Appendix 3-F: Oxford Retention Basin Multi-Use Enhancement Project

Supporting Documents

(Please see Appendix CD for additional documents)

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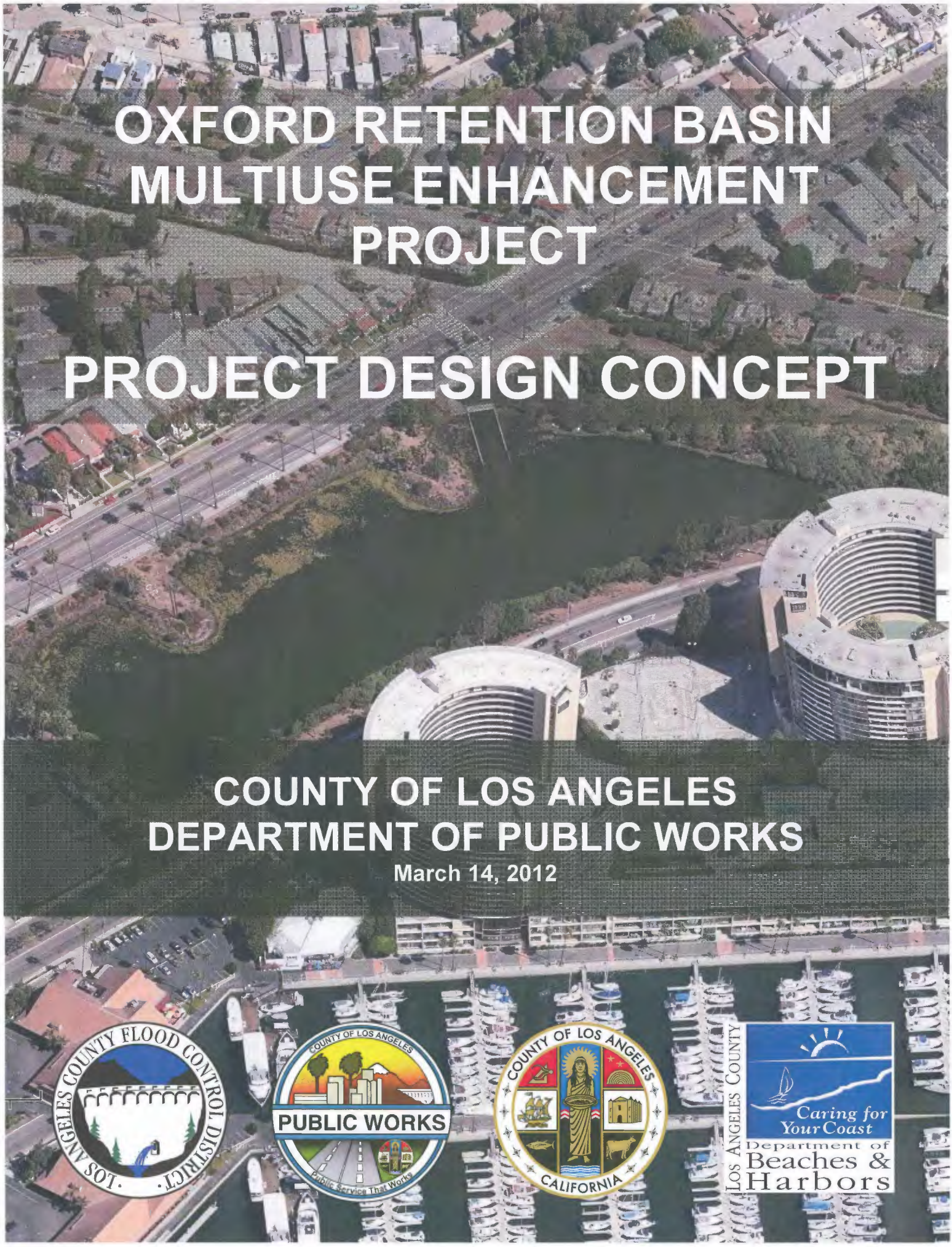

OXFORD RETENTION BASIN MULTIUSE ENHANCEMENT PROJECT

PROJECT DESIGN CONCEPT

COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS

March 14, 2012

LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

COUNTY OF LOS ANGELES PUBLIC WORKS Public Service That Works

COUNTY OF LOS ANGELES CALIFORNIA

LOS ANGELES COUNTY Caring for Your Coast Department of Beaches & Harbors

Approved _____ 3.16.2012
Patrick V. DeChellis

Approved _____
Diego Cadena

March 14, 2012

TO: Patrick V. DeChellis
Diego Cadena

FROM: Sree Kumar
Design Division

Gary Hildebrand
Watershed Management Division

PROJECT DESIGN CONCEPT
OXFORD RETENTION BASIN MULTIUSE ENHANCEMENT PROJECT
PROJECT ID FCC0001176, PCA JX0039

RECOMMENDATIONS

1. Approve the Project Design Concept (PDC) for the Oxford Retention Basin Multiuse Enhancement Project (Project) as described herein.

2. Approve a Project budget of $10,190,000 and request Watershed Management Division (WMD) to arrange for necessary financing over Fiscal Years (FY) 2012-15 as described in this PDC.

BACKGROUND

The Project is located at Oxford Retention Basin (Oxford Basin), a flood control facility operated by the Los Angeles County Flood Control District (LACFCD), one block north of Marina Del Rey Harbor Basin E (Basin E) in the unincorporated community of Marina Del Rey (Thomas Guide 671-J6).

The Project will mitigate localized flooding, address water quality deficiencies, enhance native habitat, improve the site's aesthetics, and provide passive recreation features.

WMD completed a Project Concept Report for the Project dated December 31, 2008. Design Division (DES) has studied and evaluated the alternatives for the Project and has refined the project scope and schedule.

PROJECT DESCRIPTION

The Project's scope of work is as follows:

LACFCD FUNDED WORK:

- Excavation of approximately 2,700 cubic yards (CY) of accumulated sediment along the bottom of Oxford Basin to restore basin capacity. The sediment will be disposed at a Class III landfill.

- Construction of a parapet wall along the northwestern and southern boundaries of Oxford Basin. The reinforced concrete wall will be approximately 1,050 linear feet long and a maximum of 2 feet in height. The wall will provide enhanced protection from flooding along Washington Avenue.

- Construction of a berm between the two existing tide gates and reprogramming the opening cycle of the existing tide gates to improve water circulation in Oxford Basin.

- Mitigation of localized flooding by modifying the existing 7-foot-wide catch basin on the south side of Oxford Avenue at the intersection of Oxford Avenue and Olive Street. The catch basin will be modified and a Tideflex "Check-mate" flap-gate will be installed at the connection to Project 5243. Local drainage will be further improved by the removal and replacement of existing Tideflex G-37 valves in four catch basins on Oxford Avenue and Olive Street with more efficient Tideflex "Check-mate" flap-gates.

- Installation of trash BMPs at the outlets of Storm Drain Project Nos. 5243 and 3872 to remove gross solids in urban and storm water runoff.

- Construction of a maintenance vehicle access ramp from Admiralty Way adjacent to the tide gate control house.

- Installation of a steel-grated landing above the two tide gate inlet structures in the basin to provide safer access for trash rack maintenance.

- Construction of a permanent boat ramp near the outlet of Project No. 3872 to allow Flood Maintenance Division (FMD) and the Department of Beaches and Harbors (DBH) access to Oxford Basin for routine maintenance, trash removal, and water quality monitoring.

COUNTY FUNDED WORK:

- Construction of an 8-foot-wide walking trail with wildlife-friendly lighting around the perimeter of Oxford Basin. The sidewalk along Admiralty Way will be replaced with landscaped parkway and integrated with the new walking trail.

- Reconstruct approximately 400 linear feet of slope along Admiralty Way near Project 3872 with geogrid or an approved equal to stabilize the underlying soils.

- Installation of approximately 3,550 linear feet of 4-foot-high ornamental steel fence around the perimeter of Oxford Basin.

- Removal of existing vegetation and approximately 6,200 CY of contaminated soils along the perimeter of Oxford Basin (3,200 CY and 3,000 CY to be disposed at Class I and Class III landfills, respectively) and replacement with clean imported fill and attractive, drought-tolerant native plants to provide aesthetic enhancement, which will also serve to enhance the habitat surrounding Oxford Basin.

- Installation of an irrigation system to establish the new native plants.

- Construction of six observation areas with park benches overlooking Oxford Basin: two along Washington Boulevard and four along Admiralty Way.

- Installation of interpretative signage at the observation decks and along the walking trail to educate users about stormwater pollution prevention measures, native plants, and area wildlife.

The project scope is also shown on Attachment A, artistic rendering of completed project, and Attachment B, Preliminary Design Plans.

DISCUSSION

The Oxford Basin site occupies an area of approximately 10.7 acres and currently has a large retention pond that is inundated year-round with urban and stormwater runoff, high groundwater, and tidal inflows from Basin E. A 10-foot-high chainlink fence encloses the facility, and there are a variety of trees and shrubs along the basin's steep banks. The facility lacks recreational amenities and has little aesthetic appeal. Oxford Basin is primarily a flood control facility, detaining urban and stormwater runoff from the surrounding area (approximately 700 acres) of the Marina Del Rey Watershed. There are automatically controlled tide gates, which allow Oxford Basin to drain to the Marina when the water surface elevation in the Marina is lower than that in Oxford Basin. On occasion,

water in Basin E is allowed to enter the Oxford Basin through the gates for water recirculation purposes.

The Los Angeles Regional Water Quality Control Board (RWQCB) has identified Marina Beach ("Mother's Beach") and the Marina Del Rey Harbor Back Basins (Basins D, E, and F) as impaired water bodies. The jurisdictions within Oxford Basin's tributary drainage area are the Cities of Culver City and Los Angeles, the County of Los Angeles (County), and California Department of Transportation. Current Bacteria and Toxics Total Maximum Daily Load (TMDL) regulations call for an improvement to water quality in the Marina Del Rey Harbor back basins.

Basin Hydraulic Analysis

Two LACFCD storm drains discharge into Oxford Basin. Project No. 5243, constructed in 1969, was designed for the 10-year flow of 235 cubic feet per second (CFS), and Project No. 3872, constructed in 1972, was designed for the 10-year storm flows of 235 CFS. A new hydrology and storm routing analysis for Oxford Basin for a 50-year storm was conducted in August 2010, (Attachment D). The 50-year storm flow collected at Oxford Basin using the Watershed Modeling System and the Modified Rational Method was found to be 750 CFS. Based on initial water surface of 1.5 feet MSL in Oxford Basin and 2.7 feet MSL high tide water surface in the marina, routing the 50-year capital storm through the basin indicated that the maximum water surface in Oxford Basin would reach 4.9 feet MSL. While at this level, the discharge to the marina through the existing tide gates of 6-foot-by-6-foot reinforced concrete box and 81-inch diameter reinforced concrete pipe will be limited to 561 CFS. At an elevation of 4.9 feet MSL, the basin will have adequate storage capacity for 13.75 acre-feet. Under the 50-year capital storm event, the southerly and westerly perimeters of Oxford Basin will require a new parapet wall with the top-of-wall elevation at 8.0 feet MSL. This wall will provide the necessary freeboard to prevent flooding to the adjacent Parcel "OT" and along Washington Boulevard.

According to the hydraulic analysis conducted in 2010, when Oxford Basin reaches its maximum of 4.9 feet MSL, the low-lying subarea at the intersection of Oxford Avenue and Olive Street does not adequately drain into the Project 5243 Line "C" storm drain. This could lead to possible flooding above the property line within this reach for approximately 60 minutes before the basin water level recedes back to 3.8 feet MSL. In 2003, to address this flood hazard, check valves (Tideflex G-37) were installed on the connector pipes within the surrounding catch basins. However, one 7-foot-wide catch basin along Oxford Avenue could not be retrofitted with a check valve because it has a direct opening to the existing 6-foot-wide by 4-foot-high reinforced concrete box storm drain (Project 5243 Line "C").

The Project involves modification of the existing 7-foot-wide catch basin by separating the catch basin from Project No. 5243 and installing a check valve to isolate the potential backflow from the drain (See Attachment B, Sheet 3). Prior to forecasted storms, the basin is drained down to the lowest elevation possible, typically between -3.0 and -1.0 feet MSL. Any adverse affect on the lateral storm drain such as storm backflow along Oxford Avenue will be reduced. Therefore, based on the hydrology and reservoir routing analysis, the proposed improvements will alleviate flooding at the intersection of Olive Street and Oxford Avenue and no additional improvements are required on Oxford Avenue.

Water Circulation Operation

The Project will improve the water quality in Oxford Basin by increasing circulation and dissolved oxygen levels of the water within Oxford Basin. This will be accomplished by constructing a berm to direct flows around the basin and by revising the operation program of the tide gates to vary the water elevation between -2.0 and 1.5 feet MSL. This will facilitate better exchange of water between the Marina and the basin during high and low tides. Because the circulation will be powered by tidal action, the berm will have significantly lower maintenance requirements accomplishing the same goal as the mechanical circulation device included in the Project Concept Report.

The proposed berm structure will extend into the middle of Oxford Basin, separating incoming and outgoing flows and increasing circulation of water within Oxford Basin. The berm's function will be enhanced by strategic operation of the tide gates. For example, the west tide gate will be programmed to open during rising tides, sending water from Basin E into Oxford Basin, traveling upstream of the dividing berm. The east tide gate will be programmed to open during falling tides, forcing the water to circulate around the end of the berm and out of Oxford Basin into Basin E.

The top of the berm will be at 2.0 feet MSL and will be 2 feet wide. The berm will be planted with pockets of vegetation at an intermediate water elevation. The vegetation on the berm will potentially help to capture some of the pollutants in the water. See Attachment A for artistic renderings of the completed project.

Water Quality Enhancement

The proposed berm, modifications to the tide gate program, planting along the berm, landscaping on the embankment, and removal of deposited sediment will enhance circulation, increase oxygen levels in the water, remove pollutants, and improve the quality of water discharging from Oxford Basin.

To keep track of the improvements to the water quality, WMD will utilize data collected from the existing water quality monitoring system at station MdRH-5 in front of the tide gates, as well as the toxic monitoring station MdRH-B-2 in the middle of Basin E. Data collected from both stations will be used to evaluate the effectiveness of this Project.

Sediment Excavation

Removal of the contaminated sediment from Oxford Basin will ensure that this sediment is not contributing to concentrations of toxics, metals, or other pollutants of concern in the water within Oxford Basin prior to discharge to Basin E. A sediment and geotechnical study completed at Oxford Basin by URS Corporation in December 2011 identified evidence of elevated levels of hydrocarbons in sediment samples from the bottom of the basin. The report also identified the basin's perimeter to have levels of heavy metals above the thresholds for federal Resource Conservation and Recovery Act (RCRA) and California regulated (non-RCRA) hazardous material. Sediment removed from within the basin between elevation -3.0 MSL and elevation 1.0 MSL (approximately 2,700 CY) will be disposed at a Class III landfill and excavation material for retaining wall, access ramps and landscaping (approximately 300 CY) will need to be disposed at a Class I landfill. Staging, drying, and hauling of the excavated materials in the basin will be done as part of the contractor's soil management plan.

The landscaping work will require the excavation of approximately 6,200 CY of contaminated soil. Approximately 3,200 CY will be directed to a Class I landfill and 3,000 CY to a Class III landfill. This soil exceeds recommended agronomic thresholds, cannot be amended, and will need to be replaced for any type of planting to flourish. Biological assessments of the site have also recommended that approximately 150 non-native mature trees be removed to restore native habitat.

Based on the results and previous removal of material in the project area, the estimated total cost to remove the clean and hazardous soils is approximately $1.4 million, $300,000 for LACFCD funded work and $1.1 million for County funded work.

Recreational and Aesthetic Improvements

The community neighboring Oxford Basin has expressed a strong desire to add recreational and aesthetically pleasing amenities to the area surrounding the basin.

Replacement of the sidewalk along Admiralty Way with a landscaped parkway/bio-swale and construction of an 8-foot-wide decomposed granite walking trail around Oxford Basin will significantly improve the recreational appeal of Oxford Basin. In addition, replacement

of existing vegetation with attractive, drought-tolerant native plants, installation of a 4-foot tall ornamental steel fence, construction of observation areas, interpretive signage, and improved wildlife friendly lighting will provide significant improvements to the site's aesthetics. See Attachment A for artistic renderings of the completed project.

The Oceana Del Rey retirement facility, a proposed multi-story housing development on Parcel OT (on the west side of Oxford Basin), is currently scheduled to begin construction in 2012. As part of their lease requirements, the developer has agreed to construct a walking trail and install landscaping in the adjacent space between the new complex and Oxford Basin. The trail and landscaping will be built to the same standard plans and architectural specifications as this Project. See Attachment C for plans of this proposed trail.

The Admiralty Way Settlement Repair Project is scheduled to begin in late 2012 and proposes a new temporary asphalt sidewalk, fencing, and grading into Oxford Basin. This sidewalk will be removed and replaced with a walking path as part of the Oxford Retention Basin Multiuse Enhancement Project.

RIGHT OF WAY AND MAINTENANCE

A construction easement from the City of Los Angeles will be required for the catch basin modification on Oxford Avenue and for construction of the walking trail along Washington Boulevard. No permanent easement or right-of-way acquisitions are required.

The County owns the Oxford Basin site, and the LACFCD, by agreement with the County, has unrestricted access to the site to maintain and operate its facilities thereon. This agreement stipulates that any construction projects initiated by the LACFCD on the Oxford Basin site must first be reviewed and approved by the DBH.

The maintenance responsibility of the non-flood control facilities on the Oxford Basin site, including the walking trail, landscaping, lighting, and other enhancements, has not been finalized. Watershed Management Division will facilitate the establishment of a Memorandum of Understanding (MOU) to be agreed upon by the County DBH, LACFCD, and/or the Department of Public Works for the maintenance of these improvements.

ENVIRONMENTAL DOCUMENT AND PERMIT REQUIREMENTS

Programs Development Division (PDD) has secured the services of Chambers Group as environmental consultant to prepare all required environmental documents. The consultant has determined the Project will require at least a Mitigated Negative Declaration, and that it may be necessary to prepare an Environmental Impact Report

depending comments from the public review period from the constituents, regulatory agencies, and the general public. The Initial study will include Biological Resources, Cultural Resources, Hazards, and Hazardous Materials.

The Project is located within the coastal zone and must comply with the County-certified Local Coastal Program (LCP) for Marina Del Rey pursuant to Section 30519.5 of the Coastal Act. In addition, a Clean Water Act Permit for Section 401 from RWQCB and a Nationwide Permit from the United States Army Corps of Engineers will be required. The California Department of Fish and Game will require compliance with Section 1602 for any modifications made to Oxford Basin.

PROJECT CONSTRUCTABILITY AND ISSUES

High groundwater is expected during high tide. Dewatering will be required during excavation within the basin and will be subject to RWQCB regulations. Noise levels may need to be addressed due to construction activities that impact the bird nesting season.

All excavation and sediment disposal included in this Project will be required to comply with hazardous waste discharge requirements and the South Coast Air Quality Management District Rule 1166, Contaminated Soil Mitigation Plan. The trucking of material will be constant during grading and excavation, a truck route plan will need to be approved by the City of Los Angeles.

COMMUNITY OUTREACH

Public Works has been in contact with several stakeholders during the planning of this project. A chronological history of meetings with stakeholders can be seen on Attachment E.

TRAFFIC

A traffic detour plan will be required in order to allow the ingress and egress of heavy equipment to perform excavation operations at Oxford Basin. Detour and/or traffic control measures will also be required during perimeter construction activities.

UTILITIES

No utility relocations are anticipated for this Project.

DIVISION INVOLVEMENT FROM FISCAL YEAR 2009- FEB 2012

DES	Prepare PDC and preliminary design plans,	$	300,000
AED	Prepare preliminary design plans	$	34,000
SPM	Collect field data and create CADD file for DES	$	42,000
GMED	Preliminary Environmental Assessment & Geotechnical Report	$	325,000
CON	Preliminary utility notification	$	3,000
FMD	Review Project plan	$	2,000
PDD	Prepare Environmental report	$	60,000
PMD	Manage Project	$	180,000
TNL	Plan review	$	9,000
WMD	Oversee Project and coordinate with stakeholders	$	428,000
	Engineering Costs from 2009-2012	**$**	**1,383,000**

DIVISION INVOLVEMENT FROM FISCAL YEAR FEB 2012-14

DES	Prepare and complete final design plans, specifications, and engineer's estimate	$	175,000
AED	Prepare and complete final design plans, specifications, and estimate	$	86,000
SPM	Collect additional field data and review project plans.	$	33,000
GMED	Final Environmental Assessment & Geotechnical Report and review project	$	170,000
CON	Coordinate utility notification, prepare construction contract documents including all special monitoring for dewatering and disposal of contaminated material, provide construction contract administration,	$	77,000
FMD	Review Project plans.	$	3,000
PDD	Perform environmental study, prepare MND, obtain regulatory permits for environmental drilling and project construction, and prepare maintenance agreement with DBH	$	75,000
PMD	Manage Project	$	175,000
TNL	Prepare detour plans	$	11,000
WMD	Oversee Project and coordinate with stakeholders	$	112,000
	Estimated Engineering Costs 2012-2014	**$**	**917,000**

CONSTRUCTION ENGINEERING JANUARY 2014-2015

CON & OTHER SUPPORT DIVISIONS	Construction support – provide construction contract administration and inspection services.	$	1,400,000

CONSTRUCTION COSTS

Drainage Improvements	$	1,000,000
Landscaping	$	1,200,000
Aesthetic Enhancements	$	1,500,000
Water Quality Enhancements	$	800,000
Excavation and disposal of sediment	$	1,400,000
Construction Contingency (10%)	$	590,000
Total Estimated Construction Costs	**$**	**6,490,000**

FUNDING BREAKDOWN

The LACFCD will provide funding for the parapet wall, modification to the catch basins on Oxford Ave, access ramps, removal of accumulated sediment within Oxford Basin, grading, and berm construction. The County of Los Angeles Supervisorial District 4 (SD4) has agreed to provide funding for landscaping and associated excavation, fencing, walking path, lighting, signage, and other aesthetic and recreational enhancements through their discretionary fund. Maintenance of the new access road and the berm will be funded by the LACFCD. Funding for maintenance of all proposed aesthetic and recreational improvements, including the fencing, lighting, walking path, and landscaping, will be arranged when establishing the MOU.

LACFCD Funded Work		
Engineering Expenditures in FY 2009-2012:	$	1,383,000
Engineering in FY 2012-2013 through FY 2014-2015:	$	917,000
Construction Engineering FY 2014-2015:	$	1,400,000
LACFCD Improvements (excavation, berm, etc)	$	2,300,000
Removal and Disposal of Accumulated Sediment	$	300,000
Construction Contingency (10%)	$	260,000
Total Estimated LACFCD Costs	**$**	**6,560,000**

SD4 Funded Work		
Fencing, Landscaping, Walking Path, Observation Deck/Areas, Aesthetic improvements	$	2,200,000
Excavation and Disposal of Contaminated Soil	$	1,100,000
Construction Contingency (10%)	$	330,000
Total Estimated Aesthetic Enhancement Costs	**$**	**3,630,000**
Total Estimated Project Costs	**$**	**10,190,000**

ISI RATING

Using the Institute for Sustainable Infrastructure's (ISI) Envision 2.0 draft sustainability rating tool released in January 2012, this project scored 438 points out of a possible 768 points (see Attachment F for summary).

PROJECT SCHEDULE

Milestone	Estimated Start (actual in **Bold**)	Estimated Finish (actual in **Bold**)
Project Design Concept	**April 2010**	**March 2012**
30% Plan	**June 2010**	**August 2010**
30% Plan Review	**September 2010**	**October 2010**
PDD - MND Report / Board approval	March 2012	October 2012
PDD – Drilling permits	**July 2011**	**September 2011**
GMED Environmental Assessment	**September 2011**	March 2012
60% Plan	**October 2010**	**March 2012**
60% Plan Review	March 2012	April 2012
First Utility Notice	March 2012	May 2012
Prepare and submit permit applications	August 2012	September 2012
Secure regulatory permits		September 2013
90% Plans, Specs, & Estimate	March 2012	May 2012
90% Plans, Specs, & Estimate Review	May 2012	June 2012
Final utility clearance	July 2012	September 2012
Final Plans, Specs, & Estimate	September 2012	September 2013
Signed Plans		September 2013
Advertise	September 2013	November 2013
Award		February 2014
Construction	March 2014	March 2015

PREPARED BY:

Charles Chen, Design Division — Date 3/14/12
Drainage Section II

Joshua Svensson, Watershed Management Division — Date 3/14/12
Santa Monica Bay Watershed

JTS:
CC:
P:\ddpub\Structures\Projects\Oxford Retention Basin PDC v6.4.docx

Attach.

cc: Construction (Sparks, Updyke, Dunn)
Flood Maintenance (Lee, South)
Geotechnical & Materials Engineering (Montgomery, Goodman)
Programs Development (Dingman)
Road Maintenance (MacGregor, MD 4)
Survey/Mapping & Property (Steinhoff, Jeffers)
Watershed Management (Hamamoto)
Project Management (Kearns, E-Nunu)
Design (Atashzay, Grindle)

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Approved _____
Diego Cadena 12/31/08

December 18, 2008

TO Diego Cadena

FROM: Mark Pestrella MP.
Watershed Management Division

PROJECT CONCEPT REPORT
OXFORD RETENTION BASIN
MULTIUSE FLOOD PROTECTION ENHANCEMENT PROJECT

Recommendations

1 Approve the development of a multiuse project at the Oxford Retention Basin (Oxford Basin) to mitigate nearby flooding conditions, improve urban and stormwater runoff water quality, and aesthetically enhance passive recreational opportunities.

2 Authorize Watershed Management Division (WMD) to place the project into the Flood Control Construction Program and allocate $8.6 million for construction of the project flood control features in Fiscal Year 2010-11

3 Request Project Management Division to manage the design of the flood control features of this project.

4 Authorize WMD to collaborate with the Department of Beaches and Harbors (DBH) on the establishment of a Capital Improvement Project to construct the recreational components of the project.

5 Request Programs Development Division (PDD) to assist in seeking grants to offset project costs.

Project Objective

The proposed project is located at the Oxford Basin in the Marina del Rey This site currently serves as a flood control facility and is presumed to contribute to water quality impairments in the Marina del Rey Harbor This facility also lacks recreational amenities and aesthetic appeal. This project proposes to mitigate localized flooding

FMGMT

conditions, address water quality deficiencies, create passive recreational enhancements, and aesthetically enhance the surrounding area. The implementation of this multiuse project will:

- Remove accumulated sediments and debris in the Oxford Basin and restore the Oxford Basin's capacity to its original level of flood control/protection.
- Alleviate local flooding in the vicinity of the Oxford Basin.
- Improve water quality and help meet the current and future Total Maximum Daily Load (TMDL) requirements.
- Reduce pollutants of concern (i.e., bacteria, toxics, metals, and trash) to the maximum extent practicable.
- Provide long-term water quality benefits through the use of new and emerging Best Management Practice (BMP) technologies.
- Provide aesthetic enhancements for the community and education through the use of interpretive signage along the bikeways and walking trails.
- Provide connectivity to nearby recreational bikeways and walking trails

Background

The Oxford Basin is located one block north of Basin E in the unincorporated community of Marina del Rey (Thomas Guide 671-J6) and occupies an area of approximately 10.7 acres (Attachment A). The project site currently has a large retention pond that is inundated year-round with urban and stormwater runoff, high groundwater, and tidal inflows from the Marina del Rey Harbor Basin E. A chainlink fence encloses the facility, and there are a variety of trees and shrubs along the basin's steep banks.

As a primary flood control facility for the surrounding area, the Oxford Basin serves the purpose of retaining urban and stormwater runoff from 687 acres of the Marina del Rey Watershed. Historically, the adjacent neighborhood is known to flood during moderate storm events due to high tide reducing the capacity of the Oxford Basin. Modifications were made to two flap gates in 1998 to control the marina water from backing into the

retention basin during high tide. The new automatically controlled slide gates allow the basin to drain to the marina when the water surface elevation in the marina is lower than that in the basin. On occasion, water in Basin E is allowed to enter the Oxford Basin through the gates for water recirculation purposes.

To address the ongoing flood hazard at the intersection of Oxford Avenue and Olive Street to the north of the Oxford Basin, a Project Design Concept (Project No 5243 – Relief Drain and Oxford Detention Basin Pump Station Upgrade) was developed by Design Division in 2005. The proposed project was for the construction of a 30-inch, 1,100 linear-foot relief drain that would outlet directly into the Oxford Basin Pump Plant (Attachment B) The Project Design Concept also proposed to increase the pumping capacity of the Oxford Basin Pump Plant. The cost of the relief drain and pump plant enhancement was estimated at $2.1 million. This project, however, was not constructed. Currently, the intersection is still subject to flooding during significant storm events combined with tides.

In 2004, Mothers' Beach and the Back Basins (Basins D, E, and F) were identified as impaired water bodies by the Los Angeles Regional Water Quality Control Board for disease-causing pathogens, such as fecal coliform and enterococcus. Current TMDL requirements necessitate improving water quality that is discharged directly into impaired Basin E from the Oxford Basin and its tributary drainage area. It is presumed that the Oxford Basin and its tributary drainage area are contributors of bacteria and other pollutants of concern. The jurisdictions covering the Oxford Basin's tributary drainage area are the Cities of Culver City and Los Angeles, the County of Los Angeles (County), and California Department of Transportation (Caltrans).

To improve water quality in this subwatershed, two upstream Low-Flow Diversions (LFDs) were proposed in the Marina del Rey Harbor Mothers' Beach and Back Basins Bacteria TMDL Implementation Plan. The LFDs divert dry-weather urban runoff, which would otherwise discharge into the Oxford Basin untreated, to the existing sanitary sewer system. Since March 2007, one of the constructed LFDs has been diverting urban runoff from Storm Drain Project No. 5243 near the intersection of Washington Boulevard and Thatcher Avenue to the City of Los Angeles' Hyperion Wastewater Treatment Plant. This project also included the installation of five Filterra Bioretention Catch Basin Units upstream of the Oxford Basin and downstream of the LFD. A second LFD will soon be constructed near the outlet of Storm Drain Project No. 3872 close to the intersection of Admiralty Way and Marina City Circle near the Oxford Basin Pump Plant. However, this alone will not resolve water quality concerns in the watershed, especially for wet-weather conditions. In fact, opportunities to implement already defined BMPs at the Oxford Basin are extremely limited due to high groundwater, tidal

influence, requirements to preserve the flood regulating capacity of the facility, and a lack of "best available technology economically achievable," defined by the Clean Water Act, to address targeted pollutants.

The community surrounding the Oxford Basin has expressed a strong desire to add recreational and more aesthetically pleasing amenities to the area surrounding the basin. As a result, the DBH approached the Department to request that recreational amenities be added to the project. The DBH staff is currently drafting architectural design guidelines for Marina del Rey in which the Oxford Basin is referenced as a potential park property

Project Description

The proposed Oxford Basin project will improve its overall flood protection capability, remove pollutants from dry- and wet-weather runoff, and incorporate aesthetic enhancements and passive recreation features. The Scope of Work will be completed in one phase and include the following project components

1 Excavation of approximately 15,000 cubic yards of accumulated sediment and deposited pollutants to restore the facility's flood protection capacity and improve water quality Prior to excavation, a water and sediment quality analysis will be performed at the Oxford Basin to identify pollutant types and their respective concentrations in order to develop a comprehensive approach to improve water quality

2. Construction of a 30-inch, 1,100 linear-foot relief drain that would outlet directly into the Oxford Basin Pump Plant. The proposed relief drain will alleviate flooding at the intersection of Oxford Avenue and Olive Street.

3 Installation of a permanent boat ramp to allow Flood Maintenance Division (FMD) and the DBH access to the Oxford Basin for routine maintenance, trash removal, and water quality monitoring within the basin.

4. Research and investigation of installations of state-of-the-art trash BMPs at the outlets of Storm Drain Project Nos. 5243 and 3872 to remove gross solids in urban and stormwater runoff

5. Implementation of a new BMP technology to address long-term water quality objectives to continuously recirculate the entire body of water at the Oxford Basin. The proposed technology is the Jet Streamer System, patented by

Marine Techno Research of Tokyo, Japan, and marketed by Hydrotech Limited, located in Redondo Beach, California. The technology is based on the principles of water rejuvenation.

Water rejuvenation takes a water body from an anaerobic state, which causes foul odors, sludge buildup, algae, and loss of aquatic life, to an aerobic state where the oxygen-enriched water eliminates those conditions. The Jet Streamer System has been used extensively in Japan and other countries and has recently started operations in the United States (Attachment C). This system is currently being pilot tested by the City of Los Angeles at Machado Lake in Harbor City Results from the pilot test should become available in the upcoming months. The Jet Streamer System is designed to vigorously agitate the water body through the use of air pumps and a jet-flow generator mounted on a small floating platform as shown in Attachment D. According to the manufacturer, the Jet Streamer System can significantly reduce bacterial concentrations by up to 99 percent and other pollutants of concern, such as total nitrogen, suspended solids, ammonia, total phosphorous, manganese, and iron, etc. It can be used in shallow water and has the ability to include ozone for bacterial disinfection. This technology is safe for human and aquatic life and is environmentally friendly Other disinfection technologies, such as injecting free iodine at the outlet of Storm Drain Project Nos. 5243 and 3872, will also be considered as a substitute for the ozone generation apparatus that could be attached to the Jet Streamer System.

6. Installation of approximately 3,850 linear feet of 6-foot-high ornamental steel picket perimeter fencing to protect the public from contact with the basin.

7. Replacement of existing vegetation with attractive, drought-tolerant native plants to enhance habitat surrounding the basin.

8. Installation of an automatic irrigation system to water the new plants.

9. Removal of the existing concrete sidewalk along Washington Boulevard and installation of an 8- to 10-foot-wide walking trail with lighting around the full perimeter of the Oxford Basin.

10. Construction of two observation decks with park benches that overlook the Oxford Basin along Washington Boulevard.

11 Installation of interpretative signage at the observation decks and along the walking trail to educate users about stormwater pollution prevention measures, native plants, and area wildlife.

12. Installation of a restroom, drinking fountain, and a covered dumpster area to facilitate the enhanced recreational opportunities.

Watershed Management Features

This project will add multiple uses to an existing single-use facility to meet the watershed management objectives of maintaining flood protection, improving water quality, and providing a multiuse facility for public use.

- Flood Hazard Mitigation – The construction of a relief drain for Project No. 5243, Line C, will convey flows from a 50-year rainfall event at the intersection of Oxford Avenue and Olive Street and discharge directly into the Oxford Basin Pump Plant. The Oxford Basin Pump Plant was constructed in 1992 to alleviate flooding in and around the vicinity, which continues to be subject to flooding Based on a hydrologic analysis completed by Water Resources Division, a peak-discharge rate of 17 cubic feet per second (cfs) is recommended for the new relief drain. This additional peak-flow rate will require an increase in the pumping capacity of the Oxford Basin Pump Plant from 30 to 47 cfs.

- Water Quality – The current and future TMDL requirements call for an improvement to water quality in the Marina del Rey Harbor This project will physically remove deposited sediment and pollutants from the Oxford Basin, reducing the chance that pollutants carrying sediment will be resuspended and discharged to Basin E. In addition, a pilot study based on new available BMP technology for water rejuvenation will be implemented to significantly reduce concentrations of bacteria and other pollutants of concern prior to discharge to the impaired water body Trash BMPs at each of the storm drain outlets and catch basins will capture gross solids and facilitate basin cleanup

- Passive Recreation – The incorporation of a walking trail loop around the Oxford Basin facility will encourage passive recreation, such as walking, jogging, and wildlife observation. Public access will not be provided within the retention basin because of public safety concerns, such as the steep slopes and the risk of drowning

- Aesthetic Enhancement – The replacement of existing vegetation and perimeter fencing will boost the visual appeal of this unique open space area within the highly urbanized Marina del Rey Watershed (Attachment D) In addition, basin observation decks with park benches and educational signage will provide enhanced views and relevant information about water quality and wildlife in the basin.

Project Investigation and Review

- Stakeholder Input

  There is extensive interest in this project throughout the Marina del Rey, Ballona Creek, and Santa Monica Bay Watersheds. Aside from residents in the area, the Marina del Rey Design Control Board, Small Craft Harbor Commission, Business and Visitors Bureau, Santa Monica Bay Restoration Commission, and Ballona Creek Watershed Task Force have expressed strong interest in developing a retention basin that is aesthetically appealing and incorporates multiuse benefits, such as passive recreation for bird watching, walking, and jogging. The DBH also noted that other design considerations that may be desirable are a restroom, drinking fountain, dumpster, and trash enclosure.

  WMD staff made a presentation to the Marina del Rey Small Craft Harbor Commission and the Design Control Board in July 2007 regarding the conditions in the basin and the need for improvements to water quality in the basin and the basin surroundings. WMD also met with the Santa Monica Bay Restoration Commission and the Ballona Creek Task Force in November 2007 WMD staff will work with the DBH to schedule presentations to the Santa Monica Bay Restoration Commission and the Marina Lessee's Association to solicit further input.

- Environmental Assessment

  The project will likely require either a Negative Declaration or Mitigated Negative Declaration. PDD will complete an environmental determination at the appropriate time as required by the California Environmental Quality Act.
  There is a possibility that deposited sediment in the Oxford Basin may be contaminated. If the soil is found to be contaminated, proper landfill disposal will be necessary

A Phase 1 Environmental Assessment for Project No. 5243 (Relief Drain) was performed by Geotechnical and Material Engineering Division in April 2006. This investigation revealed significant levels of contamination from gasoline, diesel, lead, and zinc among other contaminants discovered at various boring locations.

- Permit Requirements

The project is located within the coastal zone and will require that this alternative be consistent with the County-certified Local Coastal Program (LCP) for the Marina del Rey pursuant to Section 30519 5 of the Coastal Act. In addition, a Clean Water Act Permit for Section 401 (Water Quality Certification) and a Nationwide Permit will be required. The California Department of Fish and Game will require compliance with Section 1602 (Streambed Alteration Agreement) of the California Fish and Game Code for any modifications made to the Oxford Basin.

- Economic Analysis and Construction Schedule

The total cost of the project is estimated to be $13.5 million and project completion is anticipated in June 2012 (Attachment E). This cost estimate includes engineering design, project management, permitting, and construction. This project estimate excludes any right of way and/or easement acquisition costs associated with the relief drain.

The cost of the flood protection enhancement components of this project is estimated at $8.6 million. This estimate is the combined cost of both the basin excavation and the construction of the relief drain, which is estimated to cost $5 million and $3.6 million, respectively. Funding for all flood protection enhancements will be provided by the Los Angeles County Flood Control District (LACFCD).

The cost of the water quality components of this project is estimated at $0.8 million. It is proposed that approximately 56 percent of this cost, which is approximately $448,000, will be shared by the jurisdictions covering the Oxford Basin's tributary drainage area in accordance with the Marina del Rey Harbor Mothers' Beach and Back Basins Bacteria TMDL. The jurisdictional group consists of the Cities of Los Angeles and Culver City, the County, and Caltrans. The remaining 44 percent of the water quality enhancement cost, which is approximately $352,000, will be provided by the County

The cost of the aesthetic enhancements and recreational amenities on this project is estimated at $4.1 million and will be provided by the County through the establishment of a Capital Improvement Project.

Federal, State, and local grants are also potential sources of funding for this project.

- Operation and Maintenance

The Jet Streamer System will require ongoing operation and maintenance per the manufacturer's specifications. The associated maintenance costs primarily consist of labor and parts, such as water pumps, air pumps, and transmitters. FMD will maintain the Jet Streamer System on behalf of the County at the County's cost. It is recommended that a maintenance manual and several training sessions be included in the contract for this BMP. The basin's pool of water will need to be monitored for pre- and postconstruction pollutant levels to assess the overall effectiveness of sediment excavation and Jet Streamer System operation to remove targeted pollutants. Monitoring will be implemented by WMD on behalf of the County at the County's cost.

Postconstruction maintenance of this facility will also include the emptying and proper disposal of trash collected in the storm drain outlets in the basin and trash collection removal within the basin by the use of a boat. This maintenance effort will be performed by FMD and the DBH, and the cost be will be covered by the LACFCD.

Regular maintenance of the perimeter walking trail, park benches, ornamental steel picket fencing, signage, restrooms, trash receptacles, and observation decks will be performed by the DBH at the County's cost.

Occasional vegetation management may be required, including removal of weeds and other unwanted species, replanting native vegetation, and irrigation line repair. A pre- and postemergent weed control method is suggested where the area is sprayed in the spring to discourage growth, and then individual weeds are located and sprayed in the fall. The DBH will manage all landscaping and drip irrigation maintenance of the Oxford Basin at the County's cost.

- Right of Way and Utilities

  County owns the Oxford Basin, and the LACFCD, by agreement with the County, has unrestricted access to maintain and operate the facility Any associated work that occurs outside of the property boundaries will require a temporary construction easement from the owner

  A thorough utilities search should be conducted during the design phase of the project to identify all utilities and their respective owners. All necessary permits or easements will be acquired prior to construction.

  A portion of the proposed relief drain is located within the Oxford Basin and will require a grant easement from the County as well as a temporary construction easement. The remainder of the project is located within the public street and will require an excavation permit from the City of Los Angeles.

Project Considerations and Issues

The following topics should be considered in the final design.

- Public Safety – Public access should be limited along the exterior perimeter of the facility to minimize drowning and injury risks associated with the permanent pool of water and the steep slopes in the Oxford Basin.

- Traffic Control – It may be necessary to establish a traffic detour in order to allow the ingress and egress of heavy equipment to perform excavation operations at the Oxford Basin. Detour and/or traffic control measures will also be required during perimeter construction activities.

- Construction Issues – High groundwater is expected during high tide. Dewatering operations will be required during construction Noise levels may need to be addressed due to construction activities that impact the bird nesting season.

- Excavation – The disposal of contaminated sediment, if any, from the excavated materials may have to meet the hazardous waste discharge requirements and/or be permitted by the South Coast Air Quality Management District under Rule 1166, Contaminated Soil Mitigation Plan. Prior to excavation, a water and sediment quality analysis will be performed at the Oxford Basin to identify pollutant types and their respective concentrations.

- Maintenance Access – Access to the Oxford Basin will need to be maintained at the existing four access gates to provide sufficient ingress and egress points for maintenance activities. Two access gates are located along Washington Boulevard, one near the tide gates and one on the southeast side near the proposed LFD There is a need for a boat ramp in the southeast corner of the Oxford Basin to address trash removal in the basin.

- Postconstruction Water Quality Sampling – To evaluate the overall effectiveness of BMPs to reduce target pollutant levels, it is essential to monitor the Oxford Basin's influent and effluent to assess compliance with the Bacteria and Toxics TMDLs and the potential use of these BMPs for other water quality enhancement projects.

- TMDL Compliance – The water quality enhancements proposed in this alternative may not be sufficient to ensure full compliance with the Marina del Rey Harbor Mothers' Beach and Back Basins Bacteria TMDL. Additional BMPs may be necessary throughout the watershed to address water quality impairments to Basins D, E, and F

Project Alternatives Considered

- Treatment Wetland – A treatment wetland was evaluated as part of the development of this concept report. A properly constructed treatment wetland mimics conditions of a natural wetland and uses biological process to remove targeted pollutants. An effective treatment wetland is typically maintained at shallow water depths of 1 to 2 feet maximum

  The Oxford Basin water elevations can vary from about 4 feet during the dry season to 10 feet during the storm season It is subject to a high groundwater table and tidal influence that prohibits the basin from being maintained at depths of 1 to 2 feet. Another major factor is the need for substantial detention time of 3 to 7 days to remove high bacteria concentrations. A 7-day detention time is not possible without compromising the flood control protection provided by this facility

  It was determined that the construction of an efficient wetland at the Oxford Basin is not feasible. A treatment wetland would compromise the Oxford Basin's capacity to provide flood protection, and there is no guarantee that the treatment wetland would achieve the required bacteria removal for TMDL compliance purposes.

- Treatment Train – A treatment train strategy was evaluated for improving water quality at the Oxford Basin. A treatment train is designed to treat and discharge/infiltrate stormwater and urban runoff by using a series of BMPs that is each designed to remove different types of pollutants of concern. Since most BMPs cannot address complex stormwater issues, a treatment train strategy combines various treatment measures, which can be structural or nonstructural. For example, a Continuous Deflective Separator Unit (structural) can remove large pollutants, such as trash and debris, yet is ineffective when it comes to bacteria removal. The bacteria could then be removed by injecting ozone (structural) as disinfecting agent; and as a final approach, educational programs (nonstructural) can be implemented to inform the community about techniques to reduce pollutants contained in runoff.

  Various factors were considered in the selection of appropriate BMPs for the treatment train, such as the drainage area served, available land space, variable water surface elevations, salt water intrusion, steep side slopes, and shallow groundwater depth. An evaluation was also made of how to treat and infiltrate stormwater by use of various BMPs, such as swales, infiltration trenches, bioretention areas, oil and water separators, media filters, and their respective pollutant removal efficiencies and costs.

  The construction of an underground detention vault with built-in media filters was considered in order to treat and discharge/infiltrate stormwater and ensure a successful treatment train while still providing flood protection. However, the treatment train alternative was dismissed since it was not technically feasible at this location due to insufficient available space and because it would require costly upgrades to the existing pump plant and higher operation and maintenance costs.

Summary

The Oxford Basin currently serves as a flood control facility to retain urban and stormwater runoff. This facility is essential in the management of local flood risk. The proposed multiuse project will restore flood control capacity lost through the long-term accumulation of sediment and debris. In addition, current TMDL requirements call for improving water quality in the Marina del Rey Harbor Mothers' Beach and Back Basins D, E, and F. The Oxford Basin drains directly into Basin E, and studies have shown it

has some of the highest bacterial densities during both dry- and wet-weather sampling events. The proposed project will also provide aesthetic and passive recreational enhancements and thus create multiple uses from an existing single-use facility

YMT:jtz
P:\wmpub\Secretarial\2008 Documents\Memos\2008 Oxford Basin PCR-YMT RevApril (3).doc\C08271

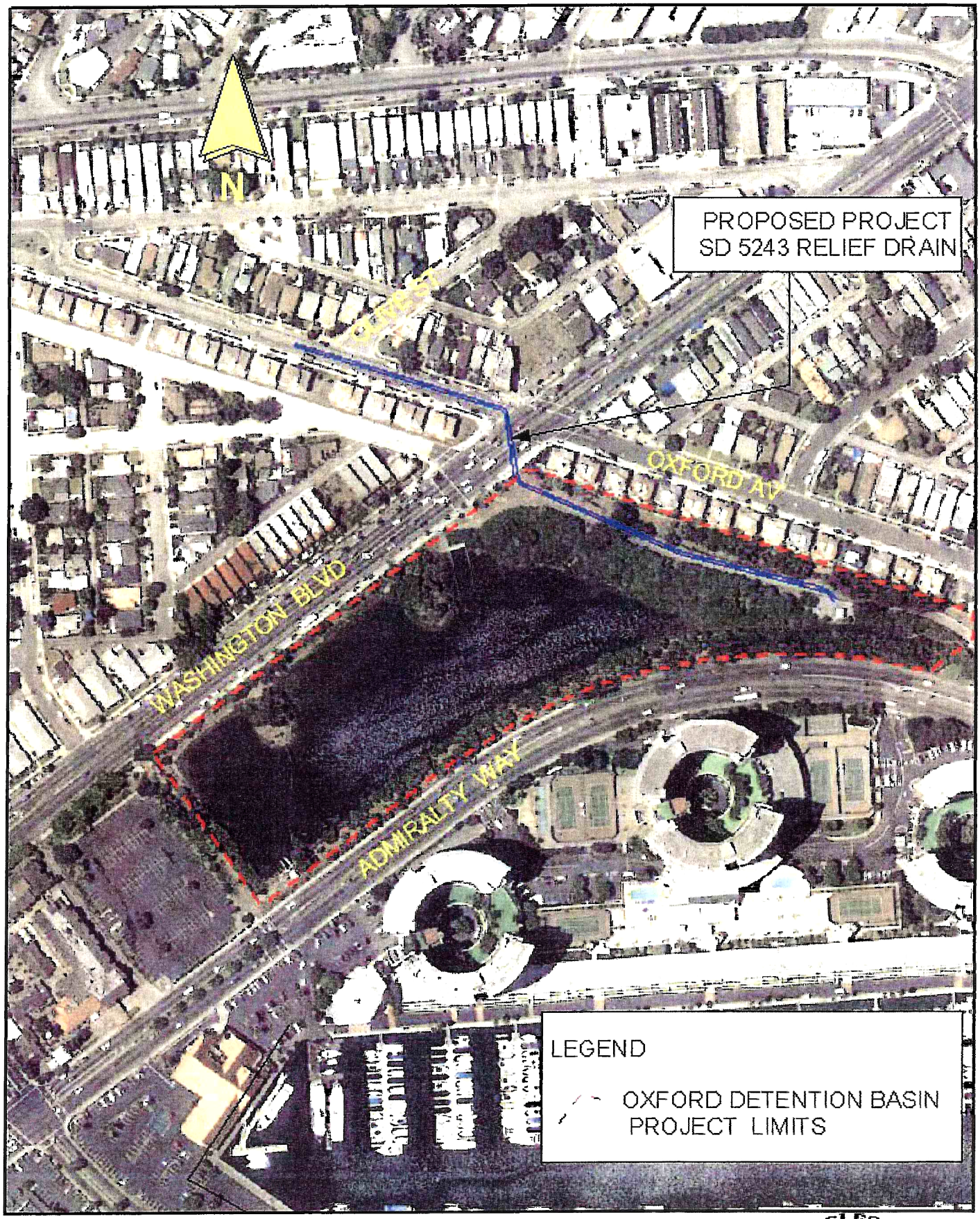
Attach

cc: Design (Kumar, Atashzay, Soliman, Thurow)
Flood Maintenance (Lee, Hildebrand)
Geotechnical and Materials Engineering (Kelley)
Programs Development (Afshari, Delegal, Dingman, Shih)
Project Management II (Eftekhari, E-Nunu)
Water Resources (Kubomoto, Nasseri)
Watershed Management (Quirk, Ozman, Galang)

ATTACHMENT A

Location Map
and
Aerial Photo

OXFORD DETENTION BASIN LOCATION MAP



OXFORD DETENTION BASIN
AERIAL VIEW

PUBLIC WORKS

LOS ANGELES COUNTY
WATERSHED MANAGEMENT

ATTACHMENT B

Project No. 5243
Relief Drain and
Oxford Pump Plant Upgrade

Approved_____
Patrick V. DeChellis

November 17, 2005

TO: Patrick V DeChellis

FROM: Sree Kumar
Design Division

PROJECT DESIGN CONCEPT
PROJECT NO. 5243 – RELIEF DRAIN AND OXFORD RETENTION BASIN PUMP STATION UPGRADE
PCA X5009412
PROJECT ID NO. FCC0000898

Recommendation

Approve the Project Design Concept (PDC) for the construction of a relief drain for Project No. 5243, Line C and the upgrade of the existing Oxford Retention Basin Pump Station as shown on Attachments A through C and as described herein. The relief drain will be designed to convey flows from a 50-year frequency rainfall.

Project Scope

The proposed project consists of a 30-inch diameter relief drain that will relieve the downstream end of Project No. 5243, Line C. Because the maximum water surface in the Oxford Retention Basin (Basin) prevents the efficient drainage of this portion of Project No. 5243, the relief drain will outlet directly into the pump station bay of the existing Oxford Retention Basin Pump Station. The proposed drain alignment is along the north levee of the Basin adjacent and parallel to Oxford Avenue. It diagonally crosses the intersection of Washington Boulevard and Oxford Avenue and proceeds westerly within Oxford Avenue terminating at the intersection of Oxford Avenue and Olive Street (see Attachments A through C). The relief drain consists of approximately 1,100 linear feet of 36-inch rubber gasketed reinforced concrete pipe (RCP). In order to minimize traffic impacts, the 170 linear foot reach across the intersection of Washington Boulevard and Oxford Avenue will be installed by trenchless methods. Either jacking or microtunneling will be specified based on results from the geotechnical investigation.

The proposed relief drain will require an increase in the pumping capacity of Oxford Retention Basin Pump Station from 30 cubic feet per second (cfs) to 47 cfs. The upgrades to the pump station include:

1) Modification of the inlet structure to join the existing and proposed storm drains.

2) Replacement of the two 50 horse power (HP) electric pump motors with two 75 HP motors.

3) Upgrade of the electrical and control panels.

4) Replacement of the two existing 16-inch diameter steel discharge lines with two 24-inch diameter steel pipes.

Upgrades to the existing pump station telemetry system will be investigated during final design, including synchronization with the telemetry system of the automated slide gates on the discharge lines between the Basin and Basin E of the Marina.

In addition, a parapet wall will be constructed along the northwestern and southern boundaries of the Basin (see Attachment A). The reinforced concrete wall will be approximately 1,050 linear feet long and a maximum of 2 feet in height. The wall is required to provide two feet of freeboard at the maximum design water surface elevation of 6.5 feet mean sea level (MSL) in the basin. The wall will be constructed with an architectural finish based on feedback from the community. It will be constructed within the existing right of way and immediately adjacent to the existing chain link fence.

Background

The proposed project is located in the unincorporated community of Marina del Rey, Supervisorial District Nos. 3 and 4, and the community of Venice in the City of Los Angeles. Recent reports of flooding at the intersection of Oxford Avenue and Olive Street, and a history of flooding in local areas during extreme storm conditions and unfavorable high tides, required a comprehensive evaluation of the hydrologic and hydraulic conditions in the greater Oxford Retention Basin area. The Basin and connecting drainage network systems are part of a complex combination of flood control facilities developed to provide flood protection in a low lying, densely populated beach neighborhood.

The Basin (see Attachment A) is the outlet basin for two independent drainage systems, Project Nos. 5243 and 3872 with design flows of 670 cfs and 265 cfs, respectively The combined 10-50-year design flows conveyed to the Basin is 935 cfs for a total tributory watershed of approximately 659 acres. The stormwater from the Basin outlets into Basin E of Marina del Rey via two existing discharge culverts, an 81-inch RCP and a 6-foot-wide by 6-foot-high reinforced concrete box each fitted with automated slide gates. The Basin is drained of the flood waters when the water level of the marina is lower than the Basin. The Basin provides adequate storage of flood waters during storm events and low tide and reduced storage during periods of high tides in the Marina.

The proposed relief drain and pump station upgrade is the latest of several projects constructed that spans more than a decade to alleviate flooding in several of the low lying areas in the vicinity of the basin.

In 1992, the Oxford Retention Basin Pump Station was constructed as well as improvements to existing Project No. 3872. The pump station and the storm drain improvements were constructed to alleviate flooding in the local sump area located along

Oxford Avenue just west of the intersection of Oxford Avenue and Dickson Street. Several studies performed in 1983 and 1989 concluded that when the water surface of the Basin reaches the elevation 2.7 (mean high tide elevation) existing Project No. 3872 does not perform as designed. Surface flows from the downstream reach of the drain are prevented from entering the drain due to high hydraulic grade line conditions. The surface flows then traveled downstream to the local sump area where they ponded until there was a more favorable tide to allow flows back into the drain.

In 1995, in an effort to mitigate the adverse effects of the higher tides on the Basin and to provide a more efficient hydraulic operation of the outlet control, the two existing flap gated discharge culverts in the Basin were retrofitted with automated controlled slide gates and an outlet telemetry system. Currently, the automated slide gates are programmed to open when the water surface in the Basin is a minimum of 3 inches above the Marina. Otherwise, the slide gates are to remain closed to prevent the back flow of tidal water into the Basin. The operation of the two slide gates is highly dependent on the tidal elevation in the Marina.

The latest improvement was constructed in August 2003. Four catch basins located at or near the intersection of Oxford Avenue and Olive Street were retrofitted with inline Tideflex check valves to prevent the backflow of storm water onto the local street. This was considered an interim solution until a permanent solution could be developed for the area.

The inline Tideflex check valves installed in 2003 and the discharge culvert improvements completed in 1995 do not however fully alleviate the flooding at the local sump area located near the intersection of Oxford Avenue and Olive Street (see Attachment A) during extreme storm events when coupled with unfavorable high tide conditions. The proposed relief drain and improvements to the Oxford Retention Basin Pump Station should provide additional relief.

Discussion

A hydraulic analysis of Project No. 5243, Line C, was performed using a downstream water surface control of 3.4 MSL (tide elevation based on the 1993 Flooding Studies) in both the Basin and in Basin E, Marina del Rey. From this analysis, five catch basins in the vicinity of the intersection of Oxford Avenue and Olive Street (see Attachment B) were determined to be below the hydraulic grade line of the mainline drain and, therefore, nonfunctional. As previously mentioned, in 2003, these catch basins were retrofitted with inline Tideflex check valves to prevent backflow of stormwater onto the street. However, the surface water from the surrounding subareas pond in the local sump until the hydraulic grade line recedes to a more favorable elevation.

To alleviate the ponding, the four catch basins will be disconnected from Project No. 5243, Line C, and directly connected to the existing Oxford Retention Basin Pump Station via the proposed relief drain. The four catch basins at the local sump will no longer be influenced by the fluctuation of tides and their capacities will be available to accept flows at all times

during a storm event. The 50-year rainfall event design flow of 17 cfs collected by the four catch basins will still be discharged to the Basin via the existing Oxford Retention Basin Pump Station.

Our study determined that the Basin performs adequately and within County standards during 10-50 year storm events.

Hydrology

The analysis of the relief drain completed for this PDC is based on the Hydrology Report dated November 22, 2004, prepared by Water Resources Division (copy attached). Based on the analysis of this Hydrology Report, a peak discharge of 17 cfs is recommended for the design of the relief drain and pump station upgrades.

The comprehensive analyses of the Basin, including the capacities of the existing flood control facilities that outlet into the Basin and the reservoir routing study, have been based on the Hydrology Report dated June 21, 1989, prepared by the then named Hydraulic/Water Conservation Division.

Right of Way

The portion of the proposed project located within the Basin will require the acquisition of permanent right of way (RW) to construct, operate, and maintain the proposed drainage facilities. Additional temporary construction easements will also be required. The permanent RW and temporary construction easements are shown on Attachment B. The Basin is owned by the Los Angeles County Department of Beaches and Harbors.

The remainder of the proposed project is located within public street (RW).

Utilities

No major utility conflicts are anticipated.

Traffic

The portion of the storm drain within Washington Boulevard will be constructed using trenchless methods. Therefore, no major traffic impacts are anticipated.

Watershed Management Applications

This local sump has a history of frequent flooding problems of varying degrees. Due to this history, the installation of automatic retractable screens for catch basin openings is not recommended. An inline treatment system such as a continuous deflective system (CDS) is not recommended due to the downstream hydraulic restriction.

However, a proprietary Best Management Practice (BMP) called Filterra was considered for the project location as part of a low-flow diversion system at Project No. 5243 but will not be installed during this phase (Refer to Project Design Concept-Marina Del Rey Bacteria Total Maximum Daily Load Low Flow Diversion Project at Project No. 5243). The low-flow diversion system at Project No. 5243 is responsible for providing the watershed management applications for the entire watershed for existing Project No. 5243. This low flow diversion project is scheduled for construction in summer 2006.

Environmental Assessment

A Phase 1 Environmental Assessment will be performed by Geotechnical and Materials Engineering Division to determine if further investigation is warranted.

Environmental Documentation and Permits

The proposed project will require a Negative Declaration. Regulatory permits may be required.

Project Schedule

The project is tentatively scheduled for design completion in December 2005.

Project Cost Estimate

The estimated contract bid price for the proposed project is approximately $2,000,000 excluding right of way and/or easement acquisition costs.

This Project Design Concept was distributed for Public Works' review and all appropriate comments have been incorporated.

Prepared by:

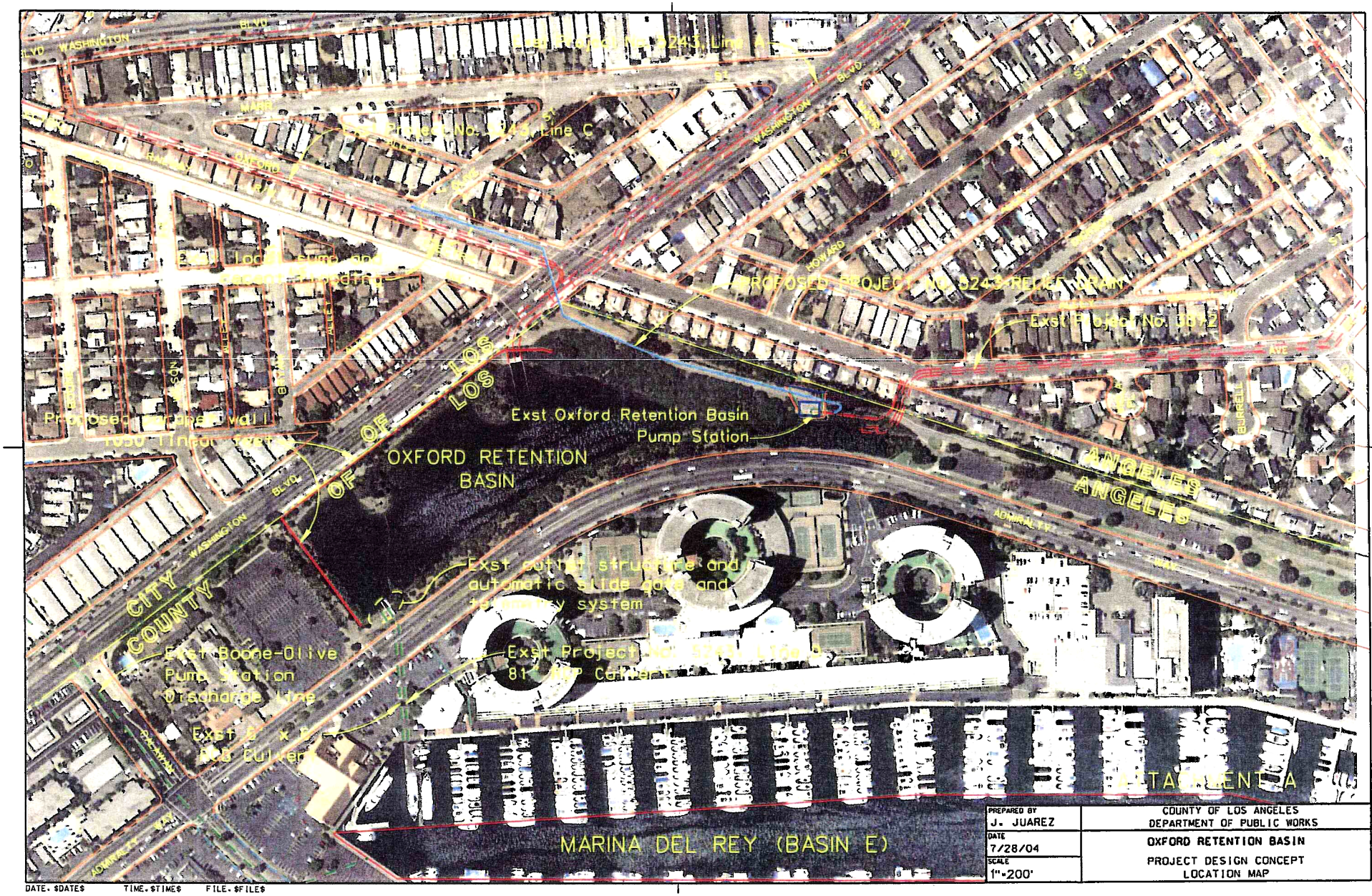
_____ _____

Julian G. Juarez, Drainage Section I — Date
Report Prepared by Javier Robles

JGJ:sn
D-2\P:\DDPUB\DRAINAGE\PDC-D1\OXFORD-FCC898-FINAL

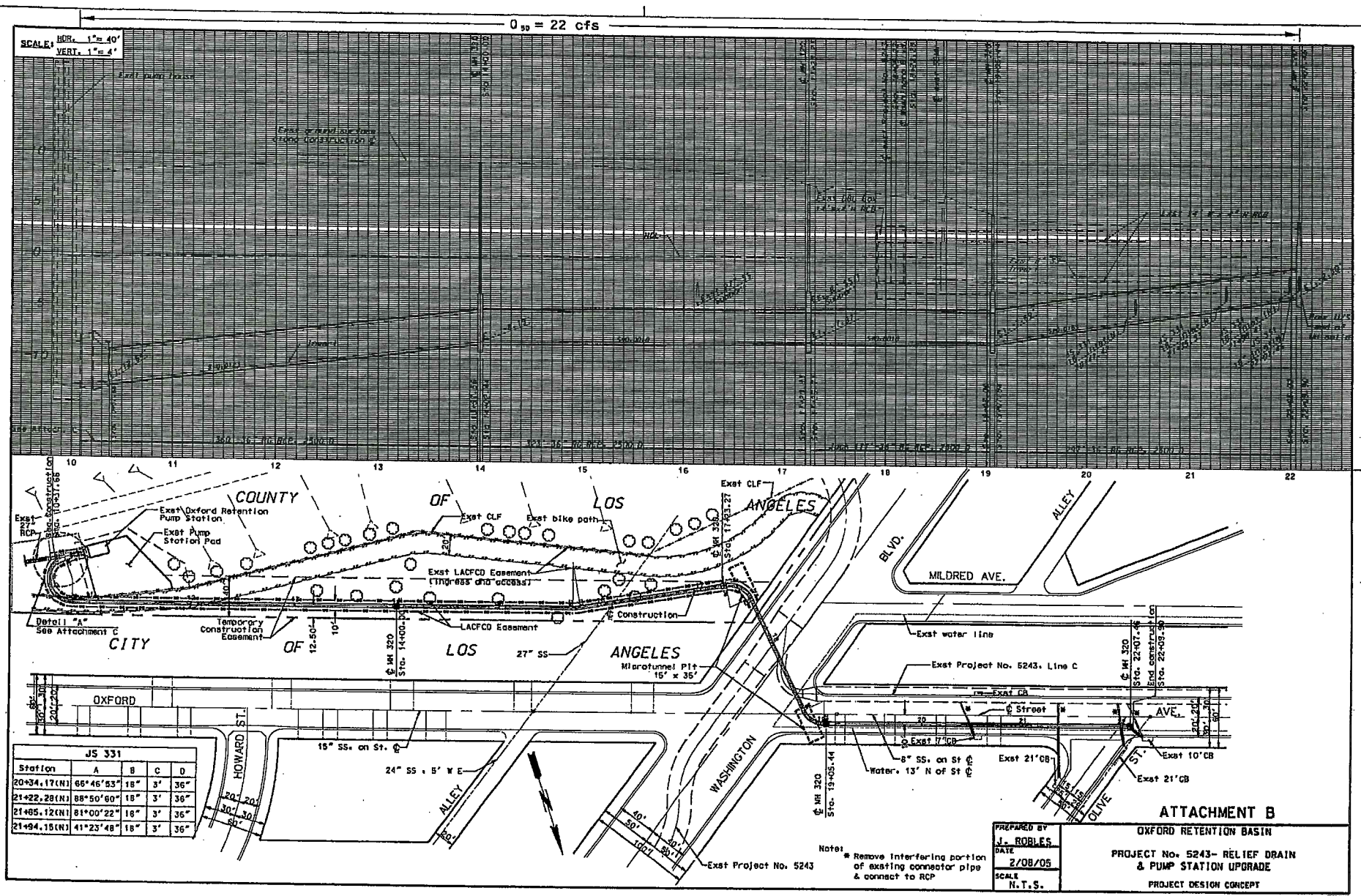
Attach.
cc: Flood Maintenance (South)
Geotechnical and Materials Engineering
Mapping & Property Management

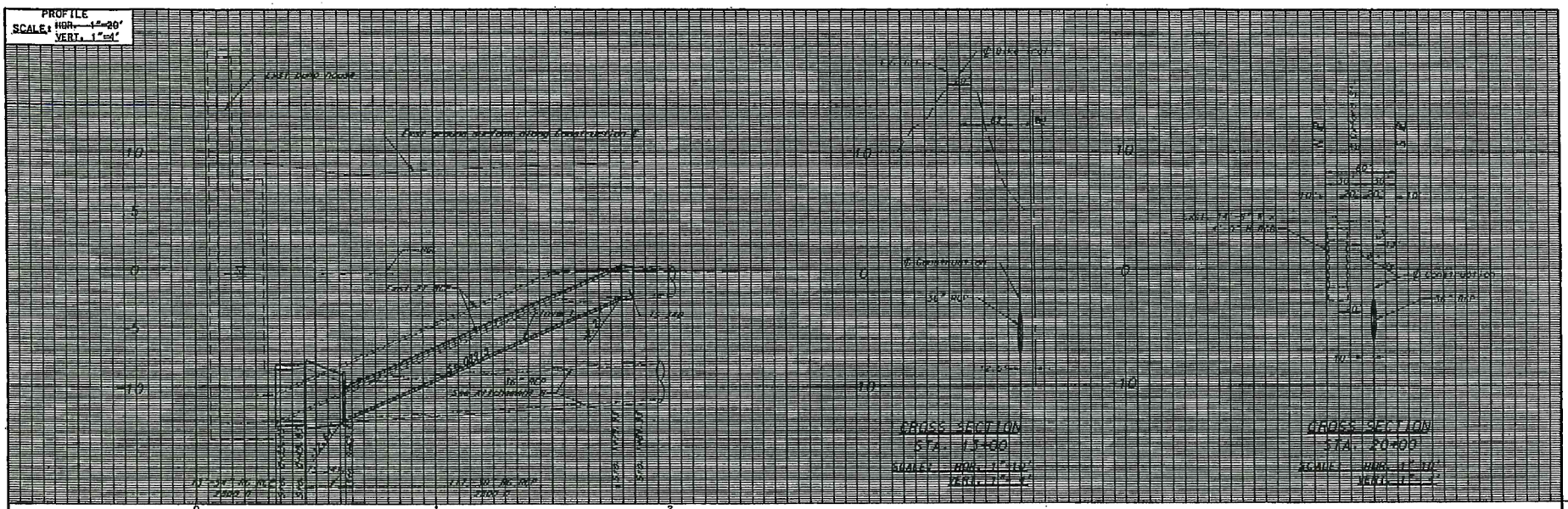
Operational Services
Programs Development (Shih)
Road Maintenance (MD 3)
Water Resources (Nasseri)
Watershed Management
Design (Soliman, Thurow, Chang)

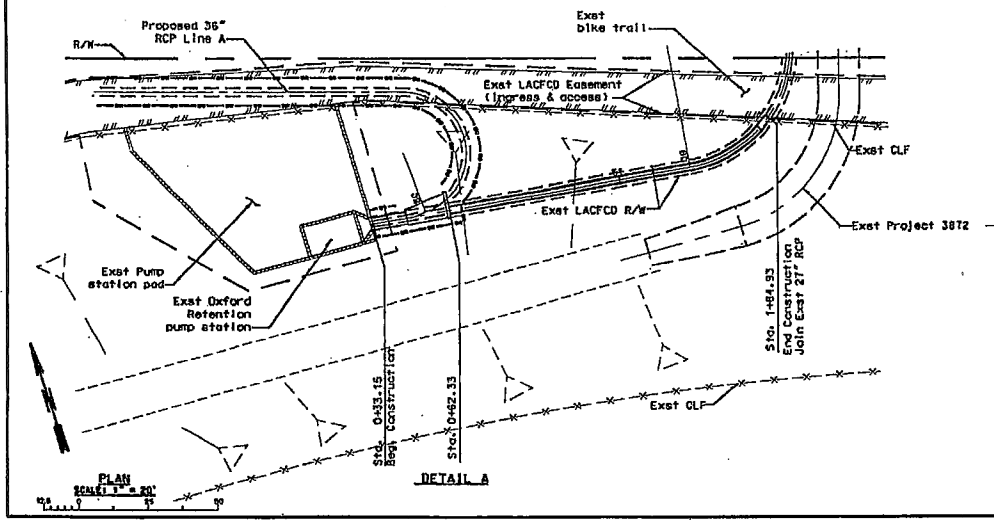


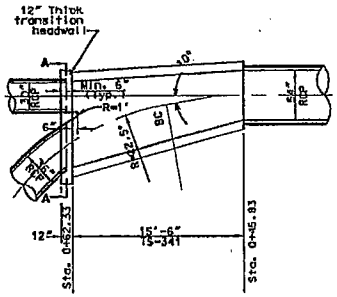
PREPARED BY J. JUAREZ	COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS
DATE 7/28/04	OXFORD RETENTION BASIN
SCALE 1"=200'	PROJECT DESIGN CONCEPT LOCATION MAP

DATE. $DATE$ TIME. $TIME$ FILE. $FILE$

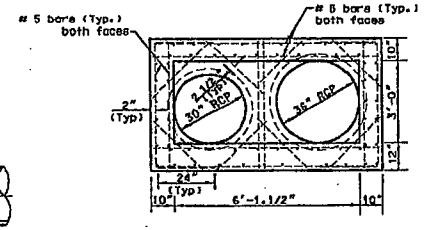

Q_{50} = 22 cfs
SCALE: HOR. 1"= 40'
VERT. 1"= 4'
COUNTY OF LOS ANGELES
CITY OF LOS ANGELES
Exist Oxford Retention Pump Station
Exist Pump Station Pad
Exist RCP
Exist CLF
Exist bike path
Exist LACFCD Easement (ingress and access)
LACFCD Easement
Temporary Construction Easement
Detail "A" See Attachment C
℄ Construction
℄ MH 320 Sta. 14+00.00
℄ MH 320 Sta. 17+93.27
℄ MH 320 Sta. 22+07.46
End construction Sta. 22+09.50
27" SS
Microtunnel Pit 15' x 35'
Exist water line
Exist Project No. 5243, Line C
Exist CB
℄ Street
Exist 17"CB
Exist 21"CB
Exist 10"CB
8" SS. on St ℄
Water. 13' N of St ℄
℄ MH 320 Sta. 19+05.44
15" SS. on St. ℄
24" SS . 5' W E
Exist Project No. 5243
MILDRED AVE.
BLVD.
ALLEY
OXFORD
HOWARD ST.
WASHINGTON
OLIVE ST.
AVE.
12.50'
10'
20'
40'
50'
100'
JS 331
Station | A | B | C | D
20+34.17(N) | 65°46'53" | 18" | 3' | 36"
21+22.28(N) | 88°50'60" | 18" | 3' | 36"
21+65.12(N) | 81°00'22" | 18" | 3' | 36"
21+94.15(N) | 41°23'48" | 18" | 3' | 36"
Note:
* Remove interfering portion of exsting connector pipe & connect to RCP
ATTACHMENT B
PREPARED BY J. ROBLES
DATE 2/08/05
SCALE N.T.S.
OXFORD RETENTION BASIN
PROJECT No. 5243- RELIEF DRAIN & PUMP STATION UPGRADE
PROJECT DESIGN CONCEPT







TRANSITION STRUCTURE 341 DETAIL
SCALE: 1"= 5'



SECTION A-A
SCALE: 1"=2'

ATTACHMENT C

PREPARED BY	J. ROBLES
DATE	2/08/05
SCALE	

OXFORD RETENTION BASIN

PROJECT No. 5243- RELIEF DRAIN & PUMP STATION UPGRADE

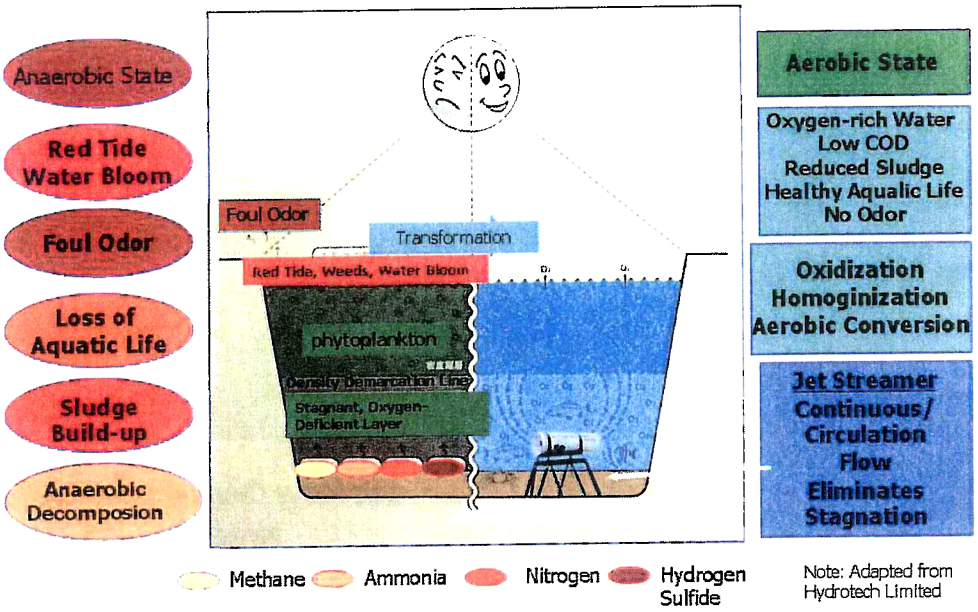
PROJECT DESIGN CONCEPT

ATTACHMENT C

Jet Streamer
by
Marine Techno Research and
Hydrotech Limited

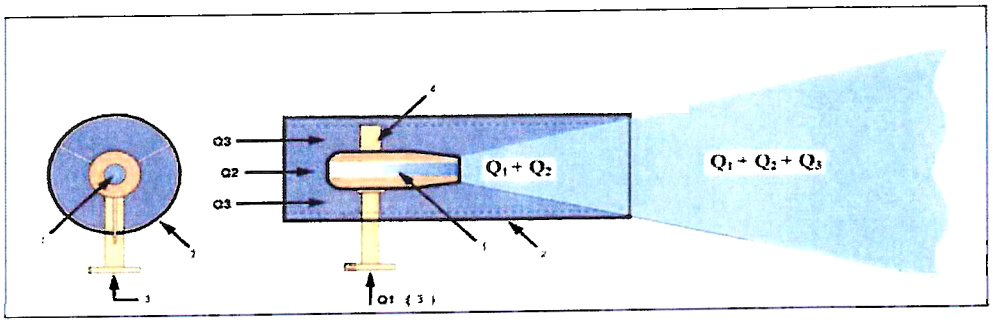
Jet Streamer System by Hydrotech Limited, Redondo Beach California

Principle of Water Rejuvenation



Note: Adapted from Hydrotech Limited

Principle of Jet Flow Generation



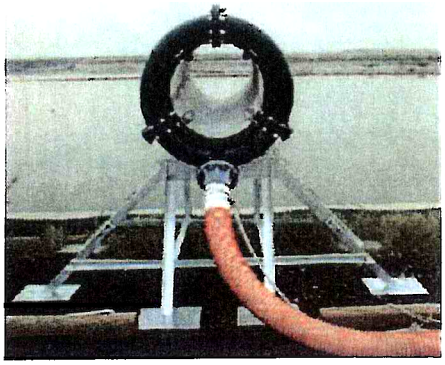
- Pump drives oxygen rich water (Q1) to Jet Flow generator (1). Q1 then pulls water (Q2) into inlet in (1) which in turn pulls surrounding water (Q3) into the Duct Housing (2), forming non-axial, Jet Flow.

Note: Adapted from Hydrotech Limited

Jet Streamer System by Hydrotech Limited, Redondo Beach California

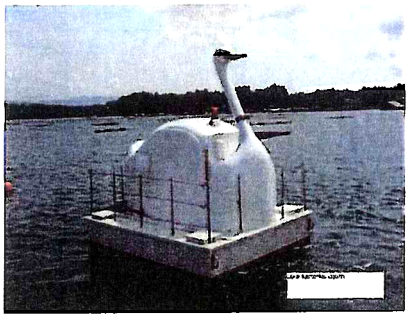
Two Designs

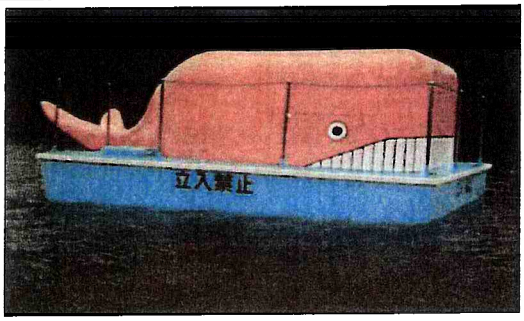
Jet Flow Generator with Nozzle in the Center of the Outer Duct



Jet Flow Generator with Nozzles Mounted in Annular Fashion

Floating Platform

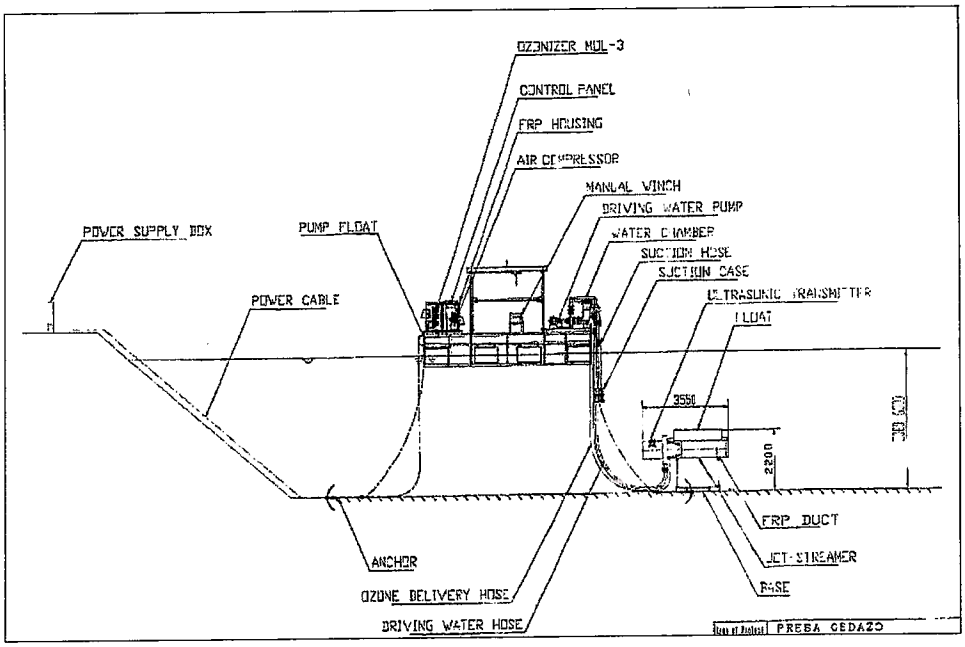


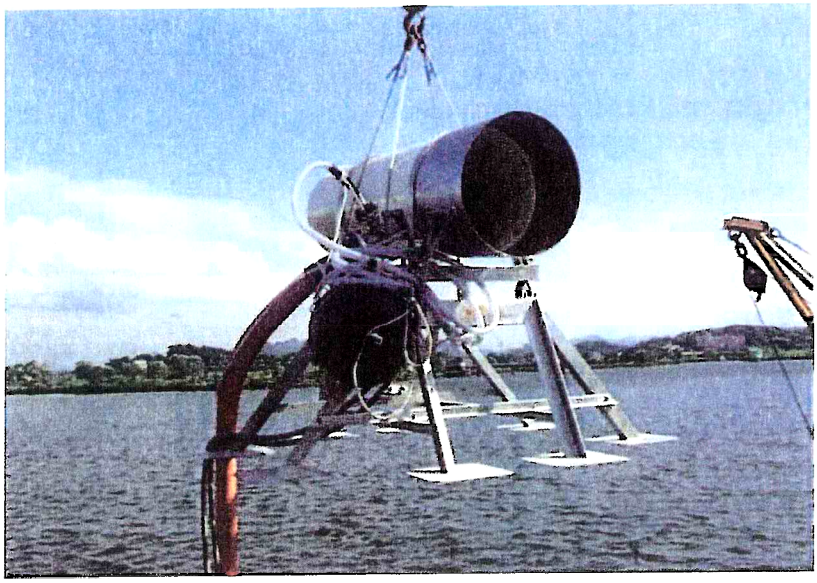


Platform can be custom designed for aesthetic appeal

Jet Streamer System by Hydrotech Limited, Redondo Beach California

Schematic of Instrumentation for land (shallow water application)





Jet Streamer System by Hydrotech Limited, Redondo Beach California

Problems with Current Technology

Chemical Treatment

- Needs repeated applications, high maintenance
- Can harm eco-system
- Doesn't address stagnation

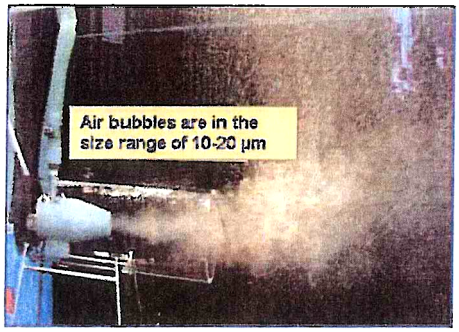
Propeller-Driven Aerators

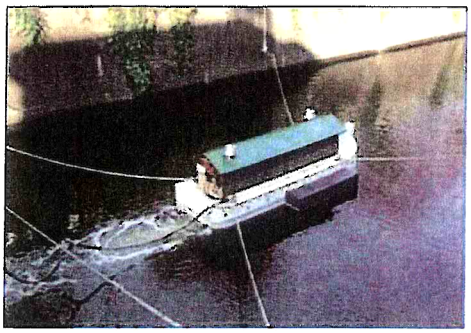
- Dangerous to aquatic life
- High maintenance costs
- Also doesn't address stagnation

- Direct Application Pumps do not mix the bulk of the water limiting water improvement
- Fountains and Paddles only effect surface water leaving lower strata unchanged

The Jet Streamer

- Only maintenance required is replacing parts (Flood Maintenance Division can perform labor)
- Does not add anything harmful to the eco-system
- Continuous recirculation of entire body of water

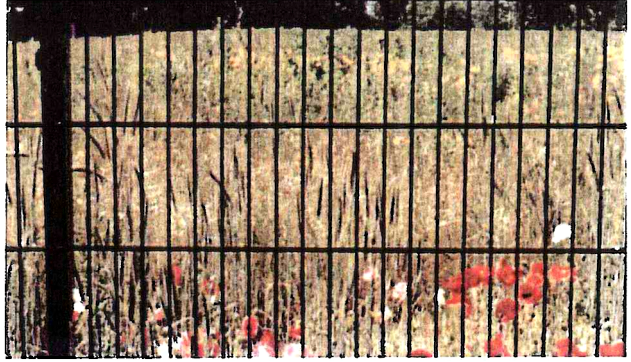




- No moving parts underwater
- Entrains more than 20 times the volume of water compared to a normal pump system

ATTACHMENT D

Fencing and Landscaping
Example Photos



Various Landscaping Plants and Shrubs for Oxford Detention Basin

Abronia

Eschscholzia californica

beach evening primrose

verben

deer grass

california sycamore

ATTACHMENT E

Economic Analysis
and
Construction Schedule

OXFORD RETENTION BASIN
MULTIUSE FLOOD PROTECTION ENHANCEMENT PROJECT

Economic Analysis

	Cost for Oxford Basin Flood Control	Cost for Project No. 5243 - Relief Drain and Oxford Pump Plant Upgrade	Cost for Oxford Basin Water Quality Enhancement	Cost for Oxford Basin Multiuse Enhancement	Total
Project Concept Report and Conceptual Design	$100,000	$100,000		$100,000	$300,000
Final Design	$400,000	$800,000	$30,000	$600,000	$1,830,000
Project Management and Permitting	$500,000	$50,000	$20,000	$100,000	$670,000
Construction Engineering	$200,000	$250,000	$10,000	$400,000	$860,000
Construction	$3,800,000	$2,400,000	$40,000	$2,900,000	$9,140,000
Water and Sediment Quality Analysis Study			$200,000		$200,000
Water Quality BMP – Jet Streamer			$500,000		$500,000
TOTAL	**$5,000,000**	**$3,600,000**	**$800,000**	**$4,100,000**	**$13,500,000**

Construction Schedule

Schedule

Project Concept Report	September 2008
Project Design Concept	October 2009
Design and Permitting	October 2010
Award Construction Contract	February 2011
Construction Start	May 2011
Construction Completion	**May 2012**

Biological Evaluation of Oxford Basin Marina del Rey, Los Angeles County, California November 22, 2010

Prepared By

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Hamilton Biological, Inc.

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Alhambra, CA 91803

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EXECUTIVE SUMMARY

Completed in the early 1960s in conjunction with the creation of Marina del Rey, the Oxford Storm Water Retention Basin (hereafter "Oxford Basin" or the "Basin") was designed to receive storm runoff from the surrounding urban landscape and to release that water into Marina del Rey, thereby avoiding inundation of low-lying neighborhoods in the Venice area. During the past decade, various species of herons and egrets have become increasingly common as breeders in Marina del Rey's non-native landscaping, and a recent marina-wide review of biological resources (Hamilton and Cooper 2010) identified Oxford Basin as the most important foraging and roosting habitat in the local area for Great Egrets (*Ardea alba*), Snowy Egrets (*Egretta thula*), and Black-crowned Night-Herons (*Nycticorax nycticorax*).

The current biological evaluation is being undertaken as part of ongoing planning by the County Department of Public Works to increase the Basin's effectiveness as a flood control facility, to improve its ecological functions and values, and to increase the area's aesthetic and recreational values. This is the first in-depth investigation of Oxford Basin since 1980, and the first such effort undertaken by a multidisciplinary team of specialists:

- David E. Bramlet: Botany, Plant Community Descriptions and Mapping; Wetland Delineation.
- Emile Fiesler: Entomology.
- Camm C. Swift and Joel Mulder: Ichthyology/Estuarine Biology.
- Daniel S. Cooper and Robert A. Hamilton: Ornithology/Terrestrial Vertebrates.

As Oxford Basin serves a critical flood protection role for the surrounding community, all proposed enhancements and policies for the Basin must be consistent with the operation and maintenance needs of the Los Angeles County Flood Control District (LACFCD). Although the flood-control imperative imposes certain constraints upon any effort to increase the Basin's ecological values, this report identifies numerous conservation strategies that could potentially be undertaken within those constraints that would be expected to improve the Basin's ecological functions and values.

1.0 INTRODUCTION & PURPOSE

1.1 Introduction

The County of Los Angeles (County) commissioned Robert A. Hamilton, president of Hamilton Biological, Inc., to prepare this biological evaluation of the Oxford Storm Water Retention Basin (hereafter "Oxford Basin" or the "Basin"; Figures 1-1, 1-2). The Basin was built during the late 1950s and early 1960s. It was designed to receive storm runoff from the surrounding urban landscape and to release that water into Marina del Rey, thereby avoiding inundation of low-lying neighborhoods in the Venice area. In June 1973, the Board adopted an agreement providing for the Los Angeles County Flood Control District (LACFCD) to assume the responsibility for the operation and maintenance of Oxford Basin as a flood control facility.

Historical information on Oxford Basin (also known as "Parcel P") was provided in a Draft Environmental Impact Report prepared for a then-proposed Japanese garden at the Basin (County of Los Angeles 1976:2; see Attachment D, appendix):

> At the time the Oxford Drainage Basin was constructed, various naturalist organizations requested that the Board of Supervisors set aside this parcel as a wildlife sanctuary, particularly for birds. In January, 1963, the Board designated Parcel P as the Bird Conservation Area. Plant materials were selected and planted to afford nesting, roosting and feeding capabilities. A band of dense shrubbery was planted along the periphery fence to afford privacy and minimize the impact of nearby streets and activity areas. A few years later, about 1965, fill was imported to construct a mound along the northeasterly property line and the area replanted and irrigated in an effort to further improve the habitat.

The "Bird Conservation Area" designation was not based on any study or plan, or in conformance to an existing land-use policy, and was unaccompanied by a formal management plan or other guidelines for ecological restoration (such plans generally did not exist for these types of "urban habitat areas" during that era). The above-described efforts toward creating bird habitat are not consistent with modern understandings of conservation biology principles.

The most thorough study of Oxford Basin's ecology prior to the current study was completed in 1980 by D. W. Schreiber and C. F. Dock, and their report is reproduced here in the appendix to Attachment D. Those authors concluded:

> . . . this area is not important as habitat for wild birds in the Los Angeles basin. While it serves as "green belt" space and as an area for a limited but important number of people to enjoy seeing and enjoying domestic ducks, the area serves little or no purpose as a conservation area for a viable population of migratory or resident wild species. Because of its limited size and relative isolation, we believe that any efforts at habitat modification would have little or no effect at increasing the wild avian populations in the region.

> Certain modifications could make it more conducive for the domestic animals and as green space (Schreiber and Dock 1980:2).

They recommended two potential options for management of the Basin. Option 1, "Leave the area essentially unchanged," reflects a common line of thinking among biologists and land managers 30 years ago, when small parks and other wildlife habitat areas surrounded by urbanization were routinely considered to have little potential conservation value (unlike today, when such areas are more highly valued for the habitat values they can provide to adaptable native species in a region where nearly all natural habitats are developed or highly disturbed). Schreiber and Dock noted:

> The domestic waterfowl currently present in the area are of interest to many people who live in the surrounding community. These birds subsist largely on "handouts" from interested citizens who regularly visit the site. In this regard, the Bird Conservation Area is of some recreational value to the human community. A regular schedule of maintenance which would improve the aesthetic appeal of the area would undoubtedly be appreciated. This has been suggested by some of the local citizenry encountered during the study. In addition, stations might be created that would allow more efficient feeding of the birds and would allow better observation of the birds (Schreiber and Dock (1980:25).

It is impossible to know the exact circumstances that led these biologists to recommend the establishment of feeding stations for domestic waterfowl, but it may be that they were attempting to make the best of a situation in which a more costly, ambitious, and controversial habitat restoration alternative was unlikely to be pursued. Nevertheless, their report did include Option 2, which was recommended "if a substantial effort is to be made to improve the current Bird Conservation Area in terms of its use by wild birds . . ." Option 2 involved the following:

> 1) Clear the area of introduced vegetation and replant with native species. This would mean an attempt to essentially reestablish a coastal scrub community on the grounds of the Bird Conservation Area. Such a program would improve the aesthetic appeal of the conservation area and could have an important educational value to the human community if information concerning the vegetation were made available to the public. Signs could be erected providing the names of the plants and historical and ecological facts pertaining to the species and coastal scrub communities in general. Such restoration measures concerning the vegetation would be likely to attract larger numbers of migrating and wintering songbirds.
>
> 2) Remove the resident domestic waterfowl and gallinaceous birds that currently inhabit the area in large numbers. Such a move might lessen the competition for space and food resources and lead to an increase in the number of wild birds. Removing domestics would also decrease the degradation of ground cover currently seen at the area. Benefits of such action must, however, be weighed against potential costs. As previously mentioned, there is considerable interest in the resident waterfowl populations among local people, many of whom would be displeased by any efforts to eliminate these "pets." Removal of the chickens and other domestic fowl would probably not be opposed and should lead to an

> increase in ground cover which could improve the habitat for terrestrial migrants.
>
> 3) Increase the extent of available mudflat habitat. This would have the potential of increasing the number of shorebirds, gulls and terns using the Bird Conservation Area. Such change could be accomplished by grading the intertidal zone to create a more gradual shoreline around the pond. Any such effort would probably have to be accompanied by dredging of the deeper regions of the pond to maintain the potential water volume of the area for flood control purposes. An alternative, or additional step, would be to create a series of small mudflat islands within the pond itself. This could be preferable to the aforementioned approach, as it would provide greater isolation from human disturbance for any birds using this habitat, and might actually make them easier to observe by interested bird watchers.
>
> 4) Regulate water quality within the pond. Pollution levels within the pond should be monitored and controlled, and the variability of salinity should be regulated to permit further development of the invertebrate community of the mudflats. The invertebrates provide food for most of the shorebirds and some of the duck species found on the area.
>
> We must emphasize that the suggestions given above are a brief outline, and we are more than willing to discuss these factors further. However, we firmly believe that it is a real gamble whether or not this "Bird Conservation Area" can actually be improved as a wild bird habitat, no matter how much funds are expanded [*sic*]. No question exists that it can be improved as a "green belt" and as an area for people to enjoy the presence of and feeding of domestic ducks, but schemes to attract a large wild bird population probably will be fruitless.

Ultimately, the County chose to eliminate the domestic waterfowl and chickens, and to continue operating Oxford Basin as a flood control facility (without attempting to improve the area for human recreational use or as a habitat for native birds or other wildlife). As discussed herein, use of Oxford Basin by wild birds has shifted considerably during the past 30 years, with some species dropping out entirely and others becoming newly established. Although it is still fair to conclude, as Schreiber and Dock did, that the Basin does not provide wildlife habitat of regional importance, it is one of very few areas with open water, mudflat, and brackish marsh in the west Los Angeles area, and Oxford Basin has come to serve as an important foraging area for herons and egrets that now maintain sizable nesting colonies along Admiralty Way (Hamilton and Cooper 2010). In this respect, the Basin provides habitat of much greater value to native bird populations than had been envisioned by Schreiber and Dock three decades ago.

This is the first in-depth biological investigation of Oxford Basin since 1980, and the first such effort undertaken by a multidisciplinary team of specialists:

- David E. Bramlet: Botany, Plant Community Descriptions and Mapping; Wetland Delineation.
- Emile Fiesler: Entomology.

- Camm C. Swift and Joel Mulder: Ichthyology/Estuarine Biology.
- Daniel S. Cooper and Robert A. Hamilton: Ornithology/Terrestrial Vertebrates.

Attachments A–E to this report provide stand-alone technical reports representing each of these disciplines. Please refer to these reports for more detailed discussions of the biological resources present, or potentially present, at Oxford Basin. Attachment F provides Curricula Vitae for each of the specialists named above.

1.2 Purpose

This biological evaluation is being undertaken as part of ongoing planning by the County Department of Public Works to increase the Basin's effectiveness as a flood control facility, to improve its ecological functions and values, and to increase the area's aesthetic and recreational values. Oxford Basin serves a critical flood protection role for the surrounding community, and so all proposed enhancements and policies must be consistent with the operation and maintenance needs of the LACFCD. The primary purpose of this study was to develop a baseline inventory of the plant and wildlife resources present at Oxford Basin prior to developing final plans for the area's renovation. The surveys were therefore designed to sample at different times of year, as necessary to capture seasonal variation in plant and wildlife detectability.

The surveys were also designed to detect any listed or otherwise "special status" species that might be present. This summary report includes a section on the special status species observed at Oxford Basin, or that have moderate or high potential to occur there; the technical reports cover some additional special status species that are deemed absent from the site, or that have only low potential to occur there.

Finally, the specialists in each discipline identified restoration and conservation strategies that may be pursued (within the constraints posed by flood-control imperatives) to improve Oxford Basin's ecological functions and values.

Figure 1-1. Oxford Basin is located along the northern boundary of Marina del Rey, on the central coast of Los Angeles County. The Basin is surrounded by urban areas, but has relative proximity to a few natural areas. The site is approximately 1.5 miles northwest of the Ballona Wetlands, three miles northwest of the El Segundo Dunes remnant, west of Los Angeles International Airport, six miles southeast of the Santa Monica Mountains, and 13 miles north of the Palos Verdes Peninsula.

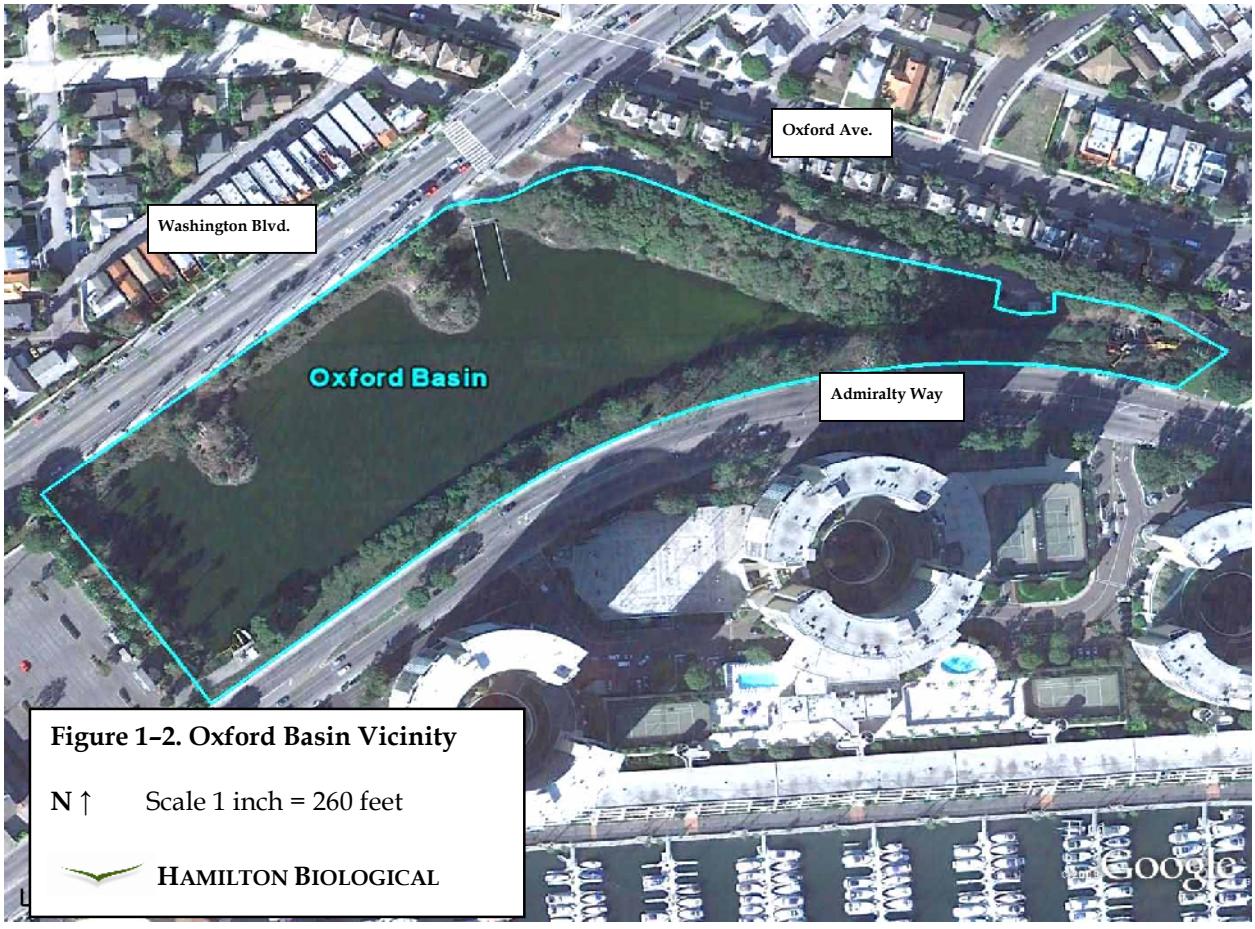


Figure 1–2. Oxford Basin Vicinity. The study area for this project, including the Basin and surrounding uplands within the blue line, covers approximately 9.0 acres. This area is bounded on the north by Washington Boulevard and Oxford Avenue and on the south by Admiralty Way. A County parking lot borders on the west and Yvonne B. Burke Park lies to the east.

2.0 METHODS

Each specialist was tasked with developing a scope of work necessary to adequately characterize the biological resources of Oxford Basin within their respective fields of study, and to search for any "special status" with potential to occur in the habitats present at the Basin. Another goal of the studies was to develop recommendations for ways to increase the Basin's ecological values (as feasible, given flood control requirements). As summarized in Table A, below, field work was completed between September 23, 2009, and June 12, 2010.

TABLE 2–1: SUMMARY OF FIELD SURVEYS

	Survey Type				
Date	Wetland Delineation	Botanical; Vegetation Mapping	Insects	Fish and Estuarine	Birds and Terrestrial Vertebrates
September 23, 2009			√		√
September 24, 2009			√		
October 23, 2009					√
November 20, 2009					√
December 23, 2009					√
January 12, 2010		√	√	√	√
February 24, 2010					√
March 25, 2010					√
March 29, 2010		√			
April 22, 2010		√			
April 27, 2010				√	√
May 7, 2010			√		
May 13, 2010		√			
May 24, 2010			√		
June 12, 2010	√				

For the study of birds and terrestrial vertebrates, Daniel S. Cooper developed the scope of work, served as lead investigator, and authored the technical report, with assistance from Robert A. Hamilton. During 2009 and 2010, Hamilton and Cooper collaborated on preparation of a Conservation and Management Plan for Marina del Rey (current draft dated September 16, 2010), a project that involved 19 visits to Oxford Basin during spring and summer 2009, primarily to document use of the Basin by foraging herons and egrets.

Please refer to the individual technical reports (Attachments A–E) for details of the dates, times, and methods used to conduct each survey undertaken by the different specialists.

3.0 SETTING

Figures 3–1 and 3–2, below, are representative views of Oxford Basin during periods of low and high water levels.

Figure 3–1. Photo showing Oxford Basin during a draw-down period on May 28, 2010. The view is to the southwest, from the northern shore, with the tide-gate visible on the far side of the open water. *Daniel S. Cooper.*

Figure 3–2. Photo showing Oxford Basin during a period of high water on September 23, 2009. The view is to the west, from the northern shore of the Basin. *Robert A. Hamilton*.

3.1 Overview

Oxford Basin, a relict of the larger Ballona/Venice marshes, was constructed in the late 1950s and early 1960s. The Basin is surrounded by elevated roadways, a parking lot, and trees along the roadway edges. Together, these extend upward to 10-15 m above the water level and shield the water's surface from wind action. Surrounding high rise

buildings and apartments along the northeast border also shelter the area from wind. Oxford Basin's purpose is to "receive storm runoff at such times as the state of the tide within the [Marina del Rey] harbor precluded its discharge causing inundation of the low-lying lands adjacent to the north section of the harbor" (County of Los Angeles 1976). The Basin's slopes were landscaped extensively with non-native trees and shrubs, and the area has never been formally managed for wildlife. By the early 1970s Oxford Basin had become a popular dumping ground for unwanted pets, including rabbits and chickens. This situation was partially remedied in the 1990s by the construction of a taller fence surrounding the site, making it more difficult to toss pets inside. Public access has since been restricted, and the area has been managed strictly for flood-control and water quality purposes.

3.2 Hydrology

Oxford Basin is fed by two (freshwater) storm drain inlets along the northeastern and southeastern ends, as well as a tidal gate at the western end that provides limited flushing. The Basin was not designed to drain completely. Water depths within the Basin fluctuate with natural tidal fluctuations in Marina del Rey, but the inflow and outflow to the Basin is controlled by a set of tide-gates at the southwestern corner of the Basin. The elevation of high tide is currently allowed to rise by no more than approximately 1.5 m (4.8 feet) above mean low water (Mike Stephenson, Los Angeles Department of Public Works, January 12, 2010, pers. comm. to Camm Swift). As a result, water depths in the Basin during 2009 and 2010 were greatest at or shortly after high tide, with a maximum depth of approximately 2 m (6.6 feet) in a localized area near the tide-gate. Depths are generally shallower throughout the remainder of the Basin. Approximately one-half of the Basin bottom substrate became exposed at low tide. The tide-gates are occasionally shut to prevent any tidal fluctuation, such as following low tides before predicted rain storms, in order to increase the Basin's capacity for storm runoff.

As of April 27, 2010, a low flow diversion structure had been installed at the north-eastern inlet. This structure consists of a concrete box that collects street runoff and periodically pumps it into the sewer system rather than allowing the potentially contaminated water to flow into the Basin. The structure includes overflow inlets to allow high storm flows to pass in the Basin.

Camm Swift and Joel Mulder (Entrix 2010; see Attachment C) described patterns of water movement in the Basin during their two field surveys:

> At high and low tides, very little flow was present in most of the Basin although some surge was observed coming through the mouth of the tide-gates. This caused a slow back and forth flow near the mouth and within about 30 m of either side of the gates, as well as some small wave action against the opposite shore. When the gates were opened with a strong difference in tidal levels between Oxford Basin and the Basin E of Marina del Rey, stronger flows occurred. During strong incoming flows on April 27, a circular

> current existed in the western portion of the Basin which caused masses of green algae to float in a broad circular track across the water surface. This current, however, is likely an infrequent event and typically the tidal flow would be much slower over the 4–6 hour duration between high and low tides. These observed currents were with one tide-gate open and possibly even stronger flows can occur under certain circumstances with both tide-gates open.

3.3 Soils

The Natural Resources Conservation Service did not prepare a published soil survey for this area of Los Angeles County, and no information on the soils in the study area was located in the literature review for this study. A study by Glenn Lukos Associates (2006) mentioned a published soil map for the region, but this could not be located in the material examined for this project.

Swift and Mulder (Entrix 2010; see Attachment C) described the soils in the inundated portion of the Basin as follows:

> Substrate within the Basin on both survey dates was predominately comprised of firm to soft mud/silt. Some small areas of fine sand existed near the tide gates where the strength of the inflowing and outflowing tidal currents presumably prevents deposition of finer substrate. The majority of the Basin banks were steep to gentle earthen slopes . . . At lower tides, bare, firm to soft mud/silt was exposed between the water's edge and the [lower edge of marsh vegetation]. The steeper south side of the Basin and eastern one third or so of the north side had approximately 1-3 m of bottom substrate exposed at low tide. The western two-thirds of the north side became much more exposed at low tide, with 5 to 20 m of gently sloping mudflats becoming exposed. Near the tide-gates and the eastern inlet, patches of concrete debris and boulders were present. A few logs were also observed floating in the water. These hard substrates supported barnacles and a small number of mussels existed near and on the tide-gate structures.

David Bramlet (2010b; see Attachment E) described the soils higher up, on the slopes above the Basin:

> Overall, the soils in the areas above the Basin tend to be sandy loams, commonly observed in southern California. The Basin itself has been filled with a silty clay and areas of loamy sands.
>
> The observations from the soil pits, conducted at each sample point, noted strong indicators of hydric soils within the tidal zone. These included extensive mottling, low chroma, stratified layers, and gleyed matrix within these soils. Depleted matrix conditions with oxidized rhizospheres or less extensive mottling, along with some low chroma soils, were observed in the soils found near the margin of the mean high tide elevation. Hydric soils were not found in areas that apparently are inundated by occasional very high tides or winter flooding events, as evidenced by drift deposits.

3.4 Plant Communities

As described by Bramlet (2010a; see Attachment A), Oxford Basin is generally characterized by open water, with wetland and upland communities occurring along the margins of this Basin. Plant communities/mapping units include open water, mud flats, saltmarsh, annual grassland, ornamental plantings and ruderal areas (Figures 3–3a, 3–3b). Plant species observed on the project site are specified in Attachment A.

OPEN WATER

Oxford Basin is characterized by open water that generally has a high salinity. This open water characteristically has blooms of dense mats of algae, but no vascular plants occur in the fluctuating waters of the Basin.

MUD FLATS

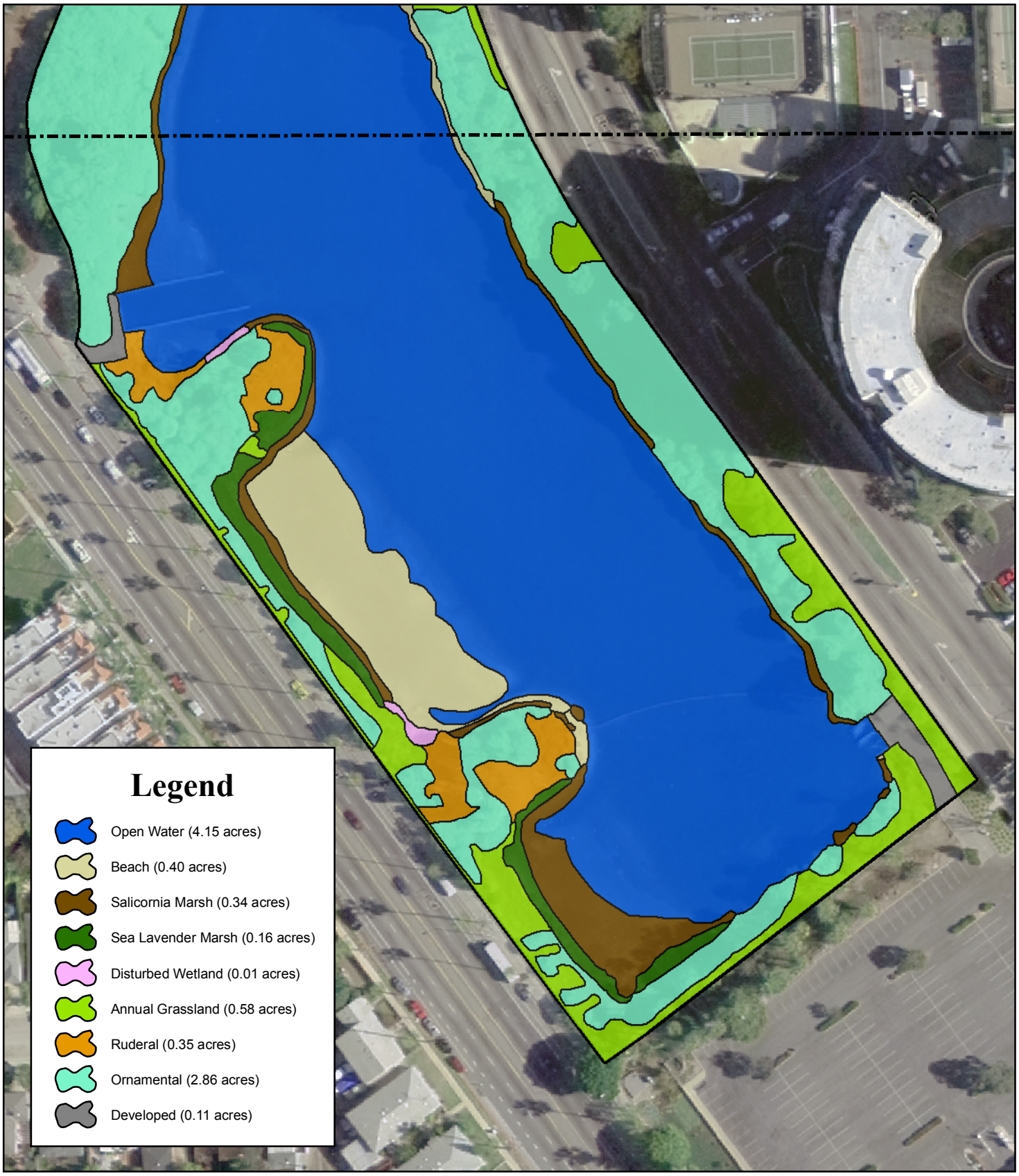
Mud flats are exposed during normal tidal fluctuations, and are generally unvegetated, although some of the higher areas do support common woody pickleweed (*Salicornia virginica*) during the summer months. The total area of exposed mud flats can fluctuate greatly depending on management actions. In particular, Oxford Basin can be pumped out in anticipation of winter storms, exposing additional areas within the Basin, and the Basin can be allowed to fill with storm waters when the tidal gates are closed, leaving no mud flats exposed.

BEACH

These unvegetated areas of Oxford Basin have a similar substrate to the mud flats but are dry and generally unvegetated, as they are inundated only by the highest tides or during heavy rainfall. However, some beach areas may develop stands of common woody pickleweed during the summer months.

SALICORNIA MARSH

Except near the inlet area at the east end, Oxford Basin supports a "ring" of saltmarsh-like vegetation along the upper tidal edge. This vegetation generally consists of a lower stratum dominated by common woody pickleweed; other commonly found species consisted of spearscale (*Atriplex prostrata*), rabbit's foot grass (*Polypogon monspeliensis*), saltmarsh sand spurry (*Spergularia marina*), toad rush (*Juncus bufonius*), alkali heliotrope (*Heliotropium curassavicum*), scarlet pimpernel (*Anagallis arvensis*), alkali weed (*Cressa truxillensis*), slender-leaved cat-tail (*Typha domingensis*), and lesser wart-cress (*Lepidium didymum*). This marsh area also included some localities with dense stands of spearscale, along with some scattered common woody pickleweed.



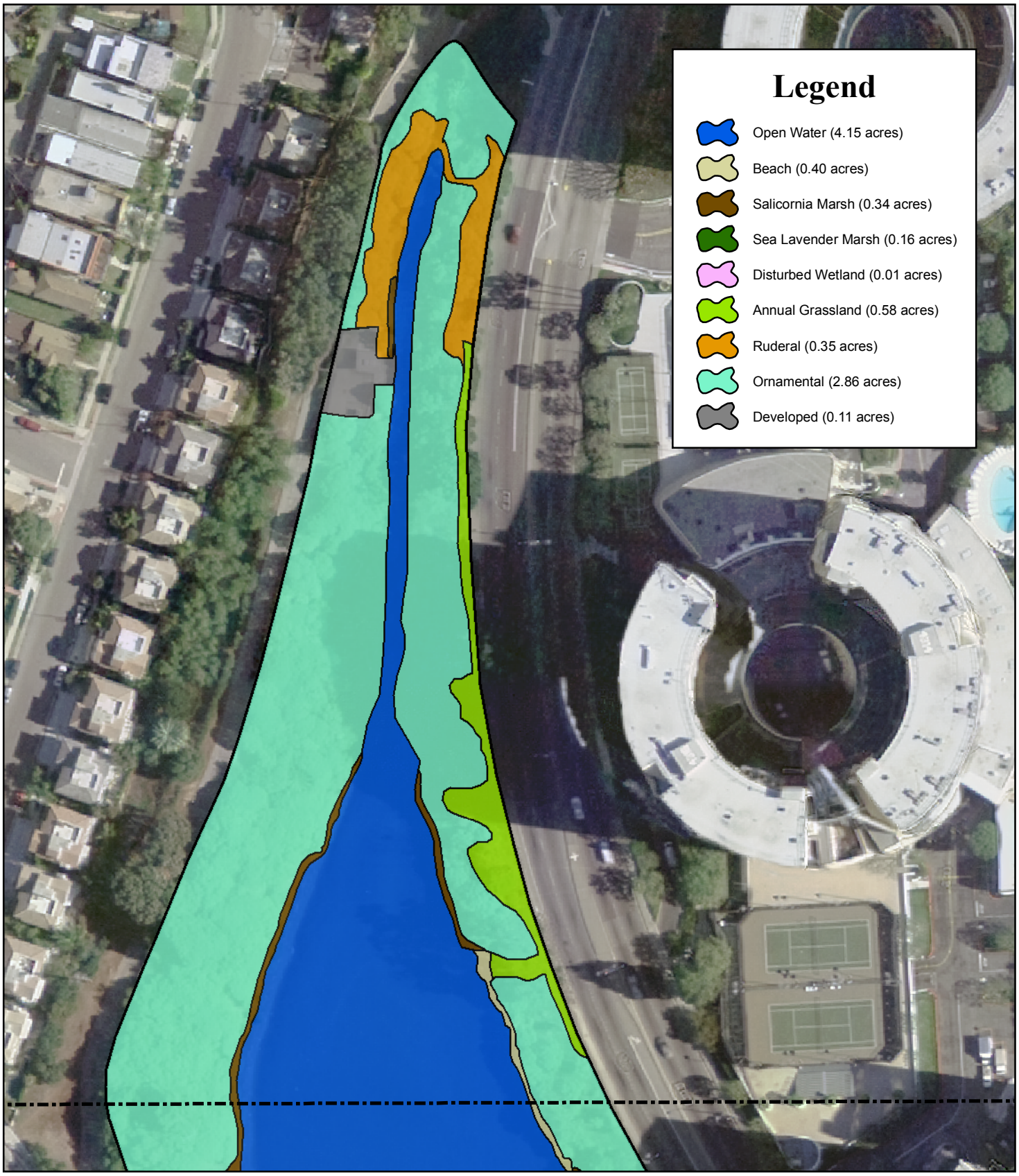
Site area: 8.94 acres

0 100 200 Feet

Figure 3-3a

Plant Communities

of the Oxford Basin



Site area: 8.94 acres

0 100 200 Feet

Figure 3-3b

Plant Communities

of the Oxford Basin

SEA LAVENDER MARSH

At Oxford Basin, this community occurs at a slightly higher elevation than does Salicornia Marsh. Sea Lavender Marsh is characterized by dense mounds of Perez's sea lavender (*Limonium perezii*), and on the south side of the Basin this species occurs together with tall limonium (*Limonium arborescens*). Other species found in this community include saltmarsh sand spurry, alkali heliotrope, curly dock (*Rumex crispus*), yellow sweet clover (*Melilotus indicus*), garden beet (*Beta vulgaris*), kikuyu grass (*Pennisetum clandestinum*), prickly lettuce (*Lactuca serriola*), and Australian saltbush (*Atriplex semibaccata*).

DISTURBED WETLAND

Some small areas along the margins of Oxford Basin that did not appear to be part of the saltmarsh community were classified as "disturbed wetland." These small areas consisted of stands of rabbit's foot grass, spearscale, Mexican tea (*Dysphania ambrosioides*), crab grass (*Digitaria sanguinalis*), Boccone's sand spurry (*Spergularia bocconei*), Mexican fan palm (*Washingtonia robusta*) seedlings, annual blue grass (*Poa annua*), common purslane (*Portulaca oleracea*), goose grass (*Eleusine indica*), lesser wart cress, and common stink grass (*Eragrostis cilianensis*).

ANNUAL GRASSLAND

Much of the upland areas around Oxford Basin consist of an annual grassland, often interspersed with ornamental shrubs and trees planted on the site. Commonly found grasses in this community consisted of ripgut brome (*Bromus diandrus*), slender wild oat (*Avena barbata*), red brome (*Bromus madritensis* ssp. *rubens*), foxtail barley (*Hordeum murinum* ssp. *leporinum*), and panic veldt grass (*Ehrharta erecta*). Moist sites contained Bermuda grass (*Cynodon dactylon*), smilo grass (*Piptatherum miliaceum*), rabbit's foot grass, water bentgrass (*Agrostis viridis*), rescue grass (*Bromus catharticus*), and Dallis grass (*Paspalum dilatatum*). Commonly found forb species included summer mustard (*Hirschfeldia incana*), common horseweed (*Conyza canadensis*), London rocket (*Sisymbrium irio*), scarlet pimpernel, Mexican tea, lesser wart cress, Australian saltbush, cheese weed (*Malva parviflora*), white-stemmed filaree (*Erodium moschatum*), common sow thistle (*Sonchus oleraceus*), yellow sweet clover, nettle-leaved goosefoot (*Chenopodium murale*), red-stemmed filaree (*Erodium cicutarium*), and dwarf nettle (*Urtica urens*).

RUDERAL

Some parts of the study area contain plant species consistent with disturbed localities. Common species in the ruderal habitat consisted of foxtail barley, panic veldt grass, red brome, ripgut brome, Russian thistle (*Salsola tragus*), bull mallow (*Malva nicaeensis*),

London rocket, serrate-leaved saltbush (*Atriplex suberecta*), garden beet, summer mustard, bristly ox-tongue (*Picris echioides*), redscale (*Atriplex rosea*), puncture vine (*Tribulus terrestris*), petty spurge (*Euphorbia peplus*), dwarf nettle, four-leaved polycarp (*Polycarpon tetraphyllum*), kikuyu grass, black mustard (*Brassica nigra*), prickly lettuce, common purslane, castor bean (*Ricinus communis*), tree tobacco (*Nicotiana glauca*), pampas grass (*Cortaderia selloana*), and sweet fennel (*Foeniculum vulgare*).

ORNAMENTAL

Ornamental tree, shrub and vine plantings generally dominate the upland areas of the Oxford Basin study area. In the eastern part of the property a myoporum "woodland" is found, characterized by dense stands of myoporum (*Myoporum laetum*), along with some planted pines (*Pinus* sp.). Other areas of the site contained scattered stands of myoporum, with Mexican fan palm, melaleuca (*Melaleuca* sp.), Brazilian pepper tree (*Schinus terebinthifolius*), crimson bottle bush (*Melaleuca citrina*), Peruvian pepper tree (*Schinus molle*), Indian laurel fig (*Ficus microcarpa*), oleander (*Nerium oleander*), and grape vines (*Vitis* sp.). The south side of the Basin has a more open cover of myoporum and a greater diversity of ornamental plantings. Planted trees and shrubs in this locality included, pines, lemon gum (*Eucalyptus citriodora*), Catalina cherry (*Prunus lyonii*), creeping fig (*Ficus pumila*), Brazilian pepper tree, red gum (*Eucalyptus camaldulensis*), Canary Island palm (*Phoenix canariensis*). Shrubs consisted of crimson bottle bush, oleander, melaleuca, firethorn (*Pyracantha coccinea*), and dwarf myoporum (*Myoporum parvifolium*).

DEVELOPED

The pump stations, low flow diversion structure, paved roads and concrete inflow structures were mapped as developed.

3.5 Invertebrates

As described by Fiesler (2010; see Attachment B), a high-level baseline invertebrate survey was conducted that covered both upland and aquatic habitats at Oxford Basin.

The terrestrial fauna is dominated by non-native species, in particular the Argentine ant (*Linepithema humile*), which is discussed below. Another important non-native is the European paper wasp (*Polistes dominula*), which often outcompetes and then replaces native paper wasp species. Two out of three adult hemipteran species encountered are non-native to the United States. They are bagrada bug, also known as the painted bug (*Bagrada hilaris*), native to Africa, Southern Asia, and Southern Europe, and the torpedo bug (*Siphanta acuta*), native to Australia. The third adult hemipteran encountered was one exemplar of a plant bug (*Phytocoris* sp.), which is not commonly found in metropolitan Los Angeles. Some native species were also found in relative abundance, like the brine fly (*Ephydra niveiceps*), which is associated with aquatic habitats, and the

sinuous bee fly (*Hemipenthes sinuosa*), as well as the Jumping Spider (*Habronattus pyrithrix*) and the margined spurthroated grasshopper (*Melanoplus marginatus*). The latter two are discussed in the next section.

Aquatic invertebrates found in the Basin itself included the California mud snail (*Cerithidea californica*; Phylum Mollusca), found in large quantities below the high-tide line, some straight horsemussels (*Modiolus rectus*), and a few other small-to-microscopic bivalves in the benthos. In the Phylum Arthropoda, sampling revealed large numbers of gammarid amphipod (Suborder Gammaridae; Order Amphipoda) adults and immaures, as well as some copepods (Class Maxillopoda) and the remains of one shrimp, which is apparently an ocean (smooth) pink, also known as pink Shrimp (*Pandalus jorani*; Order Decapoda; Class Malacostraca). Dr. Fiesler also recorded relatively large numbers of nematodes (Phylum Nematoda), some flatworms (Phylum Platyhelminthes), rotifers (Phylum Rotifera), and seed shrimp (Phylum Ostracoda), and various microscopic protozoans (Phylum Protozoa), including some collared flagellates. Within each taxon, relatively little diversity was seen. The relatively low quantity of protozoa and other micro-invertebrates is due to the relatively large (1-mm) mesh size of the sieve that was used for sampling, and, to a lesser extent, the 500-micron mesh size of the net. The smaller organisms were still collected, however, as they were trapped in the algae collected by the net.

The surveys by Swift and Mulder (Entrix 2010; see Attachment C) also included some sampling for aquatic invertebrates. They found these organisms to be uncommon in January, except for the broken-backed shrimp (*Palaemon macrodatylus*), a non-native species from Asia. This species was very common in January but fewer than 10 were captured in April, when they were much less abundant. *P. macrodatylus* is well adapted for brackish or low salinity environments (Kuris et al. 2007). Possibly this species becomes abundant in Oxford Basin during the winter with the increase in freshwater influence that provides lower salinities and decreases the number of predatory fish present as well. The California horn shell (*Cerithidia californica*), a typical invertebrate in southern California estuaries, was uncommon; only a few were observed during both surveys despite the presence of considerable amounts of green algae, their primary food source, in April. Barnacles were present on hard substrates around most of the Basin while mussels seemed restricted to the area around the tide gates. Other than an abundance of amphipods observed under the intertidal rocks, the only other aquatic invertebrate noted was the bubble shell (*Bulla gouldiana*). Several of these were observed near the mouth of the tide gate among the algae being dislodged by the strong incoming tidal currents and several were also captured by seining. Surprisingly, no crabs were encountered during the surveys. Seining and baited traps frequently take species of marsh crabs when sampling coastal salt marshes and estuaries. These crabs also have long pelagic larval stages which should enable them to colonize Oxford Basin.

NARRATIVES FOR SELECTED INVERTEBRATE SPECIES

This section discusses certain species present at Oxford Basin considered to be of special interest.

The most unexpected species found at the site was a signal fly (Family Platystomatidae), which is a beetle-like insect with a long, aardvark like snout. This appears to represent a first state record for California. Robert Hamilton found one exemplar of this Signal Fly that apparently belongs in genus *Amphicnephes*. There are only three species of *Amphicnephes* described in the world, all from America, and the specimen is likely *Amphicnephes fasciola*, given (a) that its distribution range, which includes Arizona, is the closest to southern California of the three described species, and (b) the original description of *A. fasciola* (Coquillett 1900) matches reasonably well. On subsequent visits Dr. Fiesler surveyed the area where the specimen was seen but did not find another exemplar as potential voucher specimen. It is likely that the restricted public access has contributed to the survival of this rarity at Oxford Basin. Signal flies have no state or federal listing status, or other "special status," and the occurrence of one of these flies at Oxford Basin does not appear to represent a potential regulatory constraint to the proposed renovation project.

The only species of grasshopper found during the survey is the short-winged form of the margined spurthroated grasshopper (*Melanoplus marginatus*), which was fairly common at the site. This species is endemic to California. The southern edge of its range includes part of the Santa Monica Mountains (Capinera et al. 2005). The Oxford Basin population may therefore represent its southernmost recorded occurrence. It is not clear if it is found in the Ballona Region, as only "*Melanopus species?*" is listed in the 1980-1981 entomology survey report (Schreiber 1981), and there are a number of other *Melanoplus* species present in the Los Angeles Basin. These grasshoppers have difficulty dispersing to colonize new areas due to their short wings, which render them incapable of sustained flight. Their local gene pool is therefore in danger of becoming impoverished.

The jumping spider (Family Salticidae) most often encountered during the survey is *Habronattus pyrrithrix*. This a common spider of the Los Angeles area, whose prime habitat includes wetlands. There seems to be a healthy population of these small jumping spiders at the site.

A good-sized population of small, gray-and-black spider wasps (*Aporinellus* sp.) was present at the Basin. Despite a cosmopolitan distribution across the United States and beyond, they are uncommonly found in the Los Angeles metropolitan area. Their main prey is Jumping Spiders (see previous species account), which are food for their offspring. This renders these spider wasps secondary predators in the Oxford Basin ecosystem.

The non-native Argentine ant (*Linepithema humile*) is abundant on the site, across much of Los Angeles County, and far beyond. It is a non-native species that outcompetes native ant species and other invertebrates. In Los Angeles County, Argentine Ants have decimated the native California harvester ant (*Pogonomyrmex californicus*) and hence, indirectly their predator, the coast horned lizard (*Phrynosoma blainvillii*), which primarily feeds on native ant species like the California harvester ant. No native ants were found at the site.

DISCUSSION

The predominantly non-native vegetation at the Basin constitutes a degraded fundament for terrestrial faunal ecosystem, and the native and non-native terrestrial invertebrate fauna consists, for the most part, of species typically found in urban environments. Despite the relative abundance of non-native plant and invertebrate species, the ecosystem is functional for terrestrial invertebrates, and includes primary consumers as well as primary predators (e.g., spiders) and secondary predators (e.g., spider wasps).

The broad variety of aquatic invertebrates found at Oxford Basin, as well as the overall abundance of amphipods, indicate the relative health of the Basin's water, which provides ample feeding grounds for various wildlife. In specific, gammarid amphipods are a prime food source for fish and birds (McCurdy et al. 2005, Schneider 1981). They also have a high sensitivity to environmental changes (Conlan 1994, Zajac et al. 2003), and monitoring their abundance can provide one useful measure of the quality of the ecosystem.

3.6 Fish and Estuarine Biology

Camm C. Swift and Joel Mulder of Entrix (2010; see Attachment C) evaluated this aspect of the Basin's biology, as summarized here.

SALINITY MEASUREMENTS AND TURBIDITY

On January 12, 2010 the salinity at the surface at two sites in the lower Basin ranged between 15–18 parts per thousand (‰), and salinity at the inflow at the east inlet was 3 ‰. The water temperature ranged from 15-18° Celsius (C) at several locations in the Basin.

On April 27, 2010 several salinity measurements throughout the Basin, including at the eastern inlet, ranged from 33–34 ‰. Water temperatures were 17-18° C. During both surveys the water was moderately turbid; estimated visibility was approximately 1 m.

ALGAE

During the first survey on January 12, 2010, no aquatic vegetation was observed in the Basin. During the second survey, on April 27, 2010, filamentous green algae (possibly *Enteromorpha* sp.) were present along 50–80% of the wetted margins at low tide. Approximately 10% of the Basin's surface had floating mats of this same algae present.

FISH

Attachment C provides a table showing the numbers of each species trapped, seined, and observed during each survey. A total of 14 seine hauls around the perimeter of the Basin on January 12, 2010 captured hundreds of mosquitofish (*Gambusia affinis*) and one or two small juvenile shadow gobies (*Quietula y-cauda*) just west of the tide gates. In addition one large longjaw mudsucker (*Gillichthys mirabilis*) was observed in the rocks near the upper end but was not captured. The seining (5 hauls) and trapping on April 27, 2010 captured large numbers of native gobies, such as arrow gobies (*Clevelandia ios*) and cheekspot gobies (*Ilypnus gilberti*). Also captured were a small number of native shadow gobies and longjaw mudsuckers. Topsmelt (*Atherinops affinis*) were abundant and hundreds were observed and captured ranging in size from small juveniles to adults (up to about 15 centimeters total length). In addition a few small, juvenile, non-native, yellowfin gobies (*Acanthogobius flavimanus*) were taken. The majority of fish were captured by seining rather than in the traps. Fish were found to be relatively scarce as distance form the tide-gates increased, with the exception of mosquitofish. For this reason, seining during the second survey was focused around the tide-gate. During both surveys, the majority of the Basin was observed 1–10 m from shore and fishes were rarely detected with the exception of the abundant mosquitofish in January.

The species captured during the surveys are typical of coastal estuaries of southern California and indicate that Oxford Basin contains habitat that can support estuarine species for at least part of the year. The results of the January survey suggest the Basin supported very few estuarine fish in January. Mosquitofish were present in the tens of thousands while only two or three larval or small juvenile shadow gobies were captured near the tide-gate where they had apparently recently arrived and one large mudsucker was observed. By the April 27, 2010 survey, large numbers of gobies were detected. These were comprised of four native and one non-native species, all of which are typical of coastal estuaries in southern California. In addition, large numbers of topsmelt were present and only a few mosquitofish were captured. Fish were encountered both in seine hauls near the mouth and in traps set around the perimeter of the Basin indicating fish were dispersed throughout the Basin in late April. However, fish were most abundant near the tide gates. It is likely that the difference in fish abundance between the two surveys was due to the changes in freshwater influence and salinity in the Basin. In January, when freshwater input from numerous winter storm events had presumably repeatedly washed out the Basin, salinity in the Basin ranged from almost fresh to approximately half that of seawater. The salinity was

considerably higher and at near seawater salinities in April, allowing colonization of the Basin by estuarine species dependent on higher salinity.

Also of interest are the species not encountered in the Basin during the surveys, but which would be expected to occur in southern California estuarine systems at this time of year. Because these species are typically very abundant following the springtime breeding periods, they are frequently easy to detect and would likely have been encountered if present in Oxford Basin. These species include staghorn sculpin (*Leptocottus armatus*), California killifish (*Fundulus parvipinnis*), diamond turbot (*Pleuronichthys guttatus*), bay anchovy (*Anchoa delicatissima*), deepbody anchovy (*A. compressa*), bay pipefish (*Syngnathus leptorhynchus*), barred pipefish (*S. auliscus*), California halibut (*Paralichthys californicus*), striped mullet (*Mugil cephalus*), and shiner perch (*Cymatogaster aggregata*). A few other species that are less common or are more prevalent in larger estuaries but which might be expected to occur in the Basin include bay blenny (*Hypsoblennius gentilis*), spotted sand bass (*Paralabrax maculofasciatus*), and several species of elasmobranchs (sharks and rays). Many of these are species are known to occur in adjacent Marina del Rey.

Most of the estuarine species detected during the two surveys in Oxford Basin are pelagic midwater species (such as topsmelt) or have larvae that are pelagic in the water column for a few weeks (such as the goby species encountered). Other species that could be expected in Oxford Basin that produce pelagic larvae include anchovies, staghorn sculpin, diamond turbot, striped mullet, and California halibut. The larvae of these species typically arrive in estuaries in late winter and spring. Because these larvae colonize estuaries by being swept in by water currents, Oxford Basin should have the potential to be colonized by these species.

Fish species that do not have a pelagic larval phase, as well as adult fish of any estuarine species, would only be able to colonize Oxford Basin by swimming in through the subterranean passageway and tide-gate system that connects Oxford Basin to Basin E in Marina del Rey. This connection is at least 100 m long and is unlit. It is unknown if this connection would present a barrier or deterrent to passage of fish into the Basin. County workers present at Oxford Basin on January 12 mentioned having observed "sting rays" in Oxford Basin in the past, and several other species known from Marina del Rey (Allen et al. 2006) certainly have the potential to invade. The available composition of fish species available to colonize Oxford Basin is probably largely determined by the community present in Basin E of Marina del Rey. The fauna of Marina del Rey has been studied for over 30 years and is well known to fluctuate considerably due to periodic fish kills in the summer when the lack of circulation and excess nutrients combines to lower oxygen concentrations. These effects are most extreme in the uppermost reaches of the harbor, such as at Oxford Basin or Basin E (Aquatic BioAssay and Consulting 2009). Thus, the marina may not consistently be a reliable source of fish colonization into Oxford Basin.

One species of fish not encountered in the Basin but which is extremely common in other parts of the Ballona Wetlands and Marina del Rey is the California killifish. California killifish lay large eggs on hard substrates or vegetation and the young hatch out at an advanced stage as small juveniles with little or no pelagic or drifting dispersal phase. Therefore, California killifish may be limited in their ability to colonize Oxford Basin since it does not have a pelagic phase and may not occur close enough for adults to disperse into the Basin. It is possible that the habitat between the nearest known population at Mother's Beach in the marina may be in inhospitable to killifish thereby limiting their dispersal. The long, dark passage from the tide-gates to Basin E may also deter them. In addition, Basin E has deep water (2 or more meters deep) with vertical concrete walls which may not be conducive to movement of the California killifish. The presence of larger predators in deep-water areas might also prevent significant migration through the marina and Basin E. It is possible that if California killifish were introduced into Oxford Basin they would succeed in the area since the habitat appears appropriate for them. California killifish typically inhabit gently sloping, sandy, beaches and tidal sloughs. They often inhabit vegetated margins of salt marshes and adjoining shallow marine waters and are tolerant of fresh water (Moyle 2002). They are a prevalent part of the fish fauna of most southern California tidal salt marshes, bays and estuaries and would be a valuable addition to Oxford Basin.

Two other species which lack pelagic life stages, which were not encountered in Oxford Basin, and which are common in other parts of Ballona Wetlands are pipefish and shiner perch. Pipefish reproduce through male brooding of large eggs and the young juveniles are released directly into the habitat without a distinct dispersal stage. However, pipefish are often associated with drifting seaweed and other sea grasses and may disperse via this mechanism. Shiner perch are live bearing and young are born throughout most of the summer. It is uncertain how readily the young or adults would disperse into Oxford Basin. If water quality conditions were improved in the Basin, artificial introduction of these species may be possible since appropriate habitat is present in the Basin.

The California halibut is an important commercial and sport fish species and is reliant on coastal bays and estuaries as nurseries for the first two or three years of life. Any increase is such habitat would be valuable for this species. Its preferred diet early in life, estuarine gobies, is already common in the Basin as identified in our surveys.

Additionally, there are several species of brackish, freshwater, or anadromous fish that undoubtedly occurred in the Ballona Lagoon and Ballona Wetlands historically but which have been extirpated from the area for at least 70 years or more. These species still occur to the north and south of the area and have special conservation status. The federally endangered tidewater goby (*Eucyclogobius newberryi*) occurs in Malibu and Topanga creeks to the north and in San Diego County to the south and there are historical records for artesian springs in Santa Monica (U. S. Fish and Wildlife Service

2005). The federally endangered southern California steelhead (*Oncorhynchus mykiss*) also still migrates from the ocean into Malibu and Topanga Creeks and was observed in San Mateo Creek in northern San Diego County in 1998-99 (NMFS 2009). After the adult steelhead spawned upstream in freshwater, the juveniles would have used the Basin as a nursery area for a year or so before the juveniles left for the ocean (Swift et al. 1993; Moyle 2002). Finally the federally endangered unarmored threespine stickleback (*Gasterosteus aculeatur williamsoni*) occurred in the Los Angeles River and presumably occurred in or near the Ballona wetlands. The tidewater goby and stickleback would have been permanent residents of the estuarine area of the wider Ballona Marsh. All of these species rely on relatively stable, low salinity or brackish conditions and such conditions are unlikely to develop for any extended length of time in Oxford Basin, particularly since there appears to be an effort to divert freshwater street runoff into the sewer system, as was observed at the eastern inlet, rather than allowing it to flow into the Basin. Thus it would take exceptional effort to re-establish these species. In addition steelhead and stickleback require relatively cool and well oxygenated water which will also be difficult to maintain in Oxford Basin under current conditions. If these species are ever to be seriously considered for return to this area, it would probably be best to utilize other areas of Ballona Wetlands where the appropriate habitat conditions can be developed more easily.

WATER QUALITY, WATER TEMPERATURE, DISSOLVED OXYGEN

A study conducted by Aquatic BioAssay and Consulting (2009) noted that Basin E and Oxford Basin have some of the highest levels of pollutants and lowest oxygen values in the Marina del Rey area. The study found that the number and diversity of invertebrate species dropped from the mouth of the Marina inland towards the most inland sites such as Oxford Basin. These water quality issues may explain some of the absence of species in Oxford Basin. In addition, Oxford Basin has only minimal circulation of water with the marina and is therefore more likely to suffer longer spans of poor water conditions that may arise. A good starting point for a restoration effort for fauna would be to improve the water circulation through the Basin, to reduce the level of pollutants, and to increase the dissolved oxygen levels in the Basin water in order to establish the water quality conditions necessary for successful colonization of estuarine aquatic species.

Dissolved oxygen concentration in water is related to water temperature such that the warmer the water the lower the amount of oxygen the water is able to hold in solution. Thus, excessive warming of the water will contribute to lower the availability of oxygen in the water. Other conditions such as the lack of circulation, excessive enrichment of the water, or the overnight lack of photosynthesis by aquatic plants to supply oxygen to the system can result in low dissolved oxygen levels. Excess plant material such as large algal blooms can supply oxygen in the day time but also use up the available oxygen rapidly at night as the plants respire resulting in low oxygen levels for the other organisms.

During the surveys by Entrix, water temperatures were below 20° C which is within the preferred range for most estuarine fish and is cool enough to maintain adequate dissolved oxygen concentrations. Often, areas near the coast stay cooler because the summer fog coverage can insulate coastal marshes and wetlands from the usual summer warming more prevalent farther inland (Swift and Frantz 1981). However, it is possible that the water temperature gets considerably higher in Oxford Basin during the late summer and fall due to the lack of water circulation, relatively shallow depths in the Basin, and as the cooler marine layer is less prevalent. If the water temperature increases beyond the mid-twenties Celsius then temperatures and dissolved oxygen concentrations may become intolerable to many fish species. Estuarine fish species can generally be divided into two categories relative to oxygen tolerance. Gobies, killifish, and mosquitofish are relatively tolerant of low oxygen conditions and can utilize aerial oxygen and other strategies to survive periods of low oxygen in the water. Other fishes are relatively intolerant of low oxygen conditions and include anchovies, topsmelt, flatfishes (diamond turbot, California halibut), and shiner perch. These fish are unable to tolerate lower oxygen levels for any period of time and are the fish frequently seen during morning fish kills in coastal estuaries. Any attempt to restore habitat conditions that would support these species would have to include provisions for maintenance of relatively high oxygen concentrations (above approximately 4 milligrams per liter). Dissolved oxygen levels in the waters of Basin E and Oxford Basin often fall below this value according to the study by Aquatic BioAssay and Consulting (2009). It is less well known how these fish species are affected by the other pollutants noted by Aquatic BioAssay and Consulting (2009) such as DDT and heavy metals.

DISCUSSION

It appears that the current state of Oxford Basin is of a system whose habitat and health is compromised by its distance from the ocean mouth and restricted access to Marina del Rey. It has been documented to have relatively poor values of several indicators of aquatic health, most recently by the study of Aquatic BioAssay and Consulting (2009). These factors make the development and sustainability of typical estuarine or bay fish fauna populations difficult. The Entrix study indicates that several typical species can and do colonize and inhabit the area but have difficulty maintaining a year-round population. In addition, several species that would be expected to be present are absent, and in some cases the reasons for their absence are not readily apparent.

Some uncertainty exists in the sampling results regarding the presence of fish in the Basin throughout the year since the sampling by Entrix was limited to two visits. More sampling throughout the season could better define the extent of fish population variation in the area. However, the faunal composition of nearby Marina del Rey is well understood and aquatic species composition in Oxford Basin is likely closely tied to conditions in the marina, as well.

Increasing the diversity and abundance of fish species living in Oxford Basin on a permanent basis would require management of water quality issues and the identification and removal of colonization barriers. Monitoring the fish populations in the Basin as such restoration actions are implemented would be beneficial in assessing the success of these actions as related to creating favorable habitat for estuarine fish.

3.7 Birds and Terrestrial Vertebrates

Daniel S. Cooper of Cooper Ecological Monitoring (2010; see Attachment D) evaluated the Basin's avian and terrestrial vertebrate communities, as summarized here. This included consideration of previous biological reports that were completed on the Basin during the 1970s and in 1980 (Schleicher 1974, Schreiber and Dock 1980). As noted by Cooper, these early reports were not peer-reviewed and both included some questionable information. His current study focuses upon current uses of the Basin by reptiles, birds, and mammals, but includes some comparisons with the species reliably observed during the older survey efforts completed (see Attachment D).

AMPHIBIANS, REPTILES, AND MAMMALS

Non-avian terrestrial vertebrates were scarce during the 2009/10 surveys. No lizards or amphibians were observed during the 2009/10 survey, although Schleicher (1974) recorded the southern alligator lizard (*Elgaria multicarinata*), and this species likely still occurs.

On May 28, 2010 at least ten California ground-squirrels (*Spermophilus beecheyi*) were detected, with presumed burrows scattered across the entire site; one squirrel was seen on May 7, 2010, but they were not detected during the preceding fall/winter. Two non-native eastern fox squirrels (*Sciurus niger*) were observed in the myoporum grove on February 24, 2010 and evidence of their presence (including pine cone "shavings") was easily observed.

Numerous large burrows present toward the far eastern end of the site, within the myoporum grove, likely belong to striped skunk (*Mephitis mephitis*). This evaluation is based on their size and the habitat (this mammal is now common and highly urban-adapted in the region). Tracks in mud seen on several visits were made by skunk or raccoon (*Procyon lotor*), another ubiquitous, urban-adapted animal in Los Angeles.

The earlier studies noted the presence of feral dogs, chickens, and domestic ducks, but these are no longer present, although several hybrid/feral Mallard × domestic ducks were present on most visits. Native rabbits (*Sylvilagus* sp.) that were present in the 1970s have apparently been extirpated from the site.

BIRDS

As of July 2010, 84 species of birds have been credibly recorded at Oxford Basin. Of these species, 33 were not detected during our recent monthly visits since September 2009, which suggests that approximately 50 species may be expected to occur regularly at the site each year. Table A in Attachment D provides results for 2009/2010 and compares them with results obtained in the earlier studies, mainly Schreiber and Dock (1980). Attachment D includes the scientific names of bird species recorded during the current study, or previous studies.

Three species have been observed nesting at Oxford Basin in 2010: the Mallard, Anna's hummingbird, and American crow. Several other species were observed using the site during the breeding season, but were breeding off-site in the surrounding residential area and ornamental landscaping, notably several species of herons and egrets.

The rest of this section focuses on birds, because (a) birds are, by far, the most numerous and diverse terrestrial vertebrates at Oxford Basin, and (b) several species of special interest occur, or have potential to occur, at the Basin.

Patterns of Bird Usage

The patterns of usage documented in this report provide baseline data against which the effects of future habitat enhancements may be compared. The fact that native birds are using non-native vegetation at the site does not imply that these exotic plants are especially "important" for birds at Oxford Basin. All of the birds recorded in the myoporum and other landscaping at the site are commonly encountered in urban habitats throughout Los Angeles. Nearby areas with native vegetation, either naturally-occurring or restored, such as Ballona Freshwater Marsh and the Playa Vista Riparian Corridor, see much higher usage by native bird species, including regular, successful breeding by more than a dozen species.

Seasonal Patterns

As found in previous studies, bird usage of Oxford Basin is highly seasonal. Overall numbers are lowest in late summer and fall (July to October), before wintering waterfowl have arrived, and after the locally-nesting herons have raised young and dispersed. By November, small rafts of waterfowl are present that include American wigeon, lesser scaup, and American coot, joined by lower numbers of other species of ducks and grebes. Migrant songbirds, typically in limited numbers, can occur from late July through the fall months. Wintering songbirds, such as ruby-crowned kinglets, yellow-rumped and Townsend's warblers, generally arrive by late October and remain into April. Bird activity dips in spring, after wintering waterfowl and wintering songbirds have departed (April). Only a small number of ubiquitous resident species, such as the American crow and bushtit, remain to nest in the dense myoporum grove at the far eastern edge of the site. However, on certain days in April and May, a diversity

of spring transient songbirds (e.g., Wilson's warbler) may occur, typically forming small foraging flocks in the myoporum grove (but generally using any tree or shrub habitat available throughout the Marina). During summer, waterfowl are mostly absent (aside from a handful of locally-breeding mallards and hybrids), but herons and egrets from local colonies forage in the Basin, their numbers augmented by locally-raised young that remain into July and August.

By Area

Though data on usage by area of Oxford Basin was not collected during our study in 2009/10, a few broad patterns are clear. Most waterfowl were observed either resting on open water or near overhanging vegetation along the shoreline, or foraging on the wet mud exposed during a drawdown. Fish-eating species, such as the pied-billed grebe, were observed actively feeding in open water. Herons and egrets foraged around the entire shoreline, but seemed concentrated at either inflow (especially the inflow emerging from under Washington Boulevard) or at the outflow to the Marina, where they would catch fish. Several species of large waders were observed roosting in the trees surrounding the open water, particularly black-crowned night-herons in myoporum and other landscaping trees at the far eastern end. Songbirds (tree-dwelling) were found throughout the site, but were most consistently found in and around the myoporum grove at the eastern end, especially in the area where dense vegetation approached the freshwater at the eastern inlet.

Songbirds (other than the ubiquitous, non-native European starling) were almost never seen on the ground during the surveys in 2009/2010, suggesting that foraging opportunities for birds like sparrows and towhees are limited, and have become even more degraded over time (see the next discussion).

Faunal Change at Oxford Basin

Birds

The historical avifauna of the Oxford Basin area *per se* is not known, since it was part of a much larger wetland system and its current configuration dates back only to the 1960s. Historically, the inland mudflats and tidal channels of the "Venice Marshes" would have supported flocks of shorebirds nearly year-round, and rafts of waterfowl in winter ("Lake Los Angeles," situated near present-day Oxford Basin, was a popular duck-hunting spot through the 1950s; see, e.g., Cooper 2005). Species found in extensive, often wet grassland, such as the northern harrier (*Circus cyaneus*) and the long-billed curlew (*Numenius americanus*) were common in the Venice/Ballona area into the mid-1900s, as were dune and coastal strand specialists such as the horned lark (*Eremophila alpestris*) and large-billed savannah sparrow (*Passerculus sandwichensis rostratus*). Many of these coastal marsh, dune, and open-country species were effectively extirpated by the construction of Marina del Rey, though some – notably Belding's

savannah sparrow (*P. s. beldingi*) and a variety of waterfowl and shorebirds – maintain remnant populations at the nearby Ballona Wetlands/Ballona Creek.

As Marina del Rey has lost certain species, others have colonized novel habitats, nesting in trees near water (herons/egrets, Family: Ardeidae), or on built structures such as culverts (swallows, Family: Hirundinidae), or have simply "invaded" from the surrounding residential area. These population changes are discussed below.

Of the species that are known only from 1970s surveys, several were apparently common then and are best considered extirpated from the site at this time, a determination that is supported by recent research on bird status and distribution in the Ballona area (Cooper 2006b). Recent years have seen the apparent extirpation of three resident or year-round species from Oxford Basin: two raptors/predators (American kestrel and loggerhead shrike) and a woodpecker (northern flicker). Two species, the green heron and western scrub-jay, might be considered a part of this extirpated group, as well, although only 1–3 birds each were detected during the 1970s and both species remain fairly common in the greater Marina/Ballona area year-round. Two species of sparrow, the white-crowned (formerly a winter resident) and the song (formerly occurred in fall migration), have apparently been extirpated in their local roles at the Basin.

Shorebirds, apparently present, if irregular, during the 1970s, seem to have essentially abandoned the site. Schreiber and Dock (1980) wrote, "most of the shorebirds recorded here are dependent on the mudflats for their occurrence, both to feed and rest." Only one or two individual killdeer were seen during the recent surveys. Other species that have apparently declined or stopped using the site include gulls and terns (gulls were apparently common at Oxford Basin in winter 30 years ago and are now rare) and possibly the northern mockingbird and the non-native rock pigeon. These species remain common along lower Ballona Creek and/or in Marina del Rey, so it is likely that local changes in vegetation, food supply, and/or water regime are to blame.

With declines have come inevitable increases; several species have apparently established new populations at Oxford Basin that weren't present during the 1970s. Most importantly, large waders have increased dramatically. The great egret, snowy egret, and black-crowned night-heron now breed at various locations along Admiralty Way and forage at the Basin year-round, whereas during the 1970s they were only sporadic visitors to the Basin. Two species of waterfowl should be considered new "colonists," the American wigeon (high double-digits in winter) and the gadwall; interestingly, no species of waterfowl has dramatically declined at the Basin. The black phoebe, a resident and possible breeder, appears to have recently colonized the Basin. Three species were confirmed as breeders in 2009/2010, whereas before they occurred only in the non-breeding season: Mallard, Anna's hummingbird and American crow. The ruby-crowned kinglet, black-throated gray warbler, and Townsend's warbler, all regionally

common during both migration and winter, were first recorded at the Basin during 2009/2010.

Finally, the non-native spotted dove was considered common in residential areas near Oxford Basin in the 1970s, but this species has declined greatly locally and across the Los Angeles Basin. The Eurasian collared-dove, a recent arrival to California that is starting to fill a similar niche today, was detected in the neighborhood north of Oxford Basin during this study.

The avifauna of Oxford Basin is constrained by several factors, including the area's small size (9.0 acres in the study area for this enhancement project; 10.7 acres for the entire parcel), isolation from other wetland habitats by urban development (including numerous tall trees and two high-rise towers just to the south), current lack of regular tidal flushing, and dominance of invasive, non-native vegetation. Other factors such as litter and water quality were emphasized in earlier studies but are probably only minimally impacting the birdlife of the Basin; Ballona Creek, for example, easily as polluted a water body as Oxford, sees very high usage from a much greater variety of waterbirds than does Oxford. Also, it is worth noting that the nearby (restored) Ballona Lagoon just west of Marina del Rey is also small in extent (and linear in configuration), but nonetheless supports an exceptionally high species diversity of shorebirds compared with present-day Oxford Basin (records of 10+ species per year. C. Almdale, unpubl. data; vs. 1 species at Oxford during the 2009/10 survey).

DISCUSSION

Relatively simple steps could be taken to enhance Oxford Basin for birds that have been extirpated since the 1970s, and possibly even for species that existed in the pre-Marina del Rey wetlands. Replacing the thicket of myoporum with low-profile, native vegetation would likely result in the re-colonization of the site by the white-crowned sparrow, which no longer winters there. The American kestrel might use the site with such vegetation restored, as could (migrant) northern flickers and song sparrows. These species remain common in their respective roles in the larger Ballona ecosystem where native vegetation persists or has been restored. Other migrant songbirds recorded regularly at Ballona Lagoon that could use a restored Oxford Basin could include the house wren, blue-gray gnatcatcher (*Polioptila caerulea*), common yellowthroat (*Geothlypis trichas*), and Lincoln's sparrow (*Melospiza lincolnii*). None of these currently occur at the site or in typical urban/residential vegetation, and all have responded positively to restoration at Ballona Lagoon and other nearby natural areas.

With increased tidal flushing, the mudflats of Oxford Basin could once again support numbers and a diversity of shorebirds, and possibly a wider variety of waterfowl than is currently represented (just four duck species and one shorebird species were detected during surveys in 2009/2010, contrasting with five species of waterfowl and at least nine species of shorebirds in 1980). With most of the historical tidal mudflat habitat lost

permanently in the Marina/Ballona area (and essentially absent from the rest of the Santa Monica Bay/Los Angeles Basin south of Malibu), restoration of this habitat could have a positive impact on waterbirds in the region. It is also possible that such sensitive species as the California least tern could once again use Oxford Basin as an alternate foraging site during its breeding season.

4.0 SPECIES AND COMMUNITIES OF SPECIAL INTEREST

Biological resources of special interest include species and natural communities that are of limited distribution, or that are potentially regulated under federal, state, or local laws or ordinances. The investigators conducting this study identified those special status plant and wildlife species that have at least some potential to occur at Oxford Basin, and additional species that are worthy of concern in the local area or wider region. David Bramlet completed a jurisdictional delineation that identifies those portions of the site that are under the jurisdiction of the U. S. Army Corps of Engineers, California Department of Fish and Game, and California Coastal Commission.

4.1 Species of Special Interest

Species of special interest, or "special status" species, are plants and animals occurring or potentially occurring in the Project Area that are endangered or rare, as those terms are used in CEQA and its Guidelines, or that are otherwise of concern in the local area or wider region. Legal protection for special status species varies widely, from the relatively comprehensive protection extended to listed threatened/endangered species to no legal status at present. The California Department of Fish & Game's Natural Diversity Data Base (CNDDB) periodically publishes its lists of "Special Vascular Plants, Bryophytes, and Lichens" (CNDDB 2010) and "Special Animals" (CNDDB 2009). The Special Plants list incorporates continually updated information from the California Native Plant Society (CNPS), an independent organization that maintains an online inventory of taxa that its botanists regard as rare, declining, or insufficiently known.

Table 4–1 lists each special-status species known to occur at Oxford Basin, or that has at least moderate potential to occur there (either at present, or with the Basin in a modestly "restored" state). Attachments A–D discuss these species in greater detail, and also identify and discuss some additional species that have no or low potential to occur at the Basin.

TABLE 4–1: SPECIAL STATUS SPECIES

Species	Status (Federal/State)	Known or Potential Status at Oxford Basin
Listed Species		
Birds		
California brown pelican *Pelecanus occidentalis californicus*	FE/ —	One record of a bird photographed as it foraged at Oxford Basin on October 13, 2009 (Cooper 2010; see Attachment D, Figure 6). Although a rarity at Oxford Basin, hundreds of brown pelicans roost on the Marina del Rey breakwater daily, and birds regularly forage and roost in the marina, often near bait tanks. Given the small size of Oxford Basin, it is unlikely that this area would ever provide important foraging or roosting habitat for the California brown pelican.

Species	Status (Federal/State)	Known or Potential Status at Oxford Basin
California least tern *Sternula antillarum browni*	FE/SE	This tern maintains a large nesting colony at south Venice Beach, a few hundred meters from Oxford Basin. Schreiber and Dock (1980) recorded this species at the Basin, but provided only sparse details about the nature of its occurrence: "Of particular interest are California Least Terns, an endangered species that nests on nearby Venice Beach and the Ballona Wetlands, and occasionally forages on small fish in the Bird Conservation Area." Also, "Observed foraging in the pond at the Bird Conservation Area in Spring and Summer, 1980." The number of individuals observed is illegible in the table of the report. The California least tern could possibly use Oxford Basin, at least irregularly, as a foraging site for birds nesting in the Venice Beach colony, as birds are regularly seen foraging for mosquitofish at Ballona Freshwater Marsh and elsewhere in the Ballona area (Cooper 2006b). Having been fenced for decades, Oxford Basin receives very little coverage by birders, and since the least tern is present locally for only a brief time window (May to early July), any foraging here – particularly the occasional brief visit by a bird bringing food to young – could go unobserved. It is not likely that the California least tern would ever nest at Oxford Basin, as the site does not support the broad, sandy beach and sandbar habitat favored by this species. Oxford Basin could possibly serve as an alternative foraging site for the species during its late spring/early summer nesting season.
Non-Listed Species		
Invertebrates		
monarch butterfly *Danaus plexippus*	–/CSA	Species is of concern due to its limited number of remaining overwintering sites, which are covered by statues of the California Public Resources Code and the California Fish and Game Code. Numbers have been fluctuating over the years, with a downward trend during the recent past (Xerces Society 2010). Species is migratory and frequently seen in coastal Los Angeles County; occurs at Oxford Basin only as a migrant. Recorded during all invertebrate sampling visits, passing by the site in an approximately east to west direction. Each specimen stayed only briefly near the site and visited a few flowers before continuing in westerly direction. In southern California, Monarchs usually overwinter in groves of *Eucalyptus*, in a zone between a half mile and one mile from the coast. Although Oxford Basin is on the migratory path of the Monarchs, is located approximately one mile from the coast, and has both blue gum and red gum *Eucalyptus* trees, it does not feature a grove of mixed height and diameter, with an understory of brush and sapling trees. It also lacks food plants for adult Monarchs. For these reasons, Monarchs are unlikely to choose the site in its present condition for overwintering.

Species	Status (Federal/State)	Known or Potential Status at Oxford Basin
Birds		
great egret *Ardea alba*	–/CSA (rookery site)	Unrecorded by earlier surveyors (1970s), small numbers of this large wader were found during 2009/10, including young-of-the-year during summer 2009 surveys (Hamilton and Cooper 2010). Great egrets maintain a limited nesting colony adjacent to Oxford Basin at Yvonne B. Burke Park. Additional nesting sites documented at Marina del Rey in 2009, with an estimated Marina-wide breeding population of approximately five pairs. Great egrets could potentially breed in the taller trees at Oxford Basin, but the species does not appear to be limited in the local area by a shortage of suitable nesting trees.
snowy egret *Egretta thula*	–/CSA (rookery site)	Since around 2005 snowy egrets have nested in tall eucalyptus, ficus, and coral trees in and around the parking lot of Yvonne B. Burke Park, just east of Oxford Basin (Cooper 2006b). This area held an estimated 69 nests of snowy egrets and black-crowned night-herons in July 2009, and Oxford Basin provides important breeding-season foraging area for snowy egrets, particularly for young-of-the-year (Hamilton and Cooper 2010). Up to 19 individuals per day were recorded during July 2009, likely from nearby nests at Burke Park. Snowy egrets could potentially breed in the taller trees at Oxford Basin, but the species does not appear to be limited in the local area by a shortage of suitable nesting trees.
black-crowned night-heron *Nycticorax nycticorax*	–/CSA (rookery site)	Long recorded at Oxford Basin during the non-breeding season (see Cooper 2006a), this medium-sized wader initiated nesting at Marina del Rey during the late 1990s. Several dozen pairs currently breed at the Marina, with one of the largest colonies located just east of Oxford Basin, at Yvonne B. Burke Park, where it co-occurs with snowy egrets (see preceding account). Although black-crowned night-herons were found in relatively small numbers at Oxford Basin during fall-spring (<10 birds), up to 14 birds per day were found during July 2009, when young birds were regularly seen foraging there with adults in apparent family groups (Hamilton and Cooper 2010).
great egret *Ardea alba*	–/CSA (rookery site)	Unrecorded by earlier surveyors (1970s), small numbers of this large wader were found during 2009/10, including young-of-the-year during summer 2009 surveys (Hamilton and Cooper 2010). Great egrets maintain a limited nesting colony adjacent to Oxford Basin at Yvonne B. Burke Park. Additional nesting sites documented at Marina del Rey in 2009, with an estimated Marina-wide breeding population of approximately five pairs. The species could potentially breed in one of the taller trees at Oxford Basin, but the species does not appear to be limited in the local area by a shortage of suitable nesting trees.
American kestrel *Falco sparverius*	–/–	This small raptor was found to be resident at Oxford Basin during the 1970s, but we know of no modern (post-1980) records from the site. As of 2010, the American kestrel no longer breeds at the Ballona Wetlands, where it was once a common year-round resident. In coastal portions of the Los

Species	Status (Federal/State)	Known or Potential Status at Oxford Basin
		Angeles Basin, large vacant lots that formerly supported American Kestrels year-round have all but disappeared. At Oxford Basin, such habitat modifications as removal of myoporum and trees and maintenance of low-profile vegetation, with patches of bare ground, could possibly facilitate the kestrel's re-establishment, at least in fall and early winter.
loggerhead shrike *Lanius ludovicianus*	–/–	This species, like the American kestrel, was recorded at Oxford Basin during the 1970s, but it is now best considered totally extirpated. Up to three loggerhead shrikes have been recorded in winter at the nearby Ballona Wetlands (including at Area A adjacent to Marina del Rey), and it is possible that this species could occur at Oxford Basin during migration if the site included bare ground and the establishment of a population of small mammals and/or macro-invertebrates (e.g., large grasshoppers) to provide a prey base.
western meadowlark *Sturnella neglecta*	–/–	This species has declined sharply throughout the Los Angeles area and, as of 2010, no longer breeds in the Ballona area (D. S. Cooper, unpublished data), or possibly anywhere else in coastal Los Angeles County. Two birds were photographed on October 13, 2009 along the north end of Oxford Basin (Cooper 2010; see Attachment D, Figure 9). Although these were fall migrants, small numbers of wintering birds could possibly occur if several acres of low-profile forbs/grasses and open ground were maintained at the site, rather than the dense, non-native trees and shrubs currently present.

Definitions

Federal

FE Listed as endangered under the federal Endangered Species Act.

State

SE State-listed as endangered under the California Endangered Species Act.

CSA California Special Animal. A general term that refers to all of the taxa the CNDDB is interested in tracking, regardless of their legal or protection status. This list is also referred to as the list of "species at risk" or "special status species". The Department of Fish and Game considers the taxa on this list to be those of greatest conservation need.

4.2 Communities of Special Interest

As described in this section, field surveys by David Bramlet (2010b; see Attachment E), delineated jurisdictional areas (wetlands and of Waters of the U.S.) at Oxford Basin that fall under the jurisdiction of the U.S. Army Corps of Engineers (Corps), California Coastal Commission (CCC), and California Department of Fish and Game (CDFG). Figures 4–1a and 4–1b show the extent of these jurisdictional areas. Please refer to Attachment E for documentation of the historical wetland conditions at Oxford Basin and for current photos of some of the jurisdictional areas found there. The following standard terms describe the wetland/non-wetland indicator status of plant species (see Reed 1988):

- Obligate wetland plants (Obl) – Plants that occur almost always in wetlands (>99%), under natural conditions.
- Facultative wetland plants (FacW) – Plants that usually occur in wetlands (67-99%), but also occur in nonwetlands.
- Facultative plants (Fac) – plants with a similar likely hood of occurring (33-67%) in wetlands as nonwetlands.
- Facultative Upland plants (FacUp) – Plants that sometimes occur in wetlands (1-33%), but occur more often in uplands.
- Upland plants (Up) – Plants that occur almost never in wetlands (< 1%).

AREAS UNDER CORPS JURISDICTION

The Corps regulates discharges of dredged or fill material into Waters of the United States under the provisions of Section 404 of the Clean Water Act. Waters of the United States include wetlands and nonwetland habitats, including oceans, bays, ponds, lakes, rivers, and streams, which may be used for interstate commerce. It also includes tidal areas, mudflats, sandflats, tributaries of Waters, along with wetland and adjacent wetland areas.

Wetlands are a type of the Waters of the United States, and are defined as those areas that are inundated or saturated by surface or ground water at a frequency and duration to support, under normal circumstances, a prevalence of vegetation adapted to saturated soil conditions. The determination of those wetland sites under the Corps jurisdiction is determined by the presence of wetland vegetation, hydric soils, and suitable hydrology, using the methodology defined in the arid west region supplement to the 1987 Corps wetland delineation manual (Wetland Training Institute 1991, U. S. Army Corps of Engineers 2008).

The Corps also regulates any obstruction or alteration to Navigable Waters of the U.S. The jurisdiction for these Waters extends to the high tide line, including spring high

tides or other high tides that occur with regular frequency, and to the ordinary high water mark in non tidal waters. Navigable Waters are typically within the same boundaries as the Waters of the U.S., but wetlands are not typically found within Navigable Waters, with the exception of some tidal marshes.

A total of 5.18 acres of Waters of the United States were delineated at Oxford Basin, of which 0.48 acre satisfied the Corps' criteria for vegetation, soils, and hydrology.

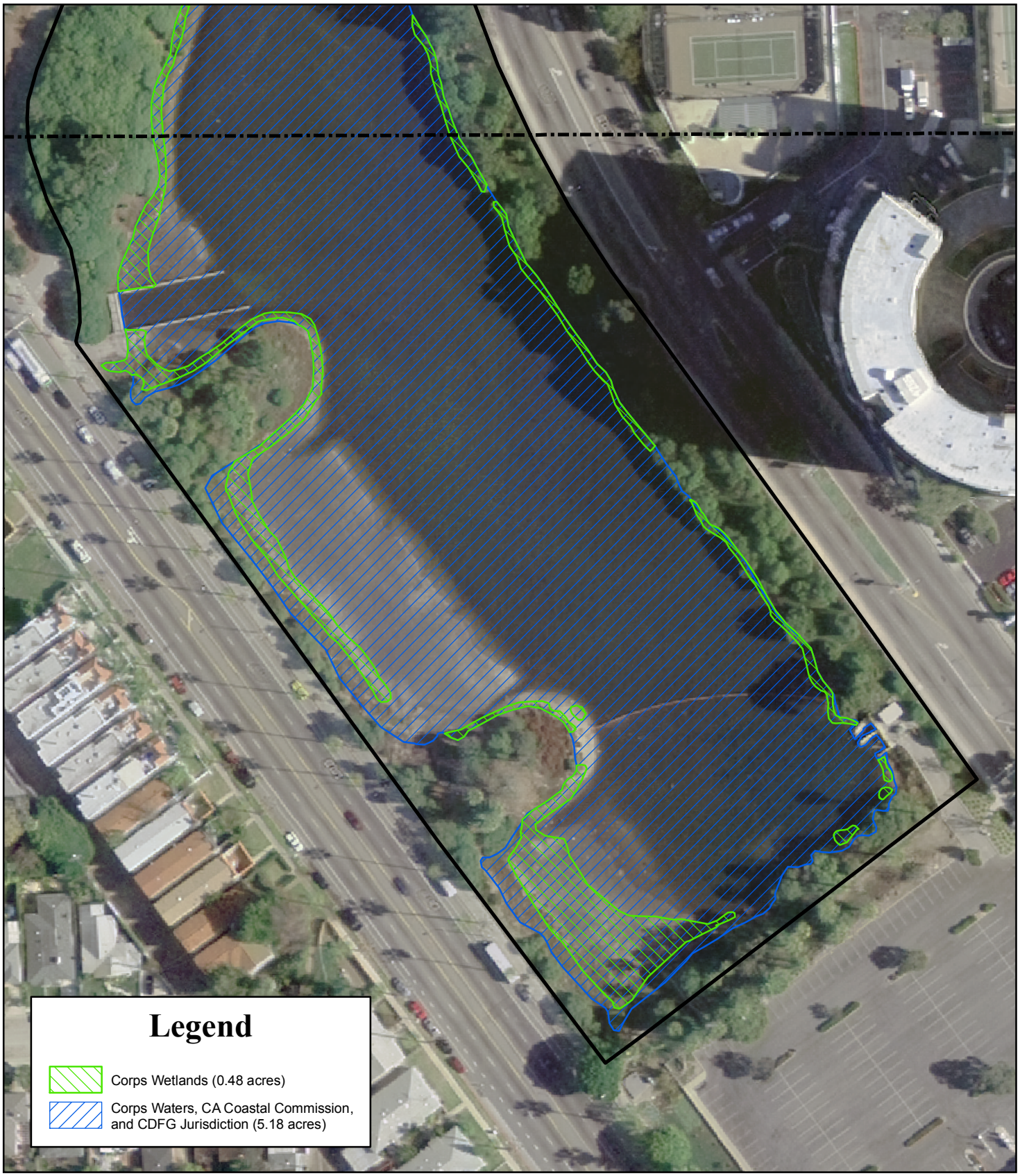
AREAS UNDER CALIFORNIA COASTAL COMMISSION JURISDICTION

Wetlands meeting the California Coastal Commission's one-parameter wetland criteria extend to the mean high tide within the Basin. These wetland areas had hydric soils and wetland hydrology, but were generally dominated by Perez's sea lavender (*Limonium perezii*). Since this species was considered a FacUp species, these localities were not considered to have hydrophytic vegetation. Therefore these areas were not considered as jurisdictional wetlands under the Corps delineation procedures, but would be classified as wetlands under the Coastal Commission's one-parameter methodology. Other species found in these wetlands included rabbit's foot grass (FacW); salt marsh sand spurry (Obl); spearscale (FacW); alkali heliotrope (*Heliotropium curassavicum*) Obl; Boccone's sand spurry (Fac), Mexican tea (*Dysphania ambrosioides*) Fac; yellow sweet clover (Fac); garden beet (*Beta vulgaris*) FacUp; and myoporum (*Myoporum laetum*) FacUp. The CCC wetland areas would also included those poorly vegetation or non vegetated "beach" areas that are infrequently tidally inundated, and the tidal flat areas that are inundated on a daily basis.

Depending on the slope of the Basin, the CCC wetlands extended from zero to 16 feet above the delineated Corps wetland areas. Along much of the north shore of the Basin, CCC wetlands extended from 6 to 8 feet above the Corps delineated wetland areas. A total of 5.18 acres was determined to meet CCC wetlands criteria at Oxford Basin.

AREAS UNDER CALIFORNIA DEPARTMENT OF FISH & GAME JURISDICTION

As with the CCC wetlands, the area under California Department of Fish & Game (CDFG) jurisdiction extends to the mean high tide line. No other riparian or isolated wetland habitat occurs within the Basin and the inlet channels are all developed storm drains. Therefore, it is determined that any CDFG jurisdiction is limited to the area in the Basin up to and including the high tide boundary. A total of 5.18 acres was determined to be under the jurisdiction of CDFG at Oxford Basin.

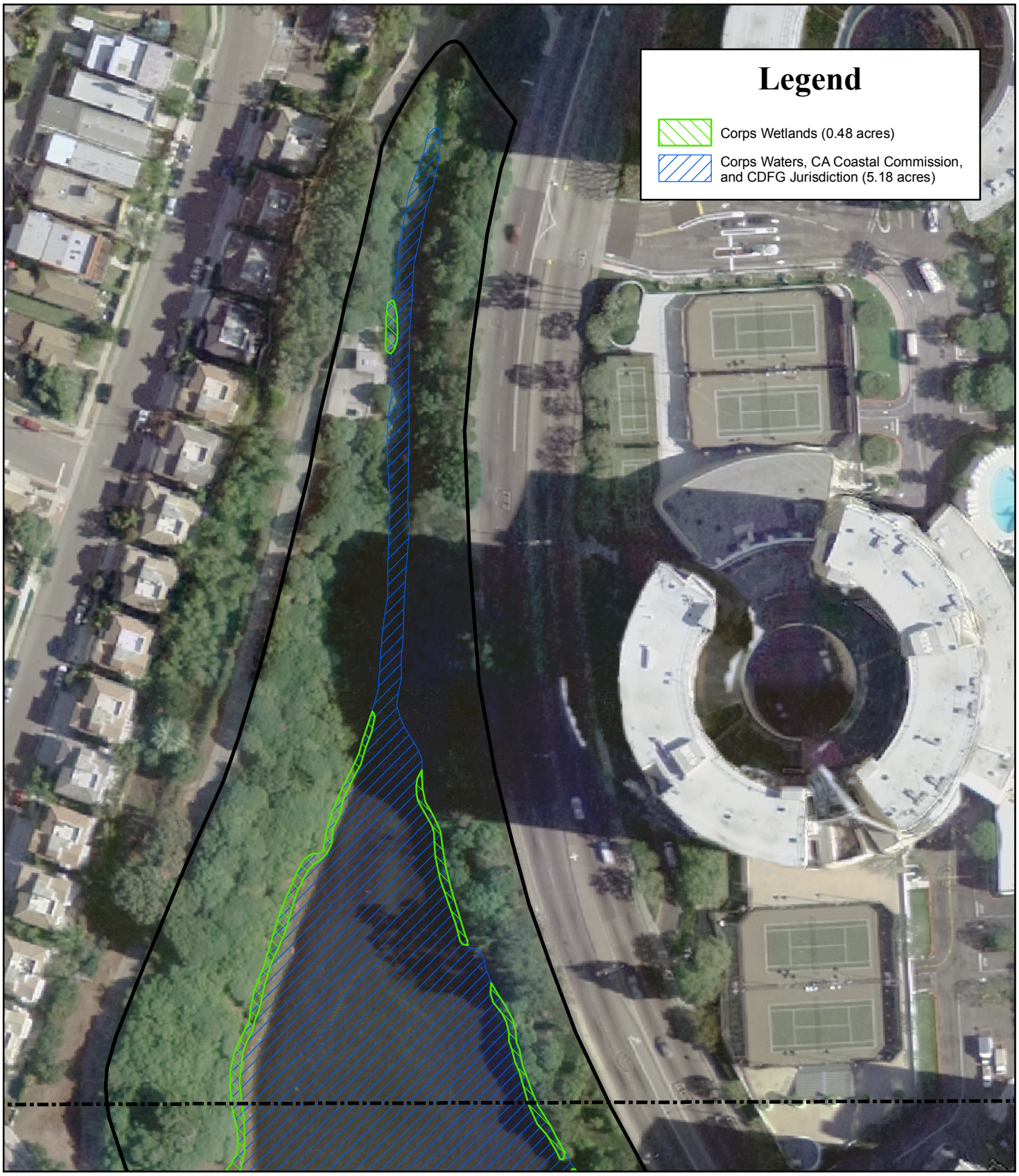


Site area: 8.94 acres

0 100 200 Feet

Figure 4-1a

Jurisdictional Wetlands in the Oxford Basin



Site area: 8.94 acres

0 100 200 Feet

Figure 4-1b

Jurisdictional Wetlands

in the Oxford Basin

5.0 RECOMMENDATIONS FOR CONSERVATION

Opportunities exist to increase habitat values of Oxford Basin for various native plant and wildlife species, and to promote its enjoyment by residents and visitors to Marina del Rey. This section summarizes (and in some cases paraphrases) the specialists' conservation recommendations and those contained in the draft Marina del Rey Conservation & Management Plan (Hamilton and Cooper 2010). The objective at this early planning stage, before a specific direction has been decided upon, was to set forth all potentially relevant recommendations for further consideration as planning of the renovation project progresses.

Oxford Basin's primary role is to receive storm runoff from and to provide flood control for the Marina and surrounding communities. The Basin must be regularly maintained, including periodic removal of sediments. As noted elsewhere in this report, all efforts to enhance habitat at Oxford Basin must be coordinated with the relevant County agencies, including the Department of Public Works, Department of Beaches and Harbors, and Flood Control District, and shall not in any way compromise the operation of the Basin as a flood control facility.

5.1 Recommendations of David Bramlet (Vegetation/Wetlands)

1. Investigate the feasibility of increasing the total area of the tidal prism at differing elevational levels. The principal function of Oxford Basin is to maintain maximum flood control capacity, and this may require a uniform upper elevational level. However, if sediment is to be removed from the Basin, the potential of having differing elevational levels within the Basin should be evaluated. This would allow for a greater diversity of native salt marsh "habitats" (e.g. mid-marsh, high marsh) and species that could potentially be introduced into the Basin.

2. Investigate the feasibility of establishing vascular aquatic plant species, such as eel grass (*Zostera marina*) within the mud flats of Oxford Basin. These could be placed in artificial submerged structures, that would allow "harvesting" of the eel grass. These plants would be grown more to enhance water quality and reduce the algal blooms, than to enhance the habitat found within the mudflats. Another alternative would be to create areas of sandy habitat within the Basin, to provide substrate for this or other suitable species.

3. Consider the feasibility of enhancing the salt marsh community found at Oxford Basin. This would include plans for the removal of non-native Perez's sea lavender (*Limonium perezii*), which has low habitat value for native wildlife, and replacing it with a more diverse group of native salt marsh species. Some of these species could include California marsh rosemary (*Limonium californicum*), alkali heath (*Frankenia salina*), saltgrass (*Distichlis spicata*), jaumea (*Jaumea carnosa*),

shore grass (*Monanthochole littoralis*), and American saltwort (*Batis maritima*). The plan would need to determine the suitability of the existing habitats for these species, and potential procedures that could allow for develop different marsh habitats within the Basin. Planting plans would then need to be developed with the different palettes for the salt marsh plantings, along with detailed procedures for preparing the sites for planting/seeding and long term maintenance of the marsh enhancement areas.

4. Consider the development of a native plant enhancement plan for Oxford Basin. This would include a plan for the removal of the myoporum, melaleuca, and other non-native trees and shrubs from the Basin. A planting palette of suitable native trees, shrubs and grasses could then be developed for the project site. These could include laurel sumac (*Malosma laurina*), Mexican elderberry (*Sambucus mexicana*), lemonadeberry (*Rhus integrifolia*), California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), coyote bush (*Baccharis pilularis*), bladder pod (*Cleome isomeris*) and other suitable shrubs or trees for the project site. Perennial grasses, such as purple needle grass (*Nassella pulchra*) or giant wild rye (*Elymus condensatus*), could also be planted in the understory. The planting plan would need to include procedures for testing the soils for excess salts, and preparing these soils before planting, determining the suitable planting procedures, detailing any provisions for erosion control, such as mulches on the exposed soils, and determining the potential need for supplemental irrigation. A detailed long-term maintenance plan would also have to be developed. This would develop provisions for maintaining any irrigation systems, repairing erosion, weeding the site, and replacing dead or damaged plantings in the enhancement areas.

5. Determine the native plants within Oxford Basin and a listing of non-native plant species that should be removed from the area surrounding the Basin. The botanical survey conducted for this report could not identify all of the species present within the study area, typically because the available plant materials lacked certain characters required for positive identification. Further studies would be necessary to more completely define the Basin's existing flora.

6. Determine the invasive non-native plants that occur within Oxford Basin and the development of a plan to remove these species. Such a plan would note the invasive plant species that are likely to cause continual problems in any native plant enhancement plantings, such as panic veldt grass (*Ehrharta erecta*). Procedures for the initial removal of the existing infestations and long-term maintenance measures to prevent further infestations of these species within the Basin would need to be developed in such a plan.

5.2 Recommendations of Emile Fiesler (Invertebrates)

Oxford Basin has great potential as a habitat for native invertebrates. Even though the site is currently in a relatively degraded state, with predominantly non-native vegetation, the Basin provides an important breeding ground for many aquatic species. The upland areas still have some native vegetation and can be restored to become a more vibrant coastal ecosystem. Specific recommendations for conservation, restoration, and overall site improvement are:

1. Remove exotic plants, ideally by hand, without the use of toxic pesticides.

2. Plant a broad diversity of native plants, specifically plants native to the local coastal area of Los Angeles County.

3. Eradicate/control Argentine ants, which displace native ant species as well as other arthropods, resulting in an impoverished biotope. A critical part of restoration efforts on the site should include the abatement of Argentine Ants. If desired, BioVeyda can assist in this effort.

4. Remove unnecessary concrete and other construction debris. Some monolithic rocks can be left or intentionally placed, as they would provide habitat for various vertebrate and invertebrate animals.

5. Possible introduction of non-listed native fauna, or at least introduction of their food-plants; for example:

    a. Pygmy blue (*Brephidium exilis*): Chenopodiaceae, including Atriplex and Chenopodium.

    b. Wandering skipper (*Panoquina errans*): saltgrass (*Distichlis spicata var. spicata*) and cordgrass (*Spartina foliosa*).

6. Invertebrates, being typically much more abundant and often more vulnerable than vertebrates, are prime indicators for ecosystem health. It would be beneficial to perform periodic surveys in the future, whose results can be compared to those obtained during this project. These future surveys would add valuable information toward completeness of the list and toward measuring changes in biodiversity over time. Ideally, monitoring should occur before, during, and after planned habitat modifications. In addition to performing qualitative surveys to compile and compare species lists, it would be of great value if quantitative data could be gathered on the relative abundance of the species present. This data would provide a detailed view on the health of the ecosystem in general.

5.3 Recommendations of Camm C. Swift and Joel Mulder of Entrix (Fish and Estuarine Biology)

1. Perform a water quality study to determine conditions present to provide a basis for predicting what fish species can be supported by the system and what changes might be made to accommodate others less likely to be currently supported.

2. Improve water circulation with Marina del Rey in order to improve water quality which is currently compromised both in Oxford Basin and its adjacent water supply, Basin E of Marina del Rey.

3. If water quality is or becomes appropriate, consider introduction of aquatic vegetation like eelgrass, ditch grass, and other species of marine algae to provide habitat for faunal elements more dependent on such vegetation (i.e. pipefishes and shiner perch).

4. Consider introducing some fish species such as California killifish which may currently be prevented from colonizing by inhospitable habitat between current populations in Marina del Rey, Ballona Marsh, and Oxford Basin.

5. Investigate options for increasing the number of algae eating snails or fish present in the Basin in order to biologically control the proliferation of algae in the summer. If the freshwater conditions present in the winter decimate the populations of such grazers, possibly they could be artificially augmented in the spring from elsewhere in the marsh area. For example, the non-native fish, the sailfin molly (*Poecilia latipinna*), has become established and is common in Ballona Marsh. Stocks of sailfin molly could be transferred to Oxford Basin as a possible way to control algae. Sailfin mollies are a fecund species producing live bearing young and are tolerant of low oxygen conditions such as those found in the Basin. Striped mullet also feed on algae and detritus, reach large size, and could potentially be artificially introduced. Striped mullet achieve much larger sizes but are more sensitive to oxygen requirements.

6. Investigate options for converting the Basin bottom substrate to more sand and less mud/fine silt. Possibly a layer of sand could be added when or after the system is dredged out periodically. If the fine sediment is determined to be primarily composed of decomposing organic matter, and water quality conditions can be stabilized, an increase in the diversity and abundance of bottom dwelling fish and invertebrate fauna may utilize and thus reduce the thickness of this silt/organic layer.

7. Explore exposing Oxford Basin to more wind, which would facilitate mixing and oxygenation of the water; this could be effective in a wide shallow system like this one, thereby reducing the need for increased water quality in the marina.

As discussed in Attachment C, the long, dark culvert between Oxford Basin and Basin E of the marina likely inhibits dispersal of fish into the Basin. This condition could be improved by replacing some of the paving above the culvert with metal grating or comparable material. However, taken by itself, such a step would not be likely to improve fish stocks in Oxford Basin due to (1) the need to limit the range of tidal fluctuations in Oxford Basin in order to maintain its flood-protection capacity, and (2) the compromised water quality of Basin E, which limits the fish populations capable of surviving there. Given the inability to change these two items, increasing the amount of light in the culvert probably would not result in significant improvement of fish stocks in Oxford Basin (without simultaneous improvement for fish in these two additional items), and so this measure is not recommended as part of the current plan.

5.4 Recommendations of Daniel S. Cooper and Robert A. Hamilton (Birds and Terrestrial Vertebrates)

Relatively simple steps could be taken to enhance habitat quality in Oxford Basin for some birds that have been extirpated since the 1970s, and possibly even for species that existed in the pre-Marina del Rey wetlands.

1. Replace the thicket of myoporum with low-profile, native vegetation would likely result in the re-colonization of the site by the white-crowned sparrow, which no longer winters there. The American kestrel might use the site with such vegetation restored, as could (migrant) northern flickers and song sparrows. These species remain common in their respective roles in the larger Ballona ecosystem where native vegetation persists or has been restored. Other migrant songbirds recorded regularly at Ballona Lagoon that could use a restored Oxford Basin could include the house wren, blue-gray gnatcatcher (*Polioptila caerulea*), common yellowthroat (*Geothlypis trichas*), and Lincoln's sparrow (*Melospiza lincolnii*). None of these currently occur at the site or in typical urban/residential vegetation, and all have responded positively to restoration at Ballona Lagoon and other nearby natural areas.

2. With increased tidal flushing, the mudflats of Oxford Basin could once again support numbers and a diversity of shorebirds, and possibly a wider variety of waterfowl than is currently represented (just four ducks and one shorebird were detected during surveys in 2009/2010, contrasting with five species of waterfowl and at least nine species of shorebirds in 1980). With most of the historical tidal mudflat habitat lost permanently in the Marina/Ballona area (and essentially

absent from the rest of the Santa Monica Bay/Los Angeles Basin south of Malibu), restoration of this habitat could have a wide-reaching, positive impact on waterbirds in the region. It is also possible that such sensitive species as the California least tern could once again use Oxford Basin as an alternate fishing site during its breeding season.

5.6 Recommendations from the Marina del Rey Conservation and Management Plan (Hamilton and Cooper 2010)

Section 6.2.1 of the plan contains the following policy recommendations for Oxford Basin.

1. Restore functional saltmash habitat. Most of the intertidal zone at Oxford Basin is currently vegetated with such native saltmarsh plants as pickleweed, sandmarsh sand-spurry (*Spergularia marina*), and salt grass (*Distichlis spicata*). Because these plants were not mentioned in earlier assessments (e.g., Schreiber and Dock 1980), it appears that they are naturally occurring here, temporarily displaced by the construction of Marina del Rey, and now regenerating within the Basin. Therefore, we recommend that this vegetation be preserved in place or stock-piled for later replanting during any reworking of the Basin's sides. The term "functional saltmarsh habitat" implies regular and, if possible, natural tidal flushing (corresponding to timing and magnitude of natural tidal cycles). A functional saltmarsh at Oxford Basin would, ideally, support a healthy sedimentary invertebrate fauna, to provide habitat for ducks and shorebirds, and a predictable population of small fish during the May–July nesting season for the California Least Tern, a listed species that maintains a large nesting colony on Venice Beach and that has been documented foraging at Oxford Basin in past years. Many other migratory and resident waterbirds would also benefit from the enhancement of this habitat, including those that currently utilize the nearby restored Ballona Lagoon.

2. To the extent possible, the Oxford Retention Basin Flood Protection Multiuse Enhancement Project (currently in design) should maintain the natural characteristics of the site. Once the final contours are established, habitat should be established to include areas of emergent native marsh vegetation exposed during high tide, to serve as refugia for animals, and areas of exposed mud ("mudflats") at low tide, to serve as foraging areas for migratory and resident birds. Although the extent of mudflats may be limited by engineering constraints, including at least a band of this habitat at low tide would be valuable, considering how much mudflat habitat was lost during construction of Marina del Rey, and how vital such areas are for a wide variety of native wildlife, including birds, mollusks, and other intertidal invertebrates.

3. Subsurface debris, including chunks of concrete and asphalt, and sections of pipe, should be removed from the Basin where possible, as these would interfere with ecological functions of the mudflat.

4. Establish the primacy of habitat values over recreation as part of restoration. Removing non-native landscaping and increasing passive recreation potential along the margins of Oxford Basin are worthwhile improvements, but the existing dense vegetation and fencing currently provide considerable security for the herons and egrets that use the Basin's existing habitats in large numbers. Improving public access to the Basin and replacing the tall myoporum with low-growing scrub will be of little or no practical value (for wildlife or the public) if increased human activity causes the herons, egrets, and other wildlife species to stay away from Oxford Basin. Therefore, the Basin must be managed carefully for its wildlife habitat values, along with providing for flood protection and water quality improvement. Levels of passive recreation and other non-essential human uses should not conflict with these main purposes.

5. With plans for new fencing and increased public access to the Basin, care must be given to ensure that the old pattern of dumping of pets or other feral animals into the Basin does not recur, perhaps by the creation and support of a local stewardship organization (including a volunteer ranger/docent program) and clear, vandal-resistant (and easily-replaced/repaired) signage.

6. Any new development at Oxford Basin should be evaluated for its role in promoting natural wildlife habitat, vs. degrading or hindering this habitat. As the site is restored and public access improves, the County may receive proposals from groups to make various uses of the area (e.g., filming, special events, trash clean-up). The County should establish a mechanism for handling such requests, or should include appropriate provisions in a contract with an outside resource management group or a local Audubon chapter.

7. Following renovation, care should be taken to communicate effectively with all relevant users and managers that Oxford Basin, although first and foremost a flood-control facility, can be managed simultaneously as a habitat for native plants and wildlife without affecting flood-control capabilities. Therefore, activities like dumping compost or construction material, planting inappropriate vegetation, and feeding wildlife or domesticated birds, should not be tolerated.

8. Non-native vegetation should be removed from all parts of Oxford Basin on a regular, continuing basis under the supervision of a qualified professional, except where demonstrated to be critical to fulfilling an important natural process (e.g., retention of a small number of eucalyptus, ficus, or other non-native trees with regularly-nesting herons/egrets), consistent with the operation and maintenance requirements of the LACFCD. However, no new non-native

vegetation, or even "California native" (but not locally-native) vegetation inappropriate for the Ballona Wetlands, should be introduced.

9. The establishment of appropriate native landscaping will probably require a complete removal of all existing ground cover and weeds, and could also require eradication of the weed seedbank (e.g., through "solarization" or appropriate means).[1]

10. All vegetation above the high-tide line to be preserved, promoted, and restored/re-created should consist only of the two habitat types native to the historical Ballona Wetlands area (from Cooper 2008): 1) coastal scrub (a low-profile, summer-deciduous community dominated by such species as California sagebrush *Artemisia californica*, California sunflower *Encelia californica*, and coast goldenbush *Isocoma menziesii*), and 2) willow scrub (a low thicket-like community dominated by narrow-leaved willow *Salix exigua*). A professional firm, or firms, specializing in southern California native plant restoration, installation, and maintenance is recommended to prepare the site for planting, and to achieve successful establishment of these native communities.

11. Unnecessary and derelict concrete structures currently on the site (such as old wildlife watering troughs) and redundant fencing should be removed from the upper slopes where feasible.

12. Telephone lines that currently cut across the northern part of Oxford Basin may be re-routed along Washington Boulevard or Admiralty Way, as they could conflict with future wildlife use of the site (and lead to collisions with flying birds, including the listed California Brown Pelican, especially on foggy days).

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[1] The term solarization refers to sterilization of soil by covering it with plastic sheeting for roughly six weeks during warm weather. The sun's radiation is converted to heat by absorption, heating the material above 60°C, hot enough to kill seeds and pathogens in the soil.

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ATTACHMENT A: BOTANY REPORT

Botanical Resources of the Oxford Basin Marina del Rey, Los Angeles County, California

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1.0 INTRODUCTION

Oxford Retention Basin (Oxford Basin or Basin) is located in the Marina del Rey Harbor, Los Angeles County, California. It is located approximately 1 mile east of Venice Beach, and 600 feet north of the Marina del Rey Harbor (Figure 1-1). It is south of Washington Boulevard, north of Admiralty Way, east of an existing public parking lot, and west of Yvonne B. Burke park (Figure 1-2). The property occurs on the Venice 7.5' U.S.G.S. topographic quadrangle map and is generally located at the following UTM coordinates: 11S 03 65 584m E × 37 61 458mN. Oxford Basin occurs in an area that was historically part of the Venice Marshes (Figure 1-3).

The County of Los Angeles has proposed an enhancement project for Oxford Basin (County of Los Angeles 2009), to improve flood control, water quality, aesthetics, and passive recreation at this facility.

To characterize and document the existing botanical resources at Oxford Basin, a series of botanical surveys was conducted during the spring of 2010 in a study area, consisting of the Basin and a surrounding fenced-in area, which covers approximately 8.94 acres. The objectives of this study were to describe and determine the extent of each plant community and to note the plant species within this study area.

Figure 1-1. Oxford Basin is located on the northern boundary of Marina del Rey, Los Angeles County, California.

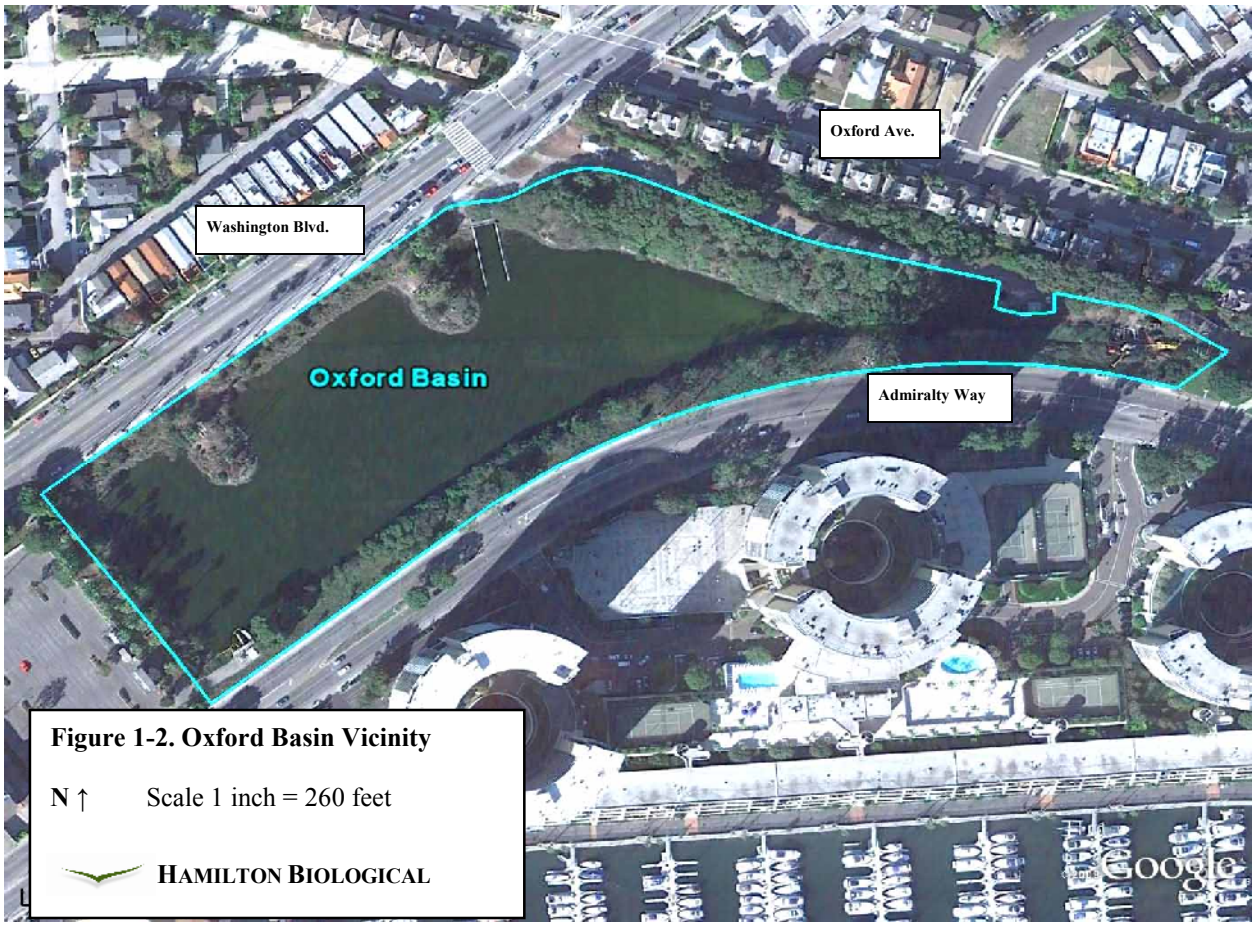


Figure 1-2. Oxford Basin is bounded on the north by Washington Boulevard and Oxford Avenue, and on the south by Admiralty Way.

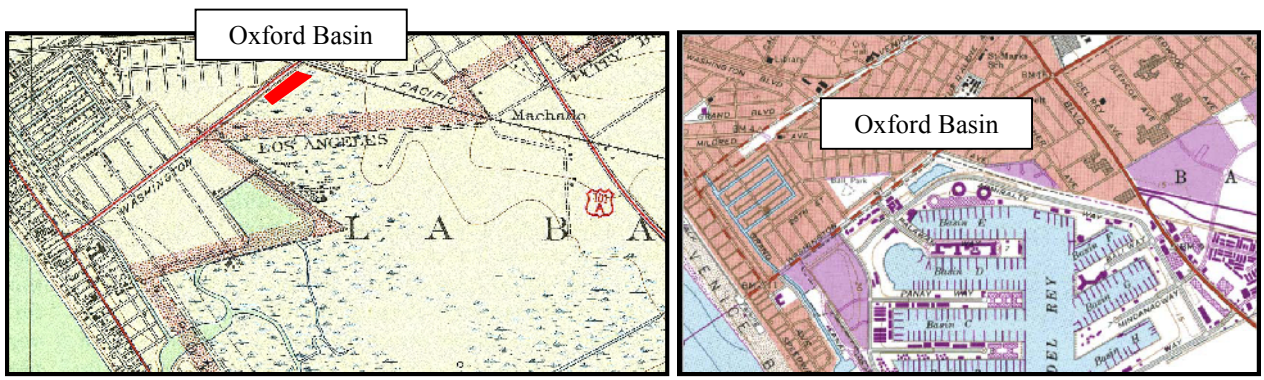


Figure 1-3. Historical topography showing in red the future location of Oxford Basin in 1942 (left) and the Basin as it existed (and still exists) in 1964 (right). Source: USGS Venice 7.5' topographic quadrangles.

2.0 METHODS

A literature review was conducted to determine the known information on the plant communities and botanical resources in the Marina del Rey region, and to determine the known plant species of special interest documented from this area. Literature reviewed included various species lists (Frankel 2006a, 2006b, 2006c, 2007; Mattoni 1997), environmental studies (Glenn Lukos Associates 2006), and information on plant communities (Zedler 1982). To determine the potential "special status" plant species known from the region, the California Natural Diversity Data Base (CNDDB 2010b), CNPS Inventory (2010), and the Consortium of California Herbaria (2010) were examined to note the species and when these plants had last been collected or observed.

A general tour of the project site was conducted with Robert Hamilton and other biologists evaluating Oxford Basin on 12 January 2010. Generally, only limited observations were conducted during this brief examination of the study area. Three botanical surveys were conducted during the spring of 2010. The surveys were conducted by David Bramlet, botanist, and generally consisted of walking over the project site for four or five hours. Surveys were conducted on 29 March, 22 April, and 13 May 2010. Field notes were taken on the plant species present in each community, and notes on the distribution of the communities were made on copies of an aerial photo of Oxford Basin at scale 1 inch equals 100 feet.

A wetland delineation was conducted on 12 June 2010 by D. Bramlet and R. Riefner, using the Arid West supplement (U.S. Army Corps of Engineers 2008) to the Corps' 1987 wetland delineation manual (Wetland Training Institute 1991). The examination included a review of hydrology, soils and vegetation at selected areas around the Basin and determinations were made of those areas that would qualify as Corps jurisdictional wetlands and those that would qualify as wetlands under the criteria of the California Coastal Commission.

The scientific names provided in the text generally follow Roberts (2008) for native plant species and Brenzel (2007) for ornamental plant species.

3.0 EXISTING ENVIRONMENT

3.1 PLANT COMMUNITIES

Oxford Basin is generally characterized by open water, with wetland and upland communities occurring along the margins of this Basin. Mapping units or plant communities found within the Oxford Basin study area include open water, mud flats, saltmarsh, annual grassland, ornamental plantings and ruderal areas (Figures 3-1a, 3-1b). The following paragraphs describe the characteristic species in each community. Plant species observed on the project site are specified in Appendix A.

Open Water (OW)

Oxford Basin is characterized by open water that generally has a high salinity. This open water characteristically has blooms of dense mats of algae, but no vascular plants occur in the fluctuating waters of the Basin.

Mud Flats (MF)

Mud flats are exposed during normal tidal fluctuations, and are generally unvegetated, although some of the higher areas do support common woody pickleweed (*Salicornia virginica*) during the summer months. The total area of exposed mud flats can fluctuate greatly depending on management actions. In particular, Oxford Basin can be drained in anticipation of winter storms, exposing additional areas within the Basin, and the Basin can be allowed to fill with storm waters when the tidal gates are closed, leaving no mud flats exposed.

Beach (Bch)

These unvegetated areas of Oxford Basin have a similar substrate to the mud flats but are dry and generally unvegetated, as they are inundated only by the highest tides or during heavy rainfall. However, some beach areas may develop stands of common woody pickleweed during the summer months.

Salicornia Marsh (SM)

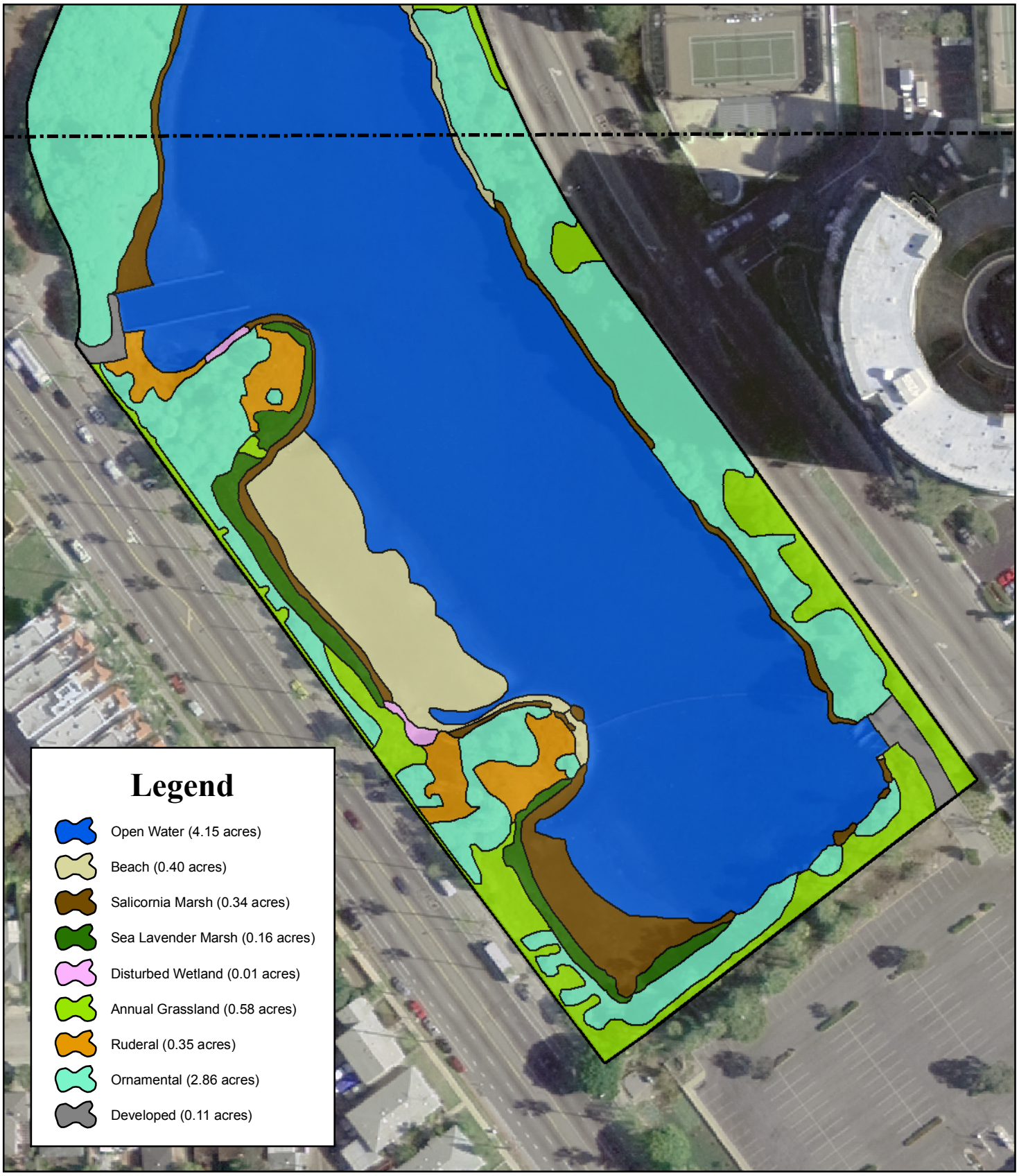
Except near the inlet area at the east end, Oxford Basin supports a "ring" of saltmarsh-like vegetation along the upper tidal edge. This vegetation generally consists of a lower stratum dominated by common woody pickleweed; other commonly found species consisted of spearscale (*Atriplex prostrata*), rabbit's foot grass (*Polypogon monspeliensis*), saltmarsh sand spurry (*Spergularia marina*), toad rush (*Juncus bufonius*), alkali heliotrope (*Heliotropium curassavicum*), scarlet pimpernel (*Anagallis arvensis*), alkali weed (*Cressa truxillensis*), slender-leaved cat-tail (*Typha domingensis*), and lesser wart-cress (*Lepidium didymum*). This marsh area also included some localities with dense stands of spearscale, along with some scattered common woody pickleweed.

Sea Lavender Marsh (SLM)

At Oxford Basin, this community occurs at a slightly higher elevation than does Salicornia Marsh. Sea Lavender Marsh is characterized by dense mounds of Perez's sea lavender (*Limonium perezii*), and on the south side of the Basin this species occurs together with tall limonium (*Limonium arborescens*). Other species found in this community include saltmarsh sand spurry, alkali heliotrope, curly dock (*Rumex crispus*), yellow sweet clover (*Melilotus indicus*), garden beet (*Beta vulgaris*), kikuyu grass (*Pennisetum clandestinum*), prickly lettuce (*Lactuca serriola*), and Australian saltbush (*Atriplex semibaccata*).

Disturbed Wetland (DW)

Some small areas along the margins of Oxford Basin that did not appear to be part of the saltmarsh community were classified as "disturbed wetland." These small areas consisted of stands of rabbit's foot grass, spearscale, Mexican tea (*Dysphania ambrosioides*), crab grass (*Digitaria sanguinalis*), Boccone's sand spurry (*Spergularia bocconei*), Mexican fan palm (*Washingtonia robusta*) seedlings, annual blue grass (*Poa annua*), common purslane (*Portulaca oleracea*), goose grass (*Eleusine indica*), lesser wart cress, and common stink grass (*Eragrostis cilianensis*).



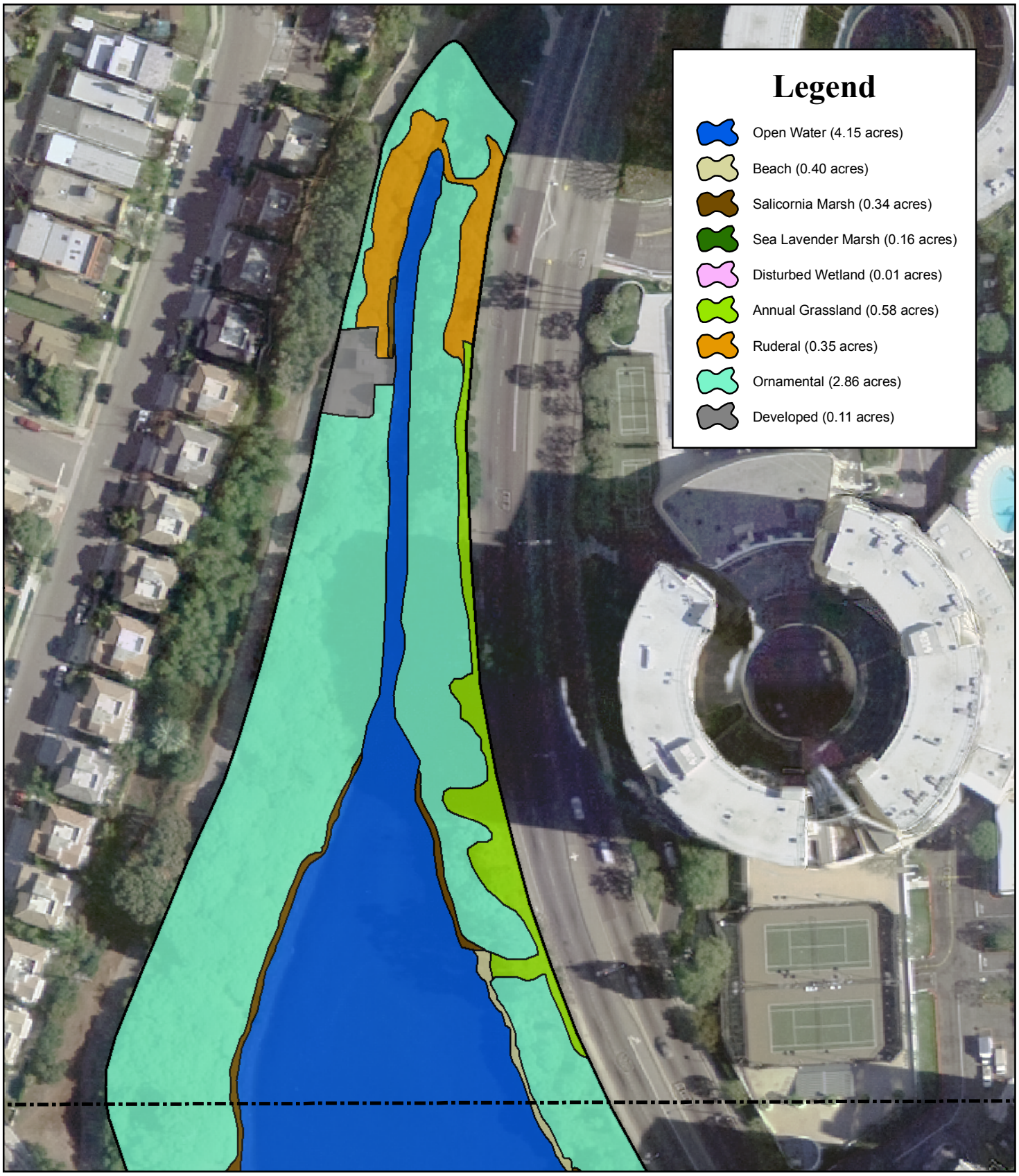
Site area: 8.94 acres

0 100 200 Feet

Figure 3-1a

Plant Communities

of the Oxford Basin



Site area: 8.94 acres

0 100 200 Feet

Figure 3-1b

Plant Communities

of the Oxford Basin

Annual grassland (Agr)

Much of the upland areas around Oxford Basin consist of an annual grassland, often interspersed with ornamental shrubs and trees planted on the site. Commonly found grasses in this community consisted of ripgut brome (*Bromus diandrus*), slender wild oat (*Avena barbata*), red brome (*Bromus madritensis* ssp. *rubens*), foxtail barley (*Hordeum murinum* ssp. *leporinum*), and panic veldt grass (*Ehrharta erecta*). Moist sites contained Bermuda grass (*Cynodon dactylon*), smilo grass (*Piptatherum miliaceum*), rabbit's foot grass, water bentgrass (*Agrostis viridis*), rescue grass (*Bromus catharticus*), and Dallis grass (*Paspalum dilatatum*). Commonly found forb species included summer mustard (*Hirschfeldia incana*), common horseweed (*Conyza canadensis*), London rocket (*Sisymbrium irio*), scarlet pimpernel, Mexican tea, lesser wart cress, Australian saltbush, cheese weed (*Malva parviflora*), white-stemmed filaree (*Erodium moschatum*), common sow thistle (*Sonchus oleraceus*), yellow sweet clover, nettle-leaved goosefoot (*Chenopodium murale*), red-stemmed filaree (*Erodium cicutarium*), and dwarf nettle (*Urtica urens*).

Ruderal (Ru)

Some parts of the study area contain plant species consistent with disturbed localities. Common species in the ruderal habitat consisted of foxtail barley, panic veldt grass, red brome, ripgut brome, Russian thistle (*Salsola tragus*), bull mallow (*Malva nicaeensis*), London rocket, serrate-leaved saltbush (*Atriplex suberecta*), garden beet, summer mustard, bristly ox-tongue (*Picris echioides*), redscale (*Atriplex rosea*), puncture vine (*Tribulus terrestris*), petty spurge (*Euphorbia peplus*), dwarf nettle, four-leaved polycarp (*Polycarpon tetraphyllum*), kikuyu grass, black mustard (*Brassica nigra*), prickly lettuce, common purslane, castor bean (*Ricinus communis*), tree tobacco (*Nicotiana glauca*), pampas grass (*Cortaderia selloana*), and sweet fennel (*Foeniculum vulgare*).

Ornamental

Ornamental tree, shrub and vine plantings generally dominate the upland areas of the Oxford Basin study area. In the eastern part of the property a myoporum "woodland" is found, characterized by dense stands of myoporum (*Myoporum laetum*), along with some planted pines (*Pinus* sp.). Other areas of the site contained scattered stands of myoporum, with Mexican fan palm, melaleuca (*Melaleuca* sp.), Brazilian pepper tree (*Schinus terebinthifolius*), crimson bottle bush (*Melaleuca citrina*), Peruvian pepper tree (*Schinus molle*), Indian laurel fig (*Ficus microcarpa*), oleander (*Nerium oleander*), and grape vines (*Vitis* sp.). The south side of the Basin has a more open cover of myoporum and a greater diversity of ornamental plantings. Planted trees and shrubs in this locality included, pines, lemon gum (*Eucalyptus citriodora*), Catalina

cherry (*Prunus lyonii*), creeping fig (*Ficus pumila*), Brazilian pepper tree, red gum (*Eucalyptus camaldulensis*), Canary Island palm (*Phoenix canariensis*). Shrubs consisted of crimson bottle bush, oleander, melaleuca, firethorn (*Pyracantha coccinea*), and dwarf myoporum (*Myoporum parvifolium*).

Developed (Dev)

The pump stations, low flow bypass structure, paved roads and concrete inflow structures were mapped as developed.

4.0 SPECIES AND COMMUNITIES OF SPECIAL INTEREST

Species of special interest, or "special status" species, are defined as those plant species of concern to the California Department of Fish and Game, Natural Diversity Database (CNDDB 2010a), California Native Plant Society (2010), and the U.S. Fish and Wildlife Service (USFWS). The literature review was described previously, in the Methods section. The results of this review are provided in Table 4-1. Many of these species were historically documented, but few have any recent observations. Some of the exceptions include the recent finding of an occurrence of the Orcutt's pincushion (*Chaenactis glabriuscula* var. *orcuttiana*), and it is assumed that other historically known sensitive plant species still occur in this region.

Oxford Basin has very limited habitat for any of the special status plant species potentially occurring in the region. The only species with some potential for occurrence is the southern tarplant (*Centromadia parryi* ssp. *australis*), since this species often occurs in disturbed habitats. However, this species was not observed during the field surveys and the potential for occurrence appears to be low in the highly modified habitats surrounding the Basin.

TABLE 4-1

PLANT SPECIES OF SPECIAL INTEREST IN THE OXFORD BASIN STUDY AREA

Species	Status		Habitat	Known Localities
	Federal, State	CNPS		
Astragalus pycnostachyus var. *lanosissimus* Ventura marsh milk vetch	FE, CE	List 1B.1	Coastal salt marshes	Currently known from a single locality in Ventura County, other historical localities are considered extirpated. Historically recorded from the Ballona marshes.
Astragalus tener var. *titi* Coastal dunes milkvetch		List 1B.1	Coastal dunes	Known in the region only from historic localities, including Santa Monica & Hyde Park
Atriplex pacifica South coast saltbush		List 1B.2	Grassland, Sage scrub, Alkali meadow	Historically recorded from Redondo & San Pedro, no recent documentation from the region
Atriplex serenana var. *davidsonii* Davidson's saltscale		List 1B.2	Alkali meadow	Historically recorded from Los Angeles, Cienega, no recent documentation from the region.
Camissonia lewisii Lewis's evening primrose		List 3	Coastal dunes & scrub	Historically recorded from Ballona, El Segundo Dunes, Ingelwood, no recent documentation from the region.
Centromadia parryi ssp. *australis* Southern tarplant		List 1B.1	Alkali meadows, grasslands	Ballona marshes, Marina del Rey, Marina del Rey Hills.
Chaenactis glabriuscula var. *orcuttiana* Orcutt's pincushion		List 1B.1	Coastal dunes, Coastal bluff scrub	Ballona wetlands, coastal strand, recently documented from the study region.

Species	Status		Habitat	Known Localities
	Federal, State	CNPS		
Cordylanthus maritimus ssp. *maritimus* Salt marsh bird's beak	FE, CE	List 1B.2	Salt marsh	Historically recorded for "Santa Monica", considered to be extirpated from this area.
Hordeum intercedens Vernal barley		List 3.2	Moist grasslands and alkali meadows	Historically recorded from the Ballona wetlands.
Juncus acutus ssp. *leopoldii* Southwestern spiny rush		List 4.2	Salt marsh, brackish marsh	No formal documentation for the occurrence of this species within the study region. However, it does occur on some complied lists (Frankel 2006).??
Lasthenia glabrata ssp. *coulteri* Coulter's goldfields		List 1B.1	Alkali meadows salt marshes	Historically recorded from the Ballona wetlands, del Rey and El Segundo, no recent documentation.
Nemacaulis denudata var. *denudata* Coast woolly-heads		List 1B.2	Coastal dunes, margins of salt marshes	Historically reported from Los Angeles and Long Beach, no recent documentation from the region.
Phacelia stellaris Brand's star phacelia		List 1B.1	coastal dunes	Historically recorded from Playa del Rey, considered extirpated from this region.
Potentilla multijuga Ballona cinquefoil		List 1A	Salt marsh	Considered extirpated.
Suaeda esteroa Estuary seablite		List 1B.1	Salt marsh	Long Beach, Seal Beach, no records from the study area.
Suaeda taxifolia Woolly seablite		List 4.2	Salt marsh, coastal bluff	Historically reported from Playa del Rey

STATUS CATEGORIES

Federal Status:
FE - Listed as federally endangered.
FT - Listed as federally threatened.

State Status:
CE - Listed as endangered by the state of California.
CT - Listed as threatened by the state of California.

California Native Plant Society:
CNPS 1A- Plants presumed extinct in California.
CNPS 1B - Plants considered rare, threatened or endangered in California and elsewhere.
CNPS 2 - Plants rare, threatened or endangered in California but more common elsewhere.
CNPS 3 - Plants about which we need more information - A review list.
CNPS 4 - Plants of limited distribution - A watch list.

CNPS Threat Extensions
0.1 Seriously endangered in California.
0.2 Fairly endangered in California.
0.3 Not very endangered in California.

4.2 COMMUNITIES OF SPECIAL INTEREST

Plant communities of special interest are those depleted habitats of concern to local, state and federal agencies or that are within the jurisdiction of federal state or local acts ordinances or other regulations. These include coastal wetlands, Environmentally Sensitive Habitat Areas (ESHA), or other habitats designated as of special interest in the region. In the Oxford Basin area, sensitive habitats include waters or wetlands under jurisdiction to the U. S. Army Corps of Engineers, California Coastal Commission, and the California Department of Fish and Game. It also includes those areas designated by the County of Los Angeles as Significant Ecological Areas, including SEA No. 5 (Old SEA 29) at Ballona Creek (England and Nelson 1976, County of Los Angeles 2008), approximately 1.25 miles south of Oxford Basin. There are no designated ESHAs within Marina del Rey.

A wetland delineation was conducted within Oxford Basin (Bramlet 2010) to determine the extent of (a) Corps jurisdictional wetlands and waters of the United States and (b) wetland habitats as defined by the California Coastal Commission. Please refer to the wetland delineation report for maps and descriptions of these wetland areas.

5.0 RECOMMENDATIONS

The following recommendations are provided for improving the ecological functions and values of Oxford Basin's plant communities:

- Investigate the feasibility of increasing the total area of the tidal prism at differing elevational levels. The principal function of Oxford Basin is to maintain maximum flood control capacity, and this may require a uniform upper elevational level. However, if sediment is to be removed from the Basin, the potential of having differing elevational levels within the Basin should be evaluated. This would allow for a greater diversity of native salt marsh "habitats" (e.g. mid-marsh, high marsh) and species that could potentially be introduced into the Basin.

- Investigate the feasibility of establishing vascular aquatic plant species, such as eel grass (*Zostera marina*) within the mud flats of Oxford Basin. These could be placed in artificial submerged structures, that would allow "harvesting" of the eel grass. These plants would be grown more to enhance water quality and reduce the algal blooms, than to enhance the habitat found within the mudflats. Another alternative would be to create areas of sandy habitat within the Basin, to provide substrate for this or other suitable species.

- Consider the feasibility of enhancing the salt marsh community found at Oxford Basin. This would include plans for the removal of the non-native Perez's sea lavender (*Limonium perezii*), which has low habitat value for native wildlife, and replacement with a more diverse group of native salt marsh species. Some of these species could include California marsh rosemary (*Limonium californicum*), alkali heath (*Frankenia salina*), saltgrass (*Distichlis spicata*), jaumea (*Jaumea carnosa*), shore grass (*Monanthochole littoralis*), and American saltwort (*Batis maritima*). The plan would need to determine the suitability of the existing habitats for these species, and potential procedures that could

allow for develop different marsh habitats within the Basin. Planting plans would then need to be developed with the different palettes for the salt marsh plantings, along with detailed procedures for preparing the sites for planting/seeding and long term maintenance of the marsh enhancement areas.

- Consider the development of a native plant enhancement plan for Oxford Basin. This would include a plan for the removal of the myoporum, melaleuca, and other non-native trees and shrubs from the Basin. A planting palette of suitable native trees, shrubs and grasses could then be developed for the project site. These could include laurel sumac (*Malosma laurina*), Mexican elderberry (*Sambucus mexicana*), lemonadeberry (*Rhus integrifolia*), California sagebrush (*Artemisia californica*), California buckwheat (*Eriogonum fasciculatum*), coyote bush (*Baccharis pilularis*), bladder pod (*Cleome isomeris*) and other suitable shrubs or trees for the project site. Perennial grasses, such as purple needle grass (*Nassella pulchra*) or giant wild rye (*Elymus condensatus*), could also be planted in the understory. The planting plan would need to include procedures for testing the soils for excess salts, and preparing these soils before planting, determining the suitable planting procedures, detailing any provisions for erosion control, such as mulches on the exposed soils, and determining the potential need for supplemental irrigation. A detailed long-term maintenance plan would also have to be developed. This would develop provisions for maintaining any irrigation systems, repairing erosion, weeding the site, and replacing dead or damaged plantings in the enhancement areas.

- Determine the native plants within Oxford Basin and a listing of non-native plant species that should be removed from the area surrounding the Basin. The botanical survey conducted for this report could not identify all of the species present within the study area, typically because the available plant materials lacked certain characters required for positive identification. Further studies would be necessary to more completely define the Basin's existing flora.

- Determine the invasive non-native plants that occur within Oxford Basin and develop a plan to remove these species. Such a plan would note the invasive plant species that are likely to cause continual problems in any native plant enhancement plantings, such as panic veldt grass (*Ehrharta erecta*). Procedures for the initial removal of the existing infestations and long-term maintenance measures to prevent further infestations of these species within the Basin would need to be developed in such a plan.

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ATTACHMENT B: ENTOMOLOGY REPORT

Final Report

Oxford Basin Invertebrate Study

Report number OBIS-2010-1-F

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Project Period: *September 18th, 2009* **to** *May 24th, 2010*

September 7th, 2010

Executive summary

Marina del Rey's Oxford Basin is one of the few remaining areas in Los Angeles County with intertidal mud flat habitat. Mud flats provide essential feeding grounds for numerous animal species.

Invertebrates, because of their omnipresence and pivotal role in the food chain, are key indicators of the health of an ecosystem. The aquatic invertebrate fauna of Oxford Basin, albeit somewhat impoverished, is not atypical for a Southern Californian coastal wetland. A broad selection of phyla was encountered from sieved, netted, benthic and non-benthic samples, indicating a functional ecosystem. Most abundant among the aquatic macro-invertebrates were the native California Mud Snail (*Cerithidea californica*), and Gammarid Amphipods, which are a primary food source and an important link in healthy lagunal ecosystems.

The Oxford Basin flora is predominantly non-native, and constitutes a degraded fundament for a terrestrial faunal ecosystem. The native and non-native terrestrial invertebrate fauna at Oxford Basin consists, for the most part, of species found in urban environments. Despite the relative abundance of non-native plant and invertebrate species, the ecosystem is functional, with primary consumers, and both primary and secondary predators, present. A few remarkable species were found at the site, including a Signal Fly (Platystomatidae), see figure 1, that appears to be a first record for California.

Besides Monarch Butterflies, and the Signal Fly mentioned above, no species of potential biological sensitivity were found. The Basin in its current state does not offer a suitable overwintering site for Monarch Butterflies. Recommendations for conservation are provided toward the end of the report.

This project had the following three goals:

- to provide a high-level baseline inventory of the invertebrates of Oxford Basin;
- to survey and document invertebrate species of potential conservation concern; and
- to establish recommendations for conservation.

These goals have been successfully completed.

Figure 1: **Signal Fly** (*Amphicnephes sp.*)

1 Introduction

This report describes the methods and provides the results of the Oxford Basin Invertebrate Study that took place between September 18, 2009 and May 24, 2010. The study concerns the Oxford Retention Basin in Marina del Rey, Los Angeles County, California (the Basin or simply "the site"). The site is located approximately one mile inland from the coast and is predominantly bounded by Washington Boulevard, Admiralty Way, and Oxford Avenue. Its approximate Global Positioning System (GPS) coordinates are: 33**d** 59' 07" North; 118**d** 27' 18" West, where boldface '**d**' stands for degrees, a single quote for minutes, and a double quote for seconds.

The approximately 10.7-acre site consists of a large retention basin covering approximately three to five acres, depending on the water level. The basin is under tidal influence and can be isolated from the Marina waters by closing a gate.

The site is surrounded by urban areas, but has relative proximity to a few natural areas. The site is approximately 1.5 mile northwest of the Ballona Wetlands, three miles northwest of the El Segundo Dunes remnant west of LAX International Airport, six miles southeast of the Santa Monica Mountains, and 13 miles north of the Palos Verdes Peninsula. These four areas harbor a relatively high biodiversity, including a number of endemics, threatened species, and various other species of concern.

This study involved a high-level baseline invertebrate survey of both the upland and aquatic habitats. A key focus of the project was in determining if any species of conservation concern might be present at the site. Another goal was to provide recommendations for invertebrate conservation. The following sections contain the results obtained toward these goals.

Figure 2: **Fiery Skipper** (*Hylephita phyleus*) female on **Sea-lavender** (*Limonium perezii*)

2 Invertebrate surveys

The following two subsections contain details on the methodologies used for the terrestrial and aquatic surveys, as well as a discussion of the data obtained.

2.1 Terrestrial invertebrates data collection

Common terrestrial invertebrates are mostly comprised of insects and arachnids (spiders and kin). Other, less abundant taxa include: isopods (sow bugs and kin), land snails, and earthworms. Terrestrial invertebrates can be divided into (1) herbivores and detrivores, which are the primary consumers, and (2) predators and parasites. The herbivores and detrivores comprise the lower levels of the food chain; they are an essential cornerstone of ecosystems. Terrestrial herbivores are usually associated with certain host- or food-plants, which are predominantly plants native to the area. Native plants are therefore the base for a healthy terrestrial ecosystem.

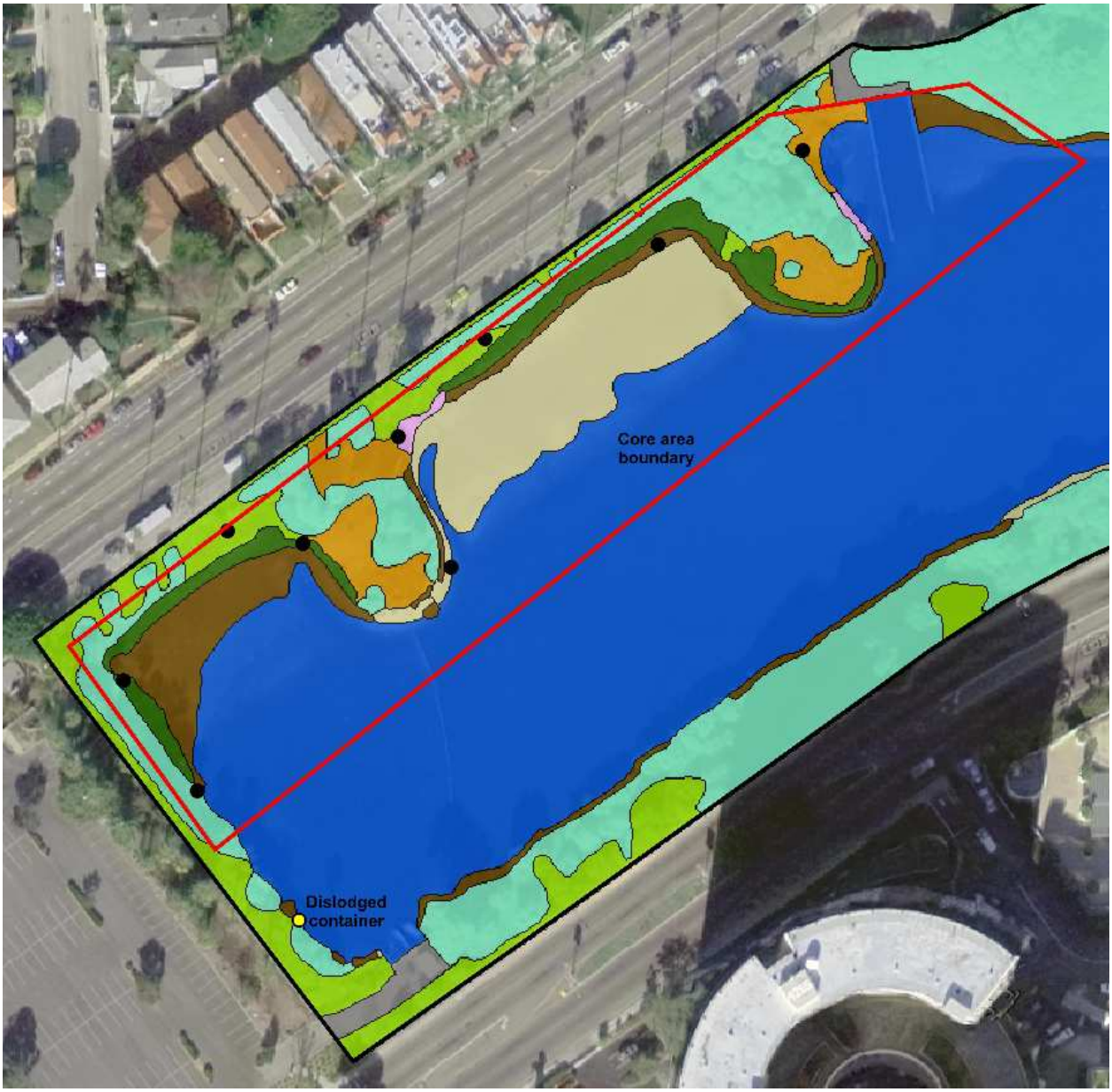
The majority of the upland area of the site is currently dominated by ruderal, non-native plant species, as documented in David Bramlet's accompanying botanical report. The biodiversity of the site is therefore expected to be compromised. The uplands of the site can be divided into "core" and "non-core" areas. The core areas include most of the basin's northwest and southwest banks, where native vegetation, such as Wild Heliotrope (*Heliotropium curassavicum*) and Common Woody Pickleweed (*Salicornia virginica*), is found. The rest of the site's uplands are non-core areas that harbor little to no native vegetation. Map 1 shows the core area delineated by a red line.

2.1.1 Methodology

The minimal impact terrestrial invertebrate survey was performed in stages, using the following methodologies:

- visual detection and photo-documenting salient organisms, as well as evidence of their presence;
- overnight pitfall trapping focused on flightless invertebrates; and
- beat-sheet collection.

Five field trips were conducted during the course of this project. The field trip dates were: September 23rd and 24th, 2009, October 5th, 2009, January 12th, 2010, and May 7th, 2010. Visual detection took place during all five visits of the site, with the bulk recorded on September 23 and 24, 2009, during unseasonably warm weather with high temperatures of approximately 85ºF. Ten pitfall traps, consisting of 1.75-liter white polypropylene containers with smooth, near-vertical walls, were placed on September 23, 2009 at various well-spaced locations between the waterline and the higher parts of the core upland areas. The locations of the pitfall traps are indicated by circles on Map 1. The next morning they were collected, and their content documented.



Map 1: Map of western part of Oxford Basin (adapted from vegetation map by David Bramlet). The red margined area delineates the core area. Pitfall trap locations are depicted by circles. The yellow circle indicates location of the pitfall trap container dislocated by the rising tide.

One container, which was placed closest to the waterline, was dislocated by the still rising water and only contained one terrestrial mite. The location of this contained is marked with a yellow circle on Map 1. The beat sheet collection took place on January 12, 2010. This technique involves beating vegetation with a stick to dislodge invertebrates that are caught on a large, white sheet placed below.

The organisms encountered were photographically recorded and the photos archived. Approximately 1,500 photos of specimens were taken during the project.

2.1.2 Terrestrial invertebrate data collected

The combined results from the three data collection methodologies are listed in Appendix A. Specimens in families already represented in the table, which were not yet identified to genus level, have been omitted.

2.1.3 Discussion

The Oxford Basin flora is predominantly non-native, and constitutes a degraded fundament for terrestrial faunal ecosystem. The native and non-native terrestrial invertebrate fauna at Oxford Basin consists, for the most part, of species typically found in urban environments. Despite the relative abundance of non-native plant and invertebrate species, the Basin's ecosystem is functional, including primary consumers and both primary predators (e.g., spiders) and secondary predators (e.g., spider wasps).

The terrestrial fauna is dominated by non-native species, in particular the Argentine Ant (*Linepithema humile*), which is discussed below. Another important non-native is the European Paper Wasp (*Polistes dominula*), which often outcompetes and then replaces native paper wasp species. Two out of three adult hemipteran species encountered are non-native to the United States. They are Bagrada Bug, also known as the Painted Bug (*Bagrada hilaris*), native to Africa, Southern Asia, and Southern Europe, and the Torpedo Bug (*Siphanta acuta*), see figure 7, native to Australia. The third adult hemipteran encountered was one exemplar of a plant bug (*Phytocoris* sp.), which is not commonly found in metropolitan Los Angeles.

Some native species were also found in relative abundance, like the Brine Fly (*Ephydra niveiceps*), which is associated with aquatic habitats, and the Sinuous Bee Fly (*Hemipenthes sinuosa*), as well as the Jumping Spider (*Habronattus pyrrithrix*) and the Margined Spurthroated Grasshopper (*Melanoplus marginatus*). The latter two are discussed below.

The most remarkable species found at the site was a beetle-like insect with a long aardvark like snout. It is a Signal Fly (Platystomatidae), see figure 1, and seems to be a new record for California. Robb Hamilton found one exemplar of this Signal Fly that looks like it belongs in genus *Amphicnephes*. There are only three species of *Amphicnephes* described in the world, all from America:

1. *A. fasciola*, with records from Kansas and Arizona,
2. *A. pullus*, which is relatively common and widespread in the Eastern Nearctic region, (west to Texas), and
3. *A. stellatus*, with records from southern and eastern Mexico.

The specimen is likely *Amphicnephes fasciola*, given that its distribution range, which includes Arizona, is the closest to Southern California of the three described species, and Coquillett's original description of *A. fasciola* [Coquillett 1900] matches reasonably well. On subsequent visits the principal investigator surveyed the area where the specimen was seen but did not find another exemplar as potential voucher specimen. It is likely that the restricted public access has contributed to the survival of this rarity at Oxford Basin.

A few species of special interest are discussed in some detail here:

Argentine Ant (*Linepithema humile*)

A species of special concern in terms of its abundance is the Argentine Ant (*Linepithema humile*). This small ant is abundant on the site, across much of Los Angeles County, and far beyond. It is an introduced, i.e. non-native, species that outcompetes native ant species [Nygard 2008] [Holway 1999] [Kennedy 1998] [Erickson 1971] [Human 1996] [Human 1998] and other invertebrates [Cole 1992] [Holway 1995] [Grover 2008]. In Los Angeles County, Argentine Ants have decimated the native California Harvester Ant (*Pogonomyrmex californicus*) and hence, indirectly their predator, the Coast Horned Lizard (*Phrynosoma blainvillii*), which primarily feeds on native ant species like the California Harvester Ant. No native ants were found at the site.

Margined Spurthroated Grasshopper (*Melanoplus marginatus*)

Only one species of grasshopper was found during the survey. This is the short-winged form of the Margined Spurthroated Grasshopper (*Melanoplus marginatus*), see figure 5, which was fairly common at the site. This species is endemic to California. The southern edge of its range includes part of the Santa Monica Mountains [Capinera 2004]. The Oxford Basin population may therefore represent its southernmost recorded occurrence. It is not clear if it is found in the Ballona Region, as only "*Melanopus species?*" is listed in the 1980-1981 entomology survey report [Schreiber 1981], and there are a number of other *Melanoplus* species present in the Los Angeles Basin. Increasing their distribution area is hampered by their short wings, which render them incapable of sustained flight and limits their dispersal, especially when surrounded by urban areas. Their local gene pool is therefore in danger of becoming impoverished.

Jumping Spider (*Habronattus pyrrithrix*)

The Jumping Spider (Salticidae) most often encountered during the survey is *Habronattus pyrrithrix*. This a common spider of the Los Angeles area, whose prime habitat includes wetlands. There seems to be a healthy population of these small jumping spiders at the site.

Spider Wasp (*Aporinellus sp.*)

A good-sized population of small, gray-and-black spider wasps (*Aporinellus sp.*) was present at the site. Despite a cosmopolitan distribution across the United States and beyond, they are uncommonly found in the Los Angeles metropolitan area. Their main prey is Jumping Spiders (see previous species account), which are food for their offspring. This renders these spider wasps secondary predators in this slender ecosystem.

2.2 Aquatic invertebrates

2.2.1 Methodology

The aquatic data collection was performed using a 500 micron D-frame net (BioQuip # 7412D). Sampling took place on Monday October 5th, 2009 near high-tide at various locations on the north and west side of the basin. These areas have the lowest bottom gradient, and consequently more extensive shallow areas, which usually have a higher invertebrate biodiversity. Before stepping into the water, we sampled the shallowest water depths, to minimize disturbance of potentially fast species. Next, we entered the water wearing waders and sampled up to deepest reachable areas, while standing in about 3 feet of water and using the 5-foot-long aquatic net handle. We first sampled the water column, followed by sweeps along the benthos, both with long, swift sweeps. The collected material was deposited into a wide white bucket. Next, the content of the bucket was transferred into collection jars using a 1-mm sieve for later examination in the lab.

2.2.2 Aquatic data

Our aquatic data collection, as described in section 2.2.1, resulted in specimens from a spectrum of phyla, as expected. We encountered large schools of juvenile fish, which were predominantly Mosquito Fish (*Gambusia affinis*, Phylum Chordata). This, and other fish species encountered at the site, are discussed in the accompanying fish report by Camm Swift of Entrix, Inc. We found the California Mud Snail (*Cerithidea californica*; Phylum Mollusca) in large quantities below the high-tide line, some Straight Horsemussels (*Modiolus rectus*), and a few other small to microscopic bivalves in the benthos. In the Phylum Arthropoda we found large numbers of Gammarid Amphipod (Suborder Gammaridae; Order Amphipoda) adults and immatures, as well as some Copepods (Class Maxillopoda) and the remains of one shrimp, which is apparently an Ocean (Smooth) Pink, also known as Pink Shrimp (*Pandalus jordani*; Order Decapoda; Class Malacostraca). We furthermore recorded relatively large numbers of Nematodes (Phylum Nematoda), some Flatworms (Phylum Platyhelminthes), Rotifers (Phylum Rotifera), and Seed Shrimp (Phylum Ostracoda), and various microscopic Protozoans (Phylum Protozoa), including some collared flagellates. Within each taxon we observed relatively little diversity.

This broad variety of organisms, plus the overall abundance of amphipods, indicates the relative health of the basin's water, and provides ample feeding grounds for various wildlife. Specifically, gammarid amphipods are a prime food source for fish and birds [McCurdy 2005] [Schneider 1981]. They also have a high sensitivity to environmental changes [Conlan 1994] [Zajac 2003], and monitoring their abundance can provide one useful measure of the quality of the ecosystem.

For completeness, we report collecting a wide spectrum of minute pieces of polymers (plastics) of all colors of the rainbow, as well as extruded polystyrene foam (Styrofoam) pellets, in our net. These ubiquitous particles typically become an undesired and unhealthy part of the food chain.

3 Species of potential concern

Species of concern range from those whose population survival is critically endangered and are formally protected by law, to rare, endemic, and other species whose populations may be declining due to urbanization, environmental pollution, or other threats. Invertebrate species of concern whose range includes, or potentially includes, the site, are discussed in the following subsections, grouped by information source.

3.1 Venice area species listed in the California Natural Diversity Database

The list of key species of concern for a certain area is usually obtained from the California Natural Diversity Database (CNDDB), which includes endangered species that are protected by law. The database contains the status and locations of rare plants and animals in California. The CNDDB data is linked to global status information, which is listed in the Global Natural Diversity Database (NDDB). The land area units used by the CNDDB correspond to Topographic Quadrangles (Quads), as defined by the United States Geological Survey (USGS). The standardized Quad map scale is 1:24,000 and the map covers an area measuring 7.5 minutes of latitude (approximately 8.5 miles) and 7.5 minutes of longitude (approximately 7 miles). The Oxford Basin is situated on the Venice Quad map. The CNDDB lists twelve species for the area covered by the Venice Quad map.

Table 1 contains the following information for each of these twelve species:

- scientific name (genus, species, and, where applicable, subspecies),
- common name,
- conservation status for the following five entities:
  - NDDB [CNDDB 2010]: “NDDB-rarity, Global”
  - CNDDB [CNDDB 2010]: “NDDB-rarity, CA”
  - Federal Endangered Species Act (ESA): “Fed.”
  - California Endangered Species Act (CESA): “(C)ESA, CA”
  - International Union for Conservation of Nature (IUCN) [IUCN 2010],
- whether the species was encountered during our surveys, and
- likelihood of presence at Oxford Basin.

Figure 3: **Plant Bug** (*Phytocoris sp.*)

Genus	Species	Sub-species	Common Name	Conservation Status					observed	Likelihood of presence at Oxford Lagoon
				NDDB-rarity		(C)ESA		IU		
				Global	CA	Fed.	CA	CN		
Brennania	belkini		Belkin's Dune Tabanid Fly	G1G2	S1S2	0	SC		no	low; lack of suitable sand dune habitat
Carolella	busckana		Busck's Gall Moth	G1G3	SH	0	SC	NE	no	very low; extirpated in L.A. County [LADoT 2009]
Cicindela	hirticollis	gravida	Sandy Beach Tiger Beetle	G5T2	S1	0	SC		no	very low; lack of suitable habitat.
Cicindela	senilis	frosti	Senile Tiger Beetle	G2G3 T1T3	S1	0	0		no	very low; possibly extirpated in L.A. Co.
Coelus	globosus		Globose Dune Beetle	G1	S1	0	SC	VU	no	very low; >50m from high-tide line; no fore-dune habitat.
Danaus	plexippus		Monarch Butterfly	G5	S3	0	SC		yes	present as migratory species
Eucosma	hennei		Henne's Eucosman Moth	G1	S1	0	SC		no	low; no host plant
Euphilotes	battoides	allyni	El Segundo Blue Butterfly	G5T1	S1	FE	0		no	low; no host plant
Onychobaris	langei		Lange's El Segundo Dune Weevil	G1	S1	0	SC	NE	no	low; lack of suitable sand dune habitat
Panoquina	errans		Wandering Skipper (Butterfly)	G4G5	S1	0	SC	NT	no	low; no host plant
Trigonoscuta	dorothea	dorothea	Dorothy's El Segundo Dune Weevil	G1T1	S1	0	SC		no	low; lack of suitable sand dune habitat
Tryonia	imitator		Mimic Tryonia (Brackish Water Snail)	G2G3	S2S3	0	SC	DD	no	very low; lack of suitable habitat; assumed extirpated in L.A. Co.

Table 1: Species listed in CNDDB for the area covered by the Venice Quad map
Abbreviations used: DD = Data Deficient; FE = Federally Endangered; NE = Not Evaluated; NT = Near Threatened; SC = Species of Concern; VU = Vulnerable; for (C)NDDB codes see [CNDDB 2010].

Some of the data in Table 1 is color coded. The conservation status data is color coded from red, representing the highest conservation level, via pinkish and brown, to beige-brown, representing the lowest level. If a species was observed during the survey, it is color coded green, otherwise brownish.

3.2 Notes on selected species

This section contains additional information on selected species listed in Table 1.

3.2.1 El Segundo Blue (*Euphilotes battoides allyni*)

The El Segundo Blue butterfly (*Euphilotes battoides allyni*) is the only taxon in Table 1 that is placed on the federal list of endangered species. It is endemic to the coastal sand dunes of southwestern Los Angeles County, which historically ranged from Westchester, which is situated southeast of Marina del Rey, southward to the Palos Verdes Peninsula [USFWS 1998]. Urbanization has drastically reduced their range to a few small disjunct populations. The site, being on the north side of Marina del Rey, is at least two miles northwest of Westchester. It is however located within the Ballona Recovery Unit for the El Segundo Blue butterfly

[USFWS 1998]. The larval food plant for the El Segundo Blue is Seacliff Buckwheat, also known as Dune Erigonium, (*Eriogonum parvifolium*), which is not found at the site. This, plus the fact that they do not stray far from their food plant, renders it quite unlikely that the El Segundo Blue will be found at the site.

3.2.2 Immitator Tryonia Snail (*Tryonia imitator*)

All but one of the 23 extant species of *Tryonia* snails live in fresh water habitats; most live in springs, some in lakes. The Immitator Tryonia (*Tryonia imitator*) is the only exception, having its habitat in brackish coastal water [Kellogg 1985]. When present, they are usually one of the more abundant among the macro-invertebrate benthos [Meffe 1983] with typical densities of 20,000 or more animals per meter square [Kellogg-1985], and hence unlikely to be missed. They have historically been found at two locations in Los Angeles County: San Pedro (extirpated) and Ballona Creek (1974) [Kellogg-1985]. Since the Basin receives an irregular influx of "fresh" water from the urban drains, mostly during the rainy season, it has a relatively high salinity and no permanent areas of brackish water. This, combined with the fact that we did not encounter any evidence of the presence of Immitator Tryonia during this survey, renders it highly unlikely that this rare species is present at the site.

3.2.3 Monarch Butterfly (*Danaus plexippus*)

During all of our site visits we recorded Monarch (*Danaus plexippus*) specimens passing by the site in an approximately east to west direction. Each specimen stayed only briefly near the site and visited a few flowers before continuing in westerly direction.

Monarch butterflies are migratory and are frequently seen in coastal Los Angeles County and beyond. Their numbers have been fluctuating over the years, with a distressing downward trend during the recent past [Xerces 2010]. They are a species of concern as they have a limited number of remaining overwintering sites. Their overwintering sites are covered by statues of the California Public Resources Code and the California Fish and Game Code.

Overwintering sites usually consist of groves of trees of mixed height and diameter, with an understory of brush and sapling trees [Calvert 1986], often adjacent to a clearing, to maximize protection from the wind, as well as avail from the winter season sun. The larger the grove, the more choices the butterflies have for relocation to areas with more optimal conditions. The vegetation moderates weather conditions and overall temperatures [Calvert 1981]. The Monarchs tend to avoid the tops of the trees to minimize exposure [Brower-2008], and favor the zone 15 to 50 feet above the ground. Availability of winter-blooming food-plants is also an important selection criterion for their overwintering sites.

Monarch butterflies feed on nectar from Milkweeds (*Asclepias* spp.) and Butterfly Mint (*Monardella* spp.) flowers. Other flowers that are used by the Monarch butterfly are: Black Sage (*Salvia mellifera*), Woolly Blue Curls (*Trichostema lanatum*), California Licorice Mint (*Agastache urticifolia*), Desert Willow (*Chilopsis linearis*), Dwarf Sunflower (*Helianthus gracilentus*), Brittlebush or California Bush Sunflower (*Encelia californica*), Nevin's Barberry

(*Mahonia nevinii*), Golden Currant (*Ribes aureum* var. *gracillimum*), Wild Hyacinth (*Dichelostemma capitatum*), Bladder Pod (*Isomeris arborea*), Blue Lobelia (*Lobelia dunnii*), and Venus Thistle (*Cirsium occidentale var. venustum*).

Some of the most important Monarch overwintering sites are along the coast of Central and Southern California. In Southern California, Monarchs usually overwinter in groves of Blue Gum (*Eucalyptus globulus*) or (River) Red Gum (*E. camaldulensis*) [Lane 1993], in a zone between a half mile and one mile from the coast. Even though the Oxford Basin is on the migratory path of the Monarchs, is located approximately one mile from the coast, and has both Blue Gum and Red Gum trees, it does not feature a grove of mixed height and diameter, with an understory of brush and sapling trees. It also lacks food plants for adult Monarchs. Hence it is unlikely that Monarchs will choose the site in its present condition for overwintering.

3.2.4 Sand Dune Tiger Beetle (*Cicindela hirticollis gravida*)

Sand Dune Tiger Beetles, also known as Sandy Beach Tiger Beetles (*Cicindela hirticollis gravida*), have been recorded from Playa del Rey in 1906. Their habitat is light-colored sand at the mouths of estuaries or barrier islands, which is not present at the site. This species of tiger beetle is very sensitive to contact with humans [Nagano 1980] and likely sensitive to human alteration of waterways [Brust 2006]. It is now apparently extinct from the mouth of Ballona Creek, which was the only remaining suitable habitat of the area [Schreiber 1981].

3.2.5 Wandering Skipper (*Panoquina errans*)

The Wandering Skipper butterfly (*Panoquina errans*) is found in a few locations in a narrow coastal strip between Santa Barbara and the cape region of Baja California [MacNeill 1962]. Its habitat is coastal salt marshes and estuaries near ocean bluffs and other open areas, and its host plants are Saltgrass (*Distichlis spicata* var. *spicata*) and Cordgrass (*Spartina foliosa*). Historically, Wandering Skippers were found in the Ballona region, but they were not found there during surveys performed between 1996 and 1998 [FHA 1998]. There is still a viable population at Malibu Lagoon in the Santa Monica Mountains area. Since the host plants are absent and no specimens were recorded during our survey, it is highly unlikely that the Oxford Basin supports a population of the Wandering Skipper.

Figure 4: **Sweat Bee** (*Halictus tripartitus*) female on **Alkali Heliotrope** (*Heliotropium curassavicum*)

3.3 Other CNDDB species

There are other invertebrates listed in the CNDDB with a historical distribution range that includes coastal Los Angeles County. These are three tiger beetle species and one freshwater mussel. The three tiger beetles, which are not listed in table 1, inhabit tidal flats and salt marshes:

- *Cicindela gabbi*, the **Western Tidal Flat Tiger Beetle**, also known as **Gabb's Tiger Beetle**;
- *Cicindela latesignata latesignata*, the **Western Beach Tiger Beetle**; and
- *Cicindela trifasciata sigmoidea*, the **Western S-banded Tiger Beetle**, also known as the **Mudflat Tiger Beetle**.

Tiger beetles are active on warm sunny days on open mud or sand. Their larvae inhabit burrows in the soils of the same habitats. Tiger beetles are severely threatened by urban expansion, insecticide use, and recreational use of coastal habitats.

The first tiger beetle listed above, *C. gabbi*, is a rare species that inhabits dark colored mud of upper mudflats and salt-pannes of coastal salt marshes. Its historic range stretched from Wilmington in southern Los Angeles County southward to northwestern Mexico. There exist three specimens labeled "Pt. Mugu, California," but Christopher Nagano feels these have been mis-labeled [Nagano 1980]. This tiger beetle species is very sensitive to urbanization pressure, and has been considered extirpated from Los Angeles County [Nagano 1980].

The second, *C. latesignata latesignata*, which inhabits coastal dunes and mudflats, is also very sensitive to urbanization pressure [Zedler 1982] [Pearson 2006]. It is historically known from San Pedro in southern Los Angeles County south to Baja California in Mexico. Its U.S. range has shrunk from three Southern California counties to one location in San Diego County [Nagano 1980] [Pearson 2006].

The third, *C. trifasciata sigmoidea*, inhabits mudflats and other areas with dark-colored, moist-to-wet sands, has been exterminated from the historic Venice Salt Marsh area, which is now Marina del Rey, except the Ballona Creek Region [Schreiber 1981]. Given the history of Oxford Basin, and it being surrounded by intense urbanization, plus the fact that we found no evidence of these tiger beetles during our survey studies — some of which took place in warm, sunny weather within their annual adult activity period — it is highly unlikely that this beetle is present at the site.

The last of the four species mentioned above is *Anodonta nuttalliana*, the **Winged Floater**. This is a freshwater mussel found on muddy and sandy bottoms in rivers and lakes [Clarke 1981], which is habitat that does not occur on the site.

For completeness we list a few species, listed in the CNDDB, whose historical range is in relative proximity of the site:

- *Coelus pacificus*, the **Channel Islands Dune Beetle**, is considered endemic to the California Channel Islands [Miller-1985].
- *Glaucopsyche lygdamus palosverdesensis*, the federally endangered **Palos Verdes Blue Butterfly**, whose larval foodplants, Rattlepod (*Astragalus trichopodus lonchus*) and Deervetch (*Lotus scoparius*) are not present on the site. This species is restricted to the Palos Verdes Peninsula area, more than twelve miles from the site.
- *Gonidea angulata*, the **Western Ridged Mussel**, is restricted to freshwater habitat, which is not (permanently) available on the site.
- *Haplotrema caelatum*, the **Slotted Lancetooth Snail**, is a little-known terrestrial snail with a distribution from coastal Central California south to northwestern Baja California, Mexico. No Slotted Lancetooth snails were found during this study.
- *Helminthoglypta traski coelata*, also known as *Helminthoglypta coelata*, the **Peninsular Range Shoulderband**, is another little-known land snail. This two centimeter diameter crepuscular snail has been found in rock slides beneath bark and rotten logs, and in coastal vegetation [SD-DPLU 2009]. The holotype is from Pacific Beach, in San Diego County, California.
- *Rhaphiomidas terminatus terminatus*, the **El Segundo Flower-loving Fly**, has historically been described from the El Segundo Dunes, and is now considered extirpated at that location [Mattoni 1994]; a small population survives on the Palos Verdes Peninsula. Its dune habitat, as well as its apparent preferred vegetation, California Croton (*Croton californicus*), are absent from Oxford Basin.

Figure 5: **Margined Spurthroated Grasshopper** (*Melanoplus marginatus*)