in a riparian woodland provides habitat for wildlife, particularly raptors and owls.

A green commercial redevelopment raises awareness about natural processes where people congregate.

Wetlands, grasslands, and woods in two public school yards allow children to experience natural systems for educational, physical, and mental health.

Demonstrating *Start Upstream* on the case study site

2. Connect the Dots

Connect the Dots is a principle that bridges public and quasi-public landscapes, and remnant habitats with a green infrastructure network in order to increase ecological, economic and human health. It addresses the root of many issues — land use decisions that increase need for travel, and therefore increase energy used for transportation.

Sub-Principles

It All Starts with Land Use illustrates the demonstration site's solutions to inefficient land use patterns, and makes policy recommendations to direct growth for increasing ecological, economic, and human health.

Plan a Green Infrastructure Network illustrates the importance of planning each redevelopment in the context of a green network that includes:

- Major streets
- Streams
- Trails and railroad easements
- Wildlife corridors

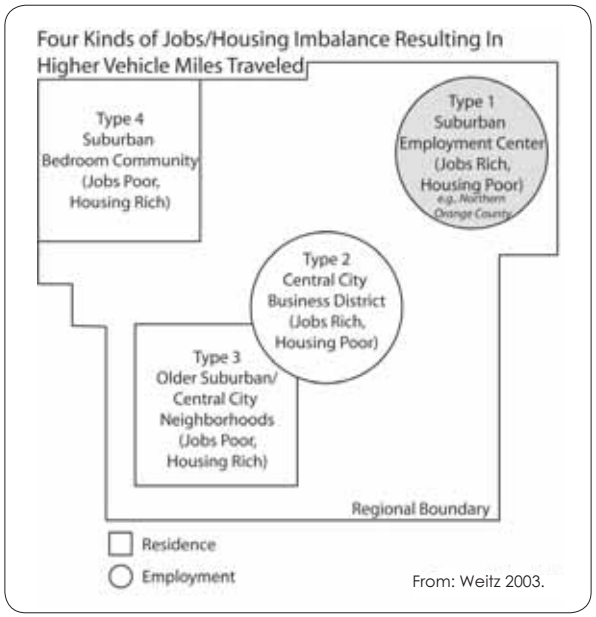
The section concludes with demonstrating the integration of site design into a green infrastructure network.

It All Starts with Land Use

Higher densities are required to justify the cost of the proposed mixed-use development and its emphasis on multi-modal accessibility. Communities often resist the idea of increased density, and its coinciding increases of demand on roadways, schools, and other public infrastructure and facilities. La Habra has nowhere to expand but upwards, if it values open space and a higher quality of life.

Intensification comes with benefits. Mixed-use residential communities can improve the problem of high traffic volume and decrease the amount of parking and conduit infrastructure required by suburban densities. Mixed-use can improve the local jobs-housing balance by providing job and housing opportunities not only for the residents of the mixed-use development, but also skills-matched jobs for other nearby residents. Those will be commuters spending less time on the roads, polluting less with their cars.

By sharing responsibility for providing recreational access, commercial sites can gain visibility, while relieving pressure to develop undeveloped land, and allowing natural systems to inhabit school grounds and parks. This model maximizes space for natural systems, habitat, and public access to nature. Land use decisions need to consider the greater context for maximum ecological, economic and human health.



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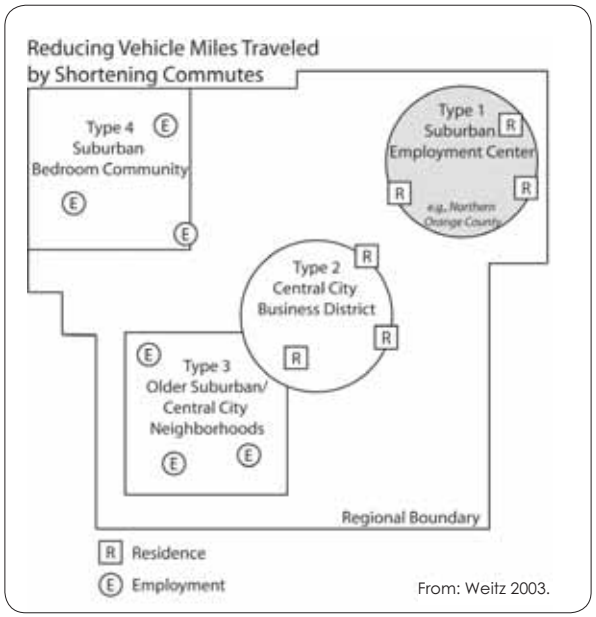


From: Weitz 2003.

Existing La Habra Policies:

- Declare that the maximum allowable Floor Area Ratio (FAR – the ratio of floor space to lot size) in this zoning designation is 30%.
- Have a limited definition of types of residential allowed in a mixed-use designation.
- Do not reflect the current situation, population, or changing objectives, as the General Plan is more than 10 years old.

Policy Recommendations:

- Increase building height maximums and FAR values. There could be a gradient of these values within a zoning type, or according to elevation. FARs for developers could be increased in exchange for open space preservation or creation, public easements, or job creation.
- Make zoning decisions consistent with transit planning.
- Integrate "workforce housing," senior housing, family housing, and live-work options in housing policy and mixed-use residential options.
- Perform a comprehensive update of the General Plan.

Redevelopment supports pedestrian, bicycle and mass transit access to reduce automobile dependence.

Mixed-use redevelopment allows access to daily needs, reducing vehicle trip rates up to 20% (Girling 2005).

Increased density reduces pressure to build on undeveloped land, saves on installation of utility lines, and provides housing.

Commercial rooftops provide public access for recreation, allowing school grounds to host wetlands and habitat for wildlife.

Land use mitigation design

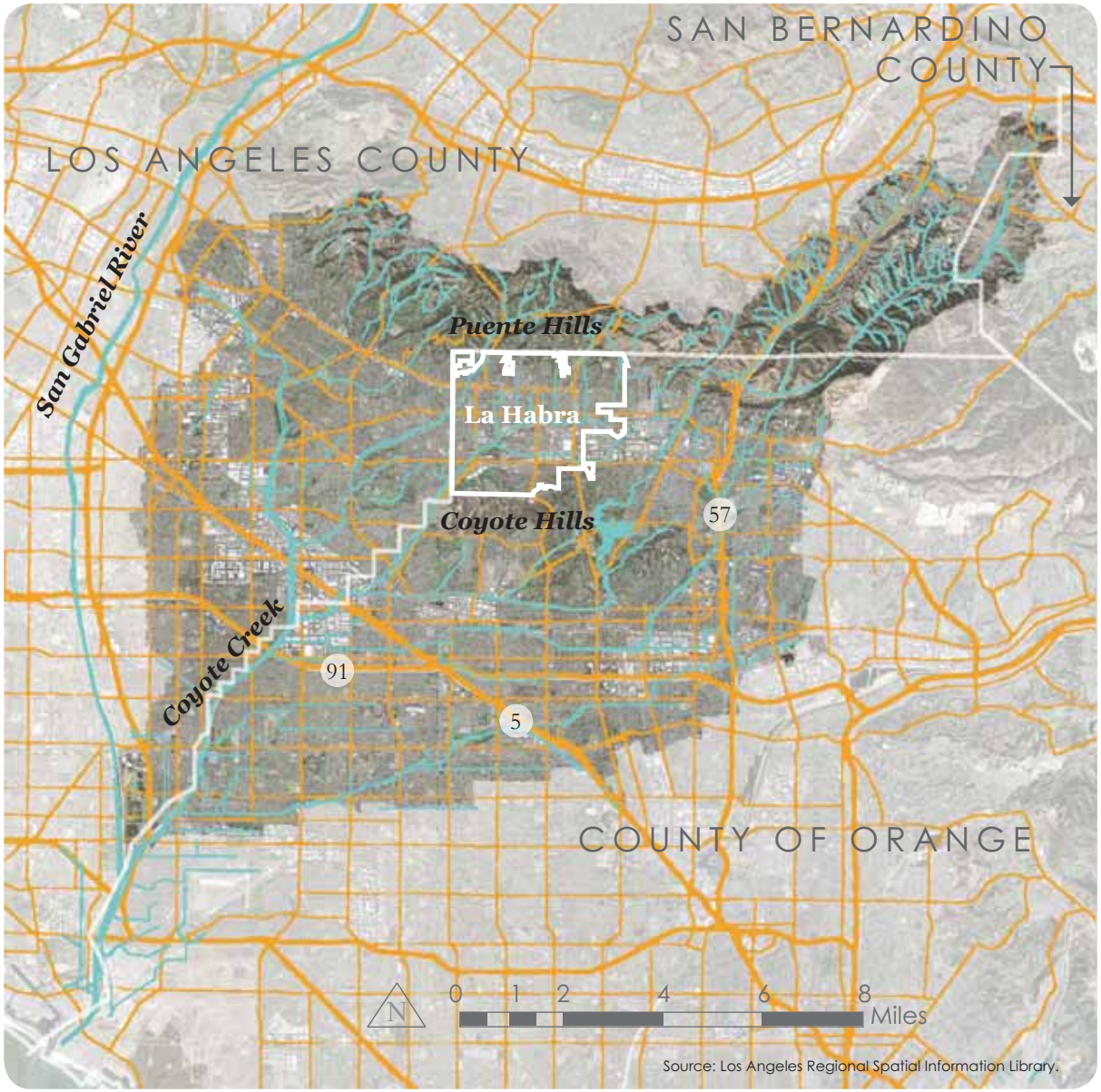
Streets and Streams

Major roads, shown in orange, can be redeveloped to capture first flush *(See Appendix A, p. 134)*, provide a tree canopy for people and wildlife, and increase pedestrian comfort.

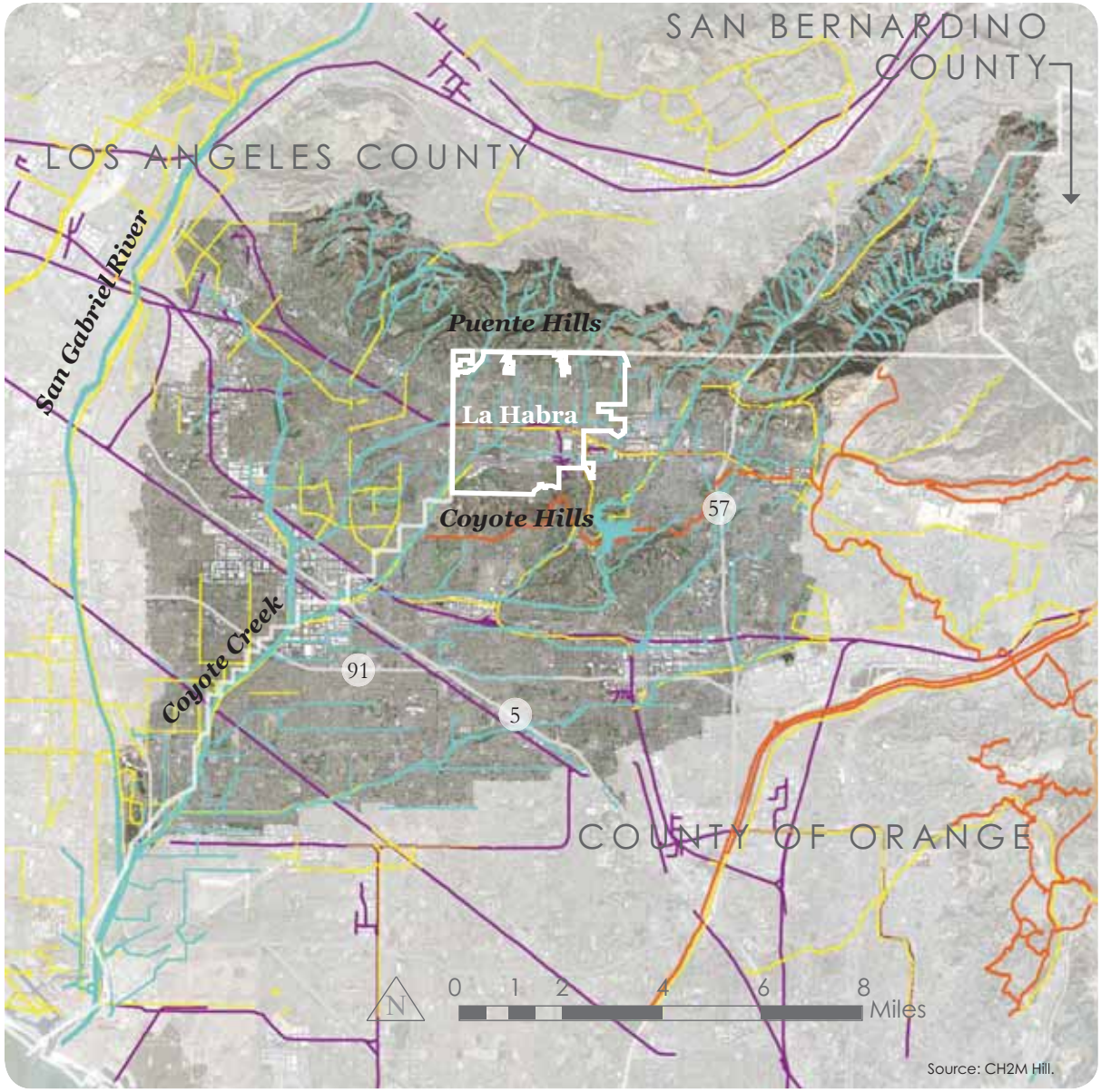
Streams can be redeveloped to restore water quality, connect habitat, and connect people to natural systems.

Major Streets

Streams



Streets and streams



Existing trails and railroad easements

Trails and Railroad Easements

Bicycle trails, hiking trails, and unused railroad corridors offer transportation and recreation opportunities throughout the watershed. In addition, those trails located away from major streets can double as wildlife corridors for animals insensitive to human presence.

- Hiking Trails
- Biking Trails
- Railroad Easements

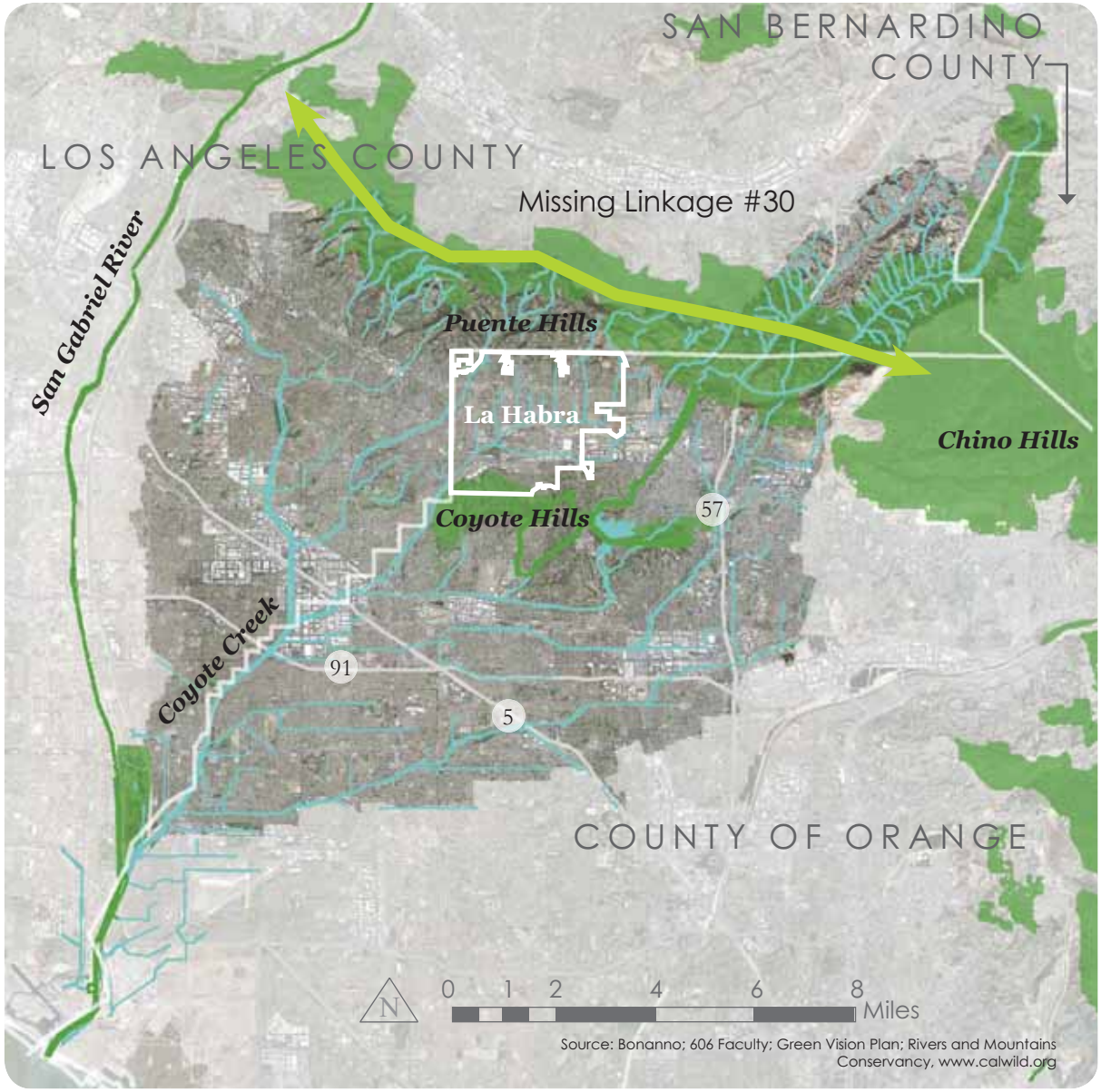
Wildlife Corridors

Existing corridors and a missing linkage are shown here, and are areas that need to be protected and restored for wildlife movement, focusing on the keystone species, the coyote (Martino 2001). The missing linkage is identified in the Rivers and Mountains Conservancy's *Common Ground* of 2001 as moderate to high priority as a possible landscape linkage for wildlife movement between the Chino and Puente Hills.

Coyote

Existing Wildlife Corridors

Missing Linkage



Existing wildlife corridors and a missing linkage

A green infrastructure network for the Coyote Creek Watershed

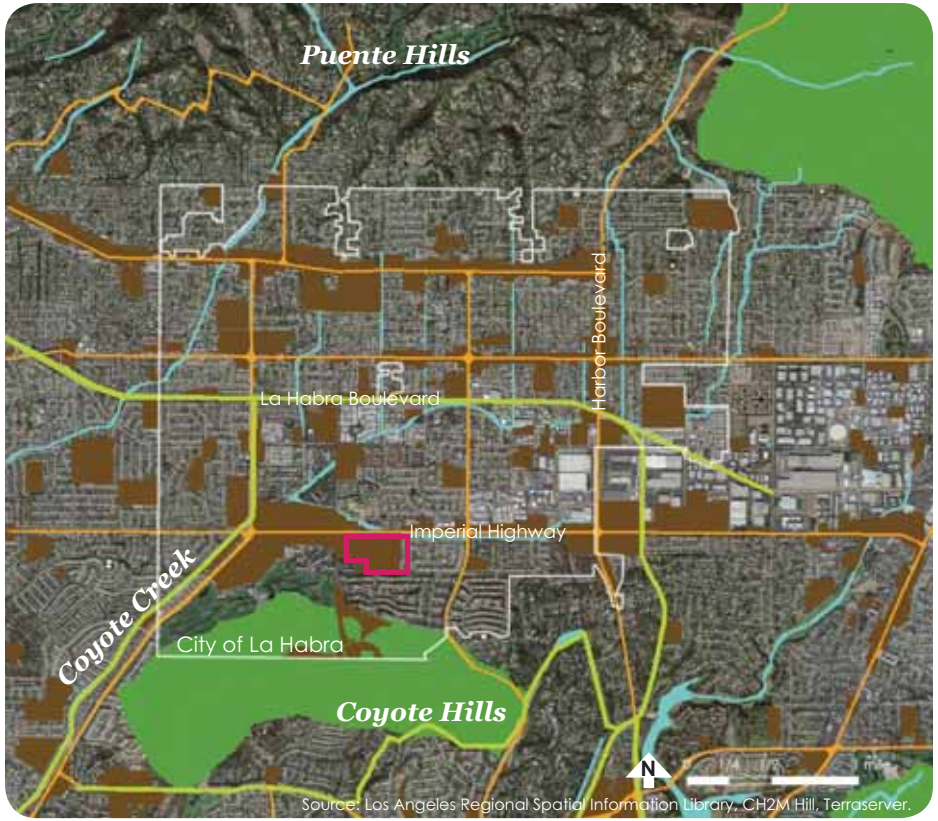
Plan a Green Infrastructure Network

In planning a green infrastructure network, corridors are used to allow movement and connection of people, habitat and/or wildlife, while increasing ecosystem health. Streets connect public places, and offer opportunities for tree canopy to provide habitat. Streams are opportunities to restore wildlife movement and habitat as well as human movement. Trails and rail corridors can move pedestrians and connect wildlife patches, while existing wildlife corridors are priorities to preserve and restore habitat.

- Public and quasi-public places: opportunities to raise awareness of natural systems
- Wildlife patches: areas to preserve and restore native wildlife habitat while allowing recreation if appropriate
- Major roads: priority areas to reduce runoff, treat stormwater and provide tree canopy for shade and habitat while connecting public and quasi-public places for pedestrian movement
- Trails: priority corridors to connect habitat for wildlife movement and connect public and quasi-public places for human movement
- Streams: priority areas to increase natural hydrological function, restore wildlife habitat and movement, and allow human recreation and movement

The Need for a Green Infrastructure Network

La Habra shares the characteristics of most Southern California cities. Single-purpose infrastructure systems bear the burden of moving energy, water, people, and vehicles, with no back-up in case of disrepair. Streets move vehicles well, at the expense of pedestrian comfort and environmental quality. Channels move water quickly, at the expense of water quality, wildlife habitat and human access to nature. In Southern California, cities have little space left in which to integrate natural systems. The sides of streets, easements, and public and quasi-public places can all be revised to support healthier ecosystems, economies, and people with a green infrastructure network.



A green infrastructure network for La Habra

- Demonstration site
- Public and quasi-public places: to raise awareness of natural systems
- Wildlife patches: to preserve and restore native wildlife habitat
- Trails: for wildlife and human movement
- Major roads: to reduce runoff, treat stormwater and provide tree canopy for shade and habitat while connecting public places for pedestrian movement
- Streams: to increase natural hydrological function, restore wildlife habitat and movement, and allow human movement

La Habra's Green Infrastructure Network

A planned green infrastructure integrates water quality, habitat, pedestrian access, and ecological health into redevelopment:

> Green Infrastructure is the Nation's natural life support system — a strategically planned and managed network of wilderness, parks, greenways, conservation easements, and working lands with conservation value that supports native species, maintains natural ecological processes, sustains air and water resources, and contributes to the health and quality of life for America's communities and people (Green Infrastructure 2005).

On an urban scale, green infrastructure embeds natural systems into city processes, connecting open space and park land with streams, swales and lines of tree canopy.

La Habra's public and quasi-public places make up over 10% of its land area, providing not only high visibility for raising public awareness of natural systems, but also a significant area to reduce runoff, clean water, and shade surfaces. Adding tree-planted swales to the over 21 miles of major roads in La Habra, will greatly improve runoff quality, cool the area, and connect habitat.

Integrating Site Design into a Green Infrastructure Network

This demonstration site illustrates the potential for redevelopment projects to tie into a local green infrastructure network. By sharing public and private responsibility for building natural systems into urban form, cities have a greater chance to create healthy ecological, economic, and social connections within the community.

As development pressures increase due to a steadily growing population in Southern California, it will become imperative to find creative ways to integrate the benefits of natural systems into urban environments.

In a city as built-out as La Habra, the expansive private sphere inhibits the development of a community ethic and mobility options for all ages. To foster community interaction, commerce, health, and transit use, the city should encourage spaces that serve the public as well as private owners. The owners can also benefit from the positive "externalities" that their properties offer to the community.

Existing La Habra Policies:

- Separate public and private uses by default, according to ownership.
- Require walls between properties in many situations.

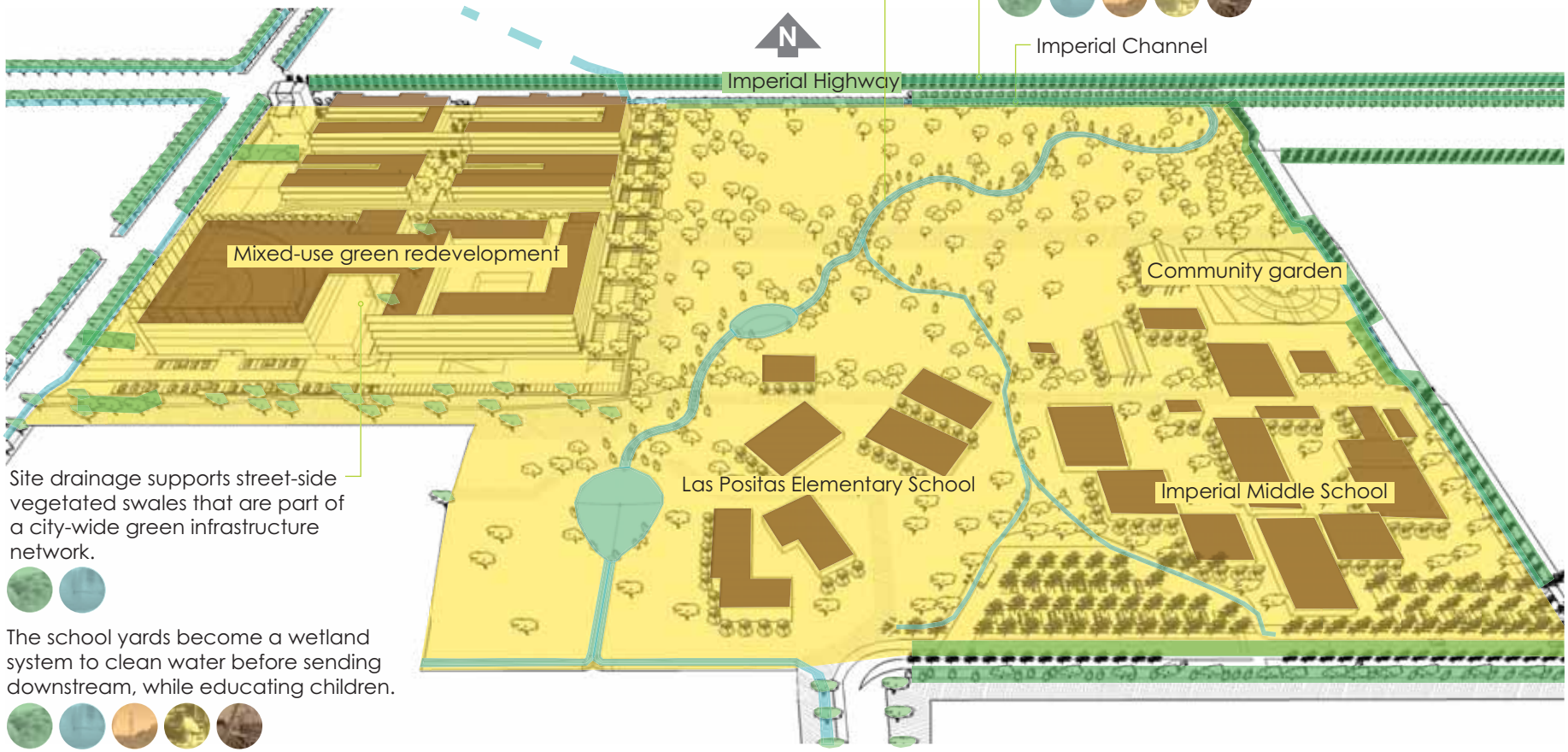
Policy Recommendations:

- Relax wall requirements to allow habitat connectivity, pedestrian paths, and more expansive views.
- Create recreational easements to channels and bikeways, and create pedestrian trails.
- Provide incentives to developers, in return for the creation of conservation and recreational easements.
- Allow shared parking agreements among separate parcels. (For precedent, see the City of San Diego's "Shared Parking Agreement" 2006).
- Allow properties to share/trade other uses, such as recreational space.

This public and quasi-public place provides housing, work, and daily needs, and optimizes its relationship with the community by providing access to pedestrians and mass transit.

Native plants and wetlands become a destination habitat for birds, such as raptors, burrowing owls, egrets, and herons; and a woodland cleans air and water, cools the area, and treats water.

Tree-planted swales capture first flush, provide habitat connectivity with canopy, shade streets, and separate pedestrians from traffic for easier access.



Site drainage supports street-side vegetated swales that are part of a city-wide green infrastructure network.

The school yards become a wetland system to clean water before sending downstream, while educating children.

Site connections to green infrastructure

3. Use Nature as a Guide

The principle of Use Nature as a Guide optimizes urban form through the use of natural systems to reduce resource use, to provide clean water and air and healthy habitats, and to plan high-quality, flexible urban spaces that change over time. Each sub-principle is illustrated on the demonstration site.

Sub-Principles will Use Nature as a Guide to:

- Clean Air and Water
- Maximize Resource Efficiency
- Enhance the Quality of Space for People
- Create Flexible Space
- Provide Redundant, Distributed Systems

Design *to Clean Air and Water*

La Habra, like most Southern California cities, has vast expanses of paved surfaces and exposed rooftops. These surfaces collect dirt and dust from vehicles, which are swept into the air with traffic and wind *(See Appendix B, p. 149)*.

High impermeability and the great expanse of surfaces for automobiles degrade air quality, pollute runoff, decrease opportunities for biological treatment of runoff. The amount of retail parking is usually designed for the busiest shopping times of the year. A project that includes so many different uses, which each have different parking peak times, should not require a cumulative total of those spaces. The mixed-use parcel could agree to share spaces with the school, so that the school would not have to pave over more land for lots. If transit, pedestrian, and bicycle accessibility are strong enough, it will decrease parking demand.

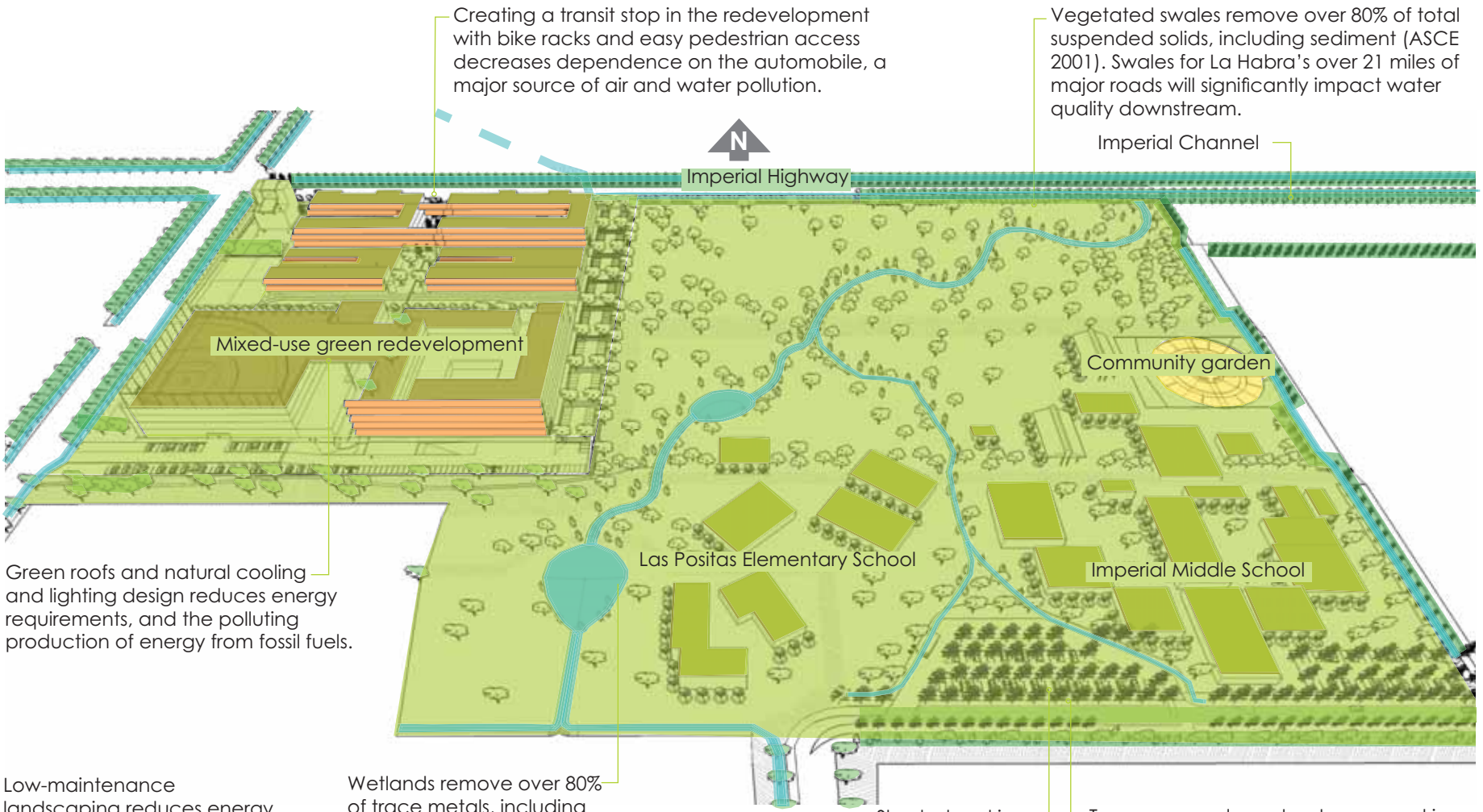
The redevelopment is designed to capture and treat stormwater runoff for a 50-year storm event. This ensures the treatment of the "first flush" of stormwater runoff — the runoff from the first inch of rainfall, which has the highest concentration of contaminants. Because urban runoff contributes the majority of Coyote Creek's contaminants *(See Appendix A, p. 135)*, managing this first flush from streets, parking lots, and landscapes will greatly improve Coyote Creek water quality.

Existing La Habra Policies:

- Require that most retail and commercial uses have one parking space for 250 square feet of floor space. Restaurants and other places require even more.
- Require parking spaces to be at least 9'x20'.
- Require parking surface to be asphalt compacted to a two-inch minimum thickness.

Policy Recommendations:

- Set maximum impermeability percentage for land area outside of building footprint.
- Set maximum number of parking spaces and maximum average size of spaces.
- Require permeable paving for overflow parking.
- Allow use of structural soils as parking substrate.



Landscape elements work to clean air and water

Clean and Hold Stormwater

Two schools make up the eastern portion of the demonstration site. The elementary school, named Las Positas, or "little swamp lands," drains into a ballfield where egrets and herons have congregated during wet seasons.

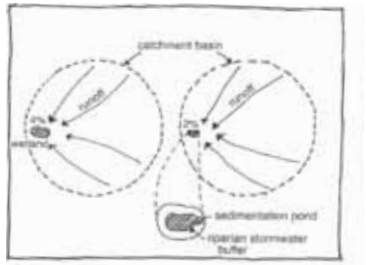
This demonstration site sits over a relatively high groundwater table, and will require extensive soil and water analysis to determine if recharge should occur. Treatment wetlands can be designed with or without groundwater recharge capability, and will slow runoff and remediate sediment and contamination, in either scenario *(see Appendix A, p. 144)*.

Some plants have excellent capabilities of absorbing contaminants from runoff and groundwater, which they store in tissue, convert to vapor, or metabolize.

Coyote Creek is contaminated by the metals copper, lead, zinc and selenium from automobiles, and coliform resulting from fertilizers on landscapes. Cleaning runoff from streets and landscapes before it reaches the stream, reduces the need for end-of-the-pipe solutions.

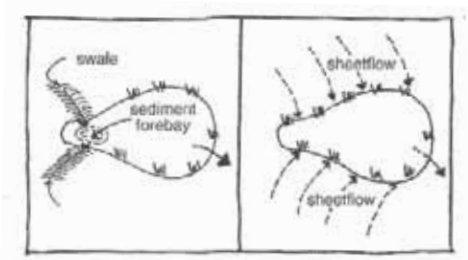
FOR FURTHER REFERENCE:

- France, Robert L. 2003. *Wetland Design: Principles and Practices for Landscape Architects and Land-Use Planners*. New York: W. W. Norton.
- Ornduff, Robert, Phyllis M. Faber, and Todd Keeler-Wolf. 2003. *Introduction to California Plant Life*. Berkeley: University of California Press.



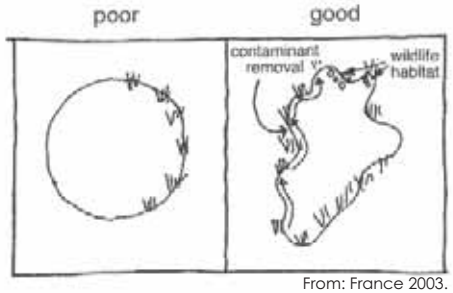
From: France 2003.

The recommended size of constructed wetlands is 2-4% of the drainage area



From: France 2003.

The sediment pond can collect water from swales or sheetflow



From: France 2003.

Curvy edges create more surface area for plants to clean water

A sample of phytoremediating plants

Plant	Contaminant
Bladder campion	Zinc, Copper
Brassica family (Indian Mustard, Broccoli)	Selenium, Sulfur, Lead, Cadmium, Chromium, Nickel, Zinc, Copper, Cesium, Strontium
Tomato plant	Lead, Zinc, Copper
Populus genus (Poplar, cottonwood)	Pesticides, Atrazine, Trichloroethylene (TCE), Carbon tetrachloride, Nitrates from fertilizers
Pennycress	Zinc, Cadmium

Source: Belz 1996.

A sample of riparian plants

Location	Plant
Stream bed	Cottonwoods, Mule Fat, Willows, Bull Rush, Cattails
Mid bank	California Sycamore, California Black Walnut, Toyon
Upper bank	Coast Live Oak, Toyon, California Rose, Black Sage, Sugar Bush, Monkey Flower

Sources: DePuydt 1996; Peterson 1966; Raven 1966.

Sediment pond removes suspended particles of rock and soil.

Wetland areas of varying depths allow diverse plantings to remove different contaminants.

Oaks and sycamores inhabit higher areas, with cottonwoods, willows, and mulefat along the streambed.

The wetlands remove sediment, metals, and bacteria — all major contaminants of Coyote Creek.

Viewpoint shown

A community garden uses graywater from the schools.

Curvy wetland edges maximize the area for plants to clean water. The wetlands are sized at 2% of the area draining into them.

In dry weather, seeps, irrigation runoff and greywater feed wetlands and stream. In wet weather, the grass meadow fills up (shown in light blue) around hills topped with oaks.

Constructed wetlands clean water, educate children, and raise awareness of natural systems

Integrate Stormwater Management and Water Efficiency

Rainfall becomes stormwater, running off of the parking lot, rooftops, streets, and school grounds, collecting pollutants without filtration, and flowing into the stormwater sewer. The runoff from the first inch of rainfall, called the first flush, contains the most contaminants *(See Appendix A, p. 135)*. During a 50-year storm, the commercial site presently sends 140,000 cubic feet of untreated runoff downstream. In a 100-year storm, Coyote Creek contributes to flooding in Long Beach. Impervious surfaces decrease the amount of rainfall allowed to infiltrate into the groundwater aquifer. Runoff from over-irrigation and rainfall that infiltrates the surface permeates into the groundwater, contaminating it with pollutants high in nitrates from fertilizers.

When groundwater recharge cannot occur, plants and filters can clean water on site before sending it downstream. This plan captures and treats runoff for up to a 50-year storm event, sending only clean water downstream.

Existing La Habra Policies:

- Require a solid concrete curb to separate parking from landscaping.
- Require qualifying projects to implement a Water Quality Management Plan (WQMP).
- Provide a list of drought-tolerant plants upon request.
- Require grass berms in setback.

Rainfall Capture Volume

Park roof	95%
Garden roof	95%
Swales	85%
Tree canopy	36%
Habitat roof	33%
Solar roof	33%
Permeable paving	33%
Parking gravel	29%
Deck roof	0%

Source: Dines, 2001.

Policy Recommendations:

- Remove requirement for unbroken curbs by planting areas.
- Modify grading and drainage policies that direct and speed runoff to street gutters, and policies that require connection of roof drain pipes to the Municipal Separate Stormwater System.
- Assess taxes for usage of the stormwater system. Create stormwater tax credits for the decrease of runoff discharge to the MS4.
- Require Treatment Control BMPs on all sites.
- Reverse ordinance requiring berms, to require vegetated swales instead.
- Set maximum impermeability percentage for land area outside of building footprint.
- Require pervious paving for overflow parking.
- Allow use of structural soils as parking substrate.
- Require a minimum 2-year plant establishment and monitoring period.
- Adopt the Model Water Efficient Landscape Ordinance created by California Assembly Bill 325, or a modified version of it.
- Promote native plants.

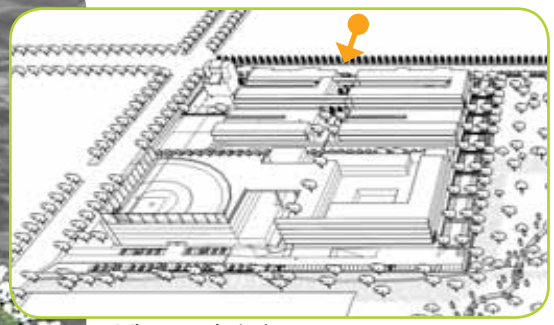
FOR FURTHER REFERENCE:

- Ferguson, Bruce K. 2005. *Porous Pavements*. Boca Raton, Florida: Taylor & Francis.
- Mays, Larry W. 2001. *Stormwater Collection Systems Design Handbook*. New York: McGraw Hill.

Strips of sedums and succulents filter and bioremediate airborne particulates from solar panel runoff. Runoff is captured in cisterns for re-use.

Roof runoff is filtered through three feet of soil, buffalo grass, trees, and collected for re-use in a cistern.

Permeable pavers and subsurface soil filter runoff — 95% of total suspended solids, 70% of total phosphorous, 51% of nitrogen, and 99% of heavy metals are removed (Winer, 2000).

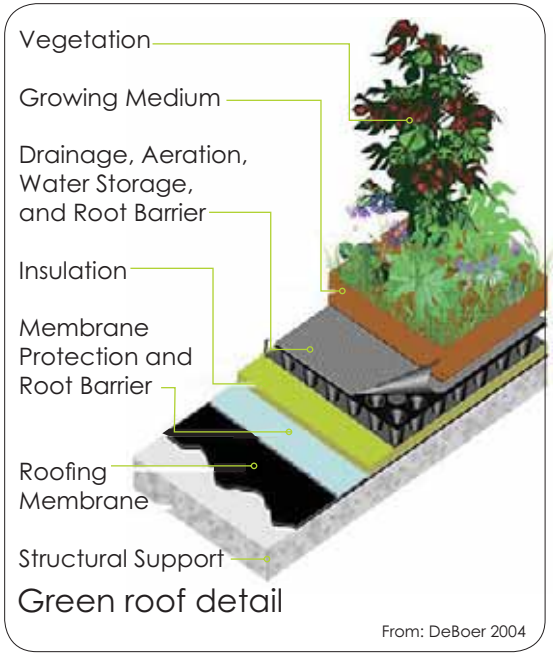


Viewpoint shown

Gravel beds direct the first flush of runoff from parking modules, where native grasses, sunflowers, and trees phytoremediate metals and oil.

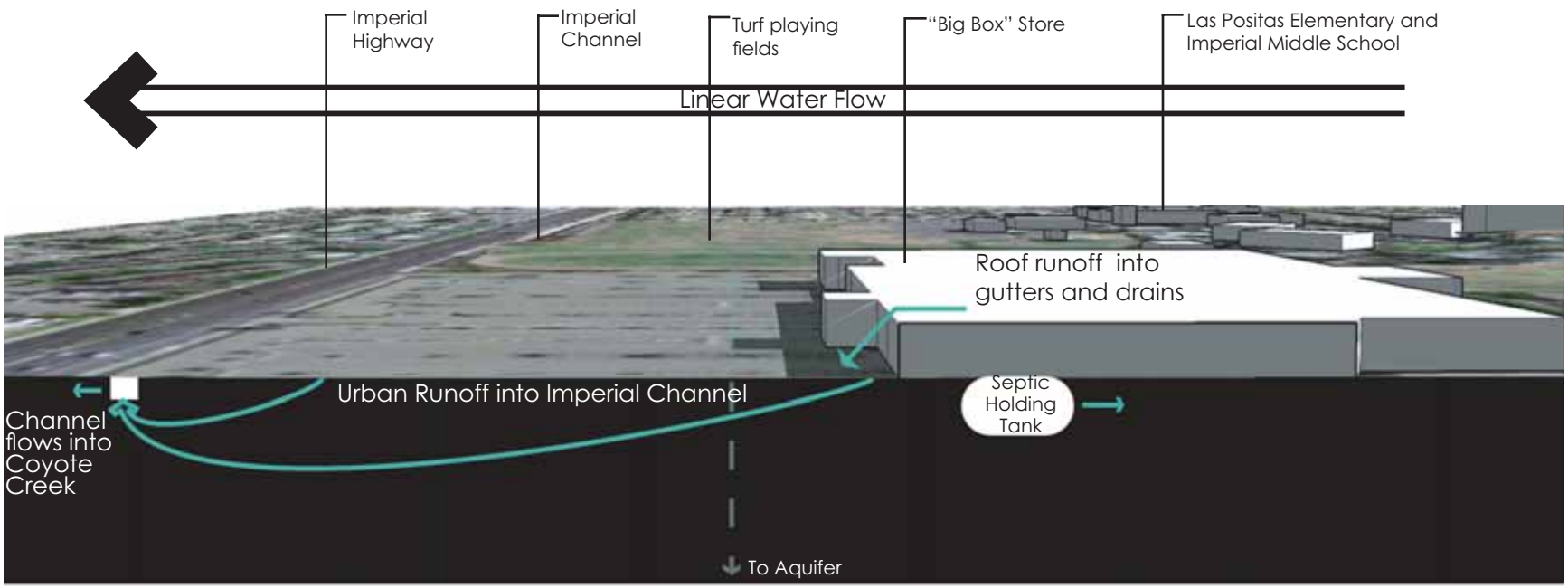
Native grasses, sunflowers, and cottonwoods slow runoff and filter pollutants. Vegetation catches 50-90% of total suspended solids and phytoremediates oil, grease, and heavy metals from streets.

Integrating stormwater management into built form



Green roof detail

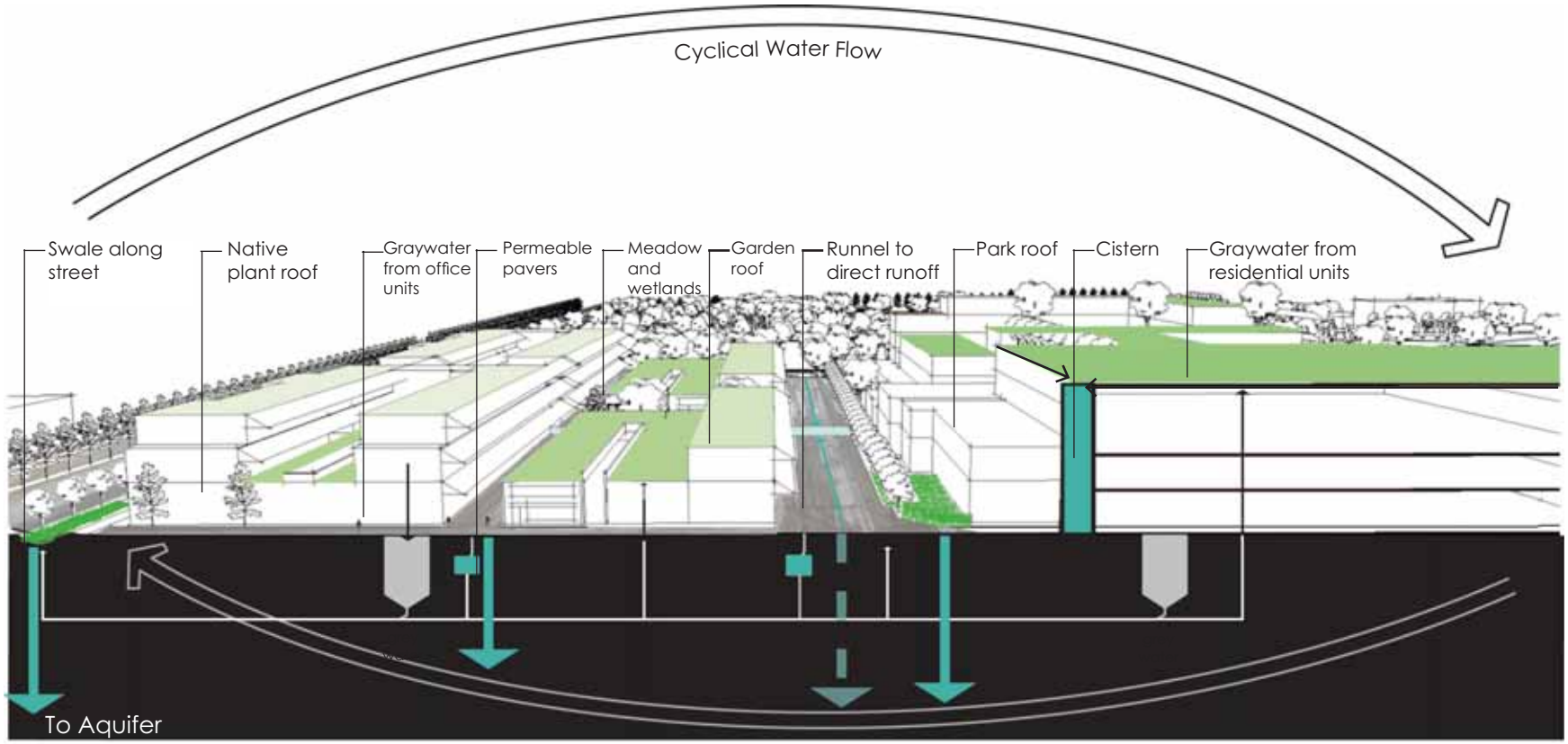
From: DeBoer 2004



Existing water flow — treating stormwater and graywater as waste

The existing water flow diagram describes the current relationship of urban stormwater runoff to the built environment *(See Appendix A, p. 132)*. Parking lots, rooftops, and playing fields pollute and waste water at commercial sites and schools throughout the Coyote Creek Watershed. Fifteen percent of rain that falls on the playing fields during a 50-year storm runs off, while almost all rainfall runs off the commercial site. Graywater is not utilized, but sent downstream for treatment and artificial recharge into the groundwater aquifer.

Water from imported sources is a tenuous resource, and is likely to increase in cost. Capturing rainfall and runoff takes advantage of an available, free source of water. The commercial site requires 245,725 cubic feet per year (or 7.3 cf per year/ square foot) of water for irrigation. The turf playing fields at the school use 1,080,000 cubic feet of water to irrigate per year. Presently 139,400 cubic feet of runoff during a 50-year storm from the parking lot and rooftop is sent directly down drains, uncollected for use. With water efficient design systems in place, runoff is reduced by 96%.



Proposed water flow — treating stormwater and graywater as assets

Captured water:

Total graywater available:	1,171,042 cf
Total stormwater captured by cisterns during an average rainfall year:	8,900,000 cf
Total irrigation needed:	220,000 cf

Excess captured water supplements the wetlands.

The proposed water flow diagram describes the relationship between new surfaces, trees and other vegetation, and the built environment for maximization of efficient use and re-use of water resources, and improved quality of runoff and groundwater recharge waters. During a storm, water will fall on permeable surfaces and runoff into runnels or above ground cisterns. Water in the runnels is sent to underground cisterns that act as water features. Collected water is stored for irrigation needs in times of drought or the school wetlands. Irrigation needed for the park roof and establishment of trees and other vegetation will be provided by greywater from offices and residential units. One hundred residential units provide 1,171,042 cubic feet of graywater per year, piped directly to the rooftop park and gardens.

Design *to Maximize Resource Efficiency*

Water is not the only limited resource in the watershed. Current development patterns require automobile transportation, and massive infrastructure investments for single-purpose systems. Stormwater channels, streets, and utilities each take up valuable land, leaving less for natural landscapes, habitat, and recreation. This results in high costs for extensive materials, loss of undeveloped land, degraded habitat, and added healthcare for people affected by asthma, heart disease, and lack of exercise.

With the growing shortage of buildable land in Southern California, building efficiently is more critical than ever. The demonstration site uses soil excavated from the mixed-use development to build mounds and berms in the schoolyard to direct water. Designing for pedestrian comfort and mass transit motivates people to leave their cars at home, saving energy. Water collected from rooftops, walkways and graywater systems replenish landscapes during times of drought.

Wise site planning contributes to reductions in use of fossil fuels and electricity produced from them. Design decisions throughout the site and in the site's relationship to its surrounding environs should reduce the energy consumption such uses would normally induce. Walkability, better air quality, reduced runoff contamination, lower life cycle costs, and reduced demand for oil result.

Existing La Habra Policies:

- Require that mechanical equipment, including photovoltaic panels, are screened from view.
- Support big box retail because of sales tax revenues brought in. Development patterns are resource-intensive, access is designed for cars, and the products travel long distances.

Policy Recommendations:

- Rather than requiring hidden utilities, recommend designing mechanical features to be an asset to building aesthetics.
- Require operable windows for localized indoor climate control.
- Recommend and support building layout to that takes advantage of cross-ventilation and passive solar heating.
- Require businesses to accommodate bicycles in site planning.
- Prohibit idling of parked cars next to pedestrian areas and building windows, through signs, and enforcement.
- Promote use of "cool towers," which cool air below through evapotranspiration — perfect for La Habra's climate (Wu 2006).
- Building codes should support or encourage the use of materials that are local, recycled or recyclable, or having low embodied energy.
- Promote a "parking cash-out" program, where employers pay employees who forego a parking space, to reduce their parking requirement.
- Adopt ordinance similar to that in the Municipal Code of Davis, California: "50% of the paved parking lot surface shall be shaded with tree canopies within 15 years of acquisition of building permit." Require parking lot shading plan.
- Allow variability in the size of parking stalls, to maximize efficient use of the surface area, and promote smaller cars.

FOR FURTHER REFERENCE:

- Lyle, John T. 1994. *Regenerative Design for Sustainable Development*. New York: John Wiley & Sons.
- Odum, Howard. 1996. *Ecology: A Bridge Between Science and Society*. Sunderland, Massachusetts: Sinauer Associates.

Photovoltaic (PV) panels harness sunlight and convert it to energy. South-facing PV awnings over windows allow indirect light and block heat.

Green roofs and walls, awnings on the south side of buildings, and trees shading south and west walls reduce energy needed for cooling costs.

Viewpoint shown

Breezeways and building layout allow air circulation and cross-ventilation to keep interiors comfortable.

Cool towers use stored rain water to cool buildings.

Energy efficiency in the redeveloped site

Enhance the Quality of Space for People

Urban and suburban Southern California is a landscape developed around the automobile, and many of its spaces reflect this priority. Wide streets are lined with narrow sidewalks, massive parking lots separate pedestrians from buildings, and the people in them. Windowless, tilt-up concrete industrial and commercial businesses hold no connection to the greater community.

Now nearly blind to the onward marching of utility poles, chain link fences, barren streets and parking lots, the public needs and deserves quality public and quasi-places in which to do business, congregate, and relax.

High quality spaces are welcoming, healthy, comfortable and beautiful. This redevelopment welcomes people with entry ways on every side into human-scaled streets and plazas that offer sun and shade for human comfort. Green design elements, such as shaded streets, energy- and water-efficient buildings, and natural water treatment provide clean air and water for human and environmental health.

Photo by Greg Barger

FOR FURTHER REFERENCE:

- Carmona et al. 2003. *Public Places Urban Spaces: The Dimensions of Urban Design*. Oxford: Architectural Press.
- Jacobs, Jane. 1992. *The Death and Life of Great American Cities*. New York: Vintage.
- Kaplan, Rachel; Stephen Kaplan and Robert L. Ryan. 1998. *With People in Mind: Design and Management for Everyday Nature*. Washington, D.C.: Island Press.

Existing La Habra Policies:

- Require a front setback of 15 feet, allowing only softscape landscaping in that area.
- Require that street frontage, must have one tree for every 20 feet, and an additional tree for every ten parking spaces.
- Require that buildings with heights exceeding 25 feet in a commercial zone increase the setback 20 feet.
- Assume that sidewalks will be adjacent to street.

Policy Recommendations:

- Implement recreational easements for the displacement of sidewalks, in exchange for the city maintaining Treatment Control BMPs in the right-of-way.
- Create maintenance agreements to designate responsibility of such paths or to share it between city and owners.
- Decrease setback requirements to allow proven forms of urban design.
- Allow city-approved variances from the formulaic tree requirements.

Trees provide shade and keep the area cool. Views of trees help reduce stress for employees and visitors of the development.

Diverse building forms create visual interest, rhythm and variety.

Windows add transparency to buildings, providing "eyes on the street" and increasing safety.

Human-scaled plazas have a feeling of enclosure, through the relationship of building height and distance.

A stormwater runnel catches runoff and recirculates water to provide soothing sound, visual interest, and a cool play area.

Viewpoint shown

High-quality outdoor spaces for people

Design *to Create Flexible Space*

Buildings and their surrounding landscapes often change ownership, use, or need. Whether these changes occur daily, seasonally, or yearly, flexibility of use is critical to meet the needs of a community. Too often, energy and resources go into creating single-purpose buildings and infrastructure with no further benefit beyond their original intent.

Ideally, redevelopment maximizes the potential for re-use, in as many variations as possible. Parking structures can be built that easily convert to office buildings in the future. Building rooftops can accommodate recreation, allowing parks and school grounds to provide natural function and interaction with nature. Commercial or office buildings can use moveable walls to accommodate different types and sizes of businesses over the years. The plaza shown at right demonstrates a flexible use of space, changing from farmer's market, to movie theater, to overflow parking during holiday season.

Photo by Greg Barger

In landscapes, particularly ones where there are many authors, the key is to establish a framework that provides overall structure — a structure not arbitrary but congruent with the deep context of a place, to define a vocabulary of forms that expresses the natural and cultural processes of the place, and then to encourage a symphony of responses to the conditions of the place and the needs of the specific people there. The result should be a dynamic fabric, complex and coherent, that will evolve to meet changing needs and desires, connecting past and present (Spirn 2000).

Existing La Habra Policies:

- Separate public and private uses by default, according to ownership.

Policy Recommendations:

- Allow shared parking agreements among separate parcels.
- Allow properties to share/trade other uses, such as recreational space, via contractual agreements.
- Support design that plans for eventual adaptation to other uses and configurations.

FOR FURTHER REFERENCE:

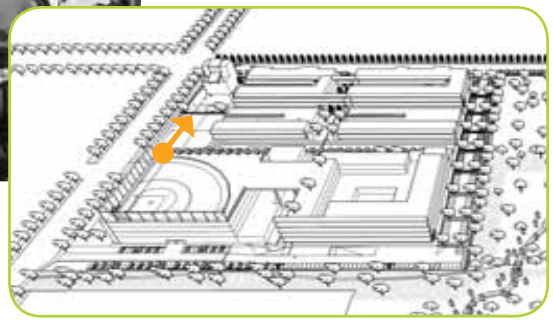
- Spirn, Anne Whiston. 2000. *The Language of Landscape*. New Haven: Yale University Press.
- Thompson, George F. and Frederick R. Steiner, Eds. 1997. *Ecological Planning and Design*. New York: John Wiley & Sons, Inc.

On a main intersection, this space has high visibility for shoppers, office workers, cafe patrons, and passing cars can draw them in with ever-changing events.

This plaza can host events such as a farmer's market, an Eco-Fair, or a school festival. At other times, it is open seating for movies projected on the curtain seen here, or space where office workers can lunch.

Trees and rolling planters can divide the space in many ways, and block vehicles from endangering pedestrians.

When the need for additional parking is anticipated, such as during holiday shopping season, this plaza can be opened to vehicles as overflow parking.



Viewpoint shown

Flexible space for a variety of uses

Design *to Provide Redundant, Distributed Systems*

While current development and infrastructure are highly useful at performing one function, their single-purpose intent makes them inefficient land uses and vulnerable to failure.

The demonstration site integrates natural processes in overlapping, redundant systems and places. These multifunctional elements, such as tree canopies, natural stormwater treatments, and high-quality spaces, provide redundancy for maximum effectiveness and stability for function and maintenance requirements.

Photo by Greg Barger

FOR FURTHER REFERENCE:

- Lyle, John T. 1999. *Design for Human Ecosystems: Landscape, Land Use and Natural Resources.* Washington, D.C.: Island Press.
- McHarg, Ian L. 1992. *Design with Nature*. New York: John Wiley & Sons, Inc.
- Spirn, Anne. 2000. *The Language of Landscape*. New Haven: Yale University Press.

Public spaces are designed for pedestrian comfort and transit accessibility, flexibility over time, and to distribute redundant systems for maximum resource efficiency and stability.

Native plants and wetlands become a destination habitat for birds, such as raptors, burrowing owls, egrets, and herons; and a woodland cleans air and water, cools the area, and treats water.

Tree-planted swales capture first flush, provide habitat connectivity with canopy, shade streets, and separate pedestrians from traffic for easier access.

Wetlands and a woodland provide wildlife habitat while cleaning air and water.

Commercial site raises awareness, mixed-use redevelopment optimizes solar and wind patterns, re-uses runoff on site, and changes over time.

The school yards become a wetland system to clean water before sending downstream, while educating children.

Redundant systems provide both flexibility and stability to urban form

4. All Fronts, No Backs

The principle of All Fronts, No Backs maximizes all usable space, prioritizes pedestrian access and shared transportation, and makes natural processes visible to the public to raise awareness and access to nature.

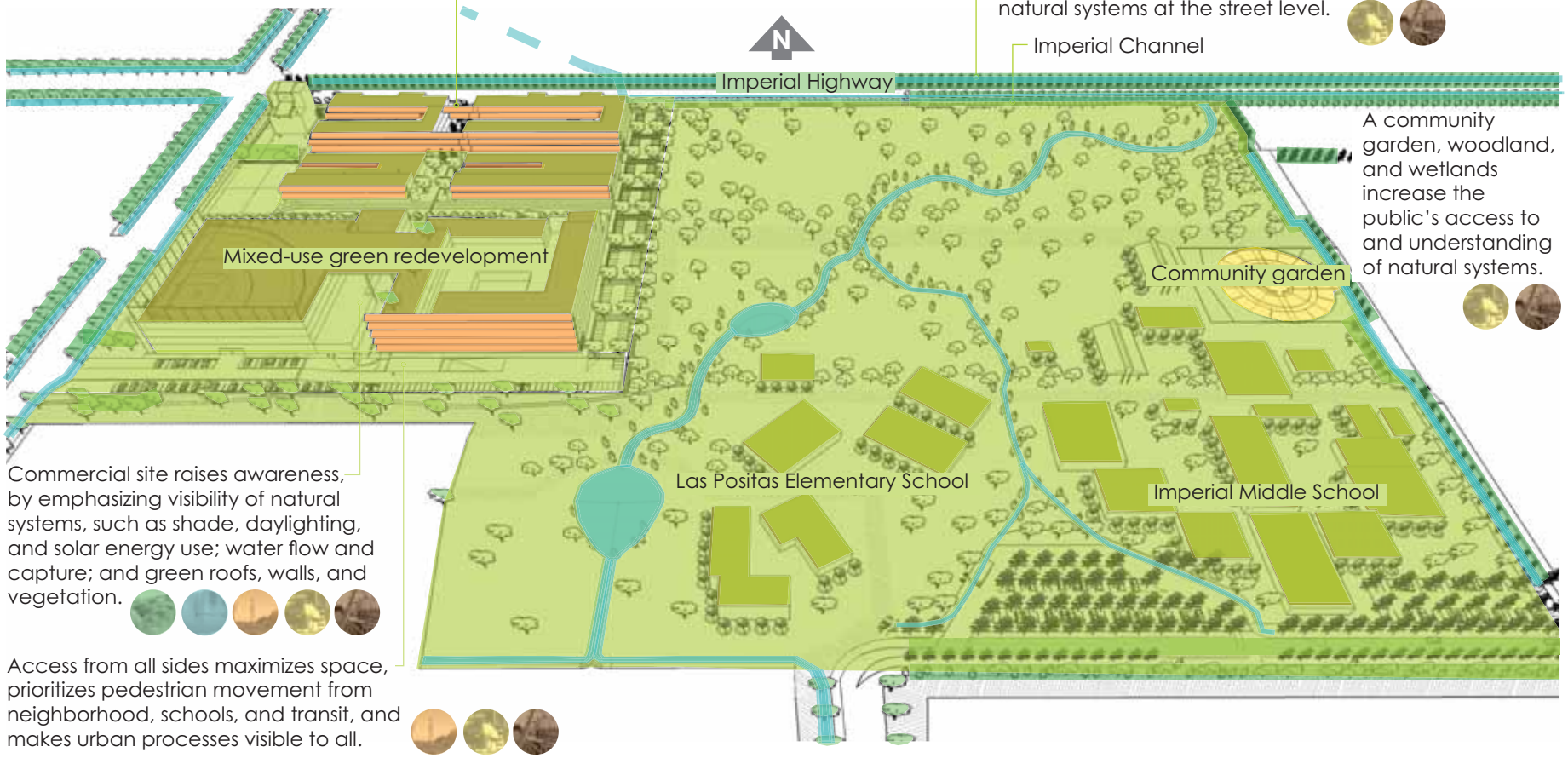
Sub-Principles

- Maximize All Space
- Put Pedestrians First
- Prioritize Mass Transportation
- Make Processes Visible

Development includes a transit stop at one entrance, connects to a biking and walking trail, and brings buildings to the street to increase visual interest and create a human scale.

Native plants and wetlands become a destination habitat for birds, such as raptors, burrowing owls, egrets, and herons; and a woodland cleans air and water, cools the area, and treats water, all where children and citizens have easy access.

Tree-planted swales between sidewalk and street separate people from traffic and provide visibility of natural systems at the street level.



A community garden, woodland, and wetlands increase the public's access to and understanding of natural systems.

Commercial site raises awareness, by emphasizing visibility of natural systems, such as shade, daylighting, and solar energy use; water flow and capture; and green roofs, walls, and vegetation.

Access from all sides maximizes space, prioritizes pedestrian movement from neighborhood, schools, and transit, and makes urban processes visible to all.

Case study site maximizes opportunities that are conventionally underutilized

Maximize All Space

Urban and suburban areas are filled with back spaces used for one purpose, such as loading, trash collection, utility easements, or stormwater channels. These back-door uses take up space that could be otherwise integrated into community uses. Maximize All Space means using urban land in the most efficient way possible — either through shared uses across time, combining previously distinct uses, and/or sharing and trading responsibilities across public and private entities.

Existing La Habra Policies:

- Allow a maximum of four stories and 50 feet in a commercial zone. Building heights exceeding 25 feet require a setback increased to 20 feet.
- Prohibit additional roof structures from exceeding overall height limits.
- Require a front yard of 15’, and a rear yard of 20’.

Building height restrictions may decrease the feasibility of rooftop green features, such as tall vegetation, rainwater cisterns, PV panels, and housing for rooftop access means, requiring a choice between those and an interior story.

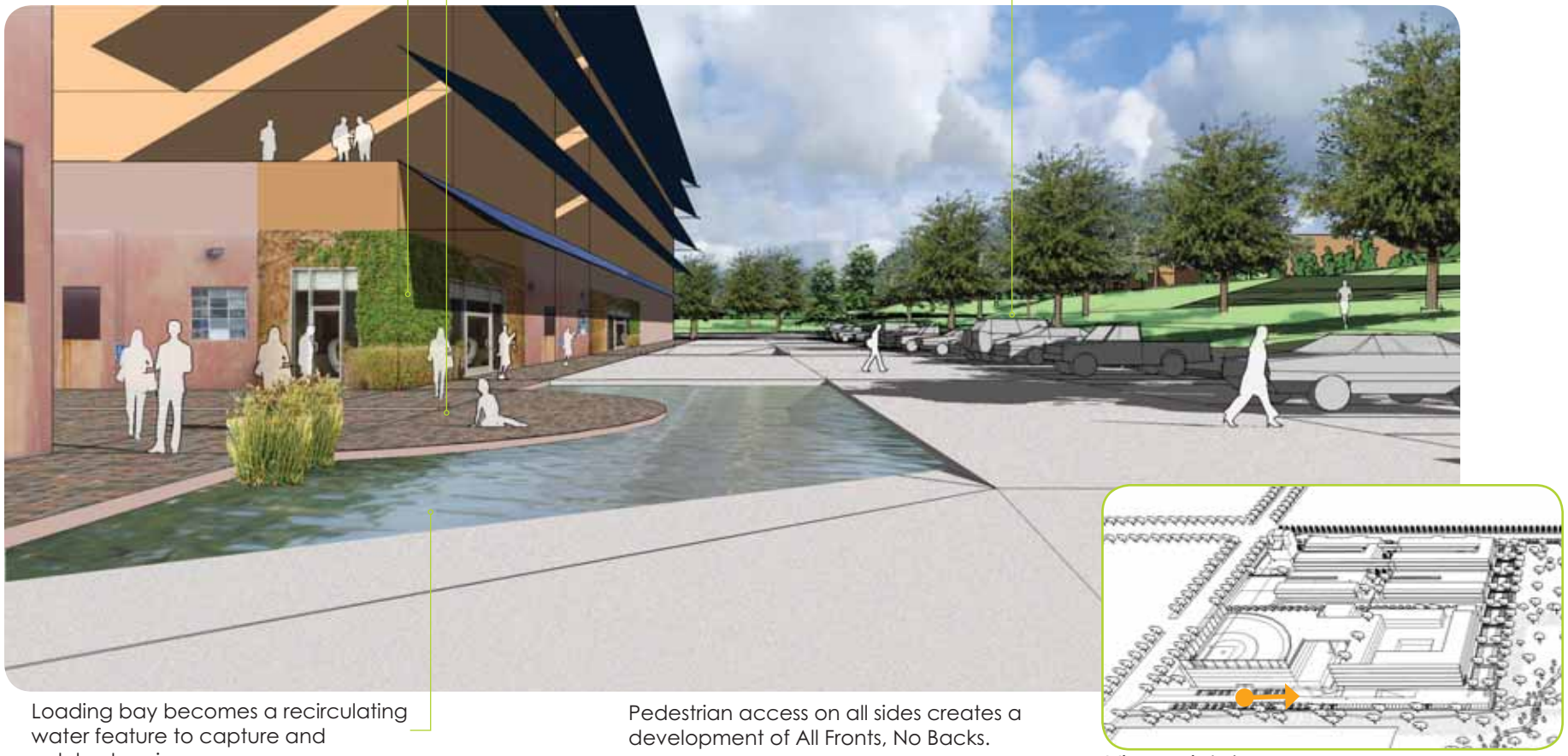
Policy Recommendations:

- Give developers park credits or density bonuses for green roofs.
- Exclude rooftop vegetation and water storage systems from overall height limits.
- Do not treat the back areas differently from other edges.

Shop frontage on all sides create no blank walls, or dead spaces.

Former back loading area transforms into a front entry for the school and adjacent neighborhood.

Wall is removed to open the site to neighbors, and the easement becomes a park-like surround.



Loading bay becomes a recirculating water feature to capture and celebrate rain.

Pedestrian access on all sides creates a development of All Fronts, No Backs.

Viewpoint shown

Backs become fronts for access, visibility, and awareness

Put Pedestrians First

Bringing storefronts right to the sidewalk creates walkability and a pedestrian scale. Variation in landscaping across properties creates interest and spurs the pedestrian to continue onwards and to explore. The city already advocates curvy sidewalks that weave in and out of the right-of-way, onto private property (Grabowski 2006).

Wide landscaped areas with trees and grasses act as a barrier to the street, help slow traffic, collect and treat runoff, and shade the street to reduce ambient heat for maximum pedestrian comfort.

FOR FURTHER REFERENCE:

- Calthorpe, Peter. 1993. *The Next American Metropolis: Ecology, Community, and the American Dream.* New York: Princeton Architectural Press.
- Carmona, Matthew et. al. 2003. *Public Places Urban Spaces: The Dimensions of Urban Design.* Oxford: Architectural Press.
- City of Seattle. 2006. *Right-of-Way Improvements Manual.*
- Jacobs, Jane. 1992. *The Death and Life of Great American Cities.* New York: Vintage.

Existing La Habra Policies:

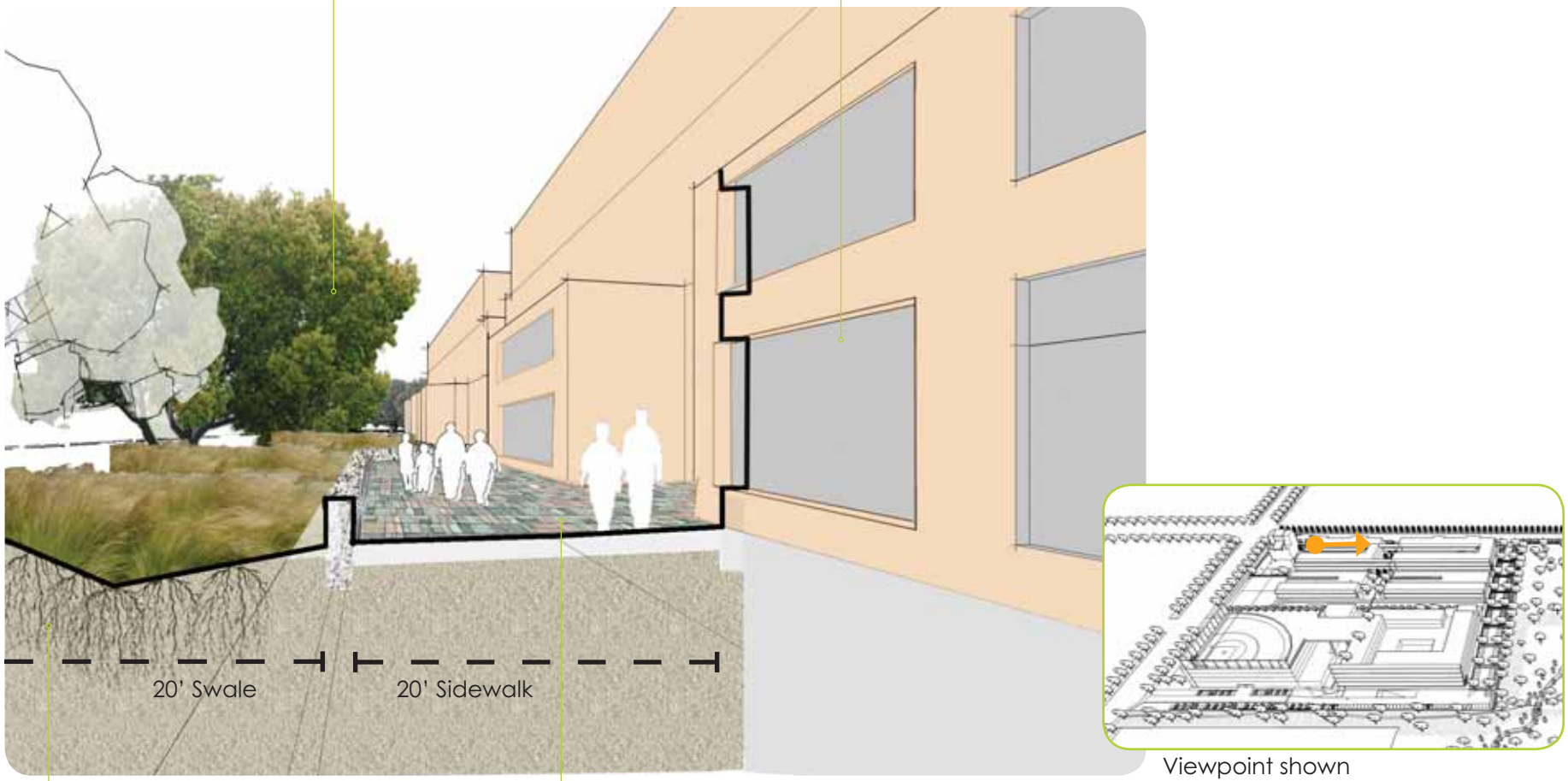
- Require the front setback to be 15 feet, allowing only softscape landscaping in that area.
- Require that street frontage must have one tree for every 20 feet, and an additional tree for every ten parking spaces.
- Require that buildings with heights exceeding 25 feet in a commercial zone increase the setback 20 feet.
- Require trees in setback to be 75% Evergreen and 25% Deciduous.
- Assume that sidewalks will be adjacent to street.

Policy Recommendations:

- Implement recreational easements for the passage of public sidewalks through private properties.
- Create maintenance agreements to designate responsibility of such paths or share it between city and owners.
- Decrease setback requirements to allow proven forms of urban design.
- Allow deciduous or non-deciduous trees to be used where appropriate to the design solution.
- Allow city-approved variances from formulaic tree requirements.
- Require sidewalks to be 12' to 20' wide (City of Seattle 2006).

A broad tree canopy on the south and west street sides shades streets, provides habitat connectivity for wildlife, and separates pedestrians from traffic.

Large windows on the building's north side optimize daylighting and ventilation, while providing transparency for visual interest and eyes on the street.



Viewpoint shown

Plants slow water, roots uptake contaminants in runoff and reduce erosion.

Permeable paving units on structural soil allow water to infiltrate and room for tree roots.

Site design makes pedestrian access convenient, safe, and comfortable, with natural systems

Put Pedestrians First

> The most comfortable viewing distance for a building is from a distance of about twice its height ... Greater variety in visual experience can be created by spaces that, in different ways, restrict views of the surrounding structure (Carmona 2003).

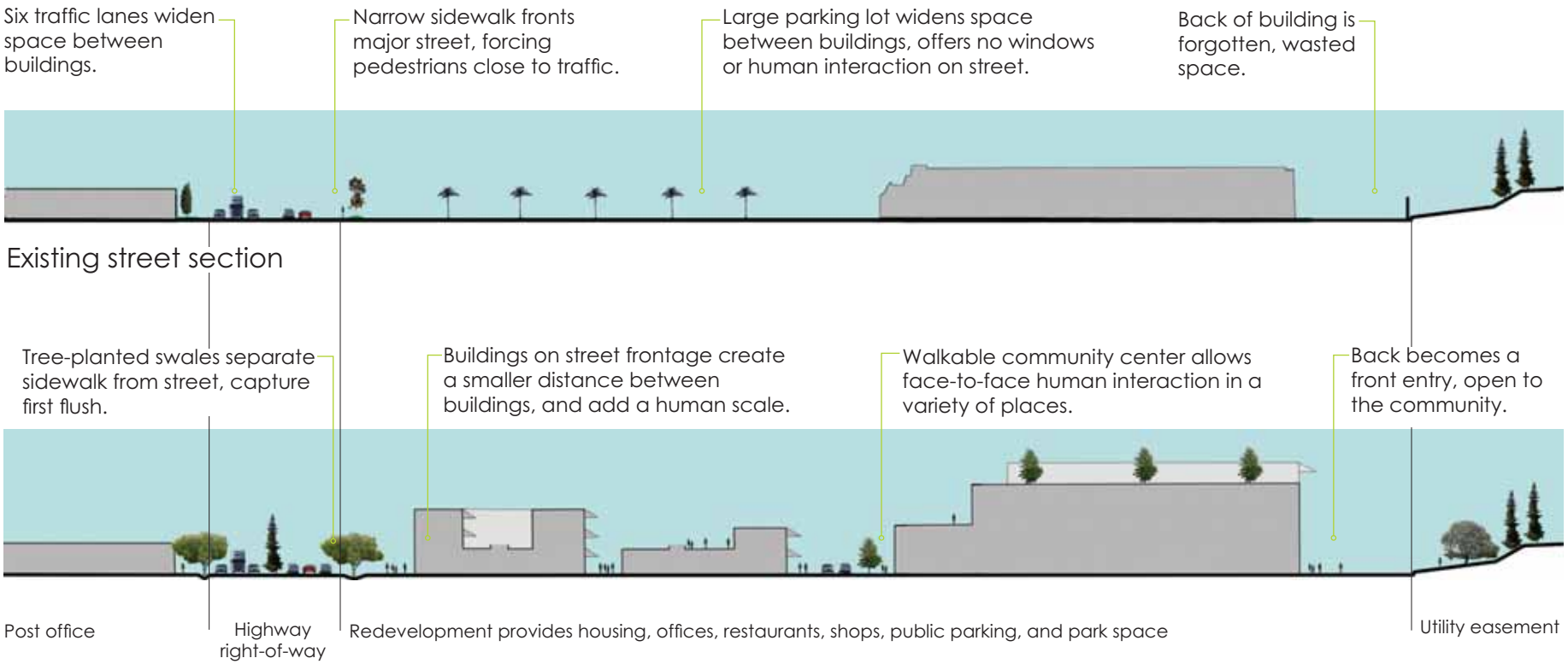
La Habra contains streets fronted with large parking lots servicing big box stores. These newer developments were designed around the automobile, and do not offer a comfortable pedestrian environment. The section below illustrates a distance of about 14 times the height of the building to the right, rather than the classic proportion referred to at left. Sidewalk placement right against the street contributes to an unwelcoming feel for people walking, as do the utility poles obstructing view and movement.

The series of parking lots and wide streets adds monotony to these landscapes that makes them both uncomfortable and forgettable. "If the whole space can be easily observed, it does not invite further involvement. It may also lack subspaces and implied movement (Carmona 2003)."

In the redevelopment, buildings front the street, creating a pedestrian scale, and giving more elements for people to engage with to impart a sense of discovery.

The demonstration site was designed for people walking, with a narrow distance between buildings, and a variety of building placement, height and type, adding visual interest at a comfortable viewing distance.

Perspective view of Imperial Highway shows existing auto-scaled streets



Proposed street section

Prioritize Mass Transportation

The many back spaces in La Habra can be turned into community assets with creative land planning. The bus stop shown at the right faces a six-lane state highway, turning its back on the creek running five feet away. Haphazard plantings and volunteer palms do nothing to shade people as they wait for a bus, and offer no buffer from heavy traffic.

The redevelopment is designed in conjunction with a transit stop, as well as comfortable pedestrian walkways and bicycle access and parking. A wide sidewalk is separated from the street by a vegetated swale to increase safety of pedestrians and people waiting for the bus. The bus stop acts as a welcoming, shaded entrance to the development, rather than a bench on a narrow sidewalk.

Existing La Habra Policies:

- Insufficiently support use of mass transit.
- Do not coordinate land use planning and transit planning.

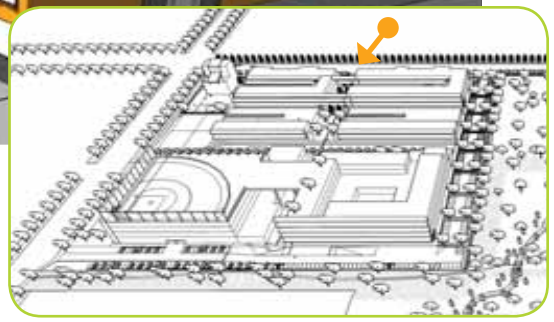
Policy Recommendations:

- Decrease required parking ratio in exchange for transit stop creation, bicycle facilities, or presence of car-sharing service.
- Mandate wide sidewalks (12' or greater) on major roads, to allow use of bicycles, skateboards, skates, and Segway scooters alongside pedestrians, safe from traffic.

The transit stop's design provides an integral part of the redevelopment, becoming a central entry, and gathering spot.

The bus stop has comfortable seating, shade, and opportunities to congregate.

The stop is located along the green infrastructure trail, and functions as a connection for pedestrians, bicyclists and transit users.



Viewpoint shown

Community and site planning integrates transit

Make Processes Visible

The processes currently visible in the landscape are the effects of human development — cars, stormwater and people moving over pavement; soil erosion from grading and human disturbance; and highly controlled growth and maintenance of resource-intensive plants. Southern California's urban and suburban areas are mostly lacking in the natural processes that teach people about local ecosystems and native habitat.

The redevelopment puts processes at the forefront of its landscape. Green roofs and sky lights spill over into green walls and windows, tying viewers to the processes of growth, solar energy and light. Cisterns, photovoltaic panels, and cool towers become a part of the landscape, giving witness to efficient built form.

Existing La Habra Policies:

- Requires mechanical equipment, including photovoltaic panels, to be screened from view
- Requires directing and speeding runoff to the Municipal Separate Stormwater System (MS4), effectively taking it away from view and human interaction.

Policy Recommendations:

- Require passive lighting and cooling, and designing mechanical features to be an asset to building aesthetics.

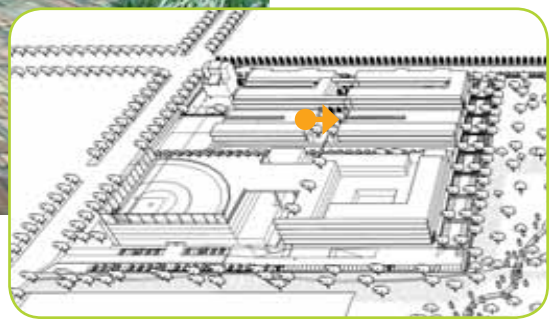
FOR FURTHER REFERENCE:

- Lyle, John T. 1994. *Regenerative Design for Sustainable Development*. New York: John Wiley & Sons.
- Spirn, Anne Whiston. 2000. *The Language of Landscape*. New Haven: Yale University Press.
- Woodward, Joan. 2000. *Waterstained Landscapes : Seeing and Shaping Regionally Distinctive Places*. Baltimore, MD: Johns Hopkins University Press.

Photovoltaics are designed as awnings to shade windows and allow indirect light while occupying a prominent location for visibility.

Green roofs blend into green walls, and the skylight continues onto the wall to make passive cooling and lighting visible to pedestrians.

Cool towers and cisterns integrated into public space provides visibility of passive cooling and water collection.



Viewpoint shown

Site design makes natural processes visible

5. Manage for the Long Term

Manage for the Long Term requires that time, energy, and materials are allocated up front to establish deep roots in community education as well as in the physical installation. Advance planning minimizes resources and time needed for future maintenance, and values maintenance considerations as an essential part of the planning and design process.

Sub-Principles:

- Establish Deep Roots by Educating Children
- Love It and Leave It
- Value Maintenance

A Green Center provides training and education on planning and caring for native plants, and landscapes using natural systems.

Educating and immersing children in nature provides deep roots for the future care and understanding of ecosystem health and management by the next generation of land planners and developers.

Tree-planted swales capture first flush, reducing the need for end-of-the-pipe stormwater treatment, and stress on infrastructure.

A community garden, woodland, and wetlands become public resources for the long term.

The redevelopment site establishes a maintenance plan for healthy natural systems up front, as an integral part of the design and development.

Plants and materials are chosen to be climate and space-appropriate, to minimize irrigation and maintenance needs.

Manage for the Long Term on-site means greater returns over time

Establish Deep Roots by Educating Children

> Passion is lifted from the earth itself by the muddy hands of the young; it travels along grass-stained sleeves to the heart. If we are going to save environmentalism and the environment, we must also save an endangered indicator species: the child in nature (Louv 2005).

The early education of future planners, gardeners, and designers cannot be over-emphasized. Establish Deep Roots educates children on native plants and ecosystems, trains young eyes to understand and appreciate natural plant forms, and teaches proper planning and care for healthy landscapes.

Children need places in cities that answer the question "Why?" With the extensive channelizing of streams and rivers in the Los Angeles region, water's natural cycle is hidden from view and experience. Though flooding brings nutrients, flushes out contaminants and vegetation for re-emergence, and recharges groundwater, these processes have been replaced in favor of constricting water courses to protect property and develop as much land as possible for human use. There are few places left in urban and suburban Los Angeles for children to explore nature. With nothing to compare it to, how will the next generation develop creative alternatives for paved parking lots, fertilized turf and asphalt playgrounds?

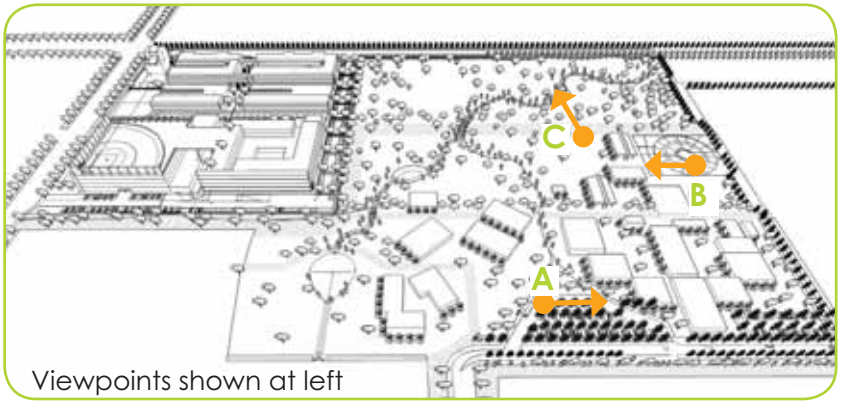
Children who have frequent, regular contact with nature also benefit socially, psychologically, and academically. Natural play invites children to use imagination, inventiveness, and creativity, rather than the physical competitiveness encouraged by play equipment and organized sports (Herrington 2001, Louv 2005, Moore 2005). Natural schoolyards also benefit children psychologically and academically. Research links greenery in everyday environments, and even just views of greenery, with reducing stress and the symptoms of attention-deficit disorder (Kaplan 1998, Louv 2005). Nature provides the tools for learning by experience rather than memorization. Through nature, children have at hand the opportunity to study ecology, geology, physics, math, language arts, biology, animal science, history, and geography, to name a few. Learning by growing things was the foundation of the very first kindergarten (Herrington 2001).

The two case study schools are luxurious in green grass and trees, an advantage over many in Southern California. However, optimizing the schoolyard for children to experience nature, natural stormwater management, and wildlife habitat will greatly improve the health of the community, as well as its greatest asset — its children.

A. The school drop-off area becomes a shaded, one-way entry for school busses, pedestrians, and bicyclists. Children who live too far to walk or bike are encouraged to ride school busses. Parents who drive their kids park along the street, and walk their younger children to the elementary school. The streets surrounding the school are made one-way during drop-off and pick-up times to ease congestion and emissions. The drop-off area, presently filled with idling cars and traffic, has large, permeable sidewalks and will become a safe and welcoming area for walking children.

B. The schools host a community garden, open to the public and serving as a community resource. Children learn about and grow food crops and flowers, and give extra harvests to the community.

C. A mounded riparian woodland fills the school yard with native habitat for birds, and treats stormwater runoff from the surrounding community. Children and citizens witness and learn about the local ecosystem. Oaks and grasses cover the higher ground, and cottonwoods, sycamores and riparian plants establish along the stream.



Viewpoints shown at left

Education through Nature in the Schoolyard

The schoolyard, now a place of primarily turf and asphalt surfaces, becomes a dynamic landscape for children to witness and experience changes of season, water flow, vegetation, and wildlife.

PRECEDENTS FOR NATURAL SCHOOLYARDS

- Creech Road Elementary School. Garner, North Carolina.
- Multnomah Elementary School. Montecito Heights, California.
- Nutter Fork Elementary School. Clarksburg, West Virginia.
- Washington Elementary School. Berkeley, California.

Spring

Summer

Fall

Winter

Vegetation changes from grasses and oaks to sycamores to cottonwoods and willows towards the streams, providing a child's-eye view into ecological systems.

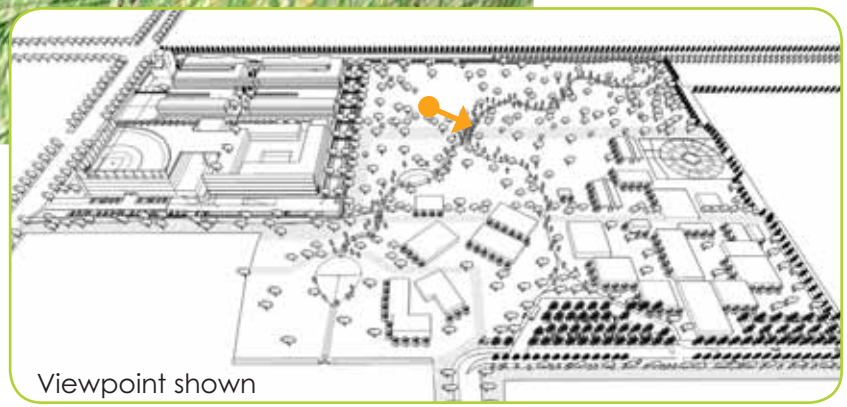
Natural play provides a non-competitive environment and helps build self-confidence, non-violent values, and academic success (Louv 2005, Moore 2005).

An open shelter acts as a shared outdoor classroom, replacing windowless modulars.

Grasses and oaks provide habitat for hawks, owls, and falcons.

Riparian systems support the most diversity of wildlife. Egrets and herons rely on wetlands.

Check dams slow runoff from school grounds, and allow children to experience the different qualities of water flow.



Nature in the schoolyard

Love It and Leave It

Love and Leave It means putting time and energy at the front end of site and designing planting and maintenance for minimal long-term requirements for energy and other resources. Plants too often are not chosen for the spaces they occupy, setting up an unending and frequent pruning and maintenance regime that requires extensive energy and time. Mowers, blowers and trimmers produce air and noise pollution, and use fossil fuels to run.

Materials should be chosen for their sustainable characteristics, and overall site maintenance requirements. Utility conduits can be buried under pavers to allow easy access for maintenance, while the pavers allow water and oxygen to reach root zones.

Value Maintenance

Landscapes are not finished when they have been constructed. It may take years to implement a design, for it to evolve; the way a landscape is maintained can change it fundamentally over time. Shaping the context in which landscape is shaped is an act of design (Spirn 2000).

Establishing a maintenance plan is a critical and often neglected part of site design. Training and education is essential to correctly choose and care for plants, and avoid the pitfalls of conventional maintenance practices, shown at the right.

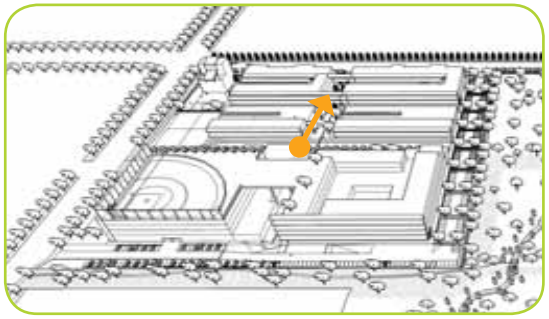
Existing La Habra Policies:

- Required commercial sites to have 5–10% of paved areas "landscaped," depending on location of site and of parking in relation to building.
- Prohibit shrubs in the setback area from being taller than 3 feet.
- Require an underground sprinkler system to serve all landscaped areas.
- Require a lemon, orange, or avocado tree on every property.

Policy Recommendations:

- Allow the owner to forego an irrigation system, where the planting plan is drought-tolerant and a temporary irrigation plan is in place.
- Require a minimum 2-year plan for establishment and monitoring of plants.
- Encourage species diversity in the city-sanctioned plant palettes.
- Encourage age diversity of trees in planting plans, as well as successional plans.
- Perform cost-limiting infrastructure maintenance of an area all at once, so that streets, sidewalks, and planting areas face lower costs of disruption over time.
- Consider fruit trees for every property to maximize value of watered landscape.

Upon installation



Viewpoint shown

Climate-appropriate plants and trees are established with occasional, deep waterings to encourage deep root growth for surviving dry periods.

Evergreens act as windbreaks for Santa Ana winds that bring hot, dry air from the desert periodically in the fall and winter.

Trees are planted free of stakes, to strengthen their resistance to winds.

Plants and trees are chosen for the size of the space they will occupy at maturity, to prevent harsh pruning and to allow natural growth patterns.

After two years of caring establishment, plants are mostly left alone to adapt to local patterns of wet and dry, and keep a natural form.

Structural soils support root growth beneath pavement. Permeable paving allows oxygen and water to reach the root zone to decrease dependence on irrigation and optimize growth.

Leaf litter and organic matter are composted and used as mulch to recycle waste, and provide nutrients to plantings.

After years of growth

6. Fulfill Multiple Objectives

The principle Fulfill Multiple Objectives embodies both planning and evaluation methods. It includes the following sub-principles:

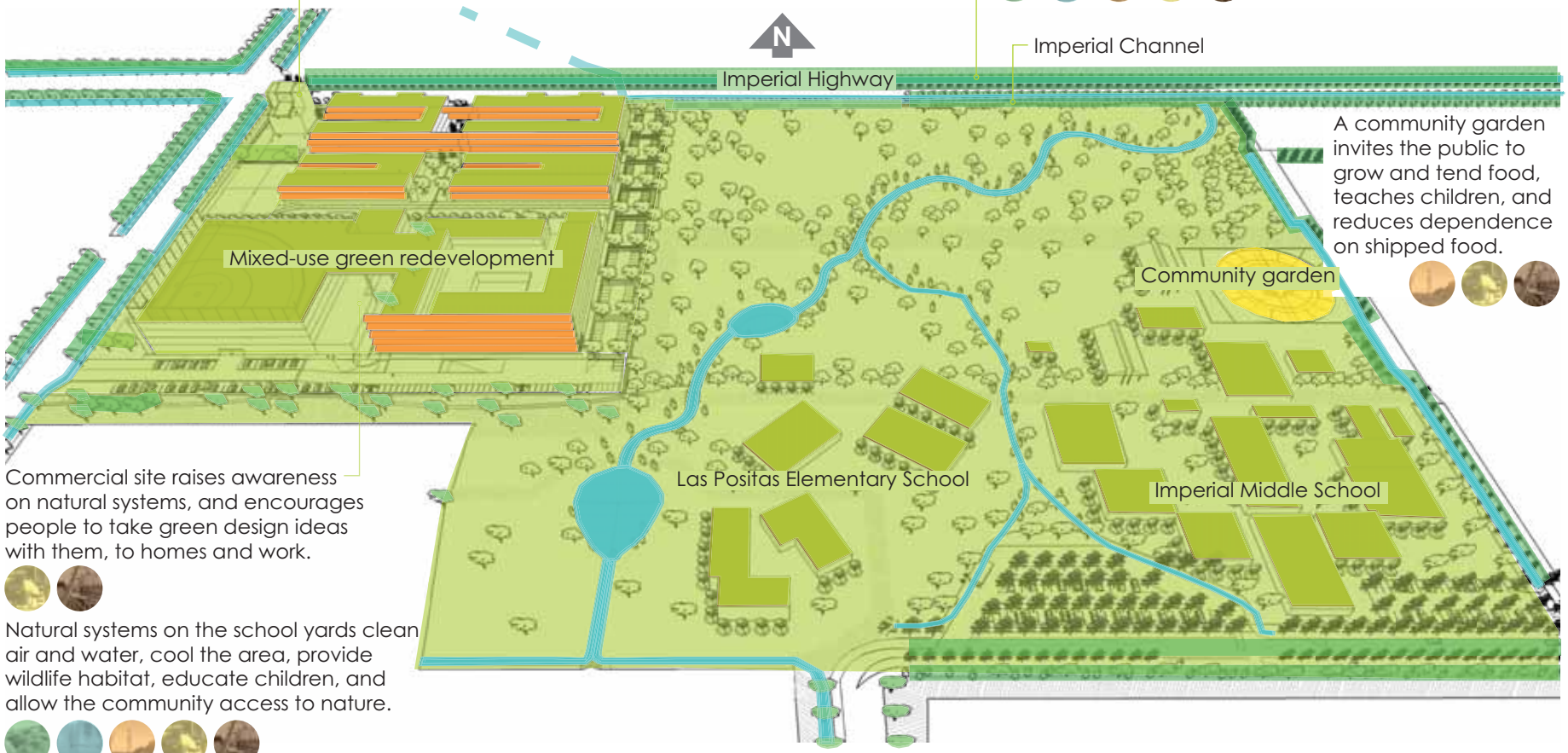
Sub-Principles

- Collaborate and Plan at All Scales
- Value Cumulative Effects
- Measure Performance, Not Means

The Green Center is a place for collaborative planning for the community, developers, and city and regional planners.

The redevelopment demonstrates the importance of investing now for ecological, economic, and human health.

Tree-planted swales capture first flush, provide habitat connectivity with canopy, pedestrian access and comfort, shades streets, and raises awareness.



A community garden invites the public to grow and tend food, teaches children, and reduces dependence on shipped food.

Commercial site raises awareness on natural systems, and encourages people to take green design ideas with them, to homes and work.

Natural systems on the school yards clean air and water, cool the area, provide wildlife habitat, educate children, and allow the community access to nature.

Fairly valuing nature's services and human welfare multiplies the benefits that the site offers

Collaborate and Plan at All Scales

A lack of inter-jurisdictional collaboration and enforceable regional planning for the ecosystem has been a common theme in the issues this project addresses. As long as neighboring communities are unaccountable to one another, they will make important decisions in a vacuum, and while competing with one another. Besides inter jurisdictional difficulties, there are vertically overlapping jurisdictions and intra-jurisdictional issues.

As an example of a local effort that would only work through collaboration, a bikeway network is an ambitious project requiring extensive collaboration, because of the number of municipalities and special districts involved. There is confusion over ownership, planning, administration, and maintenance duties.

An even more critical situation is that the Orange County Transportation Authority (OCTA) performs transportation planning for an encompassing regional district, while municipalities handle all land use planning. For mass transit to succeed to its full potential, as it does in many places outside of the U.S., there must be full integration of land use planning and transportation planning.

Sometimes, collaboration is the missing factor in planning even within a city's departments, as a department can remain compartmentalized, responsible to meeting its own duties, and missing key opportunities for collaboration and multi-objective planning.

A further venue for collaboration is between the city and private entities. Cities have the potential to serve as custodians of a city's environmental health, disseminating information to businesses and spotting opportunities for businesses to form symbiotic, resource-conserving relationships amongst themselves.

Existing La Habra Policies:

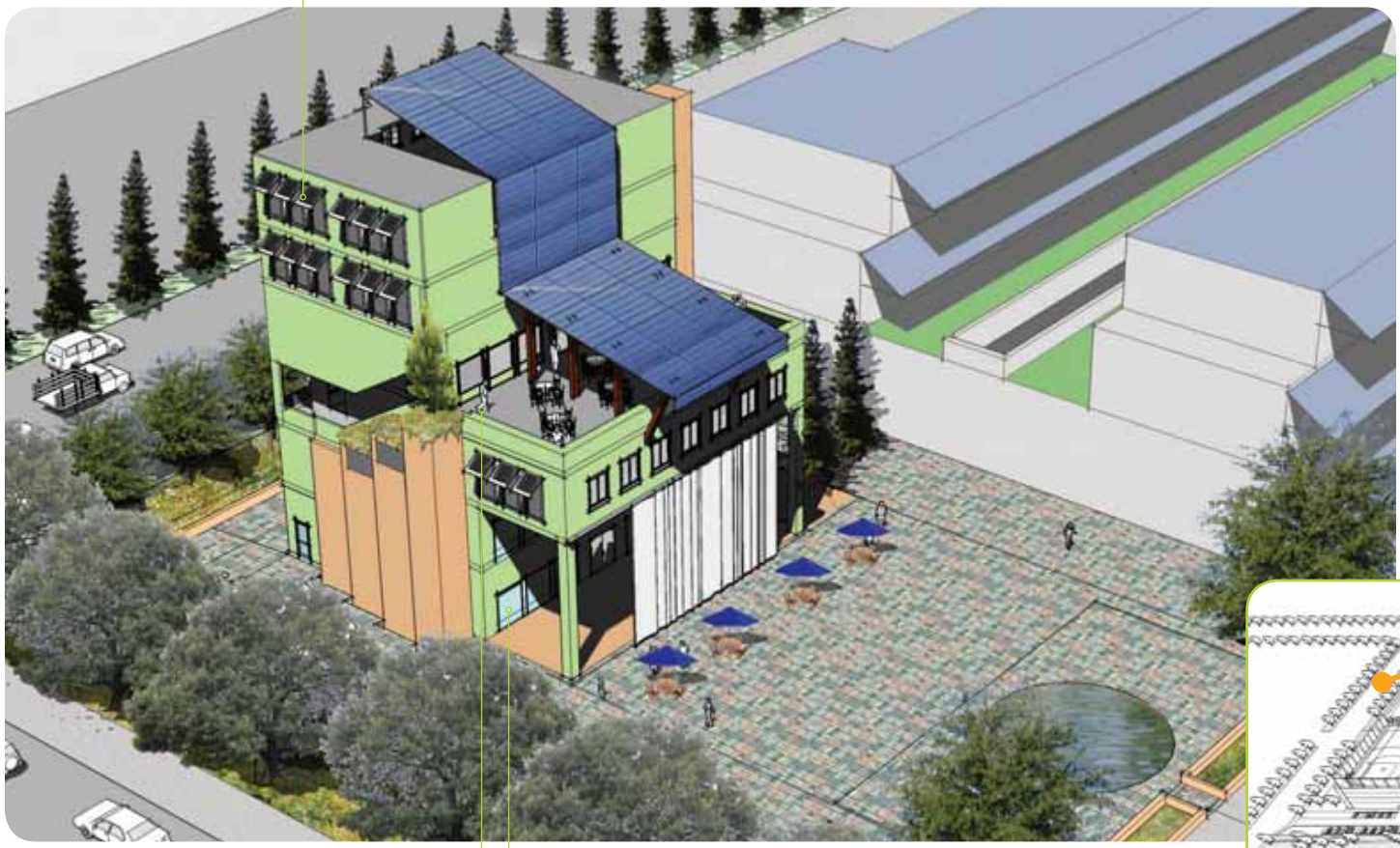
- Commit the city as a co-permittee of the County of Orange on an NPDES permit.

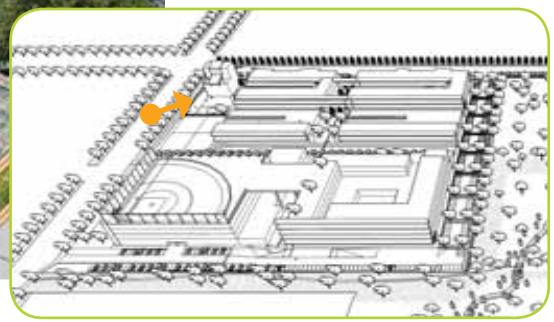
Policy Recommendations:

- Commit the city to cost-sharing, water quality BMPs, and other regionally beneficial projects
- Mandate decisions about other cross-boundary issues, like jobs, housing, utilities, bikeways, and park planning, to be made in consultation with other affected jurisdictions.
- Encourage open communication within a city administration, to allow innovative ideas from any employee to "float to the top."

The top-floor conference room is the perfect vantage point to inspire attendees of meetings for collaborative planning between city staff, regional representatives, local citizens, or any mix of the above.

The city's commitment to public/private partnerships is exemplified by the establishment of its new Green Center in this development, where the city's sustainability efforts are headquartered.





Viewpoint shown

Community interaction and informal networking happen naturally at the cafe overlooking the development.

Patrons of the cafe pass display windows of stores selling sustainable products, as they walk up to the balcony. Businesses located here could teach about, and sell, photovoltaics, irrigation equipment, porous pavers, and other green features.

The "Green Center" — an icon for the vertical and horizontal integration of the objectives of this project

Value Cumulative Effects

Value Cumulative Effects means counting on the big impacts of incremental changes. Current policy does not value natural elements for their function, but only for their aesthetics. Trees have the potential to shade pedestrians, paving, and cars, increasing human comfort, and decreasing the heat island effect, and pollution from parked vehicles. Trees are often considered only in relation to liability concerns and maintenance costs, and not for their benefits to air quality, wildlife, and people, including the offsetting of global warming.

A vegetated swale along a street takes up only slightly more space than traditional building setbacks, but can have great impact if planned wisely. A treed swale captures the first flush of runoff *(See Appendix A, p. 134)*, provides pedestrian safety from traffic, cools streets and sidewalks, and connects wildlife habitat with tree canopy.

Green roofs cool buildings through evapotranspiration while they reflect thermal energy. This decreases the urban heat island effect *(See Appendix B, p.148),* and reduces energy requirements for climate control. Shaded cars in the parking garage mean less gasoline will volatilize. Green roofs provide stormwater management through absorption of rainfall and filtering of airborne pollutants. Intensive green roofs (soil depths over six inches and deeper rooted vegetation) can reduce runoff by 90-95 percent. Roofs can also become parks, providing much needed recreation and outdoor experiences, while trading space for school playing fields. These cumulative effects are the essence of planning with natural systems. They add stability and effectiveness to designing with natural systems.

Existing La Habra Policies:

- Require landscaping.

Policy Recommendations:

- Preserve healthy, mature trees wherever possible.
- Adopt ordinance similar to that in the Municipal Code of Davis, California: "50% of the paved parking lot surface shall be shaded with tree canopies within 15 years of acquisition of building permit." Require parking lot shading plan.
- Require trees in parking lots to be rooted in structural soil, for their health and growth potential.
- Offer expedited permitting for projects with "green" features or intended accreditation.

Examples of the Cumulative Effects of Green Redevelopment:

- 20% reduction in vehicle trip rates from mixed use development (Girling 2003), resulting in cleaner air and stormwater runoff.
- Up to 98% reduction in stormwater runoff by integrating vegetated swales on street edge (City of Seattle 2006).
- 95% of total suspended solids, and 99% of metals removed by permeable pavers on structural soil (Winer 2000).
- 80%+ trace metals removed from runoff, including lead, copper and zinc, by wetlands (ASCE 2001).
- 80%+ total suspended solids removed from runoff by vegetated swales (ASCE 2001).
- 50-90% trace metals removed from runoff by vegetated swales (ACSE 2001).
- 50-90% removal of bacteria in runoff, including coliform, by extended stormwater runoff detention in wetlands and swales (Field 2000).
- Over 1,700 children receive daily access to natural systems for educational success, and physical, mental and social health.

The cumulative effects of natural systems

A. Air pollution is decreased by the filtering action of trees, energy-efficient buildings and landscapes, the decreased use of motorized vehicles, and shaded parking. Cumulative effects include reducing the heat island effect, and increasing air quality to improve ecological and human health.

B. Green roofs, permeable paving, vegetated swales and a wetland system clean and detain stormwater runoff for re-use, decreased flood risk, and higher water quality downstream. Over 80% of metals and suspended particles, and up to 80% of bacteria are treated on site (ASCE 2001, Field 2000). Cumulative effects are cleaner water upstream and down, less dependence on imported water, less pressure on infrastructure, and improved habitat for wildlife.

C. The same natural systems that provide clean air, water, and habitat also support human health and comfort. Tree canopy shades pedestrians and vehicles, and separates people from the street. Woodlands and wetlands in the schoolyard provide access to nature and its healing properties. Cumulative effects are easier access to daily needs and nature, healthier and more comfortable public places, and greater awareness of natural systems.

Viewpoints shown

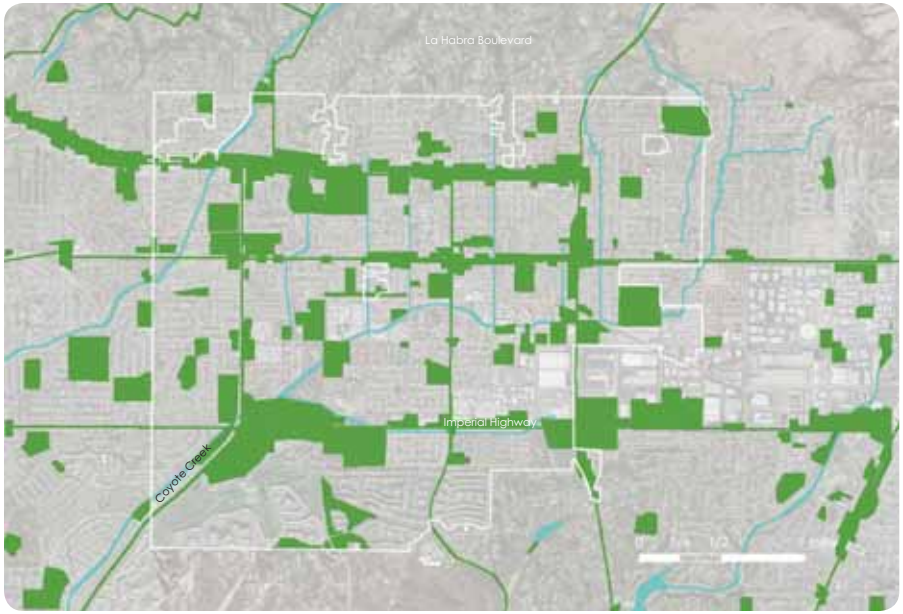
Value Cumulative Effects

Seeing Green proposes Six Principles for Policy and Design to plan a green infrastructure network. This project uses a demonstration case study site to illustrate the principles as they hit the ground. The images to the right depict the progress of green redevelopment over time — the cumulative spatial effects of this plan.

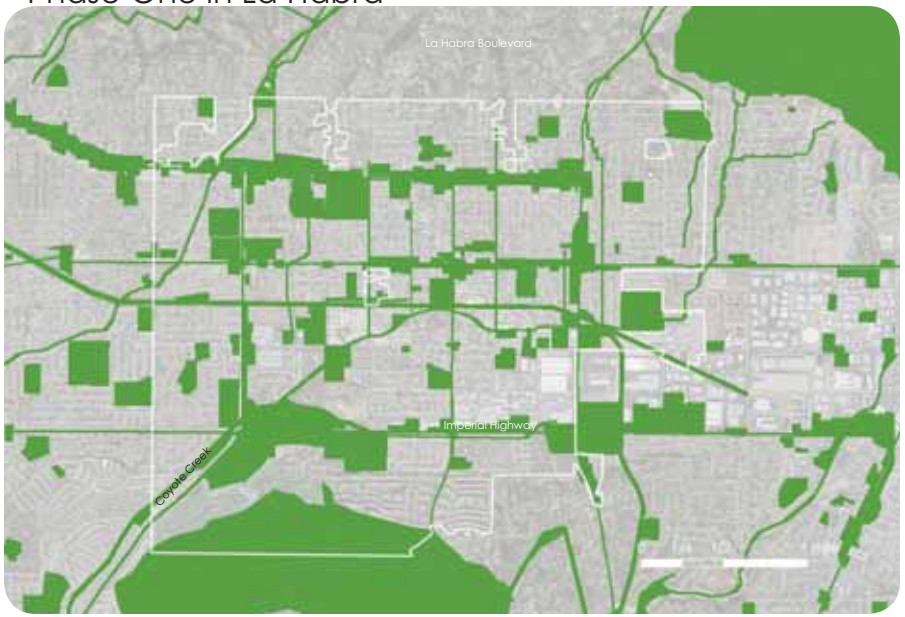
Phase One: Large commercial sites make up roughly 3% of La Habra's land use, and are devoted almost entirely to roofs and parking lots. These places, and the over 21 miles of La Habra's main streets cover nearly all of the city's most impermeable land. Treating the first flush of stormwater runoff will greatly improve water quality downstream, shade streets and parking lots, and provide habitat and tree canopy connection.

Schools and park land cover over 7% of the city. Just half of this land could provide the 2-4% recommended area for wetlands to treat La Habra's drainage area (France 2003), while providing nearly all residents with access to nature.

Phase Two: Once green redevelopment has "Started Upstream" in Phase One, greater impacts can be made on restoring stream and wildlife habitat and corridor health, while continuing to integrate green infrastructure and redevelopment into urban areas.



Phase One in La Habra

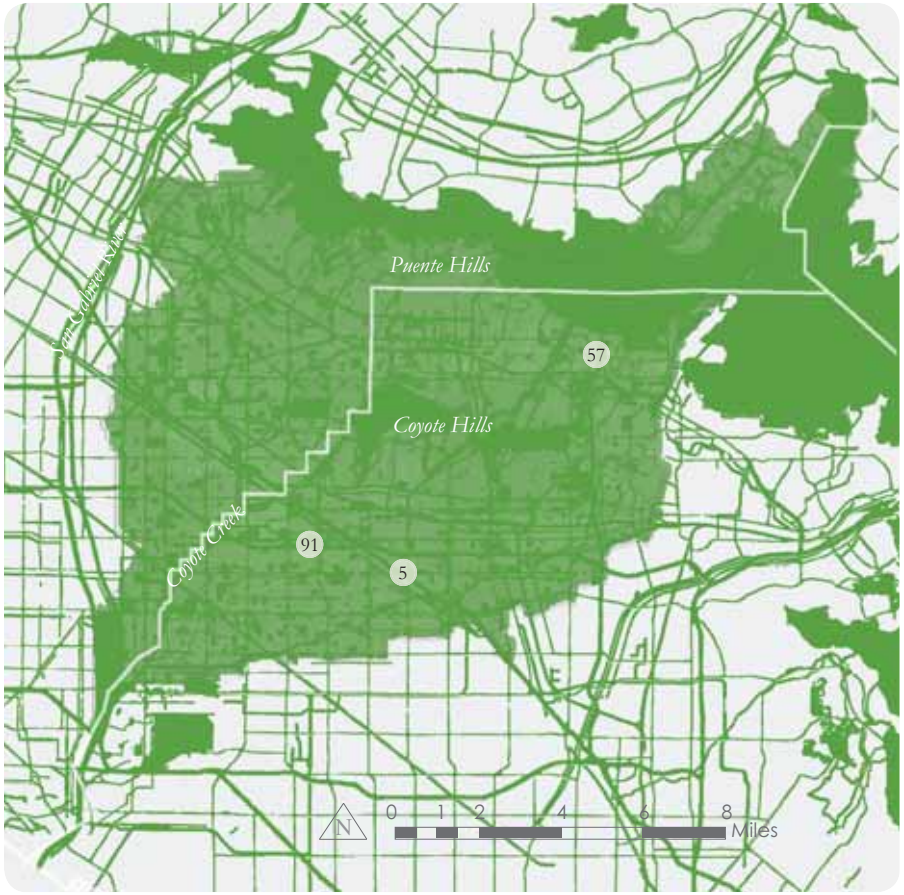


Phase Two in La Habra

The Cumulative Effects of Green Redevelopment

Phase Three at the watershed scale

While a green Coyote Creek Watershed may seem generations off, cities and counties working together will have wide-reaching effect integrating green redevelopments with a green infrastructure network.



Phase Four at the watershed scale

These public and quasi-public sites will continue their impact as green ideas take hold in the public's imagination, and are carried home and to work in residential and industrial districts. Green edges will blur into adjacent areas, building on and spreading ecological, economic, and human health into the entire watershed.

Measure Performance, not Means

Measure performance, not Means describes an evaluative framework and value system for *Seeing Green*. This principle eliminates prescriptive policies in favor of ones that require achievement of a given level of effect. And, it values ecological, economic, and human health from a holistic viewpoint, above all else in making decisions on development and infrastructure investment. This section includes:

Evaluation of Principles for Policy and Design against the project's Goals and Objectives

Within the Coyote Creek Watershed, and the entire Los Angeles Basin, redevelopment can change ecological, social, and economic systems for the better. These goals and objectives define what green redevelopment could be and principles lead design. The case study in La Habra shows how green redevelopment has the potential to change a big box commercial site into a place that provides multiple human, economic, and ecological benefits. The following analysis of the principles shows how well the goals and objectives can be met.

Measuring the Triple Bottom Line

This analysis evaluates the project's Principles as they meet ecological, economic, and human health.

Our analysis suggested that the cost per square foot for buildings seeking LEED certification falls into the existing range of costs for buildings of similar program type...Owners are finding ways to incorporate the elements important to the goals and values of the project, regardless of budget, by making choices and value decisions (Matthiessen 2004).

FOR FURTHER REFERENCE:

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A New Perspective

Thousands of commercial redevelopments each year serve as opportunities to improve the environment, human health, and economy using "green" strategies (Environmental Design Resources 2002). Yet, most of these opportunities are missed, exchanged for more 'super chains,' acres of parking lots, and architecture non-supportive of community and identity. Although green strategies have been advocated for and incorporated into redevelopments for many years, obstacles that impede universal adoption still exist for owners, developers, local governing boards, and managers (Smith 2003). Fear of high costs and lack of awareness discourage developers, while regulations without teeth do not enforce "best management practices."

The main impediment rests in the political system that allows developers and property owners to shift negative effects of the site onto society. Society and municipalities are forced to invest in costly solutions such as stormwater infrastructure, new roads, and water treatment. Political and educational responses that create a mechanism to recapture these externalities are necessary. A multi-tiered approach by green advocates and municipalities using demonstration, education, promotion, and policy could change this pattern.

Educational outreach is vital to change the perception that it is too expensive to use green strategies (Fortune 2006). Examples and statistics can show the economic competitiveness of green redevelopment, as well as the long-term benefits, not only to society as a whole, but also to owners and renters. Today, demand for green development has increased, green material and construction costs have become more level with conventional costs, and experience has been able to show that green strategies provide a return on investment that exceed initial construction costs (Kirk 2005).

Research reported in the Sustainable Building Technical Manual shows that cost savings strategies are most effective when focused on operations and maintenance, not on the initial costs which, over a 30-year period, are only two percent of total building costs (Energy Design Resources). Energy efficient design, low water landscaping, on-site water re-use, and low maintenance systems are some of the strategies that provide long-term savings in operations and maintenance costs. Heating, ventilation, and air-conditioning (HVAC) systems, which account for 40-60 percent of the energy used in commercial buildings in the in United States, can be downsized through the use of shade planting, green roofs, cooling winds, and awnings (USDOE). Consumers have been shown to spend more in a store with natural lighting, and choose to frequent a store that improves the local community through environmental, social, and economic benefits. Natural lighting has also been shown to improve student performance in schools. Property values rise when green strategies are incorporated. For example, the "USAA Realty Company's La Paz Office Plaza in Orange County experienced an increase in market value of $0.80 per square foot—a $1.5 million increase—stemming from its investments in energy efficiency measures and lower-priced power procurements" (Smith 2003).

Municipalities are also missing opportunities to reduce infrastructure investments, create a citizenry with a sense of responsibility towards the local natural systems, and improve air and water quality (Kirk 2005). Cities, concerned with providing public services, have been relying on income tax gains from conventional redevelopment. The perception is that when green strategies are used, income is reduced, thus reducing city funds for public services. Through policy change that allows greater density due to the incorporation of green strategies, equal or greater income will be realized. Cities will also experience reduced spending on public services such as water treatment, stormwater management, and street improvements.

Developers with short term interest in the development will avoid green elements with a high initial cost to improve their short term gains. To encourage developers such as these, enforceable policy that requires certain levels of green performance is necessary, in addition to incentive policies that promote green design through fee avoidance. Policy will get developers and property owners to take a longer term perspective and make green the affordable standard.

Choosing Green: Designing from a Resource Model

In the Coyote Creek Watershed most cities are entirely 'built-out,' and development is happening not because of demand, but because of opportunities that are the result of built-in obsolescence in development over the past fifty years. Yet, a development model based upon an out-dated cost-benefit analysis that perceives green development as more expensive is still used. An important question to ask is "more expensive than what?" If development choices were made from a resource based model that reflects the built-out situation of the communities in the watershed, the cost-benefit analysis would compare choices based upon resources used for construction and throughout the life span of the development.

Cities, municipalities, watersheds, and regions are interested in solutions to quality of life considerations, such as traffic congestion, long commutes, loss of green space and tree canopy, air and water pollution, affordable housing availability, and energy sustainability. These issues are pervasive in most urban and suburban communities today as both community planners and developers apply a framework that follows an economic model that burdens society with the negative effects of the built environment and values short term gain. Although community officials and planners implemented this framework with intentions of creating a community that is safe, near to nature, and affordable to the middle class, the framework, or decision model, has instead realized only economic benefits held mostly by private corporations. Policy makers, planners, and residents alike need a new model to follow for design and planning decisions. The present model that uses a demand analysis to prescribe design and planning must be replaced with a model where decisions are prescribed from a resource analysis. This new model will aid the phasing out of the present paradigm for a new paradigm that values resources for their ecological, economic, and human health values.

If a traditional cost-benefit analysis were done correctly, it would show that a green approach, such as the Leadership in Energy and Environmental Design (LEED) program, is no more expensive than a similar conventional development. "Costing Green: A Comprehensive Cost Database and Budgeting Methodology" (July 2005) by Davis Langdon, a cost planning and sustainable design management firm, shows that the actual construction cost of green buildings where LEED certification was a primary goal is no more expensive than buildings housing comparable programs where LEED was not considered during design. Costs were analyzed using the common method of comparing the final construction costs for the project to the established budget. Out of 61 LEED seeking green buildings, over half of the projects had original budgets set without regard to sustainable design, but did not need supplemental funds to support sustainable goals. When supplemental funds were required it was for specific sustainable features, such as photovoltaics.

The new resource model can help designers, planners, and developers to make decisions not based solely on initial construction costs, but on resources used, their ripple effect throughout the community, region, and world, and their ecological, economic, and human health and comfort benefits — the triple bottom line.

Satellite image: William Bowen 2006.

The built-out nature of much of the Los Angeles basin supports the need to start planning development from a resource-based perspective, rather than the conventional model of supply based on demand.

Measuring the Triple Bottom Line

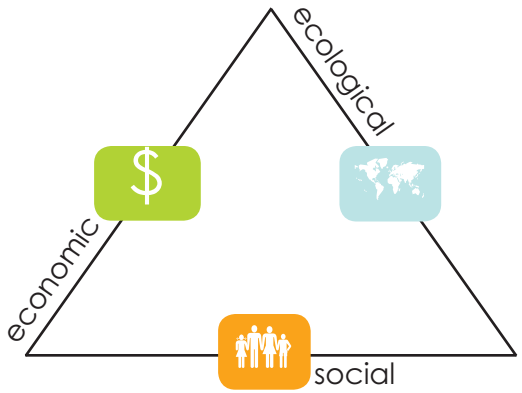
Cities, along with consumers, are beginning to demand that public and quasi public places take responsibility for the health of the environment, society, and economy, and to ensure that all three reap the rewards of success equally. Three integrated sustainability goals: economic gain, improving the environment, and improving the lives of people, sometimes called the "triple bottom line," are becoming increasingly popular in business to help describe this method (Brown 2001). Each person, as well as each unique culture and place, will define differently what design solutions meet these sustainability goals. Yet, the basic definitions for what it means to take responsibility for maintaining and improving the environment, society, and economy provides criteria for design and planning.

Basic definitions:
Environmental responsibility means ensuring that our actions and lifestyles do not have such a negative impact on the environment that the planet's resources are being used at unsustainable rates - e.g. moderating our energy usage and method of generation to take advantage of renewable energies, and to maintain fossil fuel levels.

Social responsibility means ensuring that other people's quality of life and human rights are not compromised to fulfil our expectations and demands - e.g. buying products and food which has been fairly traded, and manufactured in good conditions.

Economic responsibility means ensuring that there is an economic benefit both to the region from which the purchase came and to the region in which it is marketed (Brown 2001).

Green redevelopment of public and quasi-public sites is an opportunity to realize the triple bottom line. The La Habra case study site, a typical "big box commercial development and turf school ground, has been redeveloped to maximize improvements



for the environment, economic gains, and quality of life. In the previous design, the site had single purpose systems: one large building for retail sales, buildings for classrooms, pavement for parking, and turf for playing organized sports. At the commercial site, all systems were focused on economic gain for the business and the city, while lacking responsibility for the triple bottom line goals. At the schools, the buildings are used to meet the social responsibility of education, using limited and earmarked funding. The turf school grounds provide for the single purpose of recreation. Effects from these single purpose systems are felt throughout the region in: downstream impaired waters, endangered species, child health problems like asthma, and traffic congestion. These effects not only create ecological and social burden, but also burden the future with high maintenance, restoration, lost income, and health costs.

During redevelopment developers, designers, and planners can choose solutions that equally maximize all three benefits. In this "buy now, pay later" American culture, society really is going to pay later if current development trends continue to emphasize up-front costs. Green redevelopment principles invest in solutions for long term survival. As green redevelopment spreads across the watershed, there would be a ripple effect, making Orange County a place known for its economic, environmental, and social prosperity.

The Ripple Effect

"There has been an explosion in big box retail buildings (Energy design resources 2002)." The implications of this growth trend are significant, but can be reversed through the incorporation of green strategies. If green strategies were used in retail redevelopment projects throughout the watershed, the ecological, social, and economic benefits would offset the effects created from previous development patterns. During the phased green redevelopment across the Coyote Creek Watershed, public places incorporating green strategies, such as those outlined throughout this document, create benefits that are felt initially and over time. Economic benefits felt over time, as investments are returned through lower energy bills, reduced municipal spending on infrastructure, reduced health care needs, longer building life spans, restored environmental services, permeable surfaces, and others, create effects over time that ripple throughout every aspect of life, as do ecological and environmental benefits. These benefits can create an entirely new future that is led responsibly and skillfully by children whose education today incorporates lessons taught by and with nature that instill a responsibility for the environment. As public and quasi-public spaces blaze a trail for redeveloping using green strategies derived through the resource model, other land uses can follow suit.

Evaluation of Policy and Design Recommendations

Comparing the investment and benefits of green and conventional redevelopment shows the great difference in form and function between the two. Green redevelopment is not just a change of materials or form of a conventional development, but an integration of the landscape and the built environment that reduces water and air pollution, provides safe, comfortable, and healthy people places, improves wildlife opportunities, and reduces resource consumption. The objectives met in the La Habra redevelopment case study, displayed in the Evaluation Matrix, show how a green redevelopment can meet social and ecological goals, while also providing economic benefits. These benefits are transferable to other types of quasi-public and public redevelopments. Savings over time would be felt throughout the community in reduced health care costs, improved land values, reduced dependence on the automobile, and greater employee productivity.

The goals of this study reflect solutions that would affect the most pressing issues for communities within the Coyote Creek Watershed. This study proposes a set of six principles that can help create this new model and meet the needs of the residents and the ecosystem. The extent to which these principles realize ecological, economic, and human health can be understood through an evaluation of the principles against the goals described for this study and for green redevelopment.

Evaluation	GOALS & OBJECTIVES	Increase health of natural systems			Restore natural hydrological function wherever possible				
PRINCIPLE		Manage low flows of stormwater runoff	Preserve and restore habitat	Provide wildlife corridors	Decrease imperm-eable surfaces	Decrease storm water runoff	Increase passive groundwa-ter recharge	Capture water on site	Improve water quality
Start Upstream	Raise Awareness								
	Treat runoff before it reaches the stream								
	Educate children								
	Preserve habitat								
	Open communication								
Connect The Dots	Plan a green infrastructure network								
	It all starts with land use								
Use Nature as a Guide (See the Ripple Effect, p. 114)	Maximize resource efficiency								
	Provide redundant systems								
	Create flexible space								
	Enhance quality of spaces								
	Clean air and water								
All Fronts, No Backs	Maximize all space								
	Make processes visible								
	Prioritize pedestrian and mass transportation								
Manage For The Long Term	Establish deep roots								
	Love it and leave it								
Fulfill Multiple Objectives	Collaborate and plan at all scales								
	Value cumulative effects								
	Measure performance not means								

Use nature's services to reduce resource use				Provide high-quality environments for all			Raise awareness about natural processes		
Optimize passive daylighting and cooling	Shade vehicular and pedes-trian spaces	Optimize access to mass transit	Increase pedestrian comfort	Provide access to nature	Provide safe and comfort-able public places	Provide connectivity	Increase visibility of natural elements	Empower community	Encourage cooperation

The Ripple Effect

Conventional Development Design Solutions:

1. Landscape requiring high amounts of irrigation and maintenance
2. Large unshaded parking lots that require continuous maintenance
3. Heating, ventilation, and air-conditioning unit (HVAC) to artificially moderate inside temperatures
4. Large, structural system for stormwater management includes gutters, drains, pipes, and concrete channels
5. Extensive and inefficient indoor lighting
6. Removal of local vegetation
7. Continuous maintenance, widening, and building of roads by municipalities
8. Narrow sidewalks and uncomfortable bus stops

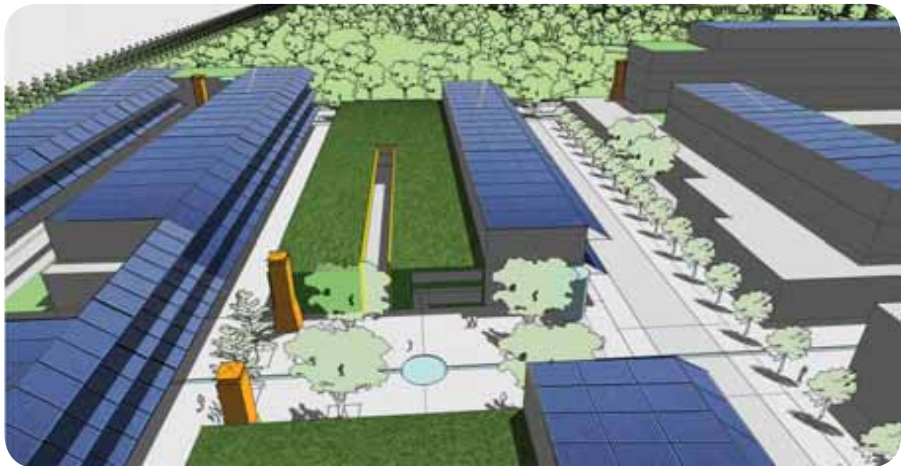
The Ripple Effect of Conventional Design:

Principle example: Use Nature as a Guide

Ecological Effect
- Runoff impairs the "beneficial uses" of creeks and rivers, and damages habitat
- High impermeability results in low, and at times polluted, groundwater recharge
- Quality wildlife habitat is lost and not restored, pushing wildlife out of the region
- Lack of transportation options forces automobile use, increases the global warming trend, and vegetation damage due to air pollution

Economic Effect
- Spending on downstream water treatment
- Parking lots and nonreflective surfaces increase temperature of the community and spending on air conditioning.
- Lost tourist income when poor water quality closes beaches
- Healthcare spending on illnesses from air and water pollution and stress from an automobile dependent lifestyle
- Gasoline consumption due to traffic congestion, lack of transportation options, and unshaded parking
- Inefficient design increases energy costs and resource use, and lost income
- Resources that can be re-used are treated as a waste

Effect on Human Health and Comfort
- Narrow sidewalks on wide streets create unsafe and uncomfortable pedestrian
- High impermeability increases flooding downstream
- Lost health benefits from access to nature
- Schools do not provide examples for resource efficiency, improving water and air quality, or creation of quality spaces for people and wildlife
- Spaces become unsafe at different times of the day due to their single purposes
- Public and quasi-public spaces are not comfortable or safe for gathering, or even for short term association



The Ripple Effect of Green Design:

Principle example: Use Nature as a Guide

Ecological Effect:
• Wildlife return to the watershed, inhabiting the tree canopy, green roofs, swales, constructed wetlands, creeks, meadows, and other vegetation
• Wildlife survival is improved as tree canopy filters airborne particulates and runoff is filtered before reaching the creek
• Improved air quality reduces global warming, while also saving land devoted and damaged by energy production
• Channelized creeks and rivers are revegetated, allowing for wildlife to return and water quality to be improved

Economic Effect:
• Businesses and individuals save money from reduced climate control needs, increasing funds available for salaries
• People spend less on automobile travel and can spend more on other needs, improving division of personal spending
• Operations and maintenance spending reduction allows for increased spending on green construction and technologies
• Consumers and renters frequent quality, environmentally friendly spaces, helping to lower costs for green products

Green Redevelopment Design Solutions:

1. To maximize resource efficiency (water): Cisterns, gutters, runnels, pipes, earth forming, drought tolerant landscape and a greywater system
2. To maximize resource efficiency (energy): Solar panels and awnings, building orientation to catch cooling breezes and natural light, green roofs, shade trees, low reflective surfaces, pedestrian and shared transportation options, wide sidewalks separated from the street
3. To clean air and water (water): Swales, gravel parking modules, green roofs, permeable paving, wetlands, native grass meadow, and other permeable surfaces; wide, shaded, and safe sidewalks, shared transportation options, tree canopy, and natural cooling
4. Quality public spaces: Human scaled plazas, shade trees, diverse building forms, water features from stormwater collection system, windows to street
5. Flexible spaces: Gathering spaces for multiple uses, rolling planters and trees used for division of space

• Healthcare needs decrease, employees are more productive, and tourist income increases

Effect on Human Health and Comfort:
• Tree canopy filters airborne particulates reducing childhood asthma and other diseases
• Using nature for cleaning water, air, and human health and comfort is initiated at homes, as learnt from visible systems in public places
• Children, adults, and seniors are motivated to walk, improving mental and physical well being.
• Comfortable, quality spaces promote gathering and a greater sense of community flourishes
• Skill-based jobs become locally available, providing parents with shorter commutes and more time with family
• Children, who learn and play in nature, grow up to care for the environment

Water Budget

Redundant permeable surfaces throughout the commercial site act as a catchment train, slowing, filtering, and infiltrating runoff. Rain falls on permeable surfaces, except for the pavement in the parking modules, solar panels, and cisterns. All surfaces are designed to absorb the first flush, and the swales and park/garden roofs absorb almost all rain falling onto them. The swales, runnels, and cisterns act as overflow devices, catching runoff not absorbed. Cisterns are designed to hold the runoff up to a 100-year storm from rooftops and permeable pavers. The parking module swale directs runoff from the pavement to the front swale, which also collects runoff from the street. Due to the redundant runoff infiltration and collection on site, only 592 cubic feet during a 50-year storm, and 757 cubic feet in a 100-year storm ends up in the drain. As green redevelopment spreads throughout the region, different combinations of green roofs, permeable paving, vegetation, swales, parking modules, and cisterns will create varying amounts of runoff reduction and on-site re-use. Reduction of runoff must be balanced with the needs of streams and water flow. The design for a 50-year storm is more than adequate for managing stormwater runoff with natural systems. Retaining overflow connection to the current infrastructure will provide added protection during extreme rain events.

50-Year Storm							
Surface	Water catchment material	Total rainfall on surface	Amount absorbed per design storm	Percentage caught	Runoff amount	Runoff catchment	Yearly catchment
Existing							
Commercial	Rooftops and pavement	142, 060 cf	2,060 cf	1.5%	140,000 cf	Drains	0
Proposed							
Rooftop park	3' of sub-soil	606,000 L	582,750 L	96%	23,250 L	Cistern	116,000 L
Habitat roofs	3" of sub-soil, native plants	1,610,000 L	536,614 L	33%	1,114,664 L	Cistern	5,600,000 L
Garden roof	3' of sub-soil, vegetables, trees	300,000 L	288,338 L	96%	11,663 L	Cistern	58,000 L
Solar roofs	3" of sub-soil, sedums	904,000 L	301,496 L	33%	625,696 L	Cistern	3,100,000 L
Other roofs	wood, etc.	7318 cf	0	0%	7,318 cf	Planting bed	
Permeable paving	sub-soil	59,162 cf	558,436.5 L	33%		Street swale	
Pathways' planting beds	sub-soil, grasses, trees, shrubs	4402 cf plus 7318 cf (runoff from impermeable roofs) = 11,720	11,280 cf	95%	441 cf	Runnel, Cistern	62,439 L/ 2,205 cf
Parking modules' pavement	pavement	2421 cf	0	0%	2421 cf	Gravel beds and swale	
Parking modules' gravel beds	gravel	202 cf plus 2421 cf (runoff from pavement)=2623 cf	588 cf	29%	2,035 cf	Parking module swale	
Parking modules' swale	sub-soil, grasses, trees, shrubs	176 cf plus 2035 (runoff from gravel beds)=2211 cf	1,879 cf	85%	332 cf	Street swale	
Street swale	sub-soil, grasses, trees, shrubs	3612 cf plus 332 cf (runoff from parking module swales)=3944 cf	3,352 cf	85%	592 cf	Drain to storm sewer	
Total							8,936,440 L

100-Year Storm							
Surface	Water catchment material	Total rainfall on surface	Amount absorbed per design storm	Percentage caught	Runoff amount	Runoff catchment	Yearly catchment
Existing							
Commercial	Rooftops and pavement	177,575 cf	3,393 cf	1.9%	174,182 cf	drains	0
Proposed							
Rooftop park	3' of sub-soil	746,000 L	582,750 L	78%	163,250 L	Cistern	653,000 L
Habitat roof	3" of sub-soil, native plants	1,981,000 L	536,614 L	27%	1,485,664 L	Cistern	46,000,000 L
Roof garden	3' of sub-soil, vegetables, trees	369,000 L	288,338 L	78%	80,662 L	Cistern	320,000 L
Solar roofs	3" of sub-soil, sedums	1,113,000 L	301,496 L	27%	834,696 L	Cistern	3,300,000 L
Other roofs	wood, etc.	9,148 cf	0 cf	0%	9,148 cf	Planting bed	
Permeable paving	sub-soil	78,883 cf	19,721 cf	25%	59,162	Street swale	
Pathways' planting beds	sub-soil, grasses, trees, shrubs	5,530 cf plus 9,148 cf (runoff from impermeable roofs) = 146,78 cf	14,125 cf	96%	553 cf	Runnel, Cistern	62,637 L/ 2212 cf
Parking modules	pavement	3,641 cf	0 cf	0%	3,641 cf	Gravel beds and swale	
Parking modules' gravel beds	gravel	252 cf plus 3,641 cf (runoff from pavement)=3,893 cf	588 cf	15%	3,335 cf	Parking module swale	
Parking swale	sub-soil, grasses, trees, shrubs	221 cf plus 3,335 cf (runoff from gravel beds) = 3,556 cf	2,802 cf	85%	533 cf	Street swale	
Street swale	sub-soil, grasses, trees, shrubs	4,512 cf plus 533 cf (runoff from parking module swales) = 5,045 cf	4,288 cf	85%	757 cf	Drain to storm sewer	
Total							50,335,637 L

Irrigation					
Existing					
Parking lot landscape	36, 763 gallons/week				
Proposed					
Surface	**Irrigation needs**	**Source**	**Availability/year**	**% of needs met**	**Supplemental water needed**
Rooftop park	104,545 cf/year	Residential greywater	1,171,042 cf	100%	0
Habitat greenroofs	minimal	Extra greywater	951,317 cf	100%	0
Kitchen garden roof	6 gal/sq. yard/wk. = 16,566 gal/week, 2,215 cf/week, 115,180 cf/year	Residential greywater	1,171,042 cf	100%	0
Solar roofs	minimal	Extra greywater	951,317 cf	100%	0
Pedestrian pathways' plant beds	minimal	Extra greywater	951,317 cf	100%	0
Parking modules' swale	minimal	Extra greywater	951,317 cf	100%	0
Street swale	minimal	Extra greywater	951,317 cf	100%	0
Roof runoff in cistern		50-year storm	8,936,440 L		
		100-year storm	50,335,637 L		

LEED-ND Evaluation

LEED (Leadership in Energy and Environmental Design) is a voluntary rating system for "high-performance, sustainable buildings" and neighborhoods that provides a framework for assessing building performance and meeting sustainability goals at multiple scales (USGBC 2006). Obtaining certification has become the standard for defining "green building" in the United States. The United States Green Building Council created the rating system with the intention to not only develop a national standard, but to stimulate the green market and raise awareness of green building benefits. Many municipalities, organizations, businesses, and developers have followed suit, mandating LEED for all new buildings.

LEED for Neighborhood Development (LEED-ND), a standard aimed at improving land-use patterns, neighborhood design, and technology, provides an additional analysis of the case study design and policy recommendations (USGBC 2006). The point system for LEED-ND places emphasis on elements that relate to the larger region and landscape. Obtaining certification means that the design, whether an infill redevelopment, part of a neighborhood, or a whole neighborhood, included qualities of an ideal neighborhood, including:

- Has a legible center and edge
- Is limited in size
- Typically five minutes average walk from center to edge
- Has a mix of land uses, to allow for some basic daily needs to be satisfied within the neighborhood
- Accommodates a diversity of household types
- Has an integrated network of walkable streets has special sites reserved for public spaces and civic buildings (USGBC 2006)

The goals of LEED-ND and the case study principles are similar, and illustrate the relevance of the case study's proposed design and policy recommendations to a larger national movement.

LEED-ND goals:

- To encourage developers and community leaders to revitalize existing urban areas
- Reduce land consumption
- Reduce automobile dependence
- Promote pedestrian activity
- Improve air quality
- Decrease polluted stormwater runoff
- Build more livable, sustainable, enduring communities for people of all income levels (USGBC 2006)

In a conceptual evaluation to the LEED-ND requirements, the case study design and planning recommendations can meet the platinum level, if coupled with an operations and management plan. The operations and management plan would include:

- A pricing schedule for units that includes a diversity of rates
- The use of energy efficient lighting and appliances
- Provision of a transit subsidy for employees
- Documentation of how buildings meet 15% below the ASHRAE/IESNA Standard 90.1 - 1999 or 15% below the local energy code, whichever is more stringent
- Design and construct all buildings in the project such that each uses 20% less water than the water use baseline set forth in the Energy Policy Act of 1992, or the local code, whichever is more stringent
- Tree growth so that shade is provided within five years
- For common or public amenities (street lights, lift stations, traffic lights), equipment used should comply with the appropriate equivalent of ASHRAE/IESNA Standards or the local energy code, whichever is more stringent.
- Documentation that on-site power generation is sufficient to meet at least 5% of the energy needs of all building uses and commonly owned infrastructure in the project.
- Stipulate standards in deed restrictions, CC&Rs, or other binding development documents, showing that all requirements will be in force in perpetuity.

In order to met certain credits the construction/post-occupancy plan must:

- Show certification of buildings as LEED-NC
- Use salvaged, refurbished, or reused materials for at least 5% of all materials in new shared infrastructure
- Use materials with recycled content such that the sum of post-consumer recycled content plus one half of the post-industrial recycled content in at least 10% of the total value of the common and public infrastructure
- Build common and public infrastructure using a minimum of 20% of materials that are manufactured, extracted, harvested or recovered within a radius of 500 miles of the project.
- Develop and implement a construction waste management plan that quantifies material diversion goals and the procedures for achieving them
- Recycle and/or salvage construction, demolition and land clearing waste generated through infrastructure development and construction of public or common amenities such that either:
  (A) 50% of these wastes are diverted from landfills, or
  (B) 25% of these wastes are recycled or reused on-site.

The following is a checklist of the LEED-ND elements met by the case study's policy and design recommendations, when coupled with an operations and management plan:

Title	Points Earned by Case Study and Policy
Location Efficiency (28 Points)	
Prerequisite: Transportation Efficiency	
Prerequisite: Water and Stormwater Infrastructure Efficiency	
Contaminated Brownfields Redevelopment	0 out of 4
High Cost Contaminated Brownfields Redevelopment	0 out of 1
Adjacent, Infill, or Redevelopment Site	10 out of 10
Reduced Automobile Dependence	0 out of 6
Contribution to Jobs-Housing Balance	4 out of 4
School Proximity	1
Access to Public Space	2 out of 2
Environmental Preservation (13 Points)	
Prerequisite: Imperiled Species and Ecological Communities	
Prerequisite: Parkland Preservation	
Prerequisite: Wetland and Water Body Protection	
Prerequisite: Farmland Preservation	
Prerequisite: Erosion and Sedimentation Control	
Support Off-Site Land Conservation	2 out of 2
Site Design for Habitat or Wetlands Conservation	1
Restoration of Habitat or Wetlands	1
Conservation Management of Habitat or Wetlands	0 out of 1
Steep Slope Preservation	0 out of 1
Minimize Site Disturbance During Construction	1
Minimize Site Disturbance Through Site Design	1
Maintain Stormwater Runoff Rates	1
Reduce Stormwater Runoff Rates	1
Stormwater Treatment	2 out of 2
Outdoor Hazardous Waste Pollution Prevention	1

Title	Points Earned by Case Study and Policy
Compact, Complete, and Connected Neighborhood (42 Points)	
Prerequisite: Open Community	
Prerequisite: Compact Development	
Prerequisite: Diversity of Uses	5 out of 5
Compact Development	1
Transit-Oriented Compactness	2 out of 3
Diversity of Uses	2 out of 3
Housing Diversity	2 out of 2
Affordable Rental Housing	2 out of 2
Affordable For-Sale Housing	1 out of 2
Reduced Parking Footprint	1 out of 2
Community Outreach and Involvement	1
Block Perimeter	4 out of 4
Locating Buildings to Shape Walkable Streets	1
Designing Building Access to Shape Walkable Streets	1
Designing Buildings to Shape Walkable Streets	1
Comprehensively Designed Walkable Streets	1 out of 2
Street Network	1
Pedestrian Network	1
Maximize Pedestrian Experience	1
Superior Pedestrian Experience	2 out of 2
Applying Regional Precedents to Urbanism and Architecture	1
Transit Subsidy	1 out of 3
Transit Amenities	1
Access to Nearby Communities	1
Adaptive Reuse of Historic Buildings	0 out of 2

Title	Points Earned by Case Study and Policy
Resource Efficiency (25 Points)	
Certified Green Building	5 out of 5
Energy Efficiency in Buildings	1 out of 3
Water Efficiency in Buildings	2 out of 2
Heat Island Reduction	1
Infrastructure Energy Efficiency	1
On-Site Power Generation	1
On-Site Renewable Energy Source	1
Efficient Irrigation	1
Greywater and Stormwater Reuse	1
Wastewater Management	1
Reuse of Materials	1
Recycled Content	1
Regionally Provided Materials	1
Construction Waste Management	1
Comprehensive Waste Management	1
Light Pollution Reduction	1
Contaminant Reduction in Brownfields Remediation	0 out of 1
Other (6 Points)	
Anticipated Accredited Professional Innovation	2 out of 2
Anticipated Innovation Credit(s)	3 out of 4
Total	97 = Platinum score

Sources: USGBC 2006; USGBC 2005

Many of the LEED-ND credits will be earned through decisions during construction, operations and management stages. The case study design and policy recommendations were developed with this phasing in mind, so that the site provides the ecological, economic, and social services that are the intent of LEED-ND. This conceptual evaluation revealed areas where policy and design recommendations can be expanded upon. Future planning should focus on social justice, regional transportation, land conservation, adaptive reuse, and brownfield remediation.

Anticipated Certification Levels

(Percentages taken from the "LEED Product Development and Maintenance Manual")

Certified: 46-56 points (40% of total points)
Silver: 57-67 points (50% of total points)
Gold: 68-90 points (60% of total points)
Platinum: 91-114 points (80% of total points)

The ripple effect turns green into gold...

Conclusion

"This is not the grand-sweep approach to regional design, but in the aggregate, it is the host of small pictures and the perception of them that is, for most people, the true regional design (Whyte 1968)."

The time for a green infrastructure is now…

Southern California is a nearly built-out region, and though surrounded by forests and mountain ranges, natural areas are rapidly disappearing near suburban and urban centers. The effects of nature's absence are broad and distressing. Air and water pollution put the public at risk of health problems. Broken ecosystems provide less habitat for wildlife and refuge for people. Inefficient resource use puts the region at risk of energy and water shortages — the current gasoline price escalations are a reminder of the possible implications. In everyday places, children have little access to nature and its physical, mental, and emotional health benefits. Furthermore, they have no means to garner an understanding of natural systems and processes, the very things that support their survival. Our public and quasi-public places are too often forgotten landscapes — the leftover pieces after commerce is considered. Sidewalks and parking lots are not amenities … They make up the everyday experiences of their users. Their design determines how comfortable, safe, and accessible a community is. Schoolyards are not just places where children exercise … They shape how children perceive themselves, their peers, and their world. Their form and function can shape children who think life is about turf and competition — or who think life is about constant change, exploration, and cooperative learning.

The public has become all but immune to landscapes with little in place to support human health and well-being. Public awareness and early natural education can infuse this region with the understanding and compassion necessary to spark a green movement. Planning green redevelopment for high-quality air, water, and spaces is critical for ecological, economic, and human health.

Cities can use these Six Principles for Policy and Design to implement and measure the effects of their own initiatives and development applications. Cities can take steps to encourage the green practices outlined in this document, such as educating developers and expediting the approval process for green projects. Providing transparency in the approval process and making city staff available for continual discussion with developers is another way to provide developer incentive and to speed the process. The sooner these projects come to fruition, the sooner their ideas can spread, and the sooner the cumulative benefits and achievement of fulfilling multiple objectives will be seen. Start Upstream can preserve what is working while planning for the future. Connect the Dots can fill in the gaps of current planning, to make better land use decisions and increase ecological health. Use Nature as a Guide can provide quality and resource-efficient spaces with high functionality and nothing to hide. All Fronts, No Backs efficiently uses all available spaces. Manage for the Long Term will assure high-quality environments that take less energy and time to maintain in the future. Fulfill Multiple Objectives shows cities will have ecological, social, and economic benefits not only in the near term, or for the life cycle of a building, but over the life cycles of generations.

Conceptual case study demonstration site perspective

1. Start Upstream

2. Connect the Dots

3. Use Nature as a Guide

4. All Fronts, No Backs

5. Manage for the Long-Term

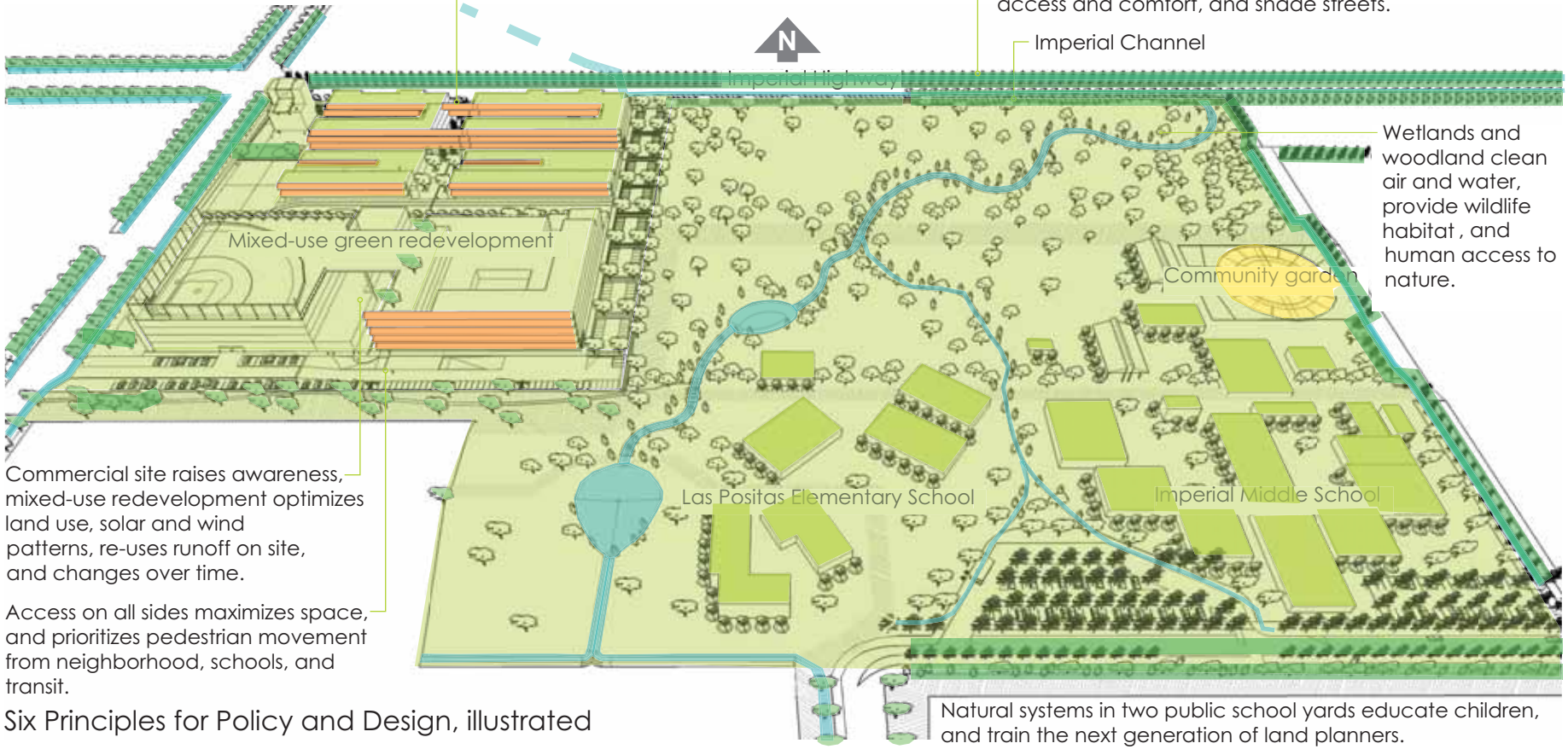
6. Fulfill Multiple Objectives

The Green Center provides training and education on maintenance and is a place for collaborative planning for the community, developers, and city and regional planners.

Development includes a transit stop at one entrance, and connects to a biking and walking trail and demonstrates the importance of investing now for ecological, economic, and human health.

Plants and materials are chosen to be climate and space-appropriate, to minimize irrigation and maintenance needs.

Tree-planted swales capture first flush, provide habitat connectivity with canopy, pedestrian access and comfort, and shade streets.



Wetlands and woodland clean air and water, provide wildlife habitat , and human access to nature.

Commercial site raises awareness, mixed-use redevelopment optimizes land use, solar and wind patterns, re-uses runoff on site, and changes over time.

Access on all sides maximizes space, and prioritizes pedestrian movement from neighborhood, schools, and transit.

Natural systems in two public school yards educate children, and train the next generation of land planners.

Six Principles for Policy and Design, illustrated

Green Resources

Coyote Creek Watershed Management Plan

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Local Government Commission

"The LGC is a nonprofit organization working to build livable communities."

The Ahwahnee Water Principles for Resource Efficient Land Use

New Tools for Water-Wise Land Use

The Local Government Commission has developed a comprehensive and integrated set of principles and policies (based on whole system planning) called the Ahwahnee Water Principles for Resource Efficient Land Use. The Ahwahnee Water Principles offer communities common sense and straightforward ways to address multiple water resource issues with smart planning and land use decisions.

The Ahwahnee Water Principles provide the communities of California a broader, more coordinated and more flexible water management system that tackles water quality, supply and flood risks together.

Applying the Ahwahnee principles in your community and working with neighboring jurisdictions, agencies, and partners to do them to do the same will result in win/win solutions for long-term regional and watershed-wide benefits.

The Ahwahnee Water Principles complement the Ahwahnee Principles for Resource-Efficient Communities that were developed in 1991. Many cities and counties are already using them to improve the vitality and prosperity of their communities.

Preamble

Cities and counties are facing major challenges with water contamination, storm water runoff, flood damage liability, and concerns about whether there will be enough reliable water for current residents as well as for new development. These issues impact city and county budgets and taxpayers. Fortunately there are a number of stewardship actions that cities and counties can take that reduce costs and improve the reliability and quality of our water resources.

The Water Principles below complement the Ahwahnee Principles for Resource-Efficient Communities that were developed in 1991. Many cities and counties are already using them to improve the vitality and prosperity of their communities.

Authors: Celeste Cantu, Martha Davis, Jennifer Hosterman, Susan Lien Longville, Jeff Loux, John Lowrie, Jonas Minton, Mary Nichols, Virginia Porter, Al Wanger, Robert Wilkinson, Kevin Wolf **Editor:** Judy Corbett

(Adopted in 2005)

For more information, contact the LGC Center for Livable Communities: 916-448-1198, ext 321.

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Community Principles

1. Community design should be compact, mixed use, walkable and transit-oriented so that automobile-generated urban runoff pollutants are minimized and the open lands that absorb water are preserved to the maximum extent possible. (See the Ahwahnee Principles for Resource-Efficient Communities)
2. Natural resources such as wetlands, flood plains, recharge zones, riparian areas, open space, and native habitats should be identified, preserved and restored as valued assets for flood protection, water quality improvement, groundwater recharge, habitat, and overall long-term water resource sustainability.
3. Water holding areas such as creek beds, recessed athletic fields, ponds, cisterns, and other features that serve to recharge groundwater, reduce runoff, improve water quality and decrease flooding should be incorporated into the urban landscape.
4. All aspects of landscaping from the selection of plants to soil preparation and the installation of irrigation systems should be designed to reduce water demand, retain runoff, decrease flooding, and recharge groundwater.
5. Permeable surfaces should be used for hardscape. Impervious surfaces such as driveways, streets, and parking lots should be minimized so that land is available to absorb storm water, reduce polluted urban runoff, recharge groundwater and reduce flooding.
6. Dual plumbing that allows graywater from showers, sinks and washers to be reused for landscape irrigation should be included in the infrastructure of new development.
7. Community design should maximize the use of recycled water for appropriate applications including outdoor irrigation, toilet flushing, and commercial and industrial processes. Purple pipe should be installed in all new construction and remodeled buildings in anticipation of the future availability of recycled water.
8. Urban water conservation technologies such as low-flow toilets, efficient clothes washers, and more efficient water-using industrial equipment should be incorporated in all new construction and retrofitted in remodeled buildings.
9. Ground water treatment and brackish water desalination should be pursued when necessary to maximize locally available, drought-proof water supplies.

Implementation Principles

1. Water supply agencies should be consulted early in the land use decision-making process regarding technology, demographics and growth projections.
2. City and county officials, the watershed council, LAFCO, special districts and other stakeholders sharing watersheds should collaborate to take advantage of the benefits and synergies of water resource planning at a watershed level.
3. The best, multi-benefit and integrated strategies and projects should be identified and implemented before less integrated proposals, unless urgency demands otherwise.
4. From start to finish, projects and programs should involve the public, build relationships, and increase the sharing of and access to information.
5. Plans, programs, projects and policies should be monitored and evaluated to determine if the expected results are achieved and to improve future practices.

Water Conservation

"Every time water is wasted, money and a precious resource go down the drain."

California Water Plan Update 2005

The Need for Water Conservation in California

Our population is growing rapidly – with 12 million more residents coming to California by 2030 – but our water supplies are fixed and limited. If the current per-capita water use of 230 gallons per day remains constant, we will need to increase our water supply by 40% in the next 25 years.

However, there is no "new source of water," and California is threatened with a loss of the water we already have. Water from the Colorado River for use by Southern California communities is being reduced. Concerns about groundwater contamination are limiting existing water supplies throughout the state.

Future growth might require even more water. Half of the new growth in the state will occur in inland regions where drier climates increase water needs for landscaping.

Local Government Commission

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One of five fact sheets on "Addressing the Disconnect: Water Resources and Local Land Use Decisions"

Drought Conditions Exacerbate the Problem

Drought is a fact of life in California. During the state's last drought:

- Reservoirs dropped by 40%.
- Central Valley Project water supplies fell by 60%.
- Municipal supplies were cut 45%, requiring severe watering restrictions.
- Hydro-electric power generation was cut in half.
- Forest fires and pine beetles devastated forests.
- Private and domestic wells went dry.
- The value of agricultural land dropped precipitously.
- Populations of sport and commercial fish species declined.
- Rivers and streams ran dry.
- Water-based tourism fell, with small communities hit hardest by drought.

Water Conservation as a New Source of Water

Recent reports by the Pacific Institute find that water conservation is the largest, least expensive and most environmentally sound source of water for meeting future needs.

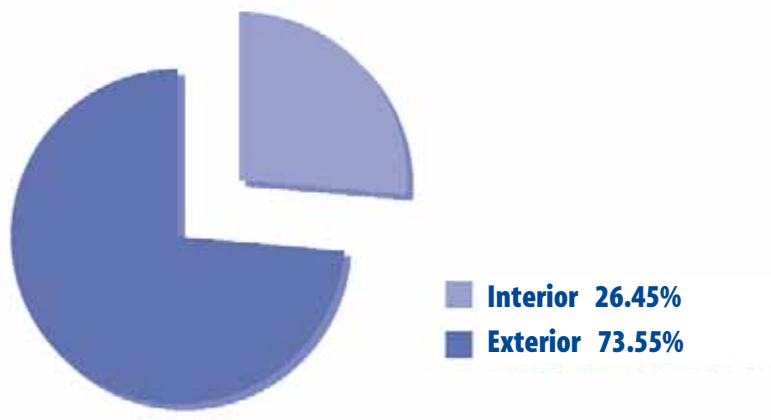
The California Department of Water Resources estimates an additional 1.5 to 2.5 million acre feet of urban water conservation is achievable. Two to 2.5 million acre feet should be adequate to meet the annual water needs of population growth over the next 25 years.

Urban areas – particularly residential uses – provide the greatest opportunity for cost-effective water savings through conservation.

More than half of urban (non-agricultural) water demand is for residential use; and much of that, often greater than 50%, goes to outdoor landscaping. Outdoor water use can be reduced by 20% to 75% with improved landscape techniques.

Without adding new technologies, currently available conservation measures – replacing inefficient toilets, washing machines, showerheads and dishwashers, and reducing leaks – could save enough water to supply more than 800,000 new homes.

Single-Family Residential Water Use California, 2001



Marin County Finds Water Savings in Residential Landscaping

A study of condominiums and townhouse complexes in Marin County found that traditional landscaping used 126 to 216 gallons per dwelling unit daily. Water-conserving landscapes at similar complexes reduced water use by greater than 50%.

The North Marin Water District offers residential customers a cash rebate for reducing the amount of lawn area in their landscapes. The District offers $25 per 100 square feet of regularly irrigated lawn area removed. The rebate is limited to $200 for single-family dwellings, $100 for townhouses or condos, and $100 for apartments. The removed turf must be replaced with water-conserving plants, vegetable gardens or other low water-using plants. Water-efficient irrigation systems must also be installed.

The District offers participants an additional rebate of up to $100 to pay for either 25% of the cost of mulch or 50% of the cost of approved irrigation supplies. For more info: www.nmwd.com/c4g.html

State Laws Give Conservation a Boost

"There is the potential for a 20% reduction in urban water use over the next 25 years – despite a substantial increase in population. Significantly, these water savings are made without investing in new technology."

– The Pacific Institute

Article X of the California Constitution prohibits the waste and unreasonable use of water.

California's Water Code Section 375 allows any public entity that supplies water to adopt and enforce a water-conservation program that requires the installation of water-saving devices.

The Water Conservation in Landscaping Act (Government Code Sections 65591-65600) requires cities and counties to adopt a water-efficient landscape ordinance. The California Department of Water Resources developed a model ordinance that they can adopt or use to guide the drafting of their own requirements.

The Urban Water Management Planning Act (Water Code Sections 10620-10621, 10644) requires urban water suppliers with over 3,000 customers to adopt water management and conservation plans in five-year increments. These plans, which must be filed with local land-use planning agencies, are a key resource for water planning and coordination between water agencies and local government.

California's Water Code Section 13550-13556 requires the use of recycled water instead of potable water for landscape irrigation when recycled water is available. Use of potable water in such cases is deemed wasteful and an unreasonable use.

SB 221 (Government Code Section 66473.7) and SB 610 (Water Code Section 10910-10915) Enacted in 2001, these measures require that adequate water supplies be identified prior to the approval by local land use agencies of new developments consisting of 500 or more houses. Under these laws, water conservation is one way to meet the needs of new development.

Landscaping Reduces Demand in Palm Desert

Palm Desert's Water-Efficient Landscaping Ordinance promotes water conservation by the use of climate-appropriate landscaping and efficient irrigation, and enhances the built and natural landscape of Palm Desert.

The ordinance requires development projects to submit landscape construction plans, grading plans, irrigation design plans and landscape-maintenance schedules for review and approval by the public works department.

Palm Desert replaced lawns in street medians with drought tolerant species. The City now pays one-third less to maintain the medians and uses only one-seventh as much water.

Also, the City's Parking Lot Tree Ordinance sets specific landscaping requirements for parking lots that reduce water demand.

Economic Implications

Approximately 33% of the energy purchases by city governments in California is used for pumping water, and 23% of local energy costs are for treating wastewater.

The State Water Project is the largest single user of energy in California, consuming an average of 5 billion kilowatt-hours of electricity each year. Assuming a relatively low rate of 8¢/kWh, that's $400 million per year.

Investing in improved water efficiency creates local jobs and economic benefits. Investment in distant supplies sends money out of the local economy.

How Conservation Saves Money

- Water conservation reduces operations and maintenance costs for water treatment and pumping.
- It reduces capital costs for water supply projects – such as dams, conveyance structures or treatment facilities – by deferring, reducing or eliminating their need.
- It reduces the amount of new water supplies that must be purchased.
- It reduces wastewater flows (when conservation measures affect indoor water use), thus reducing the operating and maintenance cost of wastewater collection, treatment and disposal, and deferring capital costs for new wastewater system capacity.
- Drought-tolerant landscaping dramatically reduces water bills and is far cheaper to maintain.

Environmental Benefits

Conventional methods of increasing supplies – building more or larger dams, transporting water long distances, and excessive pumping – have harmed the state's aquatic resources. Water conservation reduces demand, allowing more water to remain in our rivers and streams for recreation, fisheries and natural habitats. Through conservation practices, we can supply enough water to meet our needs without further damaging the natural heritage of California.

Water-efficient landscaping with native and Mediterranean species and efficient irrigation can reduce the amount of green waste for disposal and emissions from landscaping equipment. Also, this type of landscaping often requires fewer pesticides, herbicides and fertilizers.

What Local Government Can Do

Planning for Conservation

Integrate water conservation policies into specific plans, zoning ordinances and design guidelines, as well as in the General Plan.

Adopt a Water Element as recommended by the Governor's Office of Planning and Research's General Plan Guidelines, and recently implemented by Sonoma County.

Audit municipal water systems to detect and repair leaks.

Count water saved as a source of water to meet the requirements of new state "show me the water" laws that require developers and planning agencies to prove that enough water is available to serve proposed new housing.

Residential Indoor Water Conservation

Require or encourage – through incentives or fees – all new development to incorporate water conservation technologies.

Require the installation of water-efficient toilets and showerheads in existing homes before re-sale.

Implement interior and exterior water audits for existing development. Create incentive programs for residents and businesses that encourage the installation of new high-efficiency toilets or retrofit water-saving devices on existing ones, faucet aerators and low-flow showerheads, and high-efficiency clothes washers and dishwashers.

Saving Water Outdoors

Adopt and/or strengthen a water-efficient landscape ordinance as required by state law, and work with local water agencies to strictly enforce it. Water-efficient landscaping includes appropriate plants, limited turf area, efficient irrigation equipment, proper grading and soil preparation, mulch and composting, grouping plants with similar water needs, and good long-term water management and landscaping maintenance practices.

Require all new municipal landscaping to minimize water use. Develop and implement a program to retrofit existing landscaping on municipal property to minimize water use.

Work with schools to improve the efficiency of their large landscaped areas.

Consider square-footage limits on turf that is not drought-tolerant, or in arid areas, consider a ban.

Zone for smaller residential lots that require less water to maintain landscaping.

Encourage the selection of drought-tolerant, native and Mediterranean plants.

Discourage or ban daytime lawn watering.

Encourage the use of rain collection systems and cisterns to store water for landscape irrigation.

Encourage the use of graywater systems in new construction. Graywater systems reuse water from bathroom sinks, bathtubs and showers to irrigate landscaping.

LA Goes Low-Flow

The City of Los Angeles is using the same amount of water as was consumed nearly 30 years ago, despite an increase in its population of over one million people. Credit for this surprising accomplishment is given to an extensive, citywide campaign to retrofit homes with low-flow toilets.

Irvine Ranch Uses Technology to Conserve Water

ET irrigation controllers use various technologies, including on-site sensors that read weather conditions and receivers for actual data on evapotranspiration (ET – water used by plants and lost to evaporation) to determine when watering is needed. The Irvine Ranch Water District's experimental use of ET controllers in 40 homes has shown a 17% water use reduction and cut runoff in half. These findings suggest that significant cost savings can be achieved.

Work with Watershed Stakeholders

Because water resources span political boundaries and are shared by communities, collaboration is a reality of modern water management. Working collaboratively to increase efficiency is more effective than acting alone because many parties are involved in the different aspects of water management and planning.

Water utilities are major participants in local and regional water policy and planning. Municipalities that work with water utilities are more likely to realize the benefits of conservation and to implement water efficiencies in local planning.

An Urban Water Management Plan (UWMP) is a requirement for all urban water purveyors with 3,000 or more customers. This plan must address supply and demand, and specify programs for ensuring water supply. They have taken on renewed importance under new water supply legislation (SB 221 and SB 610). Cities and counties, in coordination with water purveyors, are responsible for implementing this legislation. UWMPs provide an important resource. Conservation needs to be part of the UWMP and is best implemented in concert with cities and counties.

Information about Using Water Wisely

The California Urban Water Conservation Council (cuwcc.org) was created to increase efficient water use statewide through partnerships among urban water agencies, public interest organizations and private entities. Its goal is to integrate urban water conservation Best Management Practices into the planning and management of California's water resources.

Bewaterwise.com is a web site developed by the Family of Southern California Water Agencies – including the Metropolitan Water District of Southern California and Orange, Riverside, San Bernardino, San Diego, Santa Barbara and Ventura Counties – as an educational resource about using water more efficiently in that region. It provides a range of information for businesses, homeowners, developers and property managers.

StopWaste.Org has a good example of a guide that cities and counties can develop with local water suppliers to educate the public about water-efficient landscaping called "Bay Friendly Landscape Guidelines."

- For a guide on plant selection and irrigation that considers water needs: www.owue.water.ca.gov/ landscape/faq/faq.cfm.
- Take a virtual tour of a water-saving home at h2ouse.org.

LEAGUE OF CALIFORNIA CITIES

Water Boards

This fact sheet was funded by the California State Water Resources Control Board.

Suggested Language for General Plans

- All aspects of landscaping from the selection of plants to soil preparation and the installation of irrigation systems should be designed to reduce water demand, retain runoff, decrease flooding, and recharge groundwater.

–Ahwahnee Water Principle #4

Urban water conservation technologies such as low-flow toilets, efficient clothes washers, and more efficient water-using industrial equipment should be incorporated in all new construction and retrofitted in remodeled buildings.

–Ahwahnee Water Principle #8

RESOURCES

- **Local Government Commission**
  water.lgc.org
- **Ahwahnee Water Principles**
  lgc.org/ahwahnee/h2o_principles.html
- **State Water Resources Control Board**
  www.swrcb.ca.gov
- **Department of Water Resources**
  www.dwr.water.ca.gov
- **California Bay-Delta Authority**
  calwater.ca.gov
- **EPA Smart Growth and Water**
  epa.gov/watertrain/smartgrowth

editing+design: dave davis

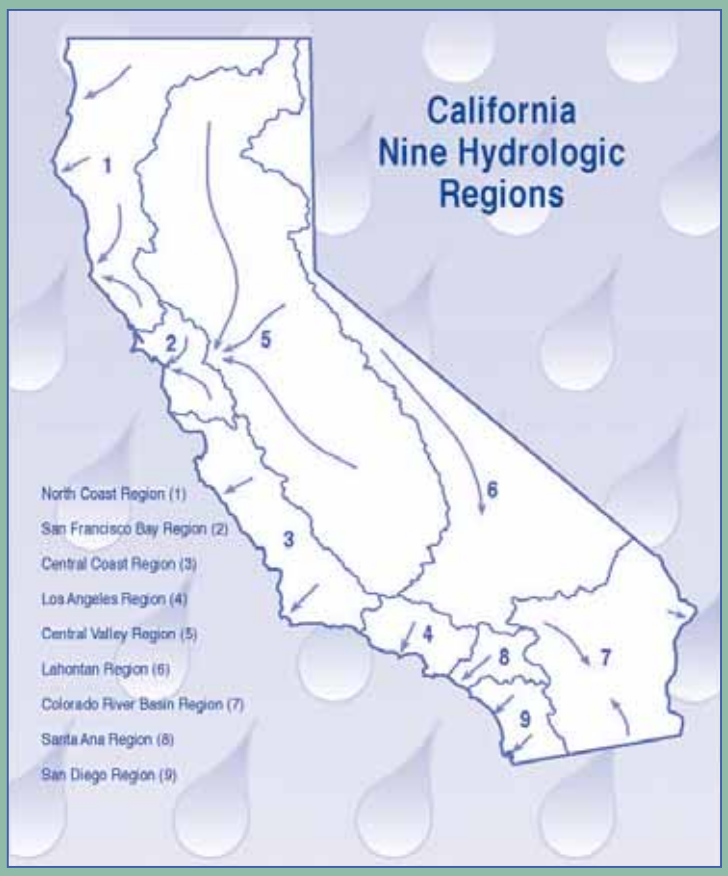
Land Use and Watersheds

How to Reduce Costs While Improving the Reliability and Quality of Water Resources

"The water in a watershed is essential for supporting all life."

Mary Nichols,
Director, UCLA Institute of the Environment

A watershed is all the land that drains into a river, stream, lake, or estuary, or flows into a groundwater basin. All land is within a watershed. The water resources within a watershed are connected, both above and below ground.



Watersheds are critical to the health and welfare of our communities – they are the source of local water supplies for homes, industry and natural habitats.

Covering a watershed with buildings and pavement has multiple, negative consequences.

Hard, impervious surfaces allow less water to infiltrate the soil. This increases urban runoff and can lead to flooding and the pollution of our existing water supplies. Impervious surfaces prevent the replenishment of underground aquifers, the source of much of our drinking water.

We need to identify watersheds that are undeveloped, determine their value, and maintain the most important ones in an undeveloped state. They are our critical sources of water.

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The Value of Watersheds to Local Communities

We have been taking our watersheds for granted. Large state and federal water projects constructed in the 1900s created the impression that communities entitled to imported water did not need to protect their own watershed. However, in 2005, a State Appeals Court blocked construction of a large industrial park in Santa Clarita after finding it would rely on water from a state water project that would not be available during a drought.

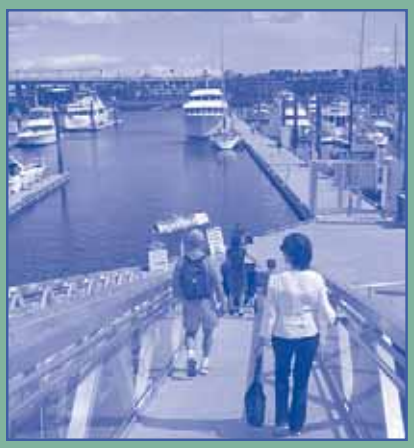
Today, we recognize that additional imported water supplies are highly unlikely, and that the most reliable water resources are the locally controlled supplies that can be protected by sustainable watershed management.

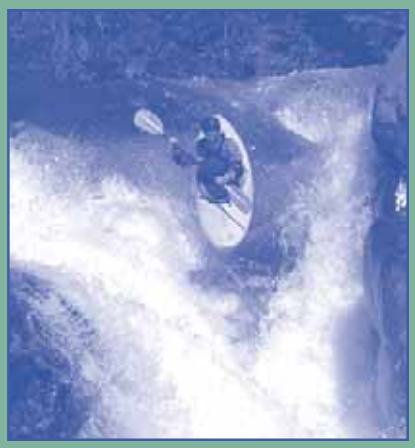
Watersheds maintain the health of forests, fisheries, wetlands, coastal resources, agricultural landscapes, habitat and water supplies. They are the foundation for a sustainable environment that supports recreational activities and healthy local economies.

Also, where land is completely paved over, treatment costs are about five times greater than in areas where less than 40% of the land in a watershed is paved.

Example: Because their local economies are dependent on fishing and tourism, the Northern California counties of Del Norte, Humboldt, Mendocino, Siskiyou and Trinity developed a watershed plan that has boosted salmon and steelhead populations and helped sustain the regional economy.

Example: New York City saved $6.5 billion in future costs by purchasing watershed lands rather than treating the contaminated water that would have resulted if they were developed.





Local Decisions Affect Regional Watersheds

Local governments for communities in the same regional watershed need to make their land-use decisions in concert with one another because each action can potentially protect or weaken the water system shared by all.

Every time a city council or county board of supervisors approves a new development, the resulting stormwater runoff has an impact on the watershed.

We are losing undisturbed areas of watersheds at a rapid rate. The U.S. population grew by 17% from 1982-97, while the amount of land covered over by development grew by an alarming 47%.

Preserving Watersheds Takes Community Teamwork

Communities need to work together to preserve their common watersheds. The benefits are many. They include:

- The preservation of local water quality.
- The preservation of adequate water supplies to support the regional economy.
- A reduced need to purchase expensive imported water.
- A reduced risk of floods.
- The preservation of natural habitats and the recreational resources that residents value.

Opportunities for Watershed Protection and

Communities should develop strategies with other stakeholders in the watershed to assure the preservation of undeveloped watershed areas, protect current water supplies, and reduce flooding. There are many venues for accomplishing this.

City/County Cooperation

Cities and counties can work together to protect their watershed.

Example: San Diego County and the cities of Escondido, Encinitas and Solana Beach formed a watershed-preservation partnership that facilitated the purchase of watershed land in collaboration with the San Elijo Lagoon Conservancy and the Escondido Creek Conservancy.

The communities are also working to maintain the land by clearing out creek debris, grappling with non-native plant species that crowd out native plants, and restoring native, natural shoreline habitats that filter pollution before it enters receiving bodies of water.

Example: Rather than continuing to try to tame the Napa River through a series of technological devices, a community coalition of county and city officials, winemakers, farmers, Army engineers, environmentalists, business leaders and community-based organizations developed a watershed management plan that will save

$26 million per year by protecting 2,700 homes, 350 businesses and more than 50 public properties from flooding.

Spearheaded by local elected officials, Napa County residents voted to pay for the project by passing a ballot measure that raised the sales tax. Today, existing dikes and levees are being removed, restoring 650 acres of vital tidal wetlands, and allowing the river to run free.

Regional Planning Agencies

Councils of Government (COGs) that are responsible for producing Regional Transportation Plans have undertaken "visioning" exercises to develop regional growth strategies that identify where and how they should grow. These strategies include reducing the excessive paving of open space by planning for compact, walkable and mixed-use communities within already developed areas. These planning efforts can also specifically address water issues.

Example: San Diego's Council of Governments (SANDAG) has undertaken a visioning project that addresses where and how the region should grow. They have signed an MOU with the San Diego County Water Authority that makes water supply a component of the overall growth management strategy.

Example: In Northern California, the Association of Bay Area Governments' CalFed Task Force, in cooperation with the Bay Area Water Forum, sent letters to every county supervisor and mayor in the nine-county region to encourage them to incorporate the Ahwahnee Water Principles into their planning documents.

Metropolitan Planning Organizations (MPOs) are often, but not always, the same as the COG. In some areas, MPOs have developed complementary "carrots and sticks" to provide incentives for smart growth and transit-oriented developments. Nothing prevents them from pursuing further strategies specifically designed to protect their regional watersheds.

...Leadership Ideas for Elected Officials

Growth decisions should reflect whether water supplies are adequate to meet current and new demands on water supplies.

Local Agency Formation Commissions (LAFCOs)

A 1995 addition to the California Water Code (Section 10910) permits LAFCOs to require cities that want to increase their sphere of influence to provide information that can help determine if existing and planned future water supplies are adequate to meet current and new demands on these water supplies.

Although LAFCOs do not create conditions of approval, elected officials who serve on their boards can base their decisions on the impact of the proposed expansion on the local watershed. The Ahwahnee Water Principles could be added by individual LAFCOs as a guideline for approval.

Example: Sacramento County's LAFCO denied an annexation request by the City of Folsom because the local water agency concluded water supplies were inadequate to serve the new development of 15,000 homes.

City/County Coordination with Water Suppliers

The Urban Water Management Planning Act requires urban water suppliers with more than 3,000 customers to adopt an Urban Water Management Plan that explains how the agency will supply adequate water to meet the growth needs projected in up-to-date city and county land use plans in five-year increments.

This offers new opportunities to coordinate watershed protection on a sub-regional or regional basis, including the preservation of important open space.

Watershed Groups

Watershed management plans have been developed over the years by all sorts of watershed groups consisting of many stakeholders, including local governments, landowners, resource conservation districts, land conservancies, nonprofit organizations, and water supply agencies and water treatment operators. Most have acquired state and federal funds matched by local funds to preserve their local watersheds.

Example: In 1998, a group that included foundations, two conservancies and a resource conservation district signed a formal agreement to protect and improve the Carlsbad Hydrologic Unit through a collaborative watershed management plan. San Diego County and seven cities joined the efforts, along with federal, state and regional government agencies and nonprofit organizations. The project protects and restores habitat, and acquires watersheds to protect them from development.

More Opportunities for Watershed Protection

Integrated Regional Watershed Management Plans (IRWMP)

IRWMPs are a new program funded by a water bond approved by the voters in 2002. The bond provides grants for local projects if they are part of a collaborative regional planning effort. The plans may be the best tool available for local governments to plan future projects with water suppliers and develop mutually beneficial strategies.

Example: The Santa Ana Regional Watershed Planning Authority covers a Southern California region projected to grow by 5-10 million residents in the next 50 years. The Santa Ana IRWMP includes a message to the planning community to "integrate watershed thinking into the everyday planning process."

Ballot-Box Tools

In several regions of California, voter initiatives have led to urban limit lines that preserve watersheds by specifying where cities should grow – and where they should not. Sonoma and Ventura Counties have approved measures on a countywide level.

Example: In 1990, residents voted to create the Sonoma County Agricultural Preservation and Open Space District. It has acquired or protected from development more than 58,000 acres of land, using funds from a local sales tax. City leaders followed this countywide effort by pursuing a model of city-centered growth through voter-approved Urban Growth boundaries around eight of the county's nine cities.

Ahwahnee Water Principles

The Ahwahnee Principles for Resource-Efficient Communities direct new growth, whenever possible, in compact development while the Ahwahnee Water Principles for Resource-Efficient Land Use guides development in undisturbed watersheds..

Suggested Language for General Plans

➙ City and county officials, the watershed council, LAFCO, special districts and other stakeholders sharing watersheds should collaborate to take advantage of the benefits and synergies of water resource planning at a watershed level.

– Ahwahnee Water Principles, Implementation Principle #2

RESOURCES

- **Local Government Commission**
  water.lgc.org
- **Ahwahnee Water Principles**
  lgc.org/ahwahnee/h2o_principles.html
- **State Water Resources Control Board**
  www.swrcb.ca.gov
- **California Department of Water Resources**
  www.dwr.water.ca.gov
- **California Bay-Delta Authority**
  calwater.ca.gov
- **Center for Watershed Protection**
  www.cwp.org

LEAGUE OF CALIFORNIA CITIES

Water Boards

This fact sheet was funded by the California State Water Resources Control Board.

editing+design: dave davis

FACT SHEET

About LEED® for Neighborhood Development

1800 Massachusetts Ave NW
Suite 300
Washington DC 20036
T 202 828-7422
F 202 828-5110
www.usgbc.org

What is LEED for Neighborhood Development?
The LEED for Neighborhood Development Rating System takes LEED beyond buildings. Currently under development, LEED for Neighborhood development integrates the principles of smart growth, new urbanism, and green building into the first national rating system for neighborhood design. It is being developed by USGBC in partnership with the Congress for the New Urbanism (CNU) and the Natural Resources Defense Council (NRDC).

What is the significance of LEED for Neighborhood Development certification?
LEED for Neighborhood Development will recognize development projects that successfully protect and enhance the overall health, natural environment, and quality of life of our communities. LEED promotes more efficient energy and water use – especially important in urban areas where infrastructure is often overtaxed. It will also encourage smart growth and new urbanist best practices, promoting the design of neighborhoods that reduce vehicle miles traveled and communities where jobs and services are accessible by foot or public transit. LEED for Neighborhood Development will include best practices in:

- Smart location and transportation linkage
- Environmental preservation
- Compact, complete, and connected neighborhoods
- High-performance, green construction and technology

What is the status of LEED for Neighborhood Development?
The LEED for Neighborhood Development Core Committee completed its first preliminary draft in September 2005 and held a comment period immediately afterwards. A document summarizing their responses to comments along with the pilot version of the rating system will be posted when the pilot launches. The pilot program is expected to launch in December 2006. The Core Committee will use the information learned during the pilot program to make further revisions and the resulting draft will be posted for public comment before it is submitted for the final ballot vote.

- *December 2006*: Pilot Program begins.
- *Spring 2008*: Public Comment periods begin.
- *Late Fall 2008*: Member Ballot and full product launch.

How will LEED for Neighborhood Development be different from the Market Sector Application for Multiple Buildings and On-Campus Building Projects?
A key difference is that LEED for Neighborhood Development – unlike the Multiple Buildings and On-Campus Building Projects application -- incorporates smart growth principles. LEED for Neighborhood Development focuses on residential, commercial, and mixed-use developments developed by a single entity but often sold or leased to multiple consumers while the Multiple Buildings and On-Campus Building Projects application will target institutional and office park campuses, which are typically owned and managed by a single entity.

Where can I learn more about USGBC and LEED for Neighborhood Development?

USGBC has a variety of resources for you to learn more and get involved with LEED for Neighborhood Development:

- **Visit the Web site**: Go to www.usgbc.org/leed to learn more about LEED, download case studies and more.

- **Receive updates and get Involved**: The LEED for Neighborhood Development Core Committee does the day-to-day work of developing the rating system, while a second, larger corresponding committee allows interested stakeholders to stay updated and provide feedback. The corresponding committee is invited to comment on draft versions and will have the first opportunity to respond to the call for LEED pilot projects. In addition, LEED for Neighborhood Development Corresponding Committee members receive minutes from Core Committee meetings and notification of LEED events. The Corresponding Committee is open to USGBC members and nonmembers but there are different ways to join:
  - USGBC members can visit www.usgbc.org, click on Your Account, and subscribe to the LEED committee listserv.
  - Others can send an e-mail to nd@committees.usgbc.org requesting to be added to the Corresponding Committee.
- **Become a member**: Encourage your company to join USGBC. USGBC members are not only recognized leaders in supporting a better built environment; member company employees have access to USGBC resources, can participate in committees and member circles, and enjoy a wide array of discounts on USGBC publications, programs and services.
- **Get involved with your local chapter:** USGBC chapters routinely host informative presentations and are a great way to connect with other professionals in your region who have experience implementing. Find the USGBC chapter nearest you at www.usgbc.org/chapters.
- **Contact USGBC:** For questions related to LEED, workshops, accreditation, membership, or chapters, e-mail info@usgbc.org or call 202-828-7422.

PILOT VERSION

LEED for Neighborhood Development Rating System

Developed through a partnership of the Congress for New Urbanism, Natural Resources Defense Council and the U.S. Green Building Council

CONGRESS FOR THE NEW URBANISM

NRDC
THE EARTH'S BEST DEFENSE

Project Checklist

Smart Location & Linkage — 30 Possible Points

Prereq 1	**Smart Location**	Required
Prereq 2	**Proximity to Water and Wastewater Infrastructure**	Required
Prereq 3	**Imperiled Species and Ecological Communities**	Required
Prereq 4	**Wetland and Water Body Conservation**	Required
Prereq 5	**Agricultural Land Conservation**	Required
Prereq 6	**Floodplain Avoidance**	Required
Credit 1	**Brownfield Redevelopment**	2
Credit 2	**High Priority Brownfields Redevelopment**	1
Credit 3	**Preferred Locations**	2-10
Credit 4	**Reduced Automobile Dependence**	1-8
Credit 5	**Bicycle Network**	1
Credit 6	**Housing and Jobs Proximity**	3
Credit 7	**School Proximity**	1
Credit 8	**Steep Slope Protection**	1
Credit 9	**Site Design for Habitat or Wetlands Conservation**	1
Credit 10	**Restoration of Habitat or Wetlands**	1
Credit 11	**Conservation Management of Habitat or Wetlands**	1

Neighborhood Pattern & Design — 39 Possible Points

Prereq 1	**Open Community**	Required
Prereq 2	**Compact Development**	Required
Credit 1	**Compact Development**	1-7
Credit 2	**Diversity of Uses**	1-4
Credit 3	**Diversity of Housing Types**	1-3
Credit 4	**Affordable Rental Housing**	1-2
Credit 5	**Affordable For-Sale Housing**	1-2
Credit 6	**Reduced Parking Footprint**	2
Credit 7	**Walkable Streets**	4-8
Credit 8	**Street Network**	1-2
Credit 9	**Transit Facilities**	1
Credit 10	**Transportation Demand Management**	2
Credit 11	**Access to Surrounding Vicinity**	1
Credit 12	**Access to Public Spaces**	1
Credit 13	**Access to Active Public Spaces**	1
Credit 14	**Universal Accessibility**	1
Credit 15	**Community Outreach and Involvement**	1
Credit 16	**Local Food Production**	1

Green Construction & Technology — 31 Possible Points

Prereq 1	**Construction Activity Pollution Prevention**	Required
Credit 1	**Certified Green Buildings**	1-3
Credit 2	**Energy Efficiency in Buildings**	1-3
Credit 3	**Reduced Water Use**	1-3
Credit 4	**Building Reuse and Adaptive Reuse**	1-2
Credit 5	**Reuse of Historic Buildings**	1

Credit 6	**Minimize Site Disturbance through Site Design**	1
Credit 7	**Minimize Site Disturbance during Construction**	1
Credit 8	**Contaminant Reduction in Brownfields Remediation**	1
Credit 9	**Stormwater Management**	1-5
Credit 10	**Heat Island Reduction**	1
Credit 11	**Solar Orientation**	1
Credit 12	**On-Site Energy Generation**	1
Credit 13	**On-Site Renewable Energy Sources**	1
Credit 14	**District Heating and Cooling**	1
Credit 15	**Infrastructure Energy Efficiency**	1
Credit 16	**Wastewater Management**	1
Credit 17	**Recycled Content in Infrastructure**	1
Credit 18	**Construction Waste Management**	1
Credit 19	**Comprehensive Waste Management**	1
Credit 20	**Light Pollution Reduction**	1

Innovation & Design Process — 6 Possible Points

Credit 1	**Innovation in Design**	1-5
Credit 2	**LEED Accredited Professional**	1

Project Totals — 106 Possible Points

Certification Levels:

Certified 40-49 points
Silver 50-59 points
Gold 60-79 points
Platinum 80-106 points

Integrated Regional Water Management Plans

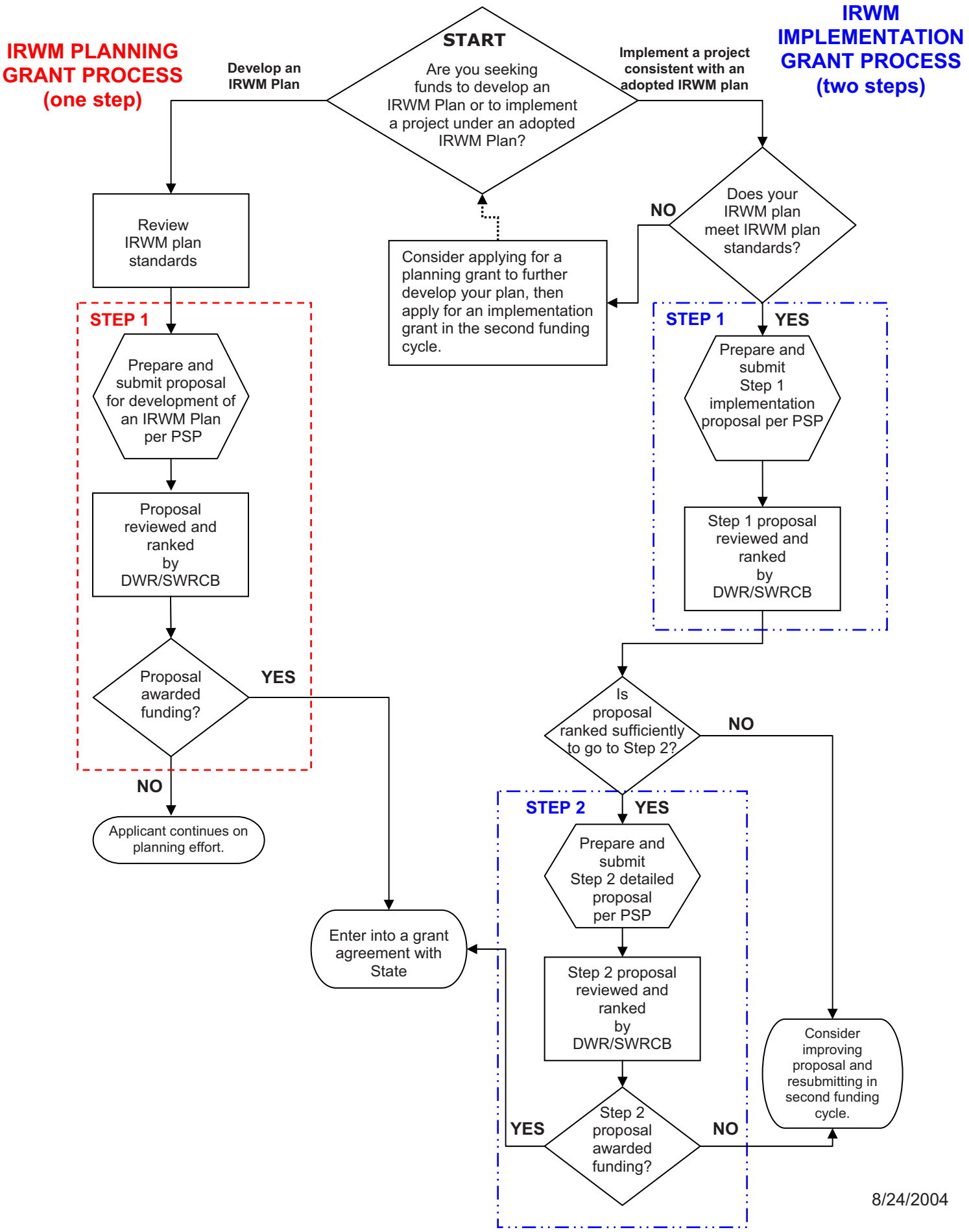
An integrated approach to water management is a new way to address a broader range of water resource management issues, competing water demands, water supply reliability, and financing of projects. Today, hundreds of local agencies, organizations, cities, and county governments are working together to develop Integrated Regional Water Management Plans (IRWMPs).

Guidelines for IRWMPs were provided by the California Department of Water Resources and the State Water Resources Control Board for Proposition 50, Chapter 8. Those guidelines state that an IRWMP must address major water related objectives and conflicts within the region, including, at a minimum, water supply, groundwater management, ecosystem restoration, and water quality.

For those cities located in the County of Los Angeles, an IRWMP was adopted in 2006. A planning grant in the amount of $1.5 million and an implementation grant in the amount of $25 million have been awarded. For Proposition 84 $215 million has been allocated for IRWMP implementation in the Los Angeles funding area for competitive grants.

For those cities located in the County of Orange, efforts began in 2007 to prepare an IRWMP for the North Orange County Watershed Management Area, which includes the Orange County portion of the Coyote Creek Watershed. Preparation of the IRWMP will qualify the group to apply for Proposition 84 grant funds. The Santa Ana River Watershed, which includes portions of Orange, Riverside and San Bernardino Counties, has been allocated $114 million for implementation of IRWMPs. Just as in the Greater Los Angeles County Region, it is anticipated that multiple plans will compete for these grant funds.

IRWM Grant Process Flow Chart



Rivers and Mountains Conservancy's

Common Ground

VISION

The watersheds were first transformed from wild-lands to farmlands. The second transformation converted farmlands to urban lands. The third transformation will create a network of livable, sustainable communities, connected by open spaces. The goal is to:

Restore balance between natural and human systems in the watersheds.

This requires that government and the public re-think the use of land and water, to better integrate human-made and natural systems. Planning must embrace multiple objectives. Economic and environmental benefits can be realized from sustainable development.

Southern California can grow greener with more open space. Open spaces can be connected with a network of trails and bike paths improving access for all residents. Habitat for wildlife can be pre-served in the foothills and mountains, and restored along rivers and tributaries in urban areas. The rivers can be enhanced, surface and ground waters cleansed, local water supply improved, and dependence on imported water reduced. Flood protection can be maintained and improved.

By planning across jurisdictions and boundaries, this vision can become a reality. This vision is achievable, but not overnight. This vision is affordable, but not by .business as usual. methods. There can be a consensus for this vision, but only if citizens are educated, involved, and allowed to choose the quality of life they prefer.

With science as a basis, this plan can be used as a framework for future planning at the subwatershed and local level. This plan is intended as a living document that will evolve over time, as priorities evolve and needs dictate, based on periodic assessment of progress. This plan is a tool to create a healthier environment, build consensus, to reach common ground.

GUIDING PRINCIPLES

To restore the watersheds, create an open space network, enhance waters and waterways, and improve coordination of planning throughout the region, plans and projects need consistent goals. The Guiding Principles represent an over-arching set of goals that can be used to guide future projects and enhance current open space planning in the watersheds. The Guiding Principles are intended to serve as a reference or a touchstone for all concerned with watershed planning. They set forth general directions without attempting to define responsibilities for implementation. They are guides, not directives. They imply a wide perspective and a long view. The Principles were developed through a consensus-building process involving state and county agencies, cities, environmental groups, local councils of government, and individuals having a stake in the evolution of the watersheds.

The Guiding Principles are intended to allow jurisdictions, communities, and groups to advance, promote, and enable the concepts below.

- Establish priorities for land acquisition
- Coordinate targeted land acquisition with regional and local land use planning
- Establish a long-term land acquisition process, including protection for current uses
- Recycle brownfields with cooperation of EPA, DTSC, and other agencies
- Coordinate public lands management policies and procedures among jurisdictions
- Accommodate active and passive recreational uses
- Incorporate passive and low-impact recreational facilities in habitat areas
- Accumulate and record the needs for active recreation facilities
- Evaluate access by population density, distance and time for different types of open space
- Open school sites for after-hours recreational use

Improve Habitat Quality, Quantity, and Connectivity

- Protect existing high-quality habitat and ecologically significant areas
- Restore and enhance aquatic and terrestrial riparian and upland habitat
- Coordinate regional efforts to remove invasive species
- Maintain and enhance wildlife corridors as continuous linkages
- Identify indicator species, develop standards and monitoring programs

Connect Open Space with a Network of Trails

- Develop continuous bike trail, equestrian, and public access systems along riverfronts and within the watershed
- Connect river trails to mountain trails, urban trails, local parks, open spaces, and beaches
- Connect open spaces to transit access points
- Provide for public safety and security along waterways and trails

Promote Stewardship of the Landscape

- Use drought-tolerant, native, and regionally-adapted plant materials
- Identify, preserve, and restore historic sites and cultural landscapes

Encourage Sustainable Growth to Balance Environmental, Social, and Economic Benefits

- Preserve major open spaces and limit urban sprawl
- Recycle urban riverfronts as frontage for new development
- Provide incentives and streamline regulations to promote watershed sustainability
- Encourage local government actions as examples of watershed sustainability
- Provide individuals and organizations with incentives to promote natural habitat

Maintain and Improve Flood Protection

- Maintain or enhance existing flood protection at all phases of implementation
- Utilize nonstructural methods for flood management where feasible
- Reduce the volume and velocity of stormwater runoff where feasible
- Develop regional and subregional networks of stormwater detention areas where feasible
- Encourage new developments to detain stormwater onsite to mitigate runoff where feasible

Establish Riverfront Greenways to Cleanse Water, Hold Floodwaters, and Extend Open Space

- Acquire land for flood management, wetlands, cleansing of water, and compatible uses
- Create a continuous network of parks along the waterways
- Develop recreational opportunities along waterways
- Connect communities to the waterways by extended greenways

Improve Quality of Surface Water and Groundwater

- Reduce dry weather urban runoff discharge into waterways and the ocean
- Coordinate local planning and opportunities for water quality improvements with the regional basin plan for water quality
- Support public/volunteer water quality monitoring programs
- Assist cities in implementing water quality regulatory requirements

Improve Flood Safety Through Restoration of River and Creek Ecosystems

- Restore the natural hydrologic functioning of subwatershed areas where feasible
- Naturalize low-flow streambeds/develop floodways for storm events where feasible
- Restore local streams to replace storm drains where feasible
- Maintain sufficient flow conditions to support riparian/riverine habitats

- Develop sediment management strategy

Optimize Water Resources to Reduce Dependence on Imported Water

- Expand groundwater recharge facilities to increase local water supplies
- Encourage onsite collection of stormwater for irrigation and percolation, where consistent with water quality goals and existing water rights
- Extend the distribution and range of uses for reclaimed water
- Expand water conservation programs
- Publish a subwatershed-level water budget and periodically monitor performance

Coordinate Watershed Planning Across Jurisdictions and Boundaries

- Partner with all relevant agency officials, staff, and elected officials throughout the process
- Develop a coordinated regional approach to obtain federal, state, and local funding
- Plan at the subwatershed level; coordinate at the watershed level
- Encourage and facilitate public and private partnerships to implement projects
- Involve the residential, business, and professional communities in all aspects of planning

Encourage Multi-Objective Planning and Projects

- Integrate land use planning with flood management principles, water quality improvement objectives, and open space uses
- Develop demonstration open space projects with multiple watershed objectives
- Provide incentives in funding and public approvals for multiple-objective projects
- Employ comprehensive cost-benefit analysis to evaluate multiple-objective projects
- Analyze interdependence of land, water, materials, energy, economics, and ecosystems

Use Science as a Basis for Planning

- Base plans and projects on scientifically derived principles, practices, and priorities
- Incorporate review of key issues by an interdisciplinary science panel
- Develop benchmarks to assess watershed status by a regular monitoring process
- Utilize applied scientific research to guide public policy

Involve the Public Through Education and Outreach Programs

- Conduct public educational and outreach programs to promote watershed restoration

- Establish a process for project participation by stakeholder representatives and the public
- Present plans and programs in reader-friendly print and electronic versions
- Involve stakeholders and the public in project implementation and maintenance
- Recognize the significance and uniqueness of individual properties for watershed planning

Utilize the Plan in an On-going Management Process

- Secure approval of the plan by partner jurisdictions
- Assure CEQA compliance in approval of proposed projects
- Establish and periodically assess measurable objectives for all plan elements
- Establish a procedure and schedule for periodic plan review and updates