CHAPTER | FOUR

CHAPTER FOUR

methods and mechanisms

A. PRIORITY ACTIONS

The goals and objectives established by the BCWTF (described in Chapter 3) are intended to address the problems and issues of interest identified by the BCWTF and achieve ecological health. Because of the extent of urbanization, a wide range of actions will be necessary to improve the ecological health of the watershed. Potential actions are described below, organized by the headings of water, land, and planning. Following a discussion of each action, a list of stakeholders that could implement the action is provided. For that list, the term "cities" refers to all cities in the watersheds, although for some actions, specific cities are identified. For a more complete list of stakeholders, refer to Chapter 6 (Stakeholder Commitment and Funding).

To improve ecological health of the watershed, progress towards all of the goals identified by the BCWTF will be necessary. However, since the charge for the Task Force included selection and prioritization of cost-effective best management practices for achieving water quality improvement/habitat restoration goals, those actions related to improving water quality and habitat are considered priority actions for the purposes of this plan.

1. Water

GOAL A: IMPROVE QUALITY OF SURFACE WATER AND GROUNDWATER

Objective: Implement projects, BMPs, and other methods to reduce pollutant loads and improve water quality, consistent with TMDL implementation

ACTION: *Implement projects, BMPs, and other methods to reduce the presence of contaminants in stormwater runoff*

To conform to the requirements of the federal Clean Water Act and the federal Coastal Zone Act Reauthorization Amendments of 1990, the State of California has developed the Nonpoint Source Program Strategy and Implementation Plan (1998–2013) (or PROSIP) which identifies actions to reduce nonpoint pollution, and a companion volume, the California Management Measures for Polluted Runoff (CAMMPR) Review Document, which identifies a range of management measures for agriculture, forestry, urban areas, marinas and recreational boating, hydro-

modification (including modification of stream channels, water impoundments, and streambank erosion), and wetlands, riparian areas and vegetated treatment systems. Additional information on sources of nonpoint pollution and measures to reduce and/or treat polluted runoff is provided in the California Nonpoint Source Encyclopedia, developed by the State Water Resources Control Board.

A comprehensive program to reduce stormwater pollution has been established by the Stormwater and Urban Runoff NPDES permit (Order No. 01-82, CA50004001) issued to the County of Los Angeles (and the incorporated cities in the Watershed), which regulates the discharge of runoff municipal storm sewer systems (MS4s), or the storm drain. The permit prohibits non-stormwater discharges into the storm drain system, limits discharges to receiving waters that would cause or contribute to a violation of water quality standards, and requires implementation of a Stormwater Quality Management Program (SQMP) that includes the use of Best Management Practices (BMPs) to reduce discharges of pollutants, including metals, nutrients, pathogens, sediment and trash, which are identified on the 303(d) list for Ballona Creek and associated water bodies. The SQMP includes seven programs, which are summarized below.

The *Industrial/Commercial Facilities Control Program* covers industrial and commercial facilities, including restaurants, automobile service facilities, retail gasoline outlets, automobile dealerships and other federally-mandated facilities.

The *Development Planning Program* requires implementation of a Standard Urban Runoff Mitigation Plan (SUSMP) for commercial developments on sites 1 acre or greater in area, automotive repair shops, retail gasoline outlets, restaurants, home subdivisions with 10 or more homes, parking lots with 25 or more spaces (or are greater than 5,000 square feet in area), single-family hillside residences, and locations within, or directly adjacent, or discharging to, environmentally sensitive areas. In addition, substantial redevelopments (resulting in the creation of more then 5,000 square feet of impervious surface) are also subject to SUSMP requirements. The Development Planning Program and SUSMP requirements include: minimize impacts of stormwater on natural drainages and water bodies; maximize pervious surfaces to allow percolation of stormwater to the ground; minimize the quantity of stormwater to impervious surfaces and the storm drain system, provide appropriate permanent measures to reduce pollutant loads; control post-development peak runoff to prevent erosion in natural drainages; conserve natural areas; minimize pollutants of concern; protect slopes and channels; provide storm drain stenciling and signage; minimize pollution from parking lots using treatment control BMPs and good housekeeping practices; proper design of storage areas, loading dock areas, repair bays, vehicle/equipment wash areas, gasoline fueling areas, and parking areas (to minimize conveyance of pollutants to storm drain systems); proper design and maintenance of BMPs to reduce vector breeding (e.g., mosquitoes); require BMPs to meet design standards and/or numerical design criteria; and provide evidence of BMP maintenance. In September 2002, the County of Los Angeles prepared a manual for SUSMP preparation entitled *Development Planning for Stormwater Management*, which is available on-line (refer to Chapter 8 References)

The *Development Construction Program* requires control of runoff from construction sites through a combination of BMPs, inspections, and for projects over 1 acre in area, preparation of a Stormwater Pollution Prevention Program (SWPPP), per the Construction Activities Stormwater General Permit (Order No. 99-08-DWQ). Depending on the site characteristics, the SWPPP may include measures to minimize disturbed areas, stabilize disturbed areas, protect slopes and channels, control the site perimeter, retain sediment on site, practice good housekeeping, and contain materials and wastes.

The *Illicit Connections and Illicit Discharges Elimination Program* requires the County and the cities to: track and

map all illicit connections and discharges to the storm drain system; train employees in methods of identification, investigation, termination, cleaning of illicit connections and discharges; screen storm drain systems for illicit connections; investigate and determine sources, nature and volume of discharge and responsibility party for illicit connections; terminate illicit connections using enforcement authority; respond to illicit discharges with activities to abate, contain, and clean up within one business day of discovery; and investigate illicit discharges and take enforcement action, as appropriate during or following containment.

The *Public Agency Activities Program* consists of maintenance, inspection, and response to minimize stormwater impacts from public agency activities. These include management of sewerage systems (including overflow and spill prevention), construction activities, vehicle maintenance/material storage facilities/ corporation yards, landscape and recreational facilities, parking facilities, storm drains, streets and roads, and emergency procedures.

The *Public Information and Participation Program* requires measures to increase awareness, change behavior, and involve the public in mitigating the impacts of stormwater pollution.

The *Countywide Monitoring Program* requires measures to assess receiving water impacts, identification of sources of pollution, evaluation of BMPs, and measure of long-term trends in mass emissions.

The County of Los Angeles Department of Public Works has established the BMP Task Force to serve as an ongoing forum to facilitate the selection, implementation and financing of effective BMPs through: data gathering, analysis, and exchange; stakeholder coordination; and outreach. The Task Force maintains a website (refer to Chapter 8 References) that provides information about BMPs and the activities of the Task Force.

The California Stormwater Quality Association has developed four stormwater Best Management Practice Handbooks to provide general guidance for selecting and implementing BMPs to reduce pollutants in runoff from (1) New Development & Redevelopment sites; (2) Construction sites; (3) Industrial & Commercial facilities; and (4) Municipal operations. The handbooks describe planning techniques for stormwater pollution prevention and provide information on a wide range of BMPs, aggregated into various categories for each handbook, including erosion and sediment control, site and material management, source control, and treatment control measures.

For the purposes of this plan, BMPs can be grouped based on the general technique used, and include: storage (multi-use retention basin, cistern, extended detention basins), underground retention/infiltration, and underground detention), infiltration (porous pavement and dry well), filtration (wetland systems, bioretention, catch basin inserts and media filtration), conveyance (vegetated swale or basin), practices (tree planting, reduce impervious surfaces, mulching, stormwater-supplied irrigation, reduce directly connected impervious surfaces, source control, acquisition or relocation, flood proofing, flood warning, and policies or ordinances) and outreach (public education).

As noted in Chapter 1 (Background), the Santa Monica Bay Restoration Commission initiated a Ballona Creek BMP Project Work Group, to implement a methodology for selection of BMPs for the Ballona Creek Watershed (currently in progress). Concurrently, a Proposition 13-funded project will develop a plan for installation of a suite of BMPs in an individual subwatershed and monitor the effectiveness of those BMPs in treating and/or reducing 303(d) list pollutants. More details on BMPs are provided in the following section (Best Management Practices).

In addition to implementation of BMPs, various projects have the potential to reduce the presence of pollutants in stormwater, including those that increase or restore

open space, reduce impervious surfaces, or treat stormwater. The concept of diverting stormwater in the Hyperion Treatment Plant operated by the City of Los Angeles has been the subject of several proposals, although the volume of water that must be treated and the timing of delivery (as the majority of excess capacity is available during the night) limit the applicability of this concept. The project inventory included in this Chapter includes numerous projects that would improve water quality. In addition to projects, other programs also have the potential to improve water quality, such as the Air Quality Management Plan for the South Coast Air Basin, which has the potential to reduce aerial deposition of certain contaminants.

Stakeholder Responsibility:

Federal, state, and regional agencies that operate facilities in the watershed, Los Angeles County, cities, NPDES point source dischargers, community-based organizations, and individuals

ACTION: *Implement projects, BMPs and other methods to reduce volume of stormwater runoff*

One of the difficulties in meeting current and future TMDLs will be treating the enormous volumes of stormwater associated with major rainfall events. One possible strategy would be to implement projects, BMPs and other methods to reduce the volume of stormwater. BMP categories that have the potential to reduce the volume of stormwater runoff include storage, infiltration, and to a lesser extent, filtration, conveyance, practices, and outreach. In addition, the implementation of SUSMPs for new development and substantial redevelopment projects also has the potential to reduce runoff volumes. Expansion of SUSMP requirements (e.g., reducing the size of development subject to the requirements) could further reduce runoff volumes. It should be noted for some contaminants, for a given unit of pollutant, the larger the volume of runoff, the lower the resultant concentration. Thus reducing the volume of stormwater runoff could increase the concentration of certain pollutants, unless pollutant loads are also reduced.

Stakeholder Responsibility:

Federal, state, and regional agencies that operate facilities in the watershed, Los Angeles County, cities, NPDES point source dischargers, and individuals

ACTION: *Install filtration devices to intercept contaminants at entrance to storm drains*

With limited exceptions, once a contaminant reaches a storm drain, it is conveyed directed to Ballona Creek and Santa Monica Bay. To reduce the introduction of contaminants into the storm drain system, a filtration device could be installed at the entrance to a storm drain (e.g., at the below grade catch basin found on many storm drains). Depending on the efficiency of the filtration device (e.g., the size of material retained) and the frequency of maintenance (as such devices can become clogged), the extent of capture can be considerable. To implement the Trash TMDL, filtration devices may be installed at many catch basins.

Stakeholder Responsibility:

Federal, state, and regional agencies that operate facilities in the watershed, Los Angeles County, cities, NPDES point source dischargers, and individuals

ACTION: *Install in-line treatment systems in storm drains and/or channels*

Once stormwater has entered the storm drain network, contaminants could be removed during conveyance (before reaching Ballona Creek) by the installation of an "in-line" treatment device or mechanisms. These could include filtration devices, storage or detention facilities, constructed wetlands, or other methods. Given the size of the watershed, opportunities for in-line treatment may be extensive; however, the accessibility of the storm drain and the availability of space to accommodate the treatment device may limit applicability.

Stakeholder Responsibility:
Los Angeles County, cities and other entities that own and operate storm drain systems

ACTION: *Install end-of-pipe treatment systems on storm drains and/or channels*

It may not be possible to achieve applicable water quality standards with source reduction, filtration at the entrance to storm drains and in-line treatment systems. Prior to discharge into Ballona Creek, end-of-pipe treatment systems or devices could be installed to reduce the load of pollutants that enter the Creek and Santa Monica Bay. These systems could be in the form of natural systems (e.g., constructed wetlands), filtration devices (such as continuous deflection separators), or water treatment and recycling plants (such as the City of Santa Monica's Urban Runoff Recycling Facility or SMURRF).

Stakeholder Responsibility:
Los Angeles County, cities and other entities that own and operate storm drain systems

ACTION: *Implement the Community-Based Monitoring Program*

The Community-Based Monitoring Program included in Chapter 5 includes water-quality monitoring elements, which would track progress towards meeting applicable water quality standards.

Stakeholder Responsibility:
Los Angeles Regional Water Quality Control Board, Los Angeles County, cities, and community-based organizations

ACTION: *Develop a comprehensive map of all storm drains, culverts and outfalls*

Currently, there is no comprehensive map of the Ballona Creek drainage network, which makes it difficult to link specific outfalls on Ballona Creek (e.g., where pollutant concentrations may be elevated) to the precise upstream area connected to that drain. Implementation of measures to reduce pollutants could be more effectively targeted if the source area for those pollutants could be readily identified. The results of this effort should be incorporated into this Plan.

Stakeholder Responsibility:
Los Angeles County, cities, and community-based organizations

ACTION: *Consider watershed-based NPDES permits*

Currently, one single NPDES permit covers most of the municipal separate storm sewers in Los Angeles County. Future permits could be developed on the basis of individual watersheds (e.g., Ballona Creek), which may facilitate coordination between relevant jurisdictions and focus efforts on programs and practices that are relevant to individual watersheds.

Stakeholder Responsibility:
Los Angeles Regional Water Quality Control Board

ACTION: *Complete the Lower Ballona Creek Ecosystem Restoration Study*

As a result of the completion of the Marina del Rey and Ballona Creek Feasibility Study and the identification of local sponsors, the Army Corps of Engineers is working to refine the scope of work for the Restoration Study, which will evaluate options to reduce sedimentation at the Creek entrance and restore the lower portions of Ballona Creek.

Stakeholder Responsibility:
US Army Corps of Engineers

ACTION: *Implement the Air Quality Management Plan for the South Coast Air Basin*

Some contaminants in stormwater runoff and dry weather flow are the result of aerial deposition of air pollutants. Implementation of the Air Quality Management Plan for the South Coast Air Basin will improve air quality and reduce aerial deposition of air

pollutants and thereby contribute to improved surface water quality.

Stakeholder Responsibility:
South Coast Air Quality Management District

Objective: Minimize dry weather urban runoff discharge into waterways and the Bay

ACTION: *Implement BMPs and projects to reduce contaminants in dry weather flows*

Similar to stormwater, dry weather flows contain a variety of contaminants that degrade water quality. Various BMPs and projects could be implemented to reduce the presence of surface contaminants that may be washed into the storm drain system. Applicable BMP types that may reduce the presence of contaminants in dry weather flow include storage, infiltration, filtration, conveyance, practices, and outreach

Stakeholder Responsibility:
Federal, state, and regional agencies that operate facilities in the watershed, Los Angeles County, cities, NPDES point source dischargers, and individuals

ACTION: *Implement BMPs and projects to reduce volume of dry weather flows*

Historically, dry weather flows in Ballona Creek were minimal. Over time, irrigation of landscaping and other uses of imported water have significantly increased dry weather flows. One potential strategy to meeting applicable water quality standards would be to reduce the volume dry weather flows, through a combination of BMPs, including storage, infiltration, filtration, conveyance, practices and outreach. As noted above for stormwater, unless pollutant loads are reduced, decreasing the volume of dry-weather runoff could result in an increased concentration of some pollutants. In addition, some freshwater input into the Ballona Creek estuary may necessary to provide suitable conditions for aquatic habitat.

Stakeholder Responsibility:
Federal, state, and regional agencies that operate facilities in the watershed, Los Angeles County, cities, NPDES point source dischargers, and individuals

Actions: *Implement BMPs and projects to intercept contaminants at the entrance to storm drains, install in-line treatment systems, and install end-of-pipe treatment systems*

These actions for stormwater were described above and may also be applicable for dry weather flows.

Stakeholder Responsibility:
Los Angeles County, cities and other entities that own and operate storm drain systems

Objective: Achieve fishable, swimmable water quality standards in Ballona Creek

ACTION: *Establish, implement, and monitor TMDLs*

As noted in Chapter 2, a TMDL for trash in Ballona Creek has already been established (along with a wet-weather pathogen TMDL for Santa Monica Bay and a bacteria TMDL for Mother's Beach in Marina del Rey); however, the majority of TMDLs for the Watershed have yet to be established. To establish TMDLs, develop waste allocations, and suggest effective implementation strategies, additional research on pollutant concentrations, sources, geographic distributions, and BMP effectiveness is needed. The City of Los Angeles has proposed to take the lead on a stakeholder-sponsored development of future TMDLs. Once the TMDL is established, NPDES permit holders will be required to development implementation plans and conduct water quality monitoring. The trash TMDL provides for a 10-year implementation schedule (with a possible two year extension), although a 20-year implementation schedule may be suggested for other TMDLs.

Stakeholder Responsibility:
US Environmental Protection Agency, State Water Resources Control Board, Los Angeles

Regional Water Quality Control Board, federal, state, and regional agencies that operate facilities in the watershed, Los Angeles County, cities, NPDES point source dischargers, and individuals

Objective: Improve water quality in Santa Monica Bay

Actions: *Establish, implement, and monitor TMDLs (and all water quality-related actions listed above)*

Implementation of TMDLs and all of the water quality measures actions identified above have the potential to improve water quality in Santa Monica Bay.

Stakeholder Responsibility:
Federal, state, and regional agencies that operate facilities in the watershed, Los Angeles County, cities, NPDES point source dischargers, and individuals

GOAL B. MAINTAIN FLOOD PROTECTION

Objective: Implement incentives to encourage new and existing developments to detain stormwater on site to reduce runoff

ACTION: *Implement SUSMPs on new development and redevelopment*

As discussed above, implementation of SUSMPs could reduce the volume of runoff from individual sites, and cumulatively reduce stormwater discharge in Ballona Creek.

Stakeholder Responsibility:
Los Angeles County and cities

ACTION: *Consider expansion of SUSMP requirements*

As discussed above, SUSMPs are currently applicable to commercial developments on sites of 1 acre or greater, automotive repair shops, retail gasoline outlets, restaurants, home subdivisions with 10 or more homes, parking lots with 25 or more spaces (or greater than 5,000 square feet), single-family hillside residences, and locations within or directly adjacent or discharging to environmentally sensitive areas. If these thresholds were reduced (e.g., fewer square feet, housing units or impervious area), additional parcels would be covered, and runoff volumes could be further reduced. In addition, it is not clear whether federal and state facilities and school districts are covered by current requirements.

Stakeholder Responsibility:
Los Angeles Regional Water Quality Control Board

Objective: Implement a plan to utilize nonstructural flood protection projects to the maximum extent feasible

Actions: *Implement BMPs to reduce stormwater runoff, implement SUSMPs for new development and substantial redevelopment, and expand SUSMP requirements*

As discussed above, various BMPs have the potential to reduce stormwater runoff volumes, or to delay peak runoff, and may employ nonstructural methods. In addition, SUSMPs may also reduce runoff via nonstructural methods.

Stakeholder Responsibility:
Federal, state, and regional agencies that operate facilities in the watershed, Los Angeles County, cities, NPDES point source dischargers, and individuals

ACTION: *Study nonstructural flood protection opportunities*

Over time, as BMPs and SUSMPs are implemented, as in-line or end-of-pipe water quality treatment systems are installed, as streams are daylighted, and riparian vegetation is planted along Ballona Creek and tributaries, nonstructural flood protection methods may become more prevalent. To assist in fostering such practices, a study of nonstructural flood protection opportunities could identify candidate sites, provide examples of relevant projects in other watersheds, and provide an assessment of the feasibility of implementing such methods in the Watershed.

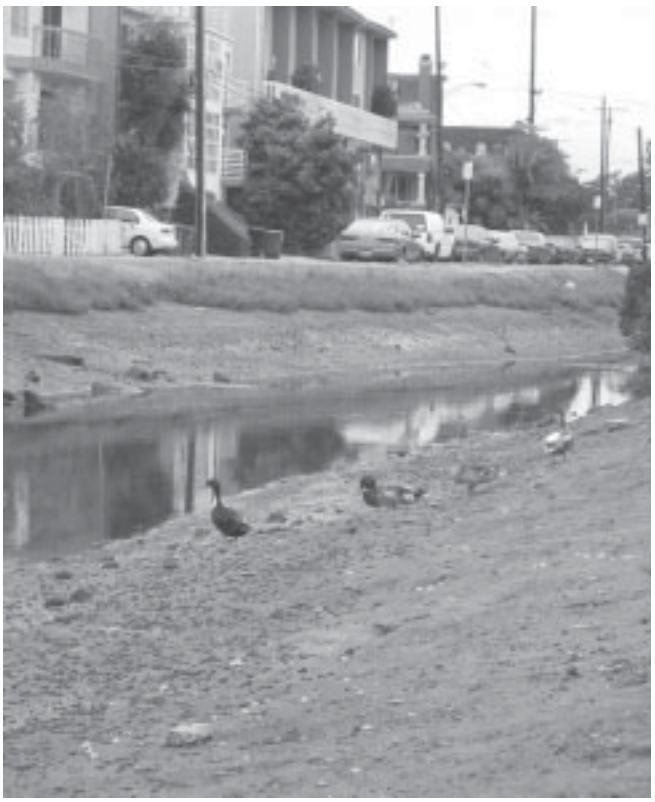
Stakeholder Responsibility:
US Army Corps of Engineers, Los Angeles County, colleges & universities, community-based organizations, and the Ballona Creek Watershed Task Force

Objective: Reduce the volume and velocity of stormwater runoff

Actions: *Implement BMPs and projects to reduce stormwater runoff, implement SUSMPs, expand SUSMP requirements, and study nonstructural flood protection*

Implementation of BMPs and project that reduce stormwater runoff and implementation of SUSMPs have the potential to reduce the volume and velocity of stormwater runoff. Expanding SUSMPs requirements could result in further reductions. A feasibility study to identify nonstructural flood control measures could increase interest in such methods and encourage agencies and cities to incorporate such measures into future projects.

Stakeholder Responsibility:
Federal, state, and regional agencies that operate facilities in the watershed, Los Angeles Regional Watershed Quality Control Board, Los Angeles County, cities, NPDES point source dischargers and individuals



GOAL C. RESTORE HYDROLOGIC FUNCTION TO BALLONA CREEK AND TRIBUTARIES WHERE FEASIBLE

Objective: Restore tidal flushing to lagoons and wetlands where consistent with flood protection objectives

ACTION: *Improve tidal flushing to Ballona Wetlands*

After many years of study, new tidal gates were installed at two locations in the Ballona Wetlands, which improved tidal flushing in this area. As part of a future restoration of the wetlands, it is assumed that tidal flushing will be improved to a larger area, which would improve aquatic and estuarine habitat in this area.

Stakeholder Responsibility:
Coastal Conservancy, Los Angeles County, Los Angeles City

ACTION: *Improve/restore tidal flushing to Del Rey/ Ballona Lagoon, and Venice Canals*

Tidal flushing in the Del Rey Lagoon and Ballona Lagoon are both constrained, due to the installation of gates to reduce flooding or the presence of sediment that reduces tidal flow. A proposed project to improve tidal flushing in the Ballona Lagoon (along with other improvements) is currently on hold. Improved tidal flushing of the Del Rey Lagoon could be coordinated with restoration of the Ballona Wetlands.

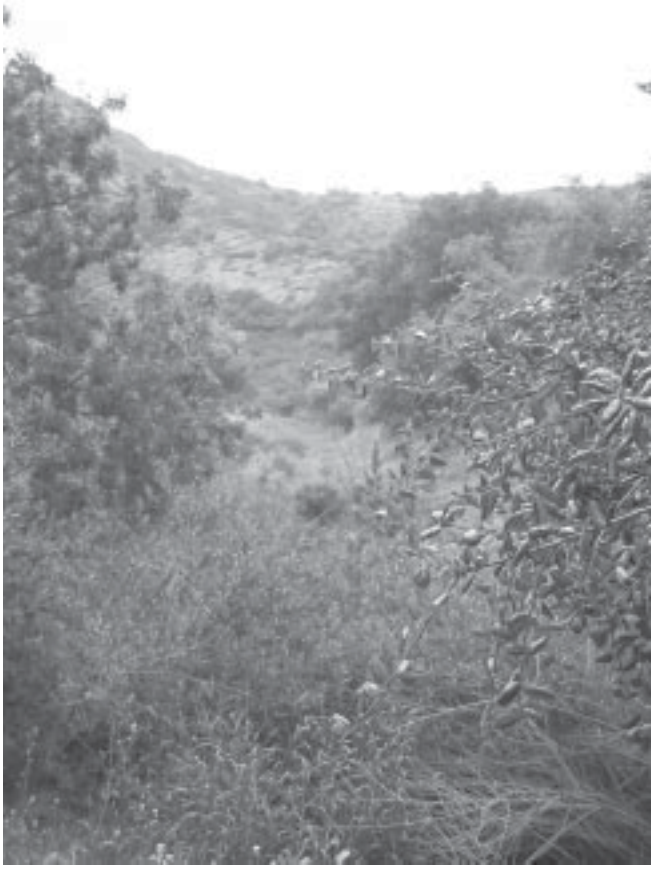
Stakeholder Responsibility:
Coastal Conservancy and Los Angeles City

Objective: Restore natural hydrologic conditions in stream channels where feasible

ACTION: *Study potential opportunities to daylight and/or restore current/historic stream channels*

The *Seeking Streams* study identified opportunities to daylight historic stream channels in the upper watershed. The feasibility of implementing the recommendations of that report could be addressed, and other candidate streams in other portions of the watershed could be identified.

Stakeholder Responsibility:
US Army Corps of Engineers, Coastal Conservancy, Los Angeles County, Los Angeles City, colleges and universities, community-based organizations and individuals



GOAL D. OPTIMIZE WATER RESOURCES TO REDUCE DEPENDENCE ON IMPORTED WATER

Objective: Expand water conservation programs

ACTION: *Develop a watershed-wide water budget*

To appreciate the value of water conservation, development of a water budget for the Ballona Creek Watershed should be developed by measuring and estimating water inputs (precipitation, groundwater inflow, and imported water) and output, including groundwater recharge, stormwater discharge, wastewater generation, and evapotranspiration by plants).

Stakeholder Responsibility:
Colleges and universities, with the assistance of Los Angeles County, cities, utility agencies, and community-based organizations

ACTION: *Expand public education and outreach on water conservation*

Following the drought in the 1980s, public education and outreach related to water conservation was commonplace, but is no longer a major focus for most water agencies. While previous efforts focused on scarce supplies and the high cost of imported water, inclusion of a "watershed stewardship" theme could expand public interest in such practices.

Stakeholder Responsibility:
State Department of Water Resources, Los Angeles County, cities, utility agencies, community-based organizations, and individuals

ACTION: *Continue rebates and technical assistance for water conservation*

Some water agencies provide financial incentives for the installation of ultra-low-flush toilets and water efficient washing machines, technical assistance programs for business and industry, and large landscape irrigation efficiency programs. Such programs help reduce dependence on imported water and should be continued.

Stakeholder Responsibility:
State Department of Water Resources, cities with utility departments, and utility agencies

ACTION: *Encourage expansion of water conservation programs*

Dry weather runoff is a major source of contaminants in Ballona Creek. Expansion of water conservation programs related to landscape irrigation and other wasteful uses of water (e.g., washing, instead of sweeping driveways) would reduce dependence of imported water, runoff the volume of dry weather runoff, and assist in meeting TMDL requirements.

Stakeholder Responsibility:
State Department of Water Resources, State Water Resources Control Board, Los Angeles Regional Water Quality Control Board, Los Angeles County, cities, utility agencies, community-based organizations, and individuals

Objective: Extend the distribution and range of uses of reclaimed water

ACTION: *Extend recycled water distribution system from Hyperion Treatment Plant*

The Hyperion Treatment Plant treats approximately 340 million gallons per day of sewage, yet only a small portion of the treated water is recycled for landscape irrigation and industrial use. Although the Playa Vista development uses recycled water for landscape irrigation, the distribution network could be extended to serve other portions of the Watershed.

Stakeholder Responsibility:
Los Angeles Regional Water Quality Control Board and City of Los Angeles

ACTION: *Site end-of-pipe treatment facilities at locations in proximity to locations that can utilize recycled water*

As part of a treatment train for runoff, end-of-pipe treatment facilities, similar to the SMURRF may be installed along Ballona Creek or other major tributaries. To the extent feasible, siting of such facilities should consider the proximity of public or other major land uses (e.g., schools, shopping centers) that could utilize recycled water for landscaping or other purposes.

Stakeholder Responsibility:
Los Angeles County and cities

ACTION: *Provide incentives for on-site treatment and reuse of reclaimed water*

Some larger scale commercial facilities have incorporated on-site treatment systems for wastewater (e.g., the Water Garden in Santa Monica). The cities and Los Angeles County should consider providing incentives for such systems, which would reduce wastewater discharge and dependence on imported water.

Stakeholder Responsibility:
Los Angeles County and cities

Objective: Maximize on-site collection of stormwater for irrigation and percolation

Actions: *Implement BMPs and projects to reduce stormwater runoff, implement SUSMPs, and tighten SUSMP requirements*

Implementation of BMPs and project that reduce stormwater runoff and implementation of SUSMPs have the potential to increase groundwater recharge, which could reduce dependence on imported water. Expanding SUSMP requirements could result in further reductions. In addition to on-site programs, opportunities for regional collection and distribution systems should also be considered.

Stakeholder Responsibility:
Federal, state, and regional agencies that operate facilities in the watershed, Los Angeles Regional Watershed Quality Control Board, Los Angeles County, cities, NPDES point source dischargers and individuals

Objective: Establish a network of stormwater detention sites

ACTION: *Study nonstructural flood protection opportunities*

As discussed above, a study of nonstructural flood protection opportunities could identify candidate sites for stormwater detention, provide examples of relevant projects in other watersheds, and provide an assessment of the feasibility of implementing such methods in the Ballona Creek Watershed.

Stakeholder Responsibility:
US Army Corps of Engineers, Los Angeles County, colleges & universities, community-based organizations, and the Ballona Creek Watershed Task Force

Objective: Expand groundwater recharge facilities

ACTION: *Study nonstructural flood protection opportunities*

A study of nonstructural flood protection opportunities could likely identify potential sites for groundwater recharge.

Stakeholder Responsibility:
US Army Corps of Engineers, Los Angeles County, colleges & universities, community-based organizations, and the Ballona Creek Watershed Task Force

GOAL E. IMPROVE AQUATIC, ESTUARINE AND RIPARIAN HABITAT QUALITY AND QUANTITY

Objective: Improve aquatic, estuarine and salt marsh habitat in the Ballona Creek estuary system, including the Ballona Wetlands, Ballona Lagoon, Playa del Rey Lagoon, and associated water bodies, by restoring tidal flushing, removal of invasive species, and restoration of native habitat

ACTION: *Develop and implement a plan to restore Ballona Wetlands*

As noted in Chapter 1, the State of California has recently acquired 483 acres of the Ballona Wetlands (in Areas A and B), in addition to the 64 acres previously acquired (Area C). Although a portion of area B is in a relatively natural state and is subject to some tidal flushing, a comprehensive plan for restoration of the other lands has yet to be established.

Stakeholder Responsibility:
Coastal Conservancy in conjunction with various federal, state, and local entities and organizations

ACTION: *Develop and implement a plan to improve Oxford Basin*

The Oxford Flood Control Basin has been the subject of much discussion about how to improve water quality and habitat, but no detailed proposal has been developed. A conceptual proposal for restoration of the basin is included in the list of Demonstration Projects included in this Chapter.

Stakeholder Responsibility:
Coastal Conservancy and County of Los Angeles

ACTION: *Implement projects to improve aquatic habitat and near-shore vegetation in Del Rey Lagoon and Ballona Lagoon*

The City of Los Angeles has developed proposals for restoration of aquatic and near-shore vegetation for Del Rey Lagoon and to improve tidal flushing and plant native vegetation in the Ballona Lagoon.

Stakeholder Responsibility:
Coastal Conservancy and City of Los Angeles

Objective: Restore riparian habitat along a section of a tributary stream

ACTION: *Study potential opportunities to daylight and/or restore current/historic stream channels*

As noted above, the feasibility of implementing the recommendations of the *Seeking Streams* study could be addressed, and candidate streams in other portions of the watershed could be identified.

Stakeholder Responsibility:
US Army Corps of Engineers, Los Angeles County, cities, and colleges & universities

Objective: Establish self-sustaining populations of key indicator species in the Ballona Wetlands and the associated estuary system

ACTION: *Study potential indicator species for Ballona Wetlands*

As noted in Chapter 2, several sensitive species are found in the Ballona Wetlands, and one or more of these could serve as indicator species (e.g., Belding's savannah sparrow), however additional study may be necessary to specify what threshold conditions (e.g., size of foraging area) must be provided to assure a self-sustaining population.

Stakeholder Responsibility:
California Department of Fish & Game and colleges & universities

Objective: Establish self-sustaining populations of key indicator riparian species along tributaries

ACTION: *Study potential indicator species for riparian habitat*

Due to the lack of riparian habitat in the watershed, there are currently no populations of sensitive species that might serve as indicator species. However, riparian habitat in other nearby coastal areas does include populations of species that might serve as a candidate species (e.g., southwestern willow flycatcher). A study could identify potential candidate species and the requisite threshold conditions (e.g., linear length of stream corridor)

Stakeholder Responsibility:
California Department of Fish & Game and colleges & universities

Objective: Restore riparian habitat along Ballona Creek where feasible

ACTION: *Introduce riparian vegetation along Ballona Creek where feasible*

Limited riparian vegetation along Ballona Creek has been planted recently (e.g., at Sepulveda Boulevard), with additional plantings proposed in conjunction with bike path improvements by the MRCA. As the channel is lined with concrete or rip rap, any such plantings may be limited by the absence of typical hydrologic conditions along riparian corridors, however, the introduction of vegetation along the creek can serve as demonstration projects and mimic historical conditions.

Stakeholder Responsibility:
Los Angeles County, Los Angeles City, and Culver City

Objective: Daylight tributary streams and restore riparian habitat wherever feasible

ACTION: *Study potential opportunities to daylight and/or restore current/historic stream channels*

As noted above, the feasibility of implementing the recommendations of the *Seeking Streams* study could be addressed, and candidate streams in other portions of the watershed could be identified.

Stakeholder Responsibility:
US Army Corps of Engineers, Los Angeles County, cities, and colleges & universities

2. Land

GOAL A. IMPROVE HABITAT QUALITY, QUANTITY AND CONNECTIVITY

Objective: Restore habitat wherever feasible on publicly owned land in the Baldwin Hills, the Santa Monica Mountains, and the Hollywood Hills, including removal of invasive species and restoration of native upland habitats, where consistent with use

ACTION: *Implement habitat restoration elements of the Baldwin Hills Master Plan*

The Baldwin Hills Park Master Plan identifies opportunities for restoration of habitat, including the creation of wildlife corridors within the Baldwin Hills and to Ballona Creek, which runs just north of the Baldwin Hills Scenic Overlook.

Stakeholder Responsibility:
California Department of Parks and Recreation and Baldwin Hills Conservancy

ACTION: *Identify opportunities for habitat restoration in Santa Monica Mountains (within the Watershed)*

Although some areas of relatively undisturbed habitat in that portion of the Santa Monica Mountains are preserved as public land, other undeveloped areas remain in private ownership and may warrant acquisition to provide habitat corridors or preserve open space.

Stakeholder Responsibility:
Santa Monica Mountains Conservancy and colleges & universities

Objective: Expand protection of high-quality habitat and ecologically-significant areas

ACTION: *Develop and implement restoration plan for Ballona Wetlands*

As discussed above, a restoration plan for the Ballona Wetlands has yet to be developed.

Stakeholder Responsibility:
Coastal Conservancy in conjunction with various federal, state, and local entities and organizations

ACTION: *Implement habitat restoration elements of the Baldwin Hills Master Plan*

As discussed above, the Baldwin Hills Master Plan includes proposals for restoration of habitat and creation of linkages to Ballona Creek.

Stakeholder Responsibility:
California Department of Parks and Recreation and Baldwin Hills Conservancy

Objective: Establish self-sustaining populations of key indicator riparian species tributary streams

ACTION: *Study indicator species for riparian habitat*

As discussed above, a study could identify candidates for indicator species and determine threshold conditions.

Stakeholder Responsibility:
California Department of Fish & Game and colleges & universities

Objective: Develop and implement habitat monitoring programs

ACTION: *Implement the Community-Based Monitoring Program*

The Community-Based Monitoring Program included in Chapter 5 includes habitat monitoring elements.

Stakeholder Responsibility:
Los Angeles Regional Water Quality Control Board, Los Angeles County, cities, Baldwin Hills Conservancy, colleges & universities and community-based organizations

Objective: Maintain, restore, and enhance wildlife corridors as continuous linkages from the Santa Monica Mountains to Baldwin Hills, Ballona Wetlands, and Santa Monica Bay

Actions: *Develop and implement a plan for restoration of the Ballona Wetlands, implement projects to restore habitat in the Del Rey Lagoon and Ballona Lagoon, develop and implement a project for restoration of the Oxford Flood Control Basin, implement the Baldwin Hills Master Plan, identify opportunities for habitat restoration in the Santa Monica Mountains, and study opportunities to daylight and/or restore streams*

As discussed above, plans and projects for restoration of habitat in various locations of the watershed have been, or will be, developed. With improved habitat at those locations, the creation of linkages via stream corridors could result in viable habitat corridors from the Mountains to the Bay.

Stakeholder Responsibility:
Coastal Conservancy, Baldwin Hills Conservancy, Santa Monica Mountains Conservancy, Los Angeles County, cities, and colleges & universities

GOAL B. IMPROVE ACCESS TO OPEN SPACE AND RECREATION FOR ALL COMMUNITIES

Objective: Increase public open space by targeted, prioritized programs of land acquisition

ACTION: *Implement the Baldwin Hills Master Plan*

As discussed above, the Baldwin Hills Master Plan proposes acquisition of additional land for public open space.

Stakeholder Responsibility:
California Department of Parks and Recreation and Baldwin Hills Conservancy

ACTION: *Acquire additional open space*

Many neighborhoods in the watershed have limited open space, mostly in the form of existing public parks. Targeted acquisition of pocket parks, land along Ballona Creek and tributaries, and undeveloped lands in the Santa Monica Mountains could expand public open space.

Stakeholder Responsibility:
National Park Service, California Department of Parks and Recreation, Los Angeles County, cities, and community-based organizations

Objective: Coordinate open space planning, land acquisition and management among jurisdictions

ACTION: *Pursue joint management of natural resources in Lower Ballona Creek area*

As discussed in Chapter 1, the City of Los Angeles, other public agencies, and community-based organizations are discussing a possible structure for joint management of natural resources in the lower Ballona Creek area. If successful, this effort could serve as a model for other areas or natural resources in the Watershed.

Stakeholder Responsibility:
US Army Corps of Engineers, Coastal Conservancy, Los Angeles County, Cities of Los Angeles, and Culver City, and community-based organizations

Objective: Accommodate a range of active and passive recreational uses

ACTION: *Implement Baldwin Hills Master Plan*

The Baldwin Hills Master Plan includes proposals for both active and passive recreation.

Stakeholder Responsibility:
California Department of Parks and Recreation and Baldwin Hills Conservancy

ACTION: *Acquire additional parkland*

Vacant parcels, land along Ballona Creek or tributaries, and undeveloped parcels in the Santa Monica Mountains could be acquired to provide pocket parks or expand existing open space and provide opportunities for both active and passive recreation.

Stakeholder Responsibility:
National Park Service, California Department of Parks and Recreation, Los Angeles County, cities, and community-based organizations

ACTION: *Develop and implement a restoration plan for the Ballona Wetlands*

Eventual restoration of the Ballona Wetlands is likely to provide opportunities for passive recreation, such as wildlife viewing, hiking, and bicycling.

Stakeholder Responsibility:
Coastal Conservancy in conjunction with various federal, state, and local entities and organizations

Objective: Improve access to open space based on population density, distance, and travel time for underserved communities

ACTION: *Encourage expansion of open space in underserved areas*

Many neighborhoods in the watershed have limited open space. Targeted acquisition in underserved areas could provide public open space, in the form of new pocket parks or expansion of existing parks.

Stakeholder Responsibility:
California Department of Parks and Recreation, Los Angeles County, cities, and community-based organizations

Objective: Connect open spaces to transit access points

ACTION: *Encourage public transit operators to provide service to open space areas*

Although some public open spaces are located on or near major streets that have transit service, many parks and open spaces are located in areas that are not served by transit. Although weekday transit service may need to remain focused on providing service for commuters, alternative transit routes could be created to serve public open space on weekends, holidays or traditional vacation periods.

Stakeholder Responsibility:
Caltrans, Los Angeles County Metropolitan Transit Authority, cities with municipal transit agencies, and community-based organizations

Objective: Connect waterway projects to adjacent communities

ACTION: *Implement recommendations of Ballona Creek & Trail Focused Special Study*

The Ballona Creek and Trail Focused Special Study provides recommendations for improving entrances to the bike path and could serve as a model for future projects along the creek and tributaries.

Stakeholder Responsibility:
California Coastal Conservancy and City of Culver City

GOAL C. IMPROVE PEDESTRIAN AND BICYCLE ACCESS AND SAFETY

Objective: Provide and maintain bicycle, pedestrian and equestrian trail systems along waterways and within the watershed to link public open space

ACTION: *Implement recommendations of Ballona Creek & Trail Focused Special Study*

The Ballona Creek and Trail Focused Special Study provides recommendations for improving the bike path along Ballona Creek and improving visibility and access.

Stakeholder Responsibility:
California Coastal Conservancy and City of Culver City

ACTION: *Encourage maintenance and expansion of bicycle paths and routes*

Bike paths and routes serve public open spaces in some areas, but many parks and open space areas could be better served. Cities should consider expansion of these routes to create a network that encourages access via means other than the automobile.

Stakeholder Responsibility:
Caltrans, Metropolitan Transit Authority, Los Angeles County, cities, community-based organizations, neighborhoods, and individuals

ACTION: *Fund bicycle paths that serve open space areas and provide alternative commute routes*

Funding for bicycle routes from transportation entities are typically reserved for routes that facilitate commuting. Expanding the eligibility of such funds to routes that serve public open space could enhance their use by recreational users.

Stakeholder Responsibility:
US Department of Transportation, Southern California Association of Governments, Caltrans, Metropolitan Transit Authority, Los Angeles County, and cities

Objective: Provide for public safety and security along pedestrian and bicycle routes

ACTION: *Implement recommendations of Ballona Creek & Trail Focused Special Study*

The Ballona Creek and Trail Focused Special Study provides recommendations for improving safety and security along the bike path.

Stakeholder Responsibility:
California Coastal Conservancy and City of Culver City

ACTION: *Maintain and enhance pedestrian safety at crosswalks*

Cities should work to maintain and enhance pedestrian safety, particularly at crossings on busy streets and along routes that provide access to public open space.

Stakeholder Responsibility:
US Department of Transportation, Southern California Association of Governments, Caltrans, Metropolitan Transit Authority, Los Angeles County, cities, community-based organizations, neighborhoods, and individuals

GOAL D. PRACTICE STEWARDSHIP OF THE LANDSCAPE

Objective: Adopt requirements for the use of native, regionally-adapted and drought-tolerant plants in all public sector projects, where consistent with use

ACTION: *Encourage cities and agencies to require native, regionally-adapted, and drought-tolerant landscaping in all projects*

Although drought-tolerant landscaping has been utilized in many public projects, the use or native and regionally-adapted plants that are drought-tolerant should be required, wherever feasible with proposed uses (e.g., for landscaping but not to replace lawns used for recreation).

Stakeholder Responsibility:
Resources Agency, Los Angeles County, cities, and community-based organizations

ACTION: *Apply the Los Angeles River Landscape Guidelines to Ballona Creek and other public projects*

The Los Angeles and San Gabriel Rivers Watershed Council, in conjunction with the Rancho Santa Ana Botanic Garden, prepared Landscaping Guidelines and Plant Palettes for the Los Angeles River Master Plan for the County of Los Angeles. The guidelines identify a range of native, regionally-adapted, and drought-tolerant plants that may be used in projects along the Los Angeles River, which could be used for projects along Ballona Creek and at other locations in the Watershed.

Stakeholder Responsibility:
Resources Agency, Los Angeles County, Cities of Los Angeles and Culver City, and community-based organizations

Stakeholder Responsibility:
Los Angeles County and cities

Objective: Provide incentives for use of native, regionally-adapted and drought-tolerant plants in private sector projects

ACTION: *Expand public education and outreach regarding appropriate landscaping*

Although some water agencies and cities provide some outreach regarding the use of drought-tolerant landscaping, more outreach on the use of native, regionally-adapted and drought-tolerant landscaping would increase public interest, reduce water demand, and reduce dependence on imported water.

Stakeholder Responsibility:
Resources Agency, Los Angeles County, cities, colleges & universities, and community-based organizations

Objective: Encourage identification, preservation, and restoration of historic sites and cultural landscapes

ACTION: *Identify and preserve historical sites and cultural landscapes*

Historic sites and cultural landscapes provide opportunities to appreciate the role of humans in modification of the watershed and provide tangible evidence of the history of development.

Stakeholder Responsibility:
Resources Agency, Los Angeles County, cities, and community-based organizations

3. Planning

GOAL A. COORDINATE WATERSHED PLANNING ACROSS JURISDICTIONS AND BOUNDARIES

Objective: Integrate watershed planning with water supply, natural resource, land use, and transportation plans

ACTION: *Encourage cities and Los Angeles County to incorporate Ballona WMP Objectives into General Plans*

As the County and cities update their General Plans, the objectives identified in this Watershed Plan should be incorporated into the Conversation, Open Space, and other elements of the General Plans to the extent feasible.

Stakeholder Responsibility:
County of Los Angeles and cities

ACTION: *Develop sub-watershed plans to localize Ballona WMP Objectives for major tributaries*

Because of the size and complexity of the Watershed, development of sub-watershed plans for major tributaries (e.g., Centinela Creek, Benedict Canyon Channel), may provide for more effective management of issues specific to those tributaries and give local jurisdictions, community-based organizations, and neighborhood groups a greater voice in the prioritization of recommended actions. The intent should be to develop localized plans that are consistent with the overall goals and objectives of this Plan.

Stakeholder Responsibility:
County of Los Angeles, cities, community-based organizations, and neighborhoods.

ACTION: *Encourage public agencies to consider cumulative impacts to watershed resources through CEQA analysis of projects*

Analysis of plans and/or projects per the requirements of the California Environmental Quality Act must include consideration of the potential cumulative effects that could result from the implementation of those plans or projects in conjunction with other development in the project area. Lead agencies should include an assessment of cumulative impacts to water quality and natural resources as relevant.

Stakeholder Responsibility:
State agencies, County of Los Angeles, cities, and other lead agencies

ACTION: *Develop and implement the Integrated Resource Plan*

The Integrated Resource Plan for the City of Los Angeles, currently in development, will provide a comprehensive program to address solid waste, wastewater generation, stormwater, and urban runoff..

Stakeholder Responsibility:
City of Los Angeles

ACTION: *Continue implementation of the Sustainable City program*

With adoption of its Sustainable City Program in 1994, the City of Santa Monica has committed to meeting its existing needs without compromising the ability of future generations to meet their own needs. Although only a small portion of the city is within the watershed, the program has the potential to become a model for other public agencies as well as private organizations.

Stakeholder Responsibility:
City of Santa Monica

ACTION: *Consider adoption of a sustainability program*

Consideration of sustainability principles in the development of public sector projects and other public agency actions could reduce water demand, wastewater generation, solid waste disposal, and consumption of nonrenewable resources and contribute to watershed health.

Stakeholder Responsibility:
Los Angeles County, cities of Beverly Hills, Culver City, Inglewood, and West Hollywood and community-based organizations

GOAL B. IMPLEMENT MULTI-OBJECTIVE PLANNING AND PROJECTS

Objective: Employ comprehensive cost-benefit analysis to evaluate multiple-objective projects

ACTION: *Include a comprehensive cost-benefit analysis in evaluation of public sector projects*

Although cost-benefit analysis is sometimes prepared for public sector projects, the application is typically limited to large infrastructure projects and includes limited information on a project's contribution to watershed health. A more comprehensive assessment, such as that developed for TreePeople's Trans-Agency Resources for Environmental and Economic Sustainability (T.R.E.E.S) program, should consider a range of environmental and socioeconomic conditions including water availability and quality, flood control, air quality, energy demand, green waste supply, capital and operational costs, employment and quality of life. Los Angeles County has funded a study to assess the economic value of watershed management , and the results of that analysis could be applicable to future cost-benefit studies.

Stakeholder Responsibility:
Resources Agency, State Water Resources Control Board, Los Angeles County, cities, and community-based organizations

Objective: Leverage planned single-purpose infrastructure projects by incorporating multiple objectives and partnerships

ACTION: *Encourage agencies, cities, and community-based organizations to seek common solutions to issues and form partnerships for projects*

To make progress towards achieving ecological health for the Watershed, cities, agencies, and community-based organizations need to work together for mutual benefits.

Stakeholder Responsibility:
All entities and agencies interested in improving watershed health

Objective: Provide incentives to promote sustainable, multiple-objective private sector projects

ACTION: *Study incentives for incorporation of sustainability concepts in private sector projects*

Although some organizations have willingly incorporated sustainability principles into private-sector projects, a study of potential incentives that the cities and Los Angeles County could incorporate as general plan policies, ordinances or other programs could increase public awareness and encourage broader application of such principles.

Stakeholder Responsibility:
Resources Agency, Los Angeles County, cities, colleges & universities, and community-based organizations

Objective: Incorporate sustainability objectives and practices in all projects

ACTION: *Continue implementation of the Sustainable City program*

As discussed above, the City of Santa Monica's Sustainable Cities program can serve as a model for other agencies and organizations.

Stakeholder Responsibility:
City of Santa Monica

ACTION: *Consider adoption of a sustainability program*

As discussed above, wider application of sustainability principles into public sector actions and activities would improve watershed health.

Stakeholder Responsibility:
Los Angeles County, cities of Beverly Hills, Culver City, Inglewood, and West Hollywood and community-based organizations

ACTION: *Study incentives for incorporation of sustainability concepts in private sector projects*

As discussed above, a study of potential incentives could increase public awareness and encourage broader application of such principles.

Stakeholder Responsibility:
Resources Agency, Los Angeles County, cities, colleges & universities, and community-based organizations

GOAL C. USE SCIENCE AS A BASIS FOR PLANNING

Objective: Base plans and projects on scientifically derived principles, practices, and priorities

ACTION: *Establish a clearinghouse for Watershed information*

Although various entities have studied water quality and other issues relevant to watershed restoration, there is no comprehensive catalog of this information, nor a central location where these materials can be accessed or viewed. Establishing a clearinghouse, most likely at a college or university, would facilitate the sharing and exchange of information, promote identification of data gaps, and reduce unnecessary duplication of effort.

Stakeholder Responsibility:
Colleges & universities

ACTION: *Established a Watershed Research Consortium to encourage research relevant to protection of natural resources*

As noted in Chapter 2 (Existing Conditions), due to the extent of urbanization, the ecological health of the

Watershed is relatively poor. Given the far-reaching vision and goals established in this plan, a wide range of research is needed to more fully appreciate the extent of the problems, evaluate options to improve the condition of natural resources, and focus efforts on effective actions that can improve watershed conditions.

Stakeholder Responsibility:
Resources Agency, Los Angeles County, cities, colleges & universities, and community-based organizations

Objective: Utilize applied scientific research to guide public policy

ACTION: *Encourage consideration of scientific studies in the formation of public policy*

Because of the magnitude of public resources that may be needed to improve watershed health, investment of such resources should be focused on methods and actions that are cost-effective, produce visible results, and assure the public that limited public funds are being wisely spent.

Stakeholder Responsibility:
Resources Agency, State Water Resources Control Board, Los Angeles Regional Water Quality Control Board, Los Angeles County, cities, colleges & universities, and community-based organizations

GOAL D. INVOLVE THE PUBLIC THROUGH OUTREACH AND EDUCATION

Objective: Conduct public educational and outreach programs to promote watershed restoration

ACTION: *Encourage continued environmental education in K–12 schools*

Continued inclusion of environmental education in school curricula will foster an understanding of human impacts on the environment among school children.

Stakeholder Responsibility:
K–12 school districts, Los Angeles County, cities, and community-based organizations

ACTION: *Encourage development of K–12 educational curriculum focused on the Ballona Watershed*

Fostering an appreciation of the Ballona Creek Watershed will help foster the next generation of watershed stewards.

Stakeholder Responsibility:
K–12 school districts, Los Angeles County, cities, and community-based organizations

ACTION: *Coordinate outreach activities with other jurisdictions and organizations to improve awareness of issues related to stormwater and urban runoff*

As discussed above, as part of the NPDES permit, the County and the cities are required to implement a Public Information and Participation Program to increase awareness of water quality issues and an understanding of how personal action can reduce water pollution. Coordination amongst the jurisdictions would maximize the impact of such programs and provide a common appreciation of the Watershed.

Stakeholder Responsibility:
Los Angeles County and cities

ACTION: *Encourage localization and distribution of the "Living Lightly" watershed brochure*

First developed for the Topanga Creek Watershed, *Living Lightly in our Watersheds* was subsequently adapted for the Malibu Creek Watershed and is being localized for other watersheds in the Los Angeles area and provides good examples of how personal action can improve watershed health.

Stakeholder Responsibility:
Resources Agency, Los Angeles County, cities, and community-based organizations

ACTION: *Develop a sponsorship program for natural resources in the Watershed*

To facilitate a better appreciation of natural resources in the Watershed, a sponsorship program could be developed, similar to the "Adopt-A-Highway" program, with signage to identify the resource and recognize the sponsor's contribution to restoration or protection of those resources.

Stakeholder Responsibility:
Resources Agency, Los Angeles County, cities, and community-based organizations

Objective: Establish a process for project participation by stakeholder representatives and the public

ACTION: *Provide for public participation in development of grant guidelines, identification of project evaluation priorities and funding solicitations*

Most agencies provide some process for public participation in the development of grant guidelines, or the approval of projects, although notification of such processes could be improved. Fostering public participation improves public agency decision-making and assures that watershed projects reflect public priorities.

Stakeholder Responsibility:
Resources Agency, State Water Resources Control Board, Los Angeles Regional Water Quality Control Board, Los Angeles County, cities, and community-based organizations

ACTION: *Continue BCWTF meetings and encourage expanded public participation*

Continuation of the BCWTF would provide a forum for discussion of issues related to the implementation of this watershed plan. Wider participation by other cities, community-based organizations, and individuals should be encouraged.

Stakeholder Responsibility:
Los Angeles County, cities, and community-based organizations

Objective: Incorporate appropriate interpretive signage and educational elements and facilities in watershed restoration projects

ACTION: *Encourage cities and agencies to include interpretive signage and educational elements in public projects*

To foster an understanding of how projects contribute to watershed health, public agencies should include interpretive signage and educational elements in projects.

Stakeholder Responsibility:
Resources Agency, State Water Resources Control Board, Los Angeles Regional Water Quality Control Board, Los Angeles County, cities, and community-based organizations

ACTION: *Require interpretive signage and educational elements as a funding condition for projects that foster watershed restoration*

Funding agencies should consider inclusion of criteria to require interpretive signage and educational elements in all projects.

Stakeholder Responsibility:
US Environmental Protection Agency, Resources Agency, State Water Resources Control Board, Los Angeles Regional Water Quality Control Board, Los Angeles County, and cities

GOAL E. UTILIZE THE PLAN IN AN ONGOING MANAGEMENT PROCESS

Objective: Periodically assess progress towards meeting Watershed Plan objectives and revise as appropriate

ACTION: *Review the Watershed Plan every three years and revise plan elements as appropriate*

As discussed later in this Chapter, it is proposed that the Watershed Plan be reviewed on a triennial basis.

Stakeholder Responsibility:
Los Angeles County, cities, BCWTF, and community-based organizations

Objective: Develop benchmarks to assess watershed status by a regular monitoring process

ACTION: *Implement community-based monitoring program, establish benchmarks, and monitor parameters on a regular basis*

As discussed in Chapter 5 (Community-Based Monitoring), some benchmarks (such as water quality standards) already exist, but others, such as those related to habitat, need to be established, based on scientific study and stakeholder consensus.

Stakeholder Responsibility:
Los Angeles County, cities, BCWTF, and community-based organizations

GOAL F. REALIZE THE POTENTIAL OF WATERSHED RESTORATION FOR SUSTAINABLE ECONOMIC DEVELOPMENT

Objective: Recycle underused sites along Ballona Creek as frontage for new, sustainable mixed-use development

ACTION: *Implement recommendations of Ballona Creek & Trail Focused Special Study*

The Ballona Creek and Trail Focused Special Study provides opportunities for mixed-use development that celebrates proximity to the Creek.

Stakeholder Responsibility:
California Coastal Conservancy and City of Culver City

ACTION: *Identify incentives for sustainable development along Ballona Creek*

As improvements to Ballona Creek occur, opportunities for development along the creek may become more prevalent. Incentives for sustainable development could encourage development that reduces water demand, wastewater generation, solid waste disposal, and consumption of nonrenewable resources and contributes to watershed health.

Stakeholder Responsibility:
Los Angeles County and cities of Culver City and Los Angeles

Ballona Creek Watershed Management Plan BMP Overview
Multi-Use Retention Basin

General BMP Type	Storage
Effectiveness on Targeted Contaminants	**High:** Sediment, floatables **Medium:** Some nutrients, some heavy metals, some toxics, some oxygen demanding substances, some oil & grease, some bacteria & viruses
Water Quantity Impact	High
Advantages	Multiple benefits from single or series of sites Increased water conservation Recreational opportunities Enhanced habitat
Disadvantages	Difficult to find suitable sites Major undertaking Loss of tax revenues on land used Expensive to construct, operate & maintain
Technical Feasibility	Very complex to design and construct
Site Considerations	Requires large vacant/open space
Regulatory Considerations	Must comply with existing discharge, water quality regulations
Social/Political Considerations	Mostly positive
Typical Unit Costs	Average $7,500 / 30,800 (residential / industrial), not including land costs
NPS Category[a]	Runoff from Existing Development Transportation Development (Roads, Highways, Bridges)
BMPLA Category[b]	Cisterns and Underground Storage Stormwater Ponds (nonproprietary) Engineered Wetlands (nonproprietary)

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview **Cistern**	
General BMP Type	Storage
Effectiveness on Targeted Contaminants	**High:** Sediment, floatables **Medium:** Some nutrients, some heavy metals, some toxics, some oxygen demanding substances, some oil & grease, some bacteria & viruses
Water Quantity Impact	High
Advantages	Retains water on site for reuse Reduces runoff volume
Disadvantages	Cost borne by property owners Requires proper maintenance by property owner Must be properly secured
Technical Feasibility	Moderate
Site Considerations	Aboveground unit requires space; below ground requires excavation
Regulatory Considerations	May require city approval (plan check, permits) Vector control Water rights issues re retained water
Social/Political Considerations	May require tax incentives to get public buy-in Requires behavioral change for use
Typical Unit Costs	Average $17,000/ $105,000 (residential / industrial)
NPS Category[a]	Runoff from Existing Development Transportation Development (Roads, Highways, Bridges)
BMPLA Category[b]	Cisterns and Underground Storage

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview
Extended Detention Basin

General BMP Type	Storage
Effectiveness on Targeted Contaminants	**High:** Sediment **Medium:** Some nutrients, some heavy metals, some toxics, some floatables, some oxygen demanding substances, some oil & grease, minimal impact on bacteria & viruses
Water Quantity Impact	High
Advantages	Removes some particulate pollution and adsorbed metals Manages peak flood flows If basin unlined, may also recharge groundwater May be designed as multi-use facility
Disadvantages	Will not remove dissolved pollutants Moderate to high operation/maintenance costs Sediments must be periodically removed and disposed
Technical Feasibility	Requires proper design and site characteristics to function properly
Site Considerations	Adequate area and gradient required
Regulatory Considerations	Vector control if any standing water Disposal of potentially contaminated sediments Must comply with existing discharge, water quality regulations if infiltrating May pose safety concerns when full
Social/Political Considerations	May not be appropriate for multiple uses
Typical Unit Costs	$0.50–1.00 cu. ft. of treated water volume
NPS Category[a]	Runoff from Existing Development Transportation Development (Roads, Highways, Bridges)
BMPLA Category[b]	Cisterns and Underground Storage Stormwater Ponds (nonproprietary)

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview **Underground Retention/Infiltration**	
General BMP Type	Storage
Effectiveness on Targeted Contaminants	**High:** Sediment, heavy metals, toxics, floatables, oxygen demanding substances, oil & grease, bacteria & viruses **Medium:** Nutrients
Water Quantity Impact	High
Advantages	Cleans out first flush contaminants Reduces peak flows
Disadvantages	Periodic maintenance is required May require pretreatment prior to infiltration
Technical Feasibility	The structural integrity of the surface must be ensured
Site Considerations	This system only works if the area beneath tanks allow infiltration into the subsoil
Regulatory Considerations	None
Social/Political Considerations	None
Typical Unit Costs	$23.5k +/- for construction cost and $5k+/- annual maintenance
NPS Category[a]	Runoff from Existing Development Transportation Development (Roads, Highways, Bridges)
BMPLA Category[b]	Cisterns and Underground Storage

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview
Underground Detention (street storage with infiltration)

General BMP Type	Storage
Effectiveness on Targeted Contaminants	**High:** Sediment, heavy metals, toxics, floatables, oxygen demanding substances, oil & grease, bacteria & viruses **Medium:** Some nutrients
Water Quantity Impact	High
Advantages	Delays peak discharge Alleviates local flooding May reduce pollutant load to receiving water body
Disadvantages	Construction would impact traffic flow Does not reduce flow to receiving water body Expensive, also high operation/maintenance Other benefits not realized
Technical Feasibility	Requires proper design and drainage outlet for release of water
Site Considerations	Potential conflict with underground utilities
Regulatory Considerations	None
Social/Political Considerations	No multiple benefits but could solve localized flooding problems
Typical Unit Costs	Average $1.8 / 3.7 million (residential / industrial)
NPS Category[a]	Runoff from Existing Development Transportation Development (Roads, Highways, Bridges)
BMPLA Category[b]	Cisterns and Underground Storage

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview **Porous Pavement (with infiltration)**	
General BMP Type	Infiltration
Effectiveness on Targeted Contaminants	**High:** Sediment, heavy metals, toxics, floatables, oxygen demanding substances, oil & grease, bacteria & viruses **Medium:** Some nutrients
Water Quantity Impact	Low
Advantages	Low cost nonintrusive groundwater recharge
Disadvantages	Oil & grease pollution in soil Potentially higher initial and operation/maintenance costs than traditional paving
Technical Feasibility	High
Site Considerations	Appropriate for parking lots, walkways, etc.; not for streets May require treatment filter in polluted areas
Regulatory Considerations	May consider building code changes to make mandatory
Social/Political Considerations	None identified
Typical Unit Costs	$3,400 for average residential site, up to $560,000 for industrial
NPS Category[a]	Runoff from existing development Transportation development (roads, highways, bridges)
BMPLA Category[b]	Porous pavement

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview **Dry Well**	
General BMP Type	Infiltration
Effectiveness on Targeted Contaminants	**High:** Sediment, heavy metals, toxics, floatables, oxygen demanding substances, oil & grease, bacteria & viruses **Medium:** Some nutrients
Water Quantity Impact	High
Advantages	Retains runoff on site for infiltration Groundwater recharge low maintenance
Disadvantages	Limited water quality benefits; potential for groundwater pollution Cost may need to be borne by property owners
Technical Feasibility	Must have sufficient clearance to groundwater
Site Considerations	Requires excavation Suitable for porous soil Can be sized according to space available
Regulatory Considerations	Must comply with existing water quality regulations
Social/Political Considerations	Must be voluntary
Typical Unit Costs	$14,000–$31,500 depending on size
NPS Category[a]	Runoff from existing development Transportation development (roads, highways, bridges)
BMPLA Category[b]	Disinfection infiltration well

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview **Wetland Systems**	
General BMP Type	Filtration
Effectiveness on Targeted Contaminants	**High:** Sediment, nutrients, heavy metals, toxics, floatables, oxygen demanding substances, oil & grease **Medium:** Some bacteria & viruses
Water Quantity Impact	High
Advantages	Aesthetic and wildlife habitat enhancement Efficient pollutant removal for metals, nutrients If unlined, can recharge groundwater
Disadvantages	Requires appropriate and regular maintenance to prevent clogging High operation/maintenance costs May require additional water during dry periods
Technical Feasibility	Design must be hydrologically correct
Site Considerations	Requires adequate water to sustain pool or aquatic vegetation Performance enhanced with sediment trap for coarse material to prevent system clogging
Regulatory Considerations	Vector control in standing water May require Clean Water Act Section 404 permit from Army Corps of Engineers Endangered Species Use
Social/Political Considerations	May be concerns over increased wildlife by adjacent property owners
Typical Unit Costs	$0.60–1.25 cu. ft. of treated water volume
NPS Category[a]	Runoff from existing development Transportation development (roads, highways, bridges)
BMPLA Category[b]	Aquatic buffers (nonproprietary) Engineered wetlands (nonproprietary)

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview **Bioretention**	
General BMP Type	Filtration
Effectiveness on Targeted Contaminants	**High:** Sediment **Medium:** Some nutrients, some heavy metals, some toxics, some floatables, some oxygen demanding substances, some oil & grease, minimal impact on bacteria & viruses
Water Quantity Impact	Medium
Advantages	Aesthetic value Sediment and pollutant removal Groundwater recharge May be used in place of traditional parking lot landscaping
Disadvantages	May be of limited value during heavy rains if drainage area exceeds detention capacity Depending on land use in drainage area, may require pretreatment
Technical Feasibility	Designs can be quite complex but are flexible Must have appropriate vegetation to tolerate inundation and dry periods
Site Considerations	Depending on plant palette, may need additional irrigation in dry periods Adaptable to a variety of sizes & locations
Regulatory Considerations	Vector control while water is ponded Must comply with existing discharge, water quality regulations
Social/Political Considerations	None
Typical Unit Costs	$5.30 cu. ft. of treated water volume
NPS Category[a]	Runoff from existing development Transportation development (roads, highways, bridges)
BMPLA Category[b]	Aquatic buffers (nonproprietary) Engineered wetlands (nonproprietary) landscape irrigation management

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview **Catch Basin Inserts**	
General BMP Type	Filtration
Effectiveness on Targeted Contaminants	**High:** Floatables, oil, & grease **Medium:** Some sediment, some nutrients, some heavy metals, some toxics, some oxygen demanding substances, minimal impact on bacteria & viruses
Water Quantity Impact	None
Advantages	Removes debris and suspended pollutants Simple and inexpensive to install No additional land or structure required
Disadvantages	High maintenance requirements—accumulated sediments and debris must be removed to avoid clogging filter and/or re-suspension/ replacement May be of limited value during heavy rains
Technical Feasibility	Can be installed in existing storm drain systems
Site Considerations	Type of insert must be appropriate for pollutants of concern
Regulatory Considerations	Disposal of potentially contaminated sediments Vector control
Social/Political Considerations	None
Typical Unit Costs	Depending on design and pollutants targeted, range from $40 to $3,000
NPS Category[a]	Runoff from existing development Transportation development (roads, highways, bridges)
BMPLA Category[b]	Drain inlet protection

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview
Media Filtration

General BMP Type	Filtration
Effectiveness on Targeted Contaminants	**High:** Sediment, floatables **Medium:** Some nutrients, some heavy metals, minimal impact on toxics, some oxygen demanding substances, some oil & grease, some bacteria & viruses
Water Quantity Impact	None
Advantages	May be placed under existing structures (parking lots, walkways, playing fields) Effective removal of suspended pollutants Organic media will also remove metals, nutrients Can be sized according to need
Disadvantages	Performance declines over time, requiring access for maintenance Inorganic media does not remove dissolved pollutants
Technical Feasibility	High—adaptable to a variety of situations and conditions
Site Considerations	Effective in small sites to treat a portion of diverted runoff Performance enhanced with sediment trap for coarse material to prevent system clogging Stability of surface area when used as below ground
Regulatory Considerations	Must comply with existing discharge, water quality regulations
Social/Political Considerations	None
Typical Unit Costs	$3.00–6.00 cu. ft. of treated water volume, or more for prebuilt systems
NPS Category[a]	Runoff from existing development On-site disposal systems Transportation development (roads, highways, bridges)
BMPLA Category[b]	Filter

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview
On-Site Retention (vegetated swale or basin)

General BMP Type	Conveyance
Effectiveness on Targeted Contaminants	**High:** Sediment, floatables **Medium:** Some nutrients, some heavy metals, some toxics, some oxygen demanding substances, some oil & grease, some bacteria & viruses
Water Quantity Impact	High
Advantages	Retains runoff on site for infiltration Groundwater recharge Low maintenance
Disadvantages	May not be maintained if ownership changes Cost to regrade for retrofit May be issues over standing water (liability, vectors, odors)
Technical Feasibility	High under certain conditions
Site Considerations	Requires regrading to construct on retrofits
Regulatory Considerations	May require city approval (plan check, permits) May require enforcement for proper maintenance Vector control Must comply with existing water quality regulations
Social/Political Considerations	Standing water may pose liability
Typical Unit Costs	$5.40/yd^2
NPS Category[a]	Runoff from existing development Transportation development (roads, highways, bridges)
BMPLA Category[b]	Infiltration trenches Vegetated drainage swales and strips (nonproprietary)

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview
Tree Planting

General BMP Type	Practices
Effectiveness on Targeted Contaminants	Variable
Water Quantity Impact	Low
Advantages	Low cost Nonintrusive Conserves energy Increased water retention Aesthetic value
Disadvantages	Small part of overall solution Requires maintenance Overgrown tree roots can crack pavement
Technical Feasibility	High
Site Considerations	More effective on larger land holdings
Regulatory Considerations	None identified
Social/Political Considerations	Mostly favorable
Typical Unit Costs	$155 per 24-inch box
NPS Category[a]	Runoff from developing areas Runoff from existing development Transportation development (roads, highways, bridges)
BMPLA Category[b]	Landscape irrigation management

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview **Removal of Paving**	
General BMP Type	Practices
Effectiveness on Targeted Contaminants	**High:** Sediment **Medium:** Some nutrients, some heavy metals, some toxics, some floatables, some oxygen demanding substances, some oil & grease, minimal impact on bacteria & viruses
Water Quantity Impact	Medium
Advantages	Low cost Nonintrusive Increases infiltration May reduce energy costs (heat island effect)
Disadvantages	No effect on peak flood flows May increase mud flows Higher maintenance costs
Technical Feasibility	High; pavement may need to be replaced with other groundcover
Site Considerations	Limited areas where pavement can be removed without some replacement cover
Regulatory Considerations	None
Social/Political Considerations	Little public awareness of benefits
Typical Unit Costs	Variable, depending on size of area and replacement cover, if any
NPS Category[a]	Runoff from existing development
BMPLA Category[b]	Aquatic buffers (nonproprietary) Good housekeeping and maintenance Landscape irrigation management

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview
Mulching (to Increase Retention / Infiltration)

General BMP Type	Practices
Effectiveness on Targeted Contaminants	**High:** Sediment, heavy metals, toxics, floatables, oxygen demanding substances, oil & grease, bacteria & viruses **Medium:** Some nutrients
Water Quantity Impact	Low
Advantages	Low-cost nonintrusive increases infiltration Some pollutant bio-remediation
Disadvantages	Does not reduce peak discharge Requires maintenance to keep mulch in place
Technical Feasibility	High
Site Considerations	More effective on larger land holdings
Regulatory Considerations	None identified
Social/Political Considerations	Probably favorable on voluntary basis
Typical Unit Costs	$2.40 sq. yd.
NPS Category[a]	Runoff from existing development Transportation development (roads, highways, bridges)
BMPLA Category[b]	Good housekeeping and maintenance Landscape irrigation management

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview
Stormwater-Supplied Irrigation System

General BMP Type	Practices
Effectiveness on Targeted Contaminants	Variable
Water Quantity Impact	None
Advantages	Cleans out first flush contaminants Conserves drinking water sources Helps conserve water in drought conditions Groundwater recharge
Disadvantages	Periodic maintenance is required Automated controls are complex to design and set
Technical Feasibility	A backflow protection system is required with the interconnect with the public water system
Site Considerations	Takes a big enough area near the outlet of the drainage area to build the system Elevated tank site desirable, but not required
Regulatory Considerations	Stormwater irrigation systems as with other recycled water systems require certain precautionary measures to insure public safety
Social/Political Considerations	None
Typical Unit Costs	$50K to $60K for a 12-acre drainage area and a 9-acre irrigation area $6k to $12k per annum could be required in maintenance
NPS Category[a]	Runoff from developing areas Runoff from constructions sites Runoff from existing development Transportation development (roads, highways, bridges)
BMPLA Category[b]	Landscape irrigation management

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview
Reduce Directly Connected Impervious Areas

General BMP Type	Practices
Effectiveness on Targeted Contaminants	Variable
Water Quantity Impact	Medium
Advantages	Reduces runoff velocity and pollution No long-term public maintenance Most applicable to new development or smaller sites
Disadvantages	Primarily applicable to re-development in urbanized watersheds Reductions in flow are modest, not dramatic
Technical Feasibility	Retrofitting is difficult on a large scale May require maintenance by property owner
Site Considerations	Could be applied to re-development projects or retrofit of existing sites May be most appropriate for residential or other small sites
Regulatory Considerations	Must comply with existing discharge, water quality regulations
Social/Political Considerations	Building community often resistant to changes Opportunity for individuals to participate in solving flood problems (e.g., Hall House in Los Angeles)
Typical Unit Costs	Low
NPS Category[a]	Outreach and education
BMPLA Category[b]	N/A

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview **Source Control**	
General BMP Type	Practices
Effectiveness on Targeted Contaminants	Variable
Water Quantity Impact	Variable
Advantages	Reduces pollutant load to runoff Increases public awareness of pollution generation Trash & sediment removal has aesthetic benefits
Disadvantages	Difficult to monitor effectiveness May be difficult to enforce
Technical Feasibility	High
Site Considerations	Methods of control may be adapted to specific source
Regulatory Considerations	None
Social/Political Considerations	Resistance to behavioral change Widespread education is required
Typical Unit Costs	Low, depending upon enforcement mechanisms
NPS Category[a]	Outreach and education
BMPLA Category[b]	N/A

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview
Acquisition or Relocation

General BMP Type	Practices
Effectiveness on Targeted Contaminants	Variable
Water Quantity Impact	High
Advantages	Reduces long-term losses from flooding Effective even if flood flows are not reduced
Disadvantages	Possible disruption to local economy No reduction in flows to receiving water body No protection for remaining properties
Technical Feasibility	No existing flood mapping to identify flood-prone properties Relocation of residential and commercial buildings is difficult
Site Considerations	Possible contaminated soils on some sites
Regulatory Considerations	None
Social/Political Considerations	Potential reduction in tax base Disruption of residents and businesses To be fair if public funds are used, need to address all flood-prone properties
Typical Unit Costs	High
NPS Category[a]	Outreach and education
BMPLA Category[b]	N/A

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview **Flood Proofing**	
General BMP Type	Practices
Effectiveness on Targeted Contaminants	None
Water Quantity Impact	Variable
Advantages	Addresses key facilities Effective even if flood flows are not reduced
Disadvantages	Requires cooperation from property owners Requires work on hundreds of properties No reduction in discharge to receiving water body Does not address traffic-related problems
Technical Feasibility	Feasible on individual properties, but less feasible on watershed scale
Site Considerations	Need to maintain ingress/egress
Regulatory Considerations	Could increase flooding on unprotected properties
Social/Political Considerations	To be fair if public funds are used, need to protect all flood-prone properties
Typical Unit Costs	Low for individual properties, but high when applied on watershed scale
NPS Category[a]	Outreach and education
BMPLA Category[b]	N/A

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview
Flood Warning

General BMP Type	Practices
Effectiveness on Targeted Contaminants	None
Water Quantity Impact	None
Advantages	Small infrastructure needs
Disadvantages	Insufficient warning time in small watersheds Does not protect structures
Technical Feasibility	Variable with watershed
Site Considerations	N/A
Regulatory Considerations	Coordinate with County and National Weather Service
Social/Political Considerations	Consequences of false warning or missed warnings are serious
Typical Unit Costs	Low
NPS Category[a]	Outreach and education
BMPLA Category[b]	N/A

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview
Policies or Ordinances (to Encourage or Require BMPs)

General BMP Type	Practices
Effectiveness on Targeted Contaminants	Variable
Water Quantity Impact	Variable
Advantages	Encourages public participation in problem-solving Builds community values Avoids private land acquisition costs where implemented
Disadvantages	Impacts on flooding or water quality difficult to monitor
Technical Feasibility	High, but may be difficult to monitor or enforce
Site Considerations	Could be applied to retrofits, new or redevelopment
Regulatory Considerations	Must comply with existing discharge, water quality regulations Detention must not conflict with water rights
Social/Political Considerations	Public may not support if costs imposed on them or compliance technically difficult Resistance to changing behavior
Typical Unit Costs	Variable, depending on requirements
NPS Category[a]	Outreach and education
BMPLA Category[b]	N/A

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview **Public Education**	
General BMP Type	Outreach
Effectiveness on Targeted Contaminants	Variable
Water Quantity Impact	Variable
Advantages	Builds community values Existing materials available Can be quite effective by increasing awareness
Disadvantages	Results are not measurable Difficult to change public behaviors
Technical Feasibility	High
Site Considerations	Can target specific industries or geographic areas
Regulatory Considerations	None
Social/Political Considerations	Resistance to changing behavior Usually strong political support
Typical Unit Costs	Variable but low
NPS Category[a]	Outreach and education
BMPLA Category[b]	N/A

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Ballona Creek Watershed Management Plan BMP Overview **Proprietary Systems**	
General BMP Type	Other
Effectiveness on Targeted Contaminants	Variable
Water Quantity Impact	Variable
Advantages	Removal of pollutants Some systems also reduce flow volume or velocity Often includes vendor technical support for installation, O&M
Disadvantages	Performance often not independently verified
Technical Feasibility	High in most cases
Site Considerations	Must select product best suited to site conditions
Regulatory Considerations	Must comply with existing discharge, water quality regulations
Social/Political Considerations	None
Typical Unit Costs	Variable but can be quite high, particularly if system maintenance included
NPS Category[a]	Runoff from existing development On-site disposal systems Transportation development (roads, highways, bridges)
BMPLA Category[b]	Cisterns and underground storage deflector screen Drain inlet protection filter Green roof In-stream trap Porous pavement Slope stabilization & erosion control Swirl concentrator Wet vault

[a] Per the Plan for California's Nonpoint Source Control Pollution Program
[b] Per the Los Angeles County BMP Task Force

Objective: Encourage compatible residential, commercial, and service uses adjacent to rehabilitated creek

ACTION: *Implement General Plan modifications per the recommendations of the Ballona Creek & Trail Focused Special Study*

The City of Culver City is dveloping revisions to the City's General Plan in response to the Ballona Creek & Trail Focused Special Study.

Stakeholder Responsibility:
City of Culver City

ACTION: *Consider revisions as appropriate to General Plans to encourage compatible residential, commercial, and service uses adjacent to Ballona Creek*

The City of Los Angeles and Los Angeles County (along with Culver City) have jurisdiction over most of the frontage along Ballona Creek and should consider General Plan revisions where appropriate to encourage mixed-use development that take advantage of proximity to the creek.

Stakeholder Responsibility:
Los Angeles County and City of Los Angeles

B. BEST MANAGEMENT PRACTICES

Potential BMPs that may be applicable in the Watershed are summarized on the following pages, based on information from the California Nonpoint Source Pollution Control Program and the Los Angeles County Best Management Practices Task Force.

As noted above, the Santa Monica Bay Restoration Commission initiated a Ballona Creek BMP Project Work Group, to implement a methodology for selection of BMPs the Ballona Creek Watershed (currently in-progress). Concurrently, a Proposition 13-funded project will develop a plan for installation of a suite of BMPs in an individual subwatershed and monitor the effectiveness of those BMPs in treating and/or reducing 303(d) list pollutants. At such time as the BMP selection methodology is completed, the recommendations from that study regarding which BMPs are most applicable in the Watershed should be incorporated into this Watershed Plan.

C. EXISTING AND PENDING PROJECTS

In May 2003, a Stakeholder Questionnaire was distributed to the BCWTF to seek input on existing and pending physical projects, volunteer monitoring, and community education and outreach efforts in the Watershed. The resulting Ballona Creek Watershed Project Inventory (Table 4-1) is organized into several categories, including Lower Ballona Creek, Water Quality, Habitat & Native Vegetation Restoration, Transportation & Trails, Site Retrofit, Urban Stream Restoration, and Generic Projects. For these categories, the list was also separated into those that were had been completed or were pending (in general, those for which a scope and budget had been identified), and potential projects (which generally projects for which a scope and budget had not been identified, or for which no fund source had been identified.). A general description of project types is provided below.

1. Lower Ballona Creek

For the purposes of this Plan, the Lower Ballona Creek area includes that portion of the creek that flows in an open channel (generally between Venice Boulevard and the coast), those areas in proximity to the open creek channel, and the areas along the coast, including Del Rey Lagoon, Ballona Lagoon, the Venice Canals, and Marina del Rey.

Within this area, a variety of project types could be implemented, including water quality, habitat

restoration, trails and transportation, site retrofit, urban stream restoration, or strategic site projects (each described below) could be implemented. Projects in the Lower Ballona Creek area have been grouped together because of their proximity to the creek, or other associated water bodies, and their potential for high visibility.

2. Water Quality

Water quality projects have the potential reduce to pollutants of concern, including nutrients, metals, organics, and trash, in stormwater, or dry season, runoff. These projects could be located on or within a stream channel, tributary, or catch basin, along the edge of impervious surfaces, such as parking lots, or within pervious areas, such as lawns or landscaped areas. In addition to physical projects or devices, other techniques include management practices and public outreach and education. In general, management techniques, outreach, and education are termed Best Management Practices (BMPs), although the term may also refer to physical improvements. BMPs may also be described as structural (generally meaning a physical improvement) and nonstructural, however the usage of these terms is not standardized.

3. Habitat & Native Vegetation Restoration

Because habitat and native vegetation is very limited in the watershed, habitat improvements and the introduction of native vegetation should be a component of projects whenever feasible. Habitat types that once were found in the watershed included coastal dunes, salt marsh, native grasslands, coastal sage scrub, chaparral, coast live oak woodland, California walnut woodlands, freshwater marsh and riparian woodlands. Today, only small remnants of those habitat types remain, generally limited to three areas, the lower Ballona Creek area (including the Ballona Wetlands and associated lagoons), the Baldwin Hills, and that portion of the Santa Monica Mountains within the watershed. Restoration of habitat within these areas could include removal of nonnative species, and replanting or reintroduction of native species.

Because 85 percent of the watershed has been urbanized, the potential to expand use of native vegetation in landscaping at parks, schools, and in commercial and residential parcels is enormous. By increasing the use of native vegetation, native birds and other wildlife could benefit. Because most native vegetation is drought-tolerant, expanded use of native plants would also reduce water demand related to landscape irrigation.

4. Transportation & Trails

Automobile use in the watershed is a source of considerable pollution, both in the form of substances that are deposited onto streets and highways (and then flushed into the creek by runoff) and from tailpipe emissions that include substances that fall to the earth via aerial deposition (and then enter the storm drain system during rainfall, or as a result of landscape irrigation. Reducing the use and dependence of the automobile thus has the potential to reduce the pollution that enters the waters of the watershed. Projects, methods and mechanisms that increase the use of public transportation, encourage bicycle commuting, or encourage pedestrian trips all have the potential to reduce vehicular trips, and thus contribute to the health of the watershed. These types of projects include trails, bike paths, public transportation improvements, and projects that enhance pedestrian and bicycle safety.

5. Site Retrofit

Traditionally, many development projects were designed to transport runoff from impervious surfaces (such as roofs, parking lots or driveways) directly to the storm drain system, often via an underground pipe. Typical landscaping was water intensive. Use of native vegetation in landscaping is often limited, and a range of plant species, some of which require regular irrigation, have been used to create a faux-tropical style of landscaping. Retrofit of these sites would generally have two main

objectives: retain stormwater runoff on-site (to reduce pollutant loads), and introduce native vegetation (to reduce irrigation needs and provide forage and nesting sites for native insects and animals).

6. Urban Stream Restoration

As noted in Chapter 2 (Existing Conditions), the entire length of Ballona Creek and most of the tributary channels, with the exception of limited sections of stream channels in the Baldwin Hills and the Santa Monica Mountain, have been modified, lined with concrete or been diverted into underground culverts. Urban stream restoration refers to the concept of daylighting buried streams, removal of concrete, re-introduction of riparian vegetation along the banks, and restoration of natural hydrologic functions of these stream channels.

Because these former stream channels were engineered to protect lives and property from flood damage, any proposal to restore a stream or stream reach must be undertaken only when consistent with the adopted watershed goal to maintain flood protection. In addition, it should be noted that urban restoration may not result in the restoration of historical conditions at all locations. Because of typical rainfall patterns, most streams in the watershed were intermittent in historic times. Because water is imported into the watershed landscape irrigation is extensive, year-round runoff occurs in many, if not all, storm drains. Thus, restoration of streams could restore natural physical conditions, but year-round, instead of seasonal stream flow, could result.

7. Strategic Sites

As described above, site retrofit projects are those that retain runoff generated by the site itself. Strategic sites are locations generally within public ownership (such as a park or school) where a major storm drain is located adjacent to, or underneath the site. Because of the proximity of the storm drain, runoff could be diverted and treated, thereby improving water quality from upstream areas (in addition to the site itself). Similar to site retrofits, native vegetation could be introduced, where compatible with use.

8. Generic Projects

The project inventory also included several "generic" projects that included various projects for which no site was identified. As most of the other projects included in the inventory were related to specific sites, this category was used for illustrative purposes only and has no other intent.

D. LOCATION OF EXISTING AND PENDING PROJECTS

Based upon the information provided in the Project Inventory, the location of those projects was identified and plotted on a map of the Watershed, as shown in Figure 4-1.

E. DEMONSTRATION PROJECTS

1. Introduction

In addition to developing a list of existing and proposed projects in the Watershed, the BCWTF also identified a short-list of demonstration projects, which are intended to serve as examples of multi-objective projects that can provide opportunities to improve waters quality, introduce native vegetation, and serve as high-visibility examples that public agencies, organizations and individuals could undertake to improve watershed health.

2. Selection Criteria

Based on the adopted list of goals and objectives, the following selection criteria were identified by the BCWTF to generate a short list of demonstration projects for additional study.

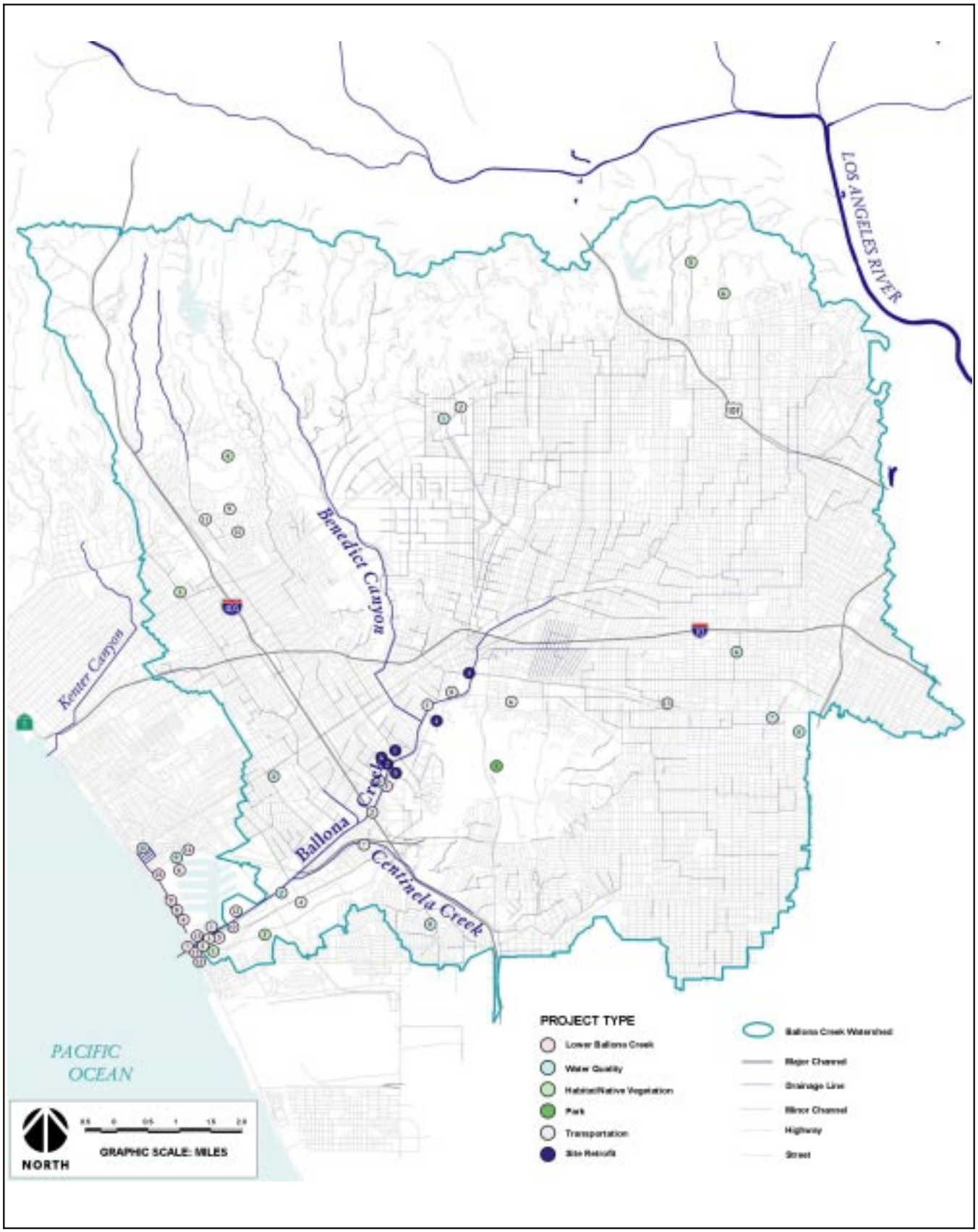


Figure 4-1 **Ballona Creek Watershed Projects**

SOURCE: Los Angeles County, Department of Public Works, Watershed Boundaries, Channels, and Roads, May 2003; EIP Associates, GIS, June 2003

TABLE 4-1
Ballona Creek Watershed Project Inventory (with Map Identifiers)

Map No.	*Project name*	*Project Location & Size*	*Project Sponsor*	*Status*	*Property Owner(s)*	*Project Cost*	*Description of project components and/or objectives*
Lower Ballona Creek—*Completed, Under Construction, Ongoing, or Pending*							
B1	Ballona Creek & Trail Focused Special Study	City boundaries of creek—roughly Sepulveda to Washington	Culver City, CA Coastal Conservancy	9/2003 study ok by city	County ROW and various	$170k	Culver City's "Ballona Creek & Trail Focused Special Study," to define recreational potential, assess condition, define goals, propose projects, develop JPA, and implement. <http://www.culvercity.org/bctfs-s>
B2	Ballona Creek Earth Day 2003 Planting Project	SW Corner of Creek & Sepulveda Blvd	LA County, CC, CCUSD, BCR	Completed April 26, 2003	County ROW		3 CA sycamores, 9 western redbud trees, 160 native shrubs & irrigation/soil amendments
B3	Ballona Creek Pedestrian Bridge & Landscaping	Between Overland & Sepulveda, connecting Ocean drive to schools on west side of creek	Grant from Coastal Conservancy	To be completed summer 2003	City of Culver City in County ROW	$920k	Culver City's pedestrian bridge & landscaping
n/a	Ballona Creek Watershed Management Plan	Watershed-wide	LA Co	Completion: Summer 2004		$200K	EIP (consultant) will prepare watershed management plan
B4	Ballona Lagoon Water Quality Enhancement	Ballona Lagoon	SMBRC (Prop. A)	Completed	City of LA	$385,024	Implemented by City of LA DPW
B5	Ballona Wetlands Tidegate (1135 Action Project)	NW Section of Area B of Ballona Wetlands		Construction started fall 2002			Modify existing tidal control system from 3 flapgates to 2 self-regulating tidegates and 1 new flapgate. This should improve tidal exchange and expand wetland from 3.5 to 13.5 acres of improved habitat.
n/a	Centinela Basin Dry-weather Runoff Diversion and BMP	Centinela Basin	SMBRC (Prop. 12)	On-going	County of LA?	$500K	City of Santa Monica is implementing project
n/a	Lower Ballona Restoration Reconnaissance Study			Completion: Dec 2002			Section 905(b) (WRDA 2000) Analysis

TABLE 4-1 (continued)
Ballona Creek Watershed Project Inventory (with Map Identifiers)

Map No.	Project name	Project Location & Size	Project Sponsor	Status	Property Owner(s)	Project Cost	Description of project components and/or objectives
B6	Marina Beach Water Quality Improvement Project	Marina Beach	L.A. County Dept. of Beaches & Harbors	Funded	L.A. County Dept. of Beaches & Harbors	$3.125 million	Construct a water infusion system or other appropriate flushing mechanism, install structural BMPs in surrounding parking lots, replace existing sediment if necessary.
n/a	New Park	South edge of creek @ Playa Vista project		Completed: 12-31-03?			Park
n/a	Playa Vista	1,087 acres in MDR, between Fiji Way, Jefferson Blvd, Vista del Mar, & Segundo Sand Hills	Playa Capital Corporation	Ongoing			Mixed commercial & residential community in part of the area, part will be sold to Trust for Public Lands, restoration of part of undeveloped portion of degraded salt & freshwater marshes is ongoing, some area to be transferred to state park system
Lower Ballona Creek—*Potential Projects*							
B7	Ballona Creek Entrance Channel Modifications	Mouth of Ballona Creek	USACE	Proposal			Modification of entrance to Marina del Rey & mouth of Ballona Creek
B8	Ballona Lagoon Improvements	Ballona Lagoon, between Marina del Rey and Venice Canals	City of Los Angeles	On hold	City of Los Angeles		Removal of non-natives, dredge channel to improve tidal circulation and install fencing to reduce public access.
B9	Ballona Lagoon Preserve	Ballona Wetlands in Venice	Coastal Conservancy, City of LA	On hold			West side Ballona Lagoon Preserve: island expansion, planting of native veg, removal of concrete oil platform, deep pool dredging, public overlook platform & walkway
B10	Ballona Wetlands Expansion	Ballona Wetlands					Constructed wetlands/potential State park
B11	Del Rey Lagoon Improvements	Del Rey Lagoon, Playa del Rey	City of Los Angeles Recreation and Parks	Pending	City of Los Angeles		Improve tidal flushing and plant native vegetation
B12	Del Rey Lagoon park expansion	Del Rey Lagoon					Del Rey Lagoon land acquisition & design process

TABLE 4-1 (continued)
Ballona Creek Watershed Project Inventory (with Map Identifiers)

Map No.	*Project name*	*Project Location & Size*	*Project Sponsor*	*Status*	*Property Owner(s)*	*Project Cost*	*Description of project components and/or objectives*
n/a	Lower Ballona Creek Restoration Study		USACE	USACE needs local match			Lower Ballona Creek Restoration study
B13	Marina del Rey entrance channel dredging	Marina del Rey harbor	USACE	Ongoing			Periodic maintenance dredging in Main, North, & South entrance channels & mouth of B. creek to maintain navigable depths
n/a	MDR & BC Sediment Control Management Plan Feasibility Study	Marina del Rey navigation channels	USACE	Summer 2003			Sediment control management plan to reduce sedimentation & contamination within MDR's navigation channels from Ballona Creek discharges
B14	Oxford Flood Control Basin Enhancements	Oxford Flood Control Basin adjacent to Marina del Rey	L.A. County Dept. of Beaches & Harbors	Preliminary/ Conceptual	L.A. County Dept. of Beaches & Harbors	$2.5 million	Install new fencing, lighting, irrigation, landscaping, bank improvements, interpretive signage and promenade along Washington Street, Admiralty Way and boundary with Admiralty Park
B15	(Venice) Grand Canal Restoration	1,000 feet long within Venice Canal network north of Washington Bl	City of Los Angeles			$1.5 M	Funded by resident assessment program. Make Grand Canal similar to Venice network, possibly widening the lagoon, create a marine preserve with sloping banks, and decomposed granite paths
n/a	Ballona Creek Inflatable Dam		??	Conceptual	??		Install inflatable dam at a location in Ballona Creek to impound water for treatment and provide aesthetic benefits
WATER QUALITY—*Completed, Under Construction, Ongoing, or Pending*							
n/a	Ballona Creek Stormwater Trash Capture System	Carmona Ave, Charnock Rd, and Sawtelle Blvd	City of Los Angeles	Ongoing	City of Los Angeles	$1.8 M	Install 3 full trash capture systems
n/a	Catch Basin Screens and Inserts	Various locations within the Ballona Creek Watershed	City of Los Angeles	Ongoing	City of Los Angeles	$24 M	This is a ongoing effort by the City of Los Angeles that upon completion will have installed 10,000 screens and inserts

TABLE 4-1 (continued)
Ballona Creek Watershed Project Inventory (with Map Identifiers)

Map No.	*Project name*	*Project Location & Size*	*Project Sponsor*	*Status*	*Property Owner(s)*	*Project Cost*	*Description of project components and/or objectives*
n/a	Full trash capture systems	Various locations within the Ballona Creek Watershed	City of Los Angeles	Ongoing	City of Los Angeles	$7.4 M	This is a ongoing effort by the City of Los Angeles that upon completion will have installed 10 full capture devices
n/a	End of line trash capture systems	Various locations within the Ballona Creek Watershed	City of Los Angeles	Ongoing	City of Los Angeles	$1.4K	This is a ongoing effort by the City of Los Angeles that upon completion will have installed 10 end of line devices
n/a	Ballona Creek Litter Monitoring Project	Various locations in watershed	SMBRC (Prop. 12)	Funded in 2001	County of LA	$600K	Implemented by LAC-DPW
W1	Catch Basin Excluders	West Hollywood along Santa Monica Blvd?	SMBRC (Prop. 12)	Completed in 2002	City of West Hollywood	$30K	Catch Basin Debris Excluder Devices
W2	Ballona Creek Shore Conveyor System	Creek crossing at Lincoln Blvd	SMBRC (Prop. A)	?	?	$265,039	Implemented by LAC-DPW
W3	Ballona Creek Water Quality Improvement Project	Culver City, near the Overland Bridge near the creek	SMBRC (Prop. 12)	On-going	County of LA	$168.5K	Implemented by Culver City
n/a	Ballona Creek Water Quality Improvement Project	Nicolet Ave. and Coliseum St, Martin Luther King Jr. Blvd, First Street and Western Ave	City of Los Angeles	Completed Feb 2005	City of Los Angeles	$2.3M	Install 200 catch basin screen covers and inserts and 3 CDSs
n/a	Ballona Watershed BMP Prioritization	Watershed-wide	SMBRC (Prop. 12)	Funded 2002		$3M	To be implemented by watershed cities and County
n/a	Ballona Creek Maintenance	Ballona Creek flood control channel	USACE & LA Co DPW				Maintenance
W4	CDS Unit @ Coliseum Area	Coliseum area	SMBRC (Prop. A)	Completed	City of LA	$125,883	Implemented by City of LA DPW
n/a	Westlake & Coliseum CDS	Westlake area and Coliseum area	City of Los Angeles	Completed	City of Los Angeles	$375K	Two CDSs were installed in the [catch basins ?] to meet the trash TMDLs
n/a	CDS Unit @ Downtown Area	Downtown	SMBRC (Prop. A)	Completed	City of LA	$247,347	Implemented by City of LA DPW

TABLE 4-1 (continued)
Ballona Creek Watershed Project Inventory (with Map Identifiers)

Map No.	*Project name*	*Project Location & Size*	*Project Sponsor*	*Status*	*Property Owner(s)*	*Project Cost*	*Description of project components and/or objectives*
n/a	CDS Unit @ Marina del Rey	Marina del Rey	SMBRC (Prop. A)	Completed ?	County of LA	$125,295	CDS Installation at Marina del Rey Boat Launch, Implemented by LAC-DBH
n/a	CDS Unit @ Westlake Area	Westlake Area	SMBRC (Prop. A)	Completed	City of LA	$111,073	Implemented by City of LA DPW
W5	SMB Watershed Urban Runoff Pollution Removal: Beethoven Street	Beethoven Street	City of Los Angeles	Ongoing –completion Sept 04	City of Los Angeles	$200K Project part of $2.3M	This project will install Stormceptor to treat oil/grease in runoff
W6	SMB Watershed Urban Runoff Pollution Removal: Dalton & 30th	Dalton & 30th	City of Los Angeles	Ongoing –completion Sept 04	City of Los Angeles	Project part of $500K	This project will install and end-of-line trash removal system
W7	SMB Watershed Urban Runoff Pollution Removal: 10th & 36th	10th & 36th	City of Los Angeles	Ongoing – completion Sept 04	City of Los Angeles	Project part of $500K	This project will install and end-of-line trash removal system
n/a	Thurman Ave Trash Removal	Thurman Ave	City of Los Angeles	Completed Oct 2004	City of Los Angeles	$860K	This project will install a fresh creek unit to capture trash flowing to Ballona Creek
n/a	Transportation Contamination Reduction Project ('99): Catch Basin Inserts	Various locations throughout the City and Ballona Creek	City of Los Angeles	Completed	City of Los Angeles	$175K	This project installed 134 catch basin inserts throughout the City of LA and Ballona Creek
n/a	Transportation Contamination Reduction Project ('01): Catch Basin Covers	Westlake Area	City of Los Angeles	July 2004	City of Los Angeles	Project part of $630K	The project will install 800 catch basin covers throughout the Westlake area to prevent trash from entering the stormdrains
n/a	Transportation Contamination Reduction Project: Catch Basin Inserts	Various locations throughout the City and Ballona Creek	City of Los Angeles	Completed	City of Los Angeles	$175K	This project installed 134 catch basin inserts throughout the City of LA to capture trash
WATER QUALITY—*Potential Projects*							
n/a	Ballona Watershed Storm Drain Map	Watershed-wide	Santa Monica Baykeeper				Map of all stormdrains in Ballona Creek Watershed

TABLE 4-1 (continued)
Ballona Creek Watershed Project Inventory (with Map Identifiers)

Map No.	Project name	Project Location & Size	Project Sponsor	Status	Property Owner(s)	Project Cost	Description of project components and/or objectives
n/a	Ballona Creek Water Quality Improvement —CDS installations	Various locations in watershed	SMBRC (Prop. A)	Application Pending	City of LA	$1,239,776	Implemented by City of LA DPW
W8	Osage School (AKA Westport Heights Elementary School) BMPs	Westchester	SMBRC (Prop. A)	Application Pending	LAUSD	$500K	Implemented by City of LA DPW
n/a	Public Education and Outreach	Watershed-wide	TBD	Concept	TBD	TBD	Develop an education and outreach program for the public and business to encourage source reduction (reduced packaging) and discourage litter
W9	Public Parking Lot Structural BMP Project	Marina del Rey	LA Co Beaches & Harbors	Application pending	LA Co. Dept of Beaches and Harbors	$1.26M	Structural BMPs at Marina del Rey County-owned public parking lots
W10	Speedway BMPs 1&2	Venice Beach	City of Los Angeles	Planned	City of Los Angeles	$479K	A variety of BMPs will be implemented in the area to treat trash and oil/grease, and also alleviate flooding
n/a	Catch Basin Labels	Various locations within the city of Los Angeles	City of Los Angeles	Ongoing	City of Los Angeles	$285K	The project labels catch basins throughout the City of LA. Approximately 11,500 in Ballona Creek
n/a	Ballona Creek Debris Fences	Ballona Creek Channel	County of Los Angeles	County of Los Angeles	County of Los Angeles	TBD	Install multiple debris fences to catch additional trash and debris
HABITAT & NATIVE VEGETATION RESTORATION—*Completed, Under Construction, Ongoing, or Pending*							
H1	Ballona Wetlands Dunes Restoration	Ballona Wetlands	SMBRC (Prop. 12)	Funded 2002	Area B	$97,060	Implemented by Friends of Ballona Wetlands
HABITAT & NATIVE VEGETATION RESTORATION—*Potential Projects*							
H2	Westchester Bluffs Restoration	Westchester Bluffs, west of Lincoln			Catellus & Sempra?		Remove non-natives and restore coastal sage scrub
H3	Kuruvunga Springs Restoration	University High School	Gabrielino Tongva Springs Foundation	Conceptual	LAUSD		Restoration of Kuruvunga Springs as a cultural and educational resource, including restoration of native vegetation

TABLE 4-1 (continued)
Ballona Creek Watershed Project Inventory (with Map Identifiers)

Map No.	*Project name*	*Project Location & Size*	*Project Sponsor*	*Status*	*Property Owner(s)*	*Project Cost*	*Description of project components and/or objectives*
H4	Bronson Canyon Enhancement	Bronson Canyon, Griffith Park	City of Los Angeles Recreation and Parks	Conceptual	City of Los Angeles		Removal of nonnatives and planting of California walnut and live oak
H5	Fern Dell Enhancements	Fern Dell, Griffith Park	City of Los Angeles Recreation and Parks	Conceptual	City of Los Angeles		Inclusion of regionally-adapted plants
H6	Stone Canyon Creek Restoration	UCLA Campus, Corrine Seeds Elementary School			UC Regents		Removal of exotics/non-native vegetation and planting of native plants and trees
PARKS—*Completed, Under Construction, Ongoing, or Pending*							
P1	Baldwin Hills Park Master Plan	Baldwin Hills, south of Ballona Creek	Baldwin Hills Conservancy	Land acquisition planned	Various		Goal: develop program of resource stewardship, restore natural areas (including removal of non-native plants), improve recreation, culture, & educational experience
PARKS—*Potential Projects*							
	None identified						
TRANSPORTATION & TRAILS—*Completed, Under Construction, Ongoing, or Pending*							
n/a	Culver City Bike Racks on Busses	All City Busses	Culver City	Due June 2003			Bike racks on all city busses. Bus rider can ride to bus stop. Place bike on rack. Get off at distant destination, then ride to work, etc.
T1	Marina Coastlink Ferry Project	Marina del Rey—Four ferry stops at Chace Park, Fire Dock, Fisherman's Village, Marina Beach	Environment Now, LA Co Beaches & Harbors, CA Coastal Conservancy	Summer pilot, 2002 (completed) Summer 2003 (in-process)	L.A. Co. Dept. of Beaches & Harbors		Four-stop, two-vessel ferries providing alternative transportation and on-the-water opportunity for the public
T2	West Hollywood Bicycle Master Plan	City Limits	W. Hollywood MTA	Being Implemented			Planning and implementation underway
n/a	Ballona Creek Trail and Bikeway Improvements —Phase I	Ballona Creek—Culver Blvd. east to Culver City	SMMC	Construction Pending	City of Los Angeles	$448,984	Improvements to bike trail access points, landscaping, signage, and public outreach

TABLE 4-1 (continued)
Ballona Creek Watershed Project Inventory (with Map Identifiers)

Map No.	*Project name*	*Project Location & Size*	*Project Sponsor*	*Status*	*Property Owner(s)*	*Project Cost*	*Description of project components and/or objectives*
TRANSPORTATION & TRAILS—*Potential Projects*							
T3	Ballona Wetlands Walkway	Pacific Ave to Ballona Wetlands	LA Co DPW				Walkway from Pacific Ave to the wetlands
T4	Playa Vista Bicycle Trail	Playa Vista Project to Ballona Creek	Caltrans				Bicycle trail
n/a	Ballona Creek Trail and Bikeway Improvement Project	Along existing bikeway adjacent to Ballona Creek	Partially funded by State Parks Recreational Trails Program. Baldwin Hills Regional Conservation Authority to implement.	Ongoing/In Process	LA County Flood Control District owns fee & easement rights of way	Over $200 K	Recreational objectives—bikeway improvements
T5	Marina del Rey/Ballona Creek Trail Beneficial Use Enhancement Project	Ballona Creek middle jetty	L.A. County Dept. of Beaches & Harbors	Application/ Pending	L.A. County	$2.197 million	Improve beneficial uses of lower reach of Ballona Creek by expanding non-water related recreational opportunities, enhancing habitat, and improving the pedestrian walkway
T6	Creek to Baldwin Hills Trail under Utility Lines	From La Cienega/Fairfax to Hills between Carmona & Hauser	TBD	Preliminary / Conceptual	Various	TBD	Bicycle, hiking, & habitat connection, including stormwater retention, recreation, etc.
T7	Centinela Creek Trail Greenway	Connections to Playa Vista and Ballona Creek	TBD (NET?)	Preliminary / Conceptual	Various	TBD	Multiple objectives
n/a	Area C Trail	Fiji Way east to east end of Parcel "C," near 90 Fwy.	Environment Now	Proposal			Trail
n/a	One Less Car	Ballona Creek Watershed	LACBC	Ongoing			Estimated 300,000,000 miles driven daily in LA. At 22 MPG: Total Gas = 136,363,636 gallons; Hydrocarbons = 18,502,202 Lbs.; Carbon Dioxide + 2,748,000,000 Lbs.; Nitrous Oxide = 9,185,022 Lbs (Based on Environmental Protection Agency document EPA420-F-97-037)

TABLE 4-1 (continued)
Ballona Creek Watershed Project Inventory (with Map Identifiers)

Map No.	*Project name*	*Project Location & Size*	*Project Sponsor*	*Status*	*Property Owner(s)*	*Project Cost*	*Description of project components and/or objectives*
T8	City of Culver City Bicycle Master Plan	City Limits	Culver City - MTA	Preliminary / Conceptual			BMP lays out streets and roads within CC city limits. Application to MTA will assist n funding bike trails Class I, II, III. User-friendly streets make for ease of bike transportation.
n/a	North/East/Central Los Angeles Bicycle Projects		City of Los Angeles				Projects connected with new Subway system
T9	UCLA Bicycle Master Plan	UCLA Campus and Westwood			Various		Ease Bicycle congestion in and around UCLA campus
T10	Westwood Traffic Mitigation Wilshire Blvd						Westside Bike working with City Council on traffic problem for bicycle riders
T11	Westwood National Cemetery Gate Access	Provide open gate to assure bicycle access	Department of Veterans Affairs				LACBC/Westside Bike petition drive
n/a	Del Rey Neighborhood Council area Bike Racks on city streets	Jefferson on South Lincoln on West Washington on North CC City limits on East					Place bike racks in business areas for shoppers and those going to eating establishments
T12	Traffic Mitigation	Lincoln Boulevard east —Jefferson-Fiji	Caltrans	Pending			Add two traffic lanes to existing Hwy. Eliminate bike lanes Sidewalks. Create more congestion-more auto pollution.
T13	Exposition Light Rail	USC to Santa Monica	Various	Preliminary/ Conceptual			Light rail on abandoned rail. Includes bicycle trail. Ten segments are in project
SITE RETROFIT—*Completed, Under Construction, Ongoing, or Pending*							
S1	Farragut Elementary School site retrofit	Farragut Elementary	Farragut Elementary	Completed 9/2002	CCUSD		De-paving project; provided turf playground and trees next to Ballona Creek
S2	Culver City Middle School planting project	Culver City Middle School	Culver City Middle School	Completed 5/2000	CCUSD		Planting project; including butterfly project near creek; with Sony & TreePeople

TABLE 4-1 (continued)
Ballona Creek Watershed Project Inventory (with Map Identifiers)

Map No.	*Project name*	*Project Location & Size*	*Project Sponsor*	*Status*	*Property Owner(s)*	*Project Cost*	*Description of project components and/or objectives*
SITE RETROFIT—*Potential Projects*							
S3	Creekside Campus and Park Native Landscaping/BMPs	Syd Kronenthal Park, Culver City	TBD	Preliminary/ Conceptual	Culver City	TBD	Watershed improvement; overlay of existing open space uses
S4	Creekside Campus and Park Native Landscaping/BMPs	Culver City Park, CC	TBD	Preliminary/ Conceptual	Culver City	TBD	Watershed improvement; overlay of existing open space uses
S5	Creekside Campus and Park Native Landscaping/BMPs	Lindberg Park, CC	TBD	Preliminary/ Conceptual	Culver City	TBD	Watershed improvement; overlay of existing open space uses
S6	Creekside Campus and Park Native Landscaping/BMPs	Marina del Rey Middle School & open space near creek	TBD	Preliminary/ Conceptual	LAUSD & LA City	TBD	Watershed improvement; overlay of existing open space uses
URBAN STREAM RESTORATION—*Completed, Under Construction, Ongoing, or Pending*							
	None identified						
URBAN STREAM RESTORATION—*Potential Projects*							
n/a	Urban Stream(s) Restoration	Various	Various	Proposed	Various		Restoration of urban streams, including Sacatela Creek, and other remnant streams, including Wilshire Country Club, Longwood Drive/8th Street, Stone Canyon Creek
n/a	Modification of Ballona Creek Channel	Various	Various	Proposed	Various		Modification of Ballona Creek Channel, to identify any current opportunities to modify the channel at a specific location or reach
GENERIC PROJECTS							
n/a	Constructed Wetlands	TBD	TBD	TBD	TBD		Developed constructed wetlands to improve runoff water quality
n/a	Public Park Retrofit	City/County Parks	Watershed Cities		Cities and LA County		Retrofit of public parks to retain stormwater, plant native vegetation, and replace non-native vegetation where appropriate with use

TABLE 4-1 (continued)
Ballona Creek Watershed Project Inventory (with Map Identifiers)

Map No.	*Project name*	*Project Location & Size*	*Project Sponsor*	*Status*	*Property Owner(s)*	*Project Cost*	*Description of project components and/or objectives*
n/a	Retrofit a Street Segment	Various	Various	Proposed	Various		Retrofit/re-engineer a segment of a street, to replace curbs with grassed swales and install porous pavement
n/a	Parking Lot Retrofit	Various	Various	Proposed	Various		Retrofit a large parking lot, to remove curbs and install porous pavement)
n/a	Establish a Stormwater Retention Site	Various existing open spaces, or proposed redevelopment sites	Various	Proposed	Various		Establish a stormwater retention site in the upper watershed, to reduce stormwater flows and promote infiltration
n/a	Strategic Site Improvements	Various	Various	Proposed	Various		Strategic Site Improvements (e.g., identify a specific site for retrofit that can take advantage of proximity of a park and open channel and accomplish multiple benefits)
n/a	Public School Site Retrofit	Elementary, Middle, and High Schools	Various	Proposed	Various		Retrofit public school site, to reduce impervious surfaces, retain stormwater, plant native vegetation, increase shade (and reduce energy costs)
n/a	Retrofit of a Linear Corridor	Various boulevard medians, utility corridor, former rail line	Various	Proposed	Various		Retrofit a linear corridor (e.g., median, utility corridor, former rail line) to retain stormwater and plant native vegetation
n/a	Retrofit a large site	Various existing institutional, commercial, industrial developments	Various	Proposed	Various		Retrofit a large site (e.g., college campus, movie studio) to retain stormwater, either above or under ground, and include native vegetation

GENERAL

Overarching Criterion

- Assure progress toward short and long term Task Force goals and objectives

Location-Related

- Targets critical problem areas
- Represent different land uses
- Public property or willing owner/seller
- Promote equitable geographic location (upper and lower watershed)

Feasibility-Related

- Technical feasibility
- Feasibility of monitoring
- Expected regulatory acceptance
- Ease of maintenance

Cost-Related

- Comprehensive cost estimate (i.e., over project lifetime)
- Satisfactory cost-benefit ratio
- Strong potential for funding partners

Aesthetic-Related

- Improve appearance of site/area
- Visible Location
- Provide quick fix/visible results

Other

- Provide multiple benefits (e.g., water supply, recreation, etc.)
- Protect public safety
- Broad stakeholder support
- New or alternative BMP techniques
- Inspires stakeholder excitement

WATER QUALITY–RELATED

- Address identified pollutants of concern (e.g., existing beneficial use impairments)
- Reduce downstream pollutant loads and effects/ impacts (e.g., via biostimulatory compounds)
- Reduce acute/chronic toxicity of chemical
- Comply with regulatory requirements (e.g., NPDES permit)
- Minimal impact on channel hydraulics
- Maintain or enhance flood protection
- Mitigate flood peaks
- Enhance erosion control (minimize sediment loss/ loads)
- Protect groundwater quality

HABITAT-RELATED

- Protection or restoration to rare, threatened or endangered species
- Creation, improvement or expansion of functional and sustainable habitat
- Improve downstream aquatic environment
- Protect and restore of wetlands
- Promote or enhance native vegetation
- Enhance biodiversity
- Restore or promote corridors for species migration
- Provide passive recreational opportunities
- Provide educational opportunities

Because of the limited amount of available information for projects included in the inventory, the consultant team recommended a shorter criteria list that included those factors that could generally be determined with limited project information, including:

- Targets Problem Areas
- Different Land Uses
- Public Property
- Improve Appearance

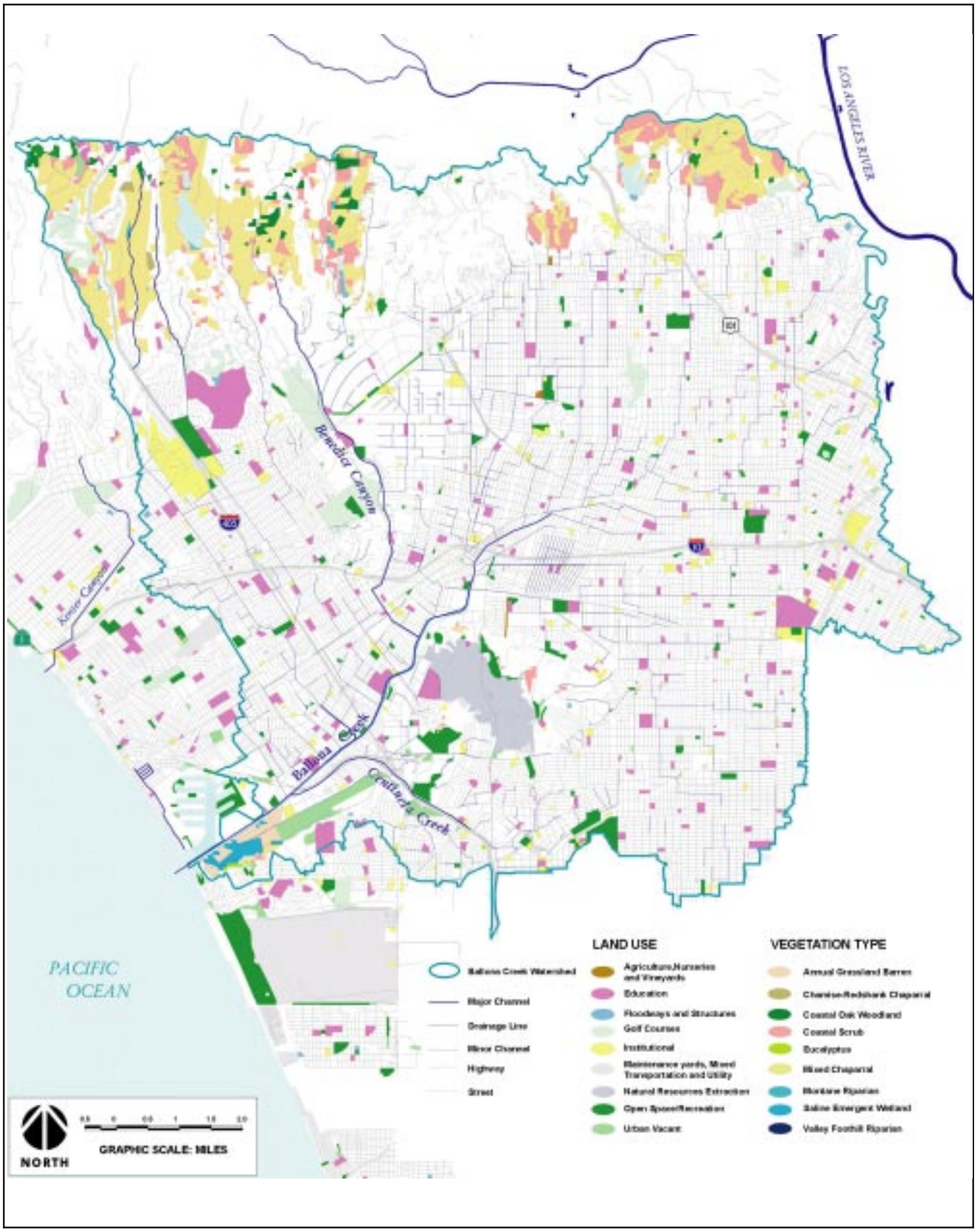


Figure 4-2 **Ballona Creek Watershed Opportunities**

SOURCE: Los Angeles County, Department of Public Works, Watershed Boundaries, Channels, SCAG 1996 Land Use, and Roads May 2003; California Department of Forestry, Fire and Resource Assessment Program Vegetation 2002; EIP Associates, GIS September 2003

BALLONA CREEK WATERSHED MANAGEMENT PLAN
Project Evaluation Form

PROJECT TITLE

Culver City High School, Middle School, and Farragut Elementary School Retrofit

PROJECT LOCATION

Watershed Quadrant	Southwest
City	Culver City
Project Site	Culver City High & Middle Schools and Farragut Elementary School
Other Relevant Jurisdiction(s)	Culver City Unified School District

PROJECT DESCRIPTION

Project Type	Site retrofit
General Project Characteristics	Water Quality, Site Retrofit, Habitat
Project Scope	Retrofit existing school to funnel runoff into a bioswale along the southern edge of the site (adjacent to the Creek) that would drain to depressed playing fields that would detain and infiltrate stormwater.
Prospective Project Sponsor(s)	Culver City Unified School District
Property Owner(s)	Culver City Unified School District

CONSISTENCY WITH...

Short List Selection Criteria		*Ballona Creek WMP Goals*	
Targets Problem Areas		Improve Water Quality	X
Different Land Uses	X	Maintain Flood Protection	X
Public Property	X	Restore Hydrologic Function	X
Improve Appearance	X	Optimize Water Resources	X
Visible Location	X	Improve Aquatic Habitat	
Quick Fix/Visible Results	X	Improve Terrestrial Habitat	X
Multiple Benefits	X	Improve Access to Open Space	
New or Alt. BMP technique		Pedestrian/Bicycle Access and Safety	X
Address Pollutants of Concern	X	Landscape Stewardship	X
Maintain Flood Protection	X	Coordinate Across Jurisdictions	X
Mitigate Flood Peaks	X	Multi-Objective Project	X
Protect/Restore Wetlands		Science as a Basis for Planning	X
Enhance Native Vegetation	X	Public Outreach and Education	X
Enhance Biodiversity		Ongoing Management Process	
Passive Recreation	X	Sustainable Economic Development	

OTHER CONSIDERATIONS

Proximity to Ballona Creek

SCOPE ASSUMPTIONS

Objectives
Water Quality: Retain/treat 1-inch storm on site underground
Flood Control: Retain 10-year storm on site in depressed area
Water Supply: Infiltrate 1-inch storm on site

Components
Construct linear swale the length of creek frontage 1 to 3 feet deep
Construct underground storage and infiltration gallery
Construct/install sedimentation/trash pretreatment facilities
Excavate ball fields to contain 10-year storm
Construct inlet/outlet structure for basin

PRELIMINARY COST ESTIMATE

Element	*Paramenters*	*Unit Cost*	*Cost*
Swale grading/excavation	1,770 by 10 feet	$10 per cubic yard	$19,689
Swale and edge landscaping	1,770 by 10 feet	n/a	$48,720
Underground infiltration gallery	7 acres	$522,702 per acre	$3,690,403
Grading/excavation of ballfield	302,534 sq. ft.	$10 per cubic yard	$398,655
Sediment/trash pretreatment	1 unit	$30,000 per unit	$30,000
Inlet structures (catch basin)	2 units	$10,000 per basin	$20,000
Outlet structure (pipe)		n/a	$10,000
		Total	**$4,217,467**

BALLONA CREEK WATERSHED MANAGEMENT PLAN
Project Evaluation Form

PROJECT TITLE

Mar Vista Recreation Center Retrofit

PROJECT LOCATION

Watershed Quadrant	Southwest
City	Los Angeles
Project Site	Mar Vista
Other Relevant Jurisdiction(s)	Los Angeles Recreation and Parks, Los Angeles City Department of Public Works

PROJECT DESCRIPTION

Project Type	Strategic Site
General Project Characteristics	Water Quality, Native Vegetation
Project Scope	Retrofit recreation center to retrofit parking lots, install underground infiltration systems, and depress playing fields to detain stormwater from major storm events
Prospective Project Sponsor(s)	Los Angeles City Recreation and Parks, Los Angeles City Department of Public Works
Property Owner(s)	City of Los Angeles

CONSISTENCY WITH...

Short List Selection Criteria		*Ballona Creek WMP Goals*	
Targets Problem Areas	X	Improve Water Quality	X
Different Land Uses	X	Maintain Flood Protection	X
Public Property	?	Restore Hydrologic Function	X
Improve Appearance	X	Optimize Water Resources	X
Visible Location	X	Improve Aquatic Habitat	?
Quick Fix/Visible Results	X	Improve Terrestrial Habitat	
Multiple Benefits	X	Improve Access to Open Space	
New or Alt. BMP technique	X	Pedestrian/Bicycle Access and Safety	
Address Pollutants of Concern	X	Landscape Stewardship	X
Maintain Flood Protection	X	Coordinate Across Jurisdictions	
Mitigate Flood Peaks	X	Multi-Objective Project	X
Protect/Restore Wetlands		Science as a Basis for Planning	X
Enhance Native Vegetation	X	Public Outreach and Education	X
Enhance Biodiversity		Ongoing Management Process	
Passive Recreation		Sustainable Economic Development	

OTHER CONSIDERATIONS

Proximity to two open channels: Sepulveda Wash (AKA Walnut Creek) and Sawtelle Channel)

SCOPE ASSUMPTIONS

Objectives
Water Quality: Retain/treat 1-inch storm on site underground
Flood Control: Retain 10-year storm on site in depressed area
Water Supply: Infiltrate 1-inch storm on site

Components
Construct diversion from Sawtelle Boulevard storm drain to east ball field
Construct/excavate east ball fields to 4-foot depth (calculate upstream area that would be served by this size facility)
Construct underground storage and infiltration gallery
Construct/install sedimentation/trash pretreatment facilities
Construct inlet/outlet structure for basins
Excavate west ball field to 4-foot depth (calculate upstream area that would be served by this size facility)
Construct underground storage and infiltration gallery
Construct/install sedimentation/trash pretreatment facilities
Construct inlet/outlet structure for basins

PRELIMINARY COST ESTIMATE

Element	*Paramenters*	*Unit Cost*	*Cost*
Excavation of ball fields			
Eastern ball fields	285,000 sq. ft	$10 per cubic yard	$422,222
Western ball field	139,500 sq. ft	$10 per cubic yard	$206,667
Underground infiltration gallery			
Eastern ball fields	285,000 sq. ft	$12 per square foot	$3,420,000
Western ball field		$12 per square foot	$1,674,000
Diversion from storm drains	2 units	$10,000 per unit	$20,000
Inlet Structure (catch basins)	2 units	$10,000 per unit	$20,000
Sedimentation/trash pretreatment	3 units	$30,000 each	$90,000
Outlet to storm drains (pipe)		$10,000 each	$20,000
Swale around parking lots	18,295 sq. ft		$33,000
Replacement of removed trees	25 trees	$25 per tree	$625
		Total	**$5,906,514**

BALLONA CREEK WATERSHED MANAGEMENT PLAN
Project Evaluation Form

PROJECT TITLE

Baldwin Hills to Ballona Creek Trail

PROJECT LOCATION

Watershed Quadrant	Southeast
City	Los Angeles/Culver City
Project Site	DWP Powerline easement from Baldwin Hills to Ballona Creek
Other Relevant Jurisdiction(s)	Los Angeles City Department of Water and Power, Los Angeles City Department of Public Works

PROJECT DESCRIPTION

Project Type	Linear Corridor Retrofit, Transportation/Trails
General Project Characteristics	Trail, Site Retrofit, potential Habitat Linkage
Project Scope	Create trail and bicycle path from Baldwin Hills to Ballona Creek (via LADWP powerline), introduce native vegetation, and create depression basins to infiltrate stormwater
Prospective Project Sponsor(s)	Los Angeles City Department of Water and Power, Los Angeles City Department of Public Works
Property Owner(s)	City of Los Angeles

CONSISTENCY WITH...

Short List Selection Criteria		*Ballona Creek WMP Goals*	
Targets Problem Areas		Improve Water Quality	X
Different Land Uses	X	Maintain Flood Protection	X
Public Property	X	Restore Hydrologic Function	X
Improve Appearance	X	Optimize Water Resources	X
Visible Location	X	Improve Aquatic Habitat	
Quick Fix/Visible Results	X	Improve Terrestrial Habitat	X
Multiple Benefits	X	Improve Access to Open Space	X
New or Alt. BMP technique	X	Pedestrian/Bicycle Access and Safety	X
Address Pollutants of Concern	X	Landscape Stewardship	X
Maintain Flood Protection	X	Coordinate Across Jurisdictions	X
Mitigate Flood Peaks	X	Multi-Objective Project	X
Protect/Restore Wetlands		Science as a Basis for Planning	X
Enhance Native Vegetation	X	Public Outreach and Education	X
Enhance Biodiversity	X	Ongoing Management Process	
Passive Recreation	X	Sustainable Economic Development	

OTHER CONSIDERATIONS

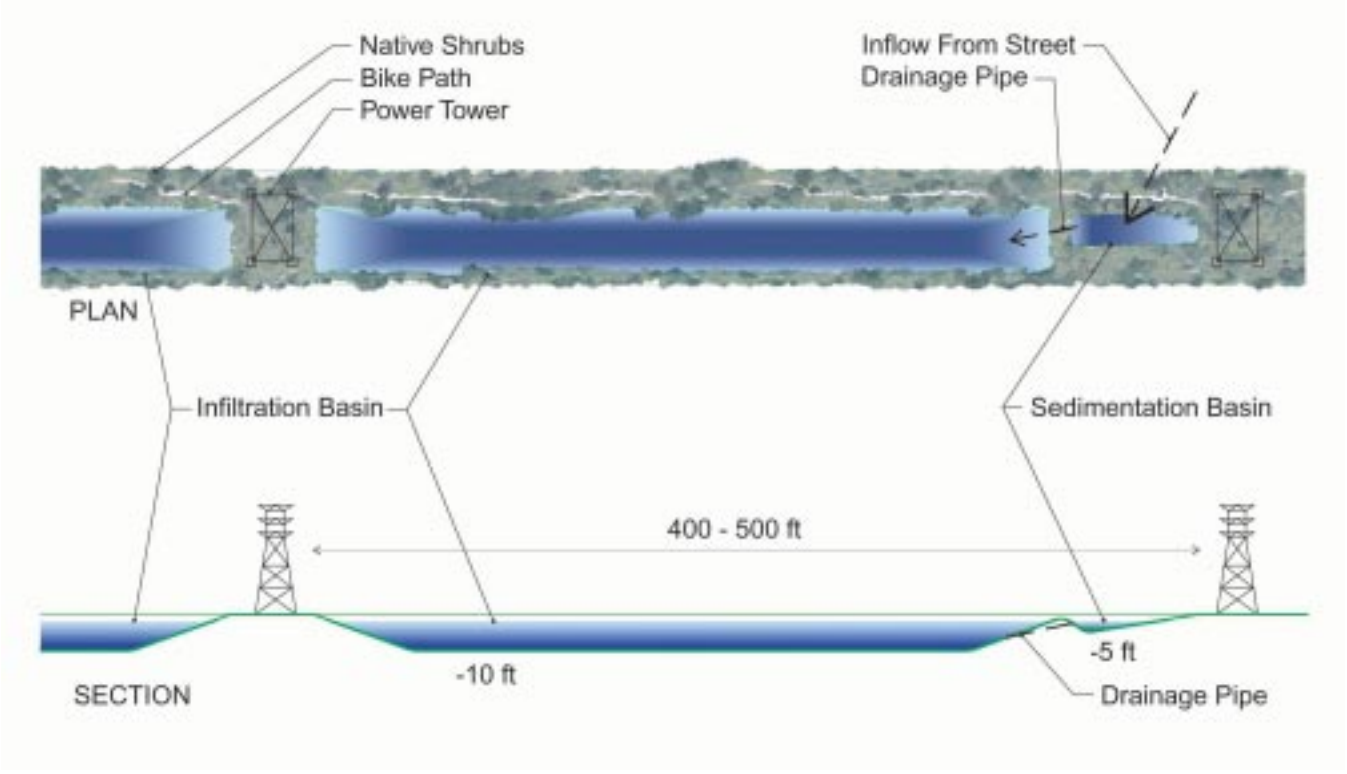
SCOPE ASSUMPTIONS

Objectives
Water Quality: Retain/treat 1-inch storm on site underground
Flood Control: Retain 10-year storm on site in depressed area
Water Supply: Infiltrate 1-inch storm on site

Components
Construct stormwater retention facilities and meandering trail (similar to Sun Valley powerline easement)
Install native plants and temporary irrigation system
Construct linear bike path the entire length of easement
Construct inlet structures to allow adjacent neighborhood stormwater runoff into basins

PRELIMINARY COST ESTIMATE

Element	*Paramenters*	*Unit Cost*	*Cost*
Excavation of retention basins	121,859 sq. ft.	$10 per cubic yard	$676,995
Inlet Structure (catch basins)	6 units	$10,000 per unit	$60,000
Sedimentation/trash pretreatment	6 units	$30,000 each	$180,000
Outlet to storm drains (pipe)		$10,000 each	$10,000
Native landscaping	16 acres		$244,916
Irrigation system			$50,000
Bike Path/Trail	116,673 sq. ft.	$5 per square foot	$584,363
		Total	**$1,806,574**



BALLONA CREEK WATERSHED MANAGEMENT PLAN
Project Evaluation Form

PROJECT TITLE

Ladera County Park Retrofit

PROJECT LOCATION

Watershed Quadrant	Southeast
City	Los Angeles (County)
Project Site	Convert storm drain (running through park) to a "daylighted" creek and install a dam that would retain stormwater during major storm events
Other Relevant Jurisdiction(s)	Los Angeles County Parks and Recreation

PROJECT DESCRIPTION

Project Type	Site Retrofit
General Project Characteristics	Water Quality, Native Vegetation
Project Scope	Retrofit county park to retain stormwater
Prospective Project Sponsor(s)	Los Angeles County Parks and Recreation Los Angeles County Department of Public Works
Property Owner(s)	County of Los Angeles

CONSISTENCY WITH...

Short List Selection Criteria		*Ballona Creek WMP Goals*	
Targets Problem Areas		Improve Water Quality	X
Different Land Uses	X	Maintain Flood Protection	X
Public Property	X	Restore Hydrologic Function	X
Improve Appearance	?	Optimize Water Resources	X
Visible Location	X	Improve Aquatic Habitat	
Quick Fix/Visible Results	X	Improve Terrestrial Habitat	X
Multiple Benefits	X	Improve Access to Open Space	
New or Alt. BMP technique	X	Pedestrian/Bicycle Access and Safety	
Address Pollutants of Concern	X	Landscape Stewardship	X
Maintain Flood Protection	X	Coordinate Across Jurisdictions	
Mitigate Flood Peaks	X	Multi-Objective Project	X
Protect/Restore Wetlands		Science as a Basis for Planning	X
Enhance Native Vegetation	X	Public Outreach and Education	X
Enhance Biodiversity		Ongoing Management Process	
Passive Recreation		Sustainable Economic Development	

OTHER CONSIDERATIONS

Natural topographic depression with underlying storm drain

SCOPE ASSUMPTIONS

Objectives
Water Quality: Retain/treat 1-inch storm on site underground
Flood Control: Retain 10-year storm on site in depressed area
Water Supply: Infiltrate 1-inch storm on site

Components
Restore/"daylight" natural creek
Construct underground storage and infiltration gallery
Construct/install sedimentation/trash pretreatment facilities
Construct inlet/outlet structure for basins
Construct 18-foot-high dam at downstream end of park
Elevate existing basketball courts so they are above 2-year storm

PRELIMINARY COST ESTIMATE

Element	*Paramenters*	*Unit Cost*	*Cost*
Excavation/Earthwork	125,000 sq. ft.	$10 per cubic yard	$231,481
Underground infiltration gallery	125,000 sq. ft.	$12 per square foot	$1,500,000
Inlet from storm drain	2 units	$10,000 per unit	$20,000
Sedimentation/trash pretreatment	2 units	$30,000 each	$60,000
Landscaping			$26,750
Creek Daylighting			$100,000
Outlet to storm drain (pipe)		$10,000 each	$10,000
Earthen Dam	200 by 18 feet	20 per cubic yard	$133,333
Reconstruction of amphitheatre			$200,000
		Total	**$2,281,564**

BALLONA CREEK WATERSHED MANAGEMENT PLAN
Project Evaluation Form

PROJECT TITLE

Lafayette Park Retrofit

PROJECT LOCATION

Watershed Quadrant	Northeast
City	Los Angeles
Project Site	Lafayette Park
Other Relevant Jurisdiction(s)	Los Angeles Department of Recreation and Parks, Los Angeles City Department of Public Works

PROJECT DESCRIPTION

Project Type	Park Retrofit
General Project Characteristics	Water Quality, Site Retrofit, Habitat
Project Scope	Retrofit to depress a portion of ballfields to infiltrate stormwater and elevate one playing field (above floodwater retention level to preserve recreational opportunities) and introduce native vegetation
Prospective Project Sponsor(s)	Los Angeles Department of Recreation and Parks, Los Angeles City Department of Public Works
Property Owner(s)	City of Los Angeles

CONSISTENCY WITH...

Short List Selection Criteria		*Ballona Creek WMP Goals*	
Targets Problem Areas	X	Improve Water Quality	X
Different Land Uses	X	Maintain Flood Protection	X
Public Property	X	Restore Hydrologic Function	?
Improve Appearance	X	Optimize Water Resources	X
Visible Location	X	Improve Aquatic Habitat	
Quick Fix/Visible Results	X	Improve Terrestrial Habitat	X
Multiple Benefits	X	Improve Access to Open Space	
New or Alt. BMP technique	X	Pedestrian/Bicycle Access and Safety	
Address Pollutants of Concern	X	Landscape Stewardship	X
Maintain Flood Protection	X	Coordinate Across Jurisdictions	
Mitigate Flood Peaks	X	Multi-Objective Project	X
Protect/Restore Wetlands		Science as a Basis for Planning	X
Enhance Native Vegetation	X	Public Outreach and Education	X
Enhance Biodiversity		Ongoing Management Process	
Passive Recreation		Sustainable Economic Development	

OTHER CONSIDERATIONS

Existing park includes a natural depression that could be adapted for stormwater detention

SCOPE ASSUMPTIONS

Objectives
Water Quality: Retain/treat 1-inch storm on site underground
Flood Control: Retain 10-year storm on site in depressed area
Water Supply: Infiltrate 1-inch storm on site

Components
Construct upstream diversion
Construct underground storage and infiltration gallery
Construct/install sedimentation/trash pretreatment facilities
Excavate ball fields to contain 10-year storm
Construct inlet/outlet structure for basin

PRELIMINARY COST ESTIMATE

Element	*Paramenters*	*Unit Cost*	*Cost*
Excavation/Earthwork	161,500 sq. ft.	$10 per cubic yard	$299,074
Underground infiltration gallery	161,500 sq. ft.	$12 per square foot	$1,938,000
Inlet from storm drain	1 unit	$10,000 per unit	$10,000
Sedimentation/trash pretreatment	1 units	$30,000 each	$30,000
Landscaping			$22,750
Creek Daylighting			$100,000
Outlet to storm drain (pipe)		$10,000 each	$10,000
Reconstruction of fields			$250,000
		Total	**$2,659,824**

BALLONA CREEK WATERSHED MANAGEMENT PLAN
Project Evaluation Form

PROJECT TITLE

Residential Street Segment Retrofit

PROJECT LOCATION

Watershed Quadrant	Northwest
City	Los Angeles
Project Site	Single block of a residential street —location TBD
Other Relevant Jurisdiction(s)	Los Angeles Department of Transportation, Los Angeles City Department of Public Works

PROJECT DESCRIPTION

Project Type	Street Segment Retrofit
General Project Characteristics	Water Quality, Site Retrofit, Habitat
Project Scope	Retrofit street to remove curbs, increase pervious areas, reduce runoff, promote infiltration and include native vegetation
Prospective Project Sponsor(s)	Los Angeles City Department of Transportation, Los Angeles City Department of Public Works
Property Owner(s)	City of Los Angeles

CONSISTENCY WITH...

Short List Selection Criteria		*Ballona Creek WMP Goals*	
Targets Problem Areas	X	Improve Water Quality	X
Different Land Uses	X	Maintain Flood Protection	X
Public Property	X	Restore Hydrologic Function	?
Improve Appearance	X	Optimize Water Resources	X
Visible Location	X	Improve Aquatic Habitat	
Quick Fix/Visible Results	X	Improve Terrestrial Habitat	X
Multiple Benefits	X	Improve Access to Open Space	
New or Alt. BMP technique	X	Pedestrian/Bicycle Access and Safety	
Address Pollutants of Concern	X	Landscape Stewardship	X
Maintain Flood Protection	X	Coordinate Across Jurisdictions	
Mitigate Flood Peaks	X	Multi-Objective Project	X
Protect/Restore Wetlands		Science as a Basis for Planning	X
Enhance Native Vegetation	X	Public Outreach and Education	X
Enhance Biodiversity		Ongoing Management Process	
Passive Recreation		Sustainable Economic Development	

OTHER CONSIDERATIONS

Serve as a demonstration project for street retrofit across entire watershed

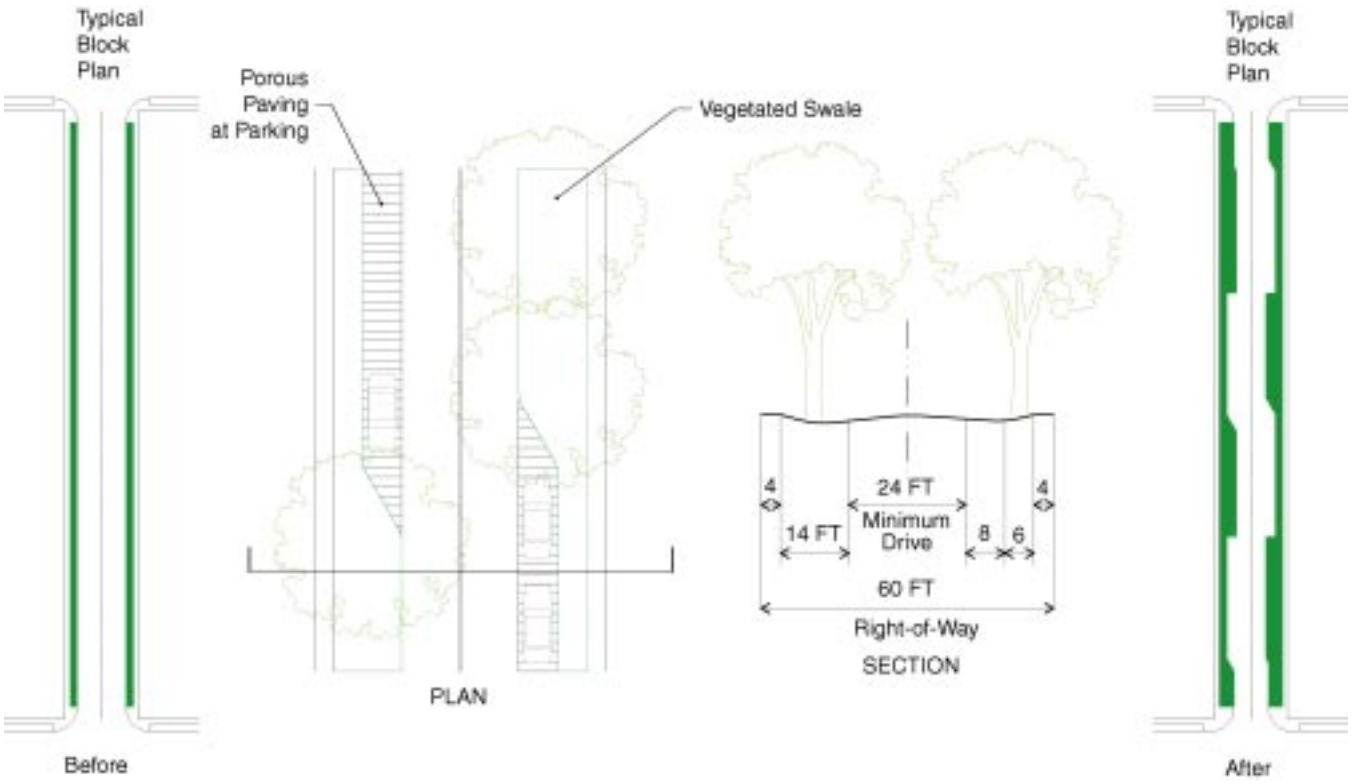
SCOPE ASSUMPTIONS

Objectives Water Quality: Retain/treat 1-inch storm on site underground

Components Demolish edges of existing street and reconstruct with swales and infiltration facilities similar to Seattle SEA concept

PRELIMINARY COST ESTIMATE

Element	*Paramenters*	*Unit Cost*	*Cost*
		Total	**$**



BALLONA CREEK WATERSHED MANAGEMENT PLAN
Project Evaluation Form

PROJECT TITLE

Oxford Flood Control Basin Retrofit

PROJECT LOCATION

Watershed Quadrant	Southeast
City	Unincorporated Los Angeles County
Project Site	Oxford Flood Basin, between Marina del Rey and Washington Boulevard
Other Relevant Jurisdiction(s)	Los Angeles County Department of Beaches and Harbors

PROJECT DESCRIPTION

Project Type	Site Retrofit
General Project Characteristics	Water Quality, Site Retrofit, Native Vegetation
Project Scope	Retrofit flood control basin to create two or more treatment ponds, introduce native vegetation, provide inlet filtration facilities and other structural measures to improve water quality
Prospective Project Sponsor(s)	Los Angeles County Department of Beaches and Harbors
Property Owner(s)	Los Angeles County Department of Beaches and Harbors

CONSISTENCY WITH...

Short List Selection Criteria		*Ballona Creek WMP Goals*	
Targets Problem Areas	X	Improve Water Quality	X
Different Land Uses	X	Maintain Flood Protection	X
Public Property	X	Restore Hydrologic Function	X
Improve Appearance	X	Optimize Water Resources	X
Visible Location	X	Improve Aquatic Habitat	X
Quick Fix/Visible Results	X	Improve Terrestrial Habitat	X
Multiple Benefits	X	Improve Access to Open Space	
New or Alt. BMP technique	X	Pedestrian/Bicycle Access and Safety	X
Address Pollutants of Concern	X	Landscape Stewardship	X
Maintain Flood Protection	X	Coordinate Across Jurisdictions	X
Mitigate Flood Peaks	X	Multi-Objective Project	X
Protect/Restore Wetlands	X	Science as a Basis for Planning	X
Enhance Native Vegetation	X	Public Outreach and Education	X
Enhance Biodiversity	X	Ongoing Management Process	
Passive Recreation	X	Sustainable Economic Development	

OTHER CONSIDERATIONS

Direct connection to Marina del Rey and Santa Monica Bay waters

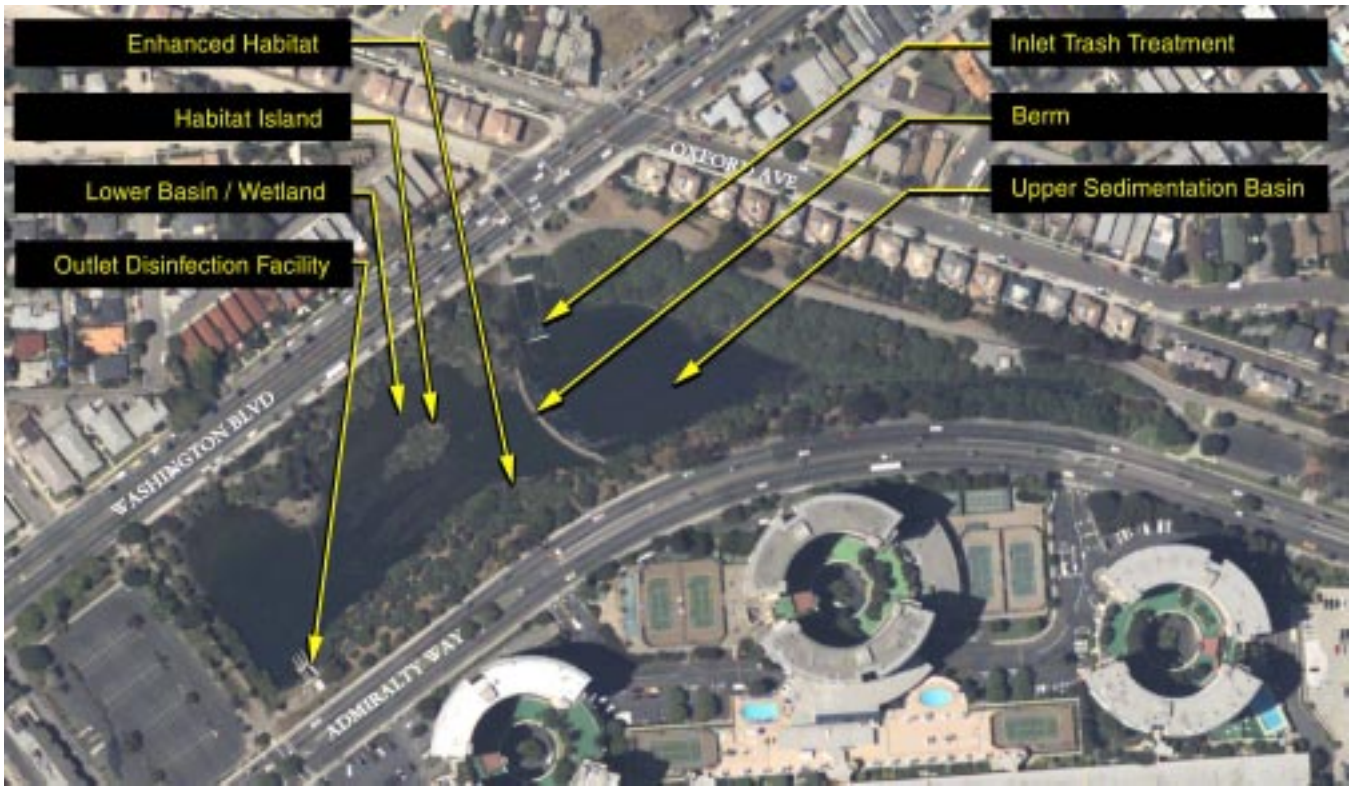
SCOPE ASSUMPTIONS

Objectives
Maintain existing flood control objective
Water Quality: Treat 1-inch storm to reduce following pollutant categories: Trash, sediment, bacteria, metals, organics, hydrocarbons, nutrients
Habitat: Provide native vegetation along edges and island to facilitate avian breeding

Components
Improve influent treatment facilities to provide influent trash/sediment treatment
Construct berm across wetland to isolate upstream primary sedimentation basin from downstream wetland
Construct inlet/outlet facilities between primary basin and wetland
Consider/install aeration facilities upstream or in downstream basins/wetland
Improve downstream basins/wetland with habitat
Install disinfection facilities at downstream effluent structure

PRELIMINARY COST ESTIMATE

Element	*Paramenters*	*Unit Cost*	*Cost*
Excavation/Earthwork	144,600 sq. ft.	$2 per cubic yard	$289,238
Contaminated Soil Disposal	Unknown	TBD	??
Inlet from storm drain	2 units	$10,000 per unit	$10,000
Sedimentation/trash pretreatment	2 units	$30,000 each	$30,000
Berm Construction	200 x 30 x 20 feet	$7 per cubic foot	$93,333
Inlet between basins (catch basin)	1 unit	$10,000	$10,000
Landscaping with Native Vegetation	2.2 acres	$50,000 per acre	$110,000
Aeration facility	1 unit	$100,000 per unit	$100,000
Disinfection facility	1 unit	TBD	??
		Total	**$353,333**



BALLONA CREEK WATERSHED MANAGEMENT PLAN
Project Evaluation Form

PROJECT TITLE

University High Retrofit/Kuruvunga Springs Restoration

PROJECT LOCATION

Watershed Quadrant	Northwest
City	Los Angeles
Project Site	University High School, West Los Angeles
Other Relevant Jurisdiction(s)	Los Angeles Unified School District

PROJECT DESCRIPTION

Project Type	Habitat
General Project Characteristics	Site Retrofit, Habitat
Project Scope	Retrofit parking lots, create underground infiltration gallery under southern parking lot, depress central playing fields to detain stormwater in major events. Create stream between existing waterfall and cultural site, create freshwater marsh habitat at end of new stream channel, and restore cultural resource values
Prospective Project Sponsor(s)	Springs Foundation Los Angeles Unified School District
Property Owner(s)	Los Angeles Unified School District

CONSISTENCY WITH...

Short List Selection Criteria		*Ballona Creek WMP Goals*	
Targets Problem Areas		Improve Water Quality	
Different Land Uses	X	Maintain Flood Protection	X
Public Property	X	Restore Hydrologic Function	X
Improve Appearance	X	Optimize Water Resources	X
Visible Location	X	Improve Aquatic Habitat	X
Quick Fix/Visible Results	X	Improve Terrestrial Habitat	X
Multiple Benefits	X	Improve Access to Open Space	
New or Alt. BMP technique		Pedestrian/Bicycle Access and Safety	
Address Pollutants of Concern		Landscape Stewardship	X
Maintain Flood Protection	X	Coordinate Across Jurisdictions	X
Mitigate Flood Peaks	X	Multi-Objective Project	X
Protect/Restore Wetlands	X	Science as a Basis for Planning	X
Enhance Native Vegetation	X	Public Outreach and Education	X
Enhance Biodiversity	X	Ongoing Management Process	
Passive Recreation	X	Sustainable Economic Development	

OTHER CONSIDERATIONS

Restore cultural resource values

SCOPE ASSUMPTIONS

Objectives
Water Quality: Retain/treat 1-inch storm on site underground
Flood Control: Retain 10-year storm on site in depressed area
Water Supply: Infiltrate 1-inch storm on site
Habitat: Improve wetland habitat and create riparian habitat along restored creek

Components
Restore natural creek between existing upstream spring and downstream wetlands
Excavate ball fields in central portion of site to contain 10-year storm
Construct underground storage and infiltration gallery under large downstream parking lot
Construct storm drain diversion facilities to divert 1-inch storms into infiltration gallery under parking lot
Construct/install sedimentation/trash pretreatment facilities

PRELIMINARY COST ESTIMATE

Element	*Paramenters*	*Unit Cost*	*Cost*
Excavation of ball fields	96,000 sq. ft.	$10 per cubic yard	$177,778
Underground infiltration gallery	87,120 sq. ft.	$12 per square foot	$1,045,440
Inlet from storm drain	1 unit	$10,000 per unit	$10,000
Sedimentation/trash pretreatment	1 unit	$30,000 each	$30,000
Outlet to storm drain (pipe)		$20,000 each	$20,000
Wetland landscaping	0.30 acre		$22,750
Creek Restoration/Landscaping	670 by 10 feet	10 per sq. ft.	$67,000
		Total	**$1,372,968**

- Visible Location
- Quick Fix/Visible Results
- Multiple Benefits
- New or Alternative BMP technique
- Address Pollutants of Concern
- Maintain Flood Protection
- Mitigate Flood Peaks
- Protect/Restore Wetlands
- Enhance Native Vegetation
- Enhance Biodiversity
- Passive Recreation

3. Demonstration Project Selection Process

Following review of the Project Inventory (included as Table 4.1 above), information in the GIS database for the Watershed was reviewed, to identify project opportunities, including schools, parks, and open space areas, as shown in Figure 4-2.

Using the revised list of selection criteria, a short list of recommended projects was developed, based on the potential to do the following:

- Meet most of the Project Selection Criteria (defined by the BCWTF)
- Make progress towards most of the goals adopted by BCWTF.
- Identify projects with multiple benefits
- Expand the type of projects being considered, beyond those project types that had been identified (by stakeholders) on the Ballona Creek Watershed Project Inventory
- Select high-visibility projects and locations that can serve as demonstration projects, interest and excite stakeholders, and educate the public about ways to restore ecological health to the watershed
- Recognize limitations imposed by certain constraints, such as the (then-unknown) extent of land purchases in the Ballona Wetlands
- Select projects for which a scope and budget has not already been delineated
- Achieve a geographic spread among projects, by identifying four quadrants in the watershed (southwest, southeast, northeast, and northwest), as generally defined by the I-10 freeway and La Cienega Boulevard)
- Identify at least one project in each city within the watershed, which includes Beverly Hills, Culver City, Inglewood, Los Angeles, Santa Monica and West Hollywood, plus unincorporated Los Angeles County

A list of sixteen projects was developed and evaluated with respect to their potential to meet both the selection criteria and the watershed goals. Two projects within each quadrant were selected, based on which project best met the criteria described above, to create a list of eight projects. The other projects (not chosen for the short list) were identified as alternative projects. Based on field review and further discussion, the two of the original eight projects were replaced, with one alternative project and a new project.

4. Demonstration Project Short List

Using the selection criteria identified by the BCWTF, and the process described above, a list of eight projects for additional study was developed:

- Mar Vista Recreation Center Retrofit
- Ladera County Park Retrofit
- Lafayette Park Retrofit
- Baldwin Hills to Ballona Creek Trail (along LADWP easement)
- Culver City High School, Middle School and Farragut Elementary School Retrofit
- University High Retrofit/Kuruvunga Springs Restoration
- Oxford Flood Control Basin Retrofit
- Residential Street Segment Retrofit

Using a standard evaluation form (which identifies how the project meets the adopted watershed goals), the eight

projects are described in more detail on the following pages. The standard form also identifies potential project sponsors that may choose to implement the project. After the evaluation form, the conceptual scope of work for each project is described.

5. Unit Cost Estimates

To assist in identifying the conceptual cost of site retrofit projects, the preliminary cost estimates provided above include unit cost estimates for various parameters, which may be useful in developing conceptual cost estimates for other projects, including those that include vegetated swales, underground infiltration galleries, and depressed retention basins.

F. PROCEDURES FOR PLAN UPDATES

The Ballona Creek Watershed Management Plan was developed to identify the current physical and environmental conditions in the watershed, assist the BCWTF articulate goals and objectives for the Plan, identify methods and mechanisms that would achieve the articulated goals, identify opportunities to expand community-based monitoring programs, and identify stakeholder commitments towards implementing projects and potential fund sources for those projects. Over time, it will be appropriate to update or revisit plan elements to gauge progress, include new concepts or projects and reflect changes in stakeholder goals or objectives.

1. Plan Elements Potentially Subject to Updating

Of the various elements of this WMP, the following components could be subject to future updates:

BACKGROUND

The list of concurrent planning efforts could be expanded and the status of those efforts updated.

PHYSICAL AND ENVIRONMENTAL CONDITIONS

Changes in the physical and environmental conditions could be noted, including updates of the (303[d]) list of impaired water bodies and the establishment of TMDLs and trends in water quality.

GOALS AND OBJECTIVES

Stakeholders could elect to identify new goals and/or objectives or modify those included in this Watershed Management Plan.

METHODS AND MECHANISMS

The Ballona Creek Watershed Project Inventory could be revised to add new projects.

The list of Best Management Practices could be revised, based on the results of the BMP prioritization project (currently underway) or to add new BMPs.

The list of Project Types could be expanded as appropriate.

COMMUNITY-BASED MONITORING PROGRAM

The parameters subject to monitoring could be revised as appropriate.

Frequency of monitoring could be modified.

The intent of the Community-Based Monitoring Program is to identify measures that can be monitored by stakeholder groups, typically with volunteers. Of the fifteen goals adopted by the BCWTF, the following goals are most relevant to community-based programs:

- Improve Quality of Surface Water and Groundwater
- Improve Aquatic, Estuarine and Riparian Habitat Quality and Quantity
- Improve Habitat Quality, Quantity and Connectivity

For some other measures, reliance on stakeholder or community-based monitoring may not be appropriate. Progress towards the following goals may best be addressed via future updates of this Watershed Plan:

- Maintain Flood Protection
- Restore Hydrologic Function to Ballona Creek and Tributaries where feasible
- Optimize Water Resources to Reduce Dependence on Imported Water
- Improve Access to Open Space and Recreation for All Communities
- Improve Pedestrian and Bicycle Access and Safety
- Practice Stewardship of the Landscape
- Coordinate Watershed Planning Across Jurisdictions and Boundaries
- Implement Multi-Objective Planning and Projects
- Use Science as a Basis for Planning
- Involve the Public through Outreach and Education
- Utilize the Plan in an Ongoing Management Process
- Realize the Potential of Watershed Restoration for Sustainable Economic Development

STAKEHOLDER COMMITMENT AND FUNDING

As new projects are identified, new stakeholder commitments could be identified.

As new fund sources become available, the list could be revised.

A cumulative total of projects funded and completed could be compiled, to identify the level of investment in improving watershed health.

2. Frequency of Plan Updates

Because of the amount of information that could be required to update the plan (identified above), it is recommended that the plan be updated every 3 years.

3. Options for Plan Updates

Once this plan is completed, the allocated Proposition 13 grants funds will have been expended. Future updates to the plan will require an alternative mechanism to assure that the update occurs, and happens as the desired frequency. Given the amount of information that could be required to update the Plan, various options are described below.

BALLONA CREEK WATERSHED TASK FORCE

The Ballona Creek Watershed Task Force could assume responsibility for Plan updates, with tasks assigned to individual stakeholders. This assumes that members of the Task Force are willing to accept responsibility, and could be provided access to necessary data. However, as this would rely on volunteer efforts, it would require an individual (or group) to assume responsibility for the overall effort. It also relies upon the continued existence of the Task Force.

WATERSHED COORDINATOR

A proposal to seek grant funds to hire a Watershed Coordinator has been recently identified. If the grant application is successful, that individual could update the plan. However, the current proposal would fund such a position for three years. Thus, even if grant funds are secured, only one update of the Plan might occur under this scenario.

LOS ANGELES COUNTY DPW STAFF

Staff of the Los Angeles County Department of Public Works Watershed Management Division could prepare future updates of the Plan. This assumes that the LACDPW is willing to assume responsibility and can identify a responsible individual or position to accomplish the task at the specified frequency.

GRANT FUNDING

The County of Los Angeles, cities in the Watershed, or another group could seek grant funds to perform the update (which presumably would be conducted by a consultant). Recent and currently available funds have been available for watershed planning and projects to improve water quality and restore watersheds, however, none of these fund sources have explicitly identified watershed plans updates as eligible projects. Although monitoring of water quality might be eligible for some funds sources.

LOCAL FUNDS

The County of Los Angeles and/or the cities in the watershed could contribute funds to hire a consultant to perform the update, which could be administered by the County. This would require funding at intermittent intervals, a commitment from the County and/or cities, and a selection process to identify and retain a consultant.

ACADEMIC INSTITUTIONS

A local academic institution, such as Loyola Marymount University, the University of California, Los Angeles or the University of Southern California (which are all located within the watershed), could perform regular Plan updates as part of an instructional or research program. For an instructional program, the update could be the subject of a class exercise, where individual students or student teams are given responsibility for updating individual sections of the report. As a research program activity, grant funds may be necessary to support the time required for research (e.g., by graduate students and/or faculty). This would require a commitment from an academic department or research unit to assure that future updates are pursued.