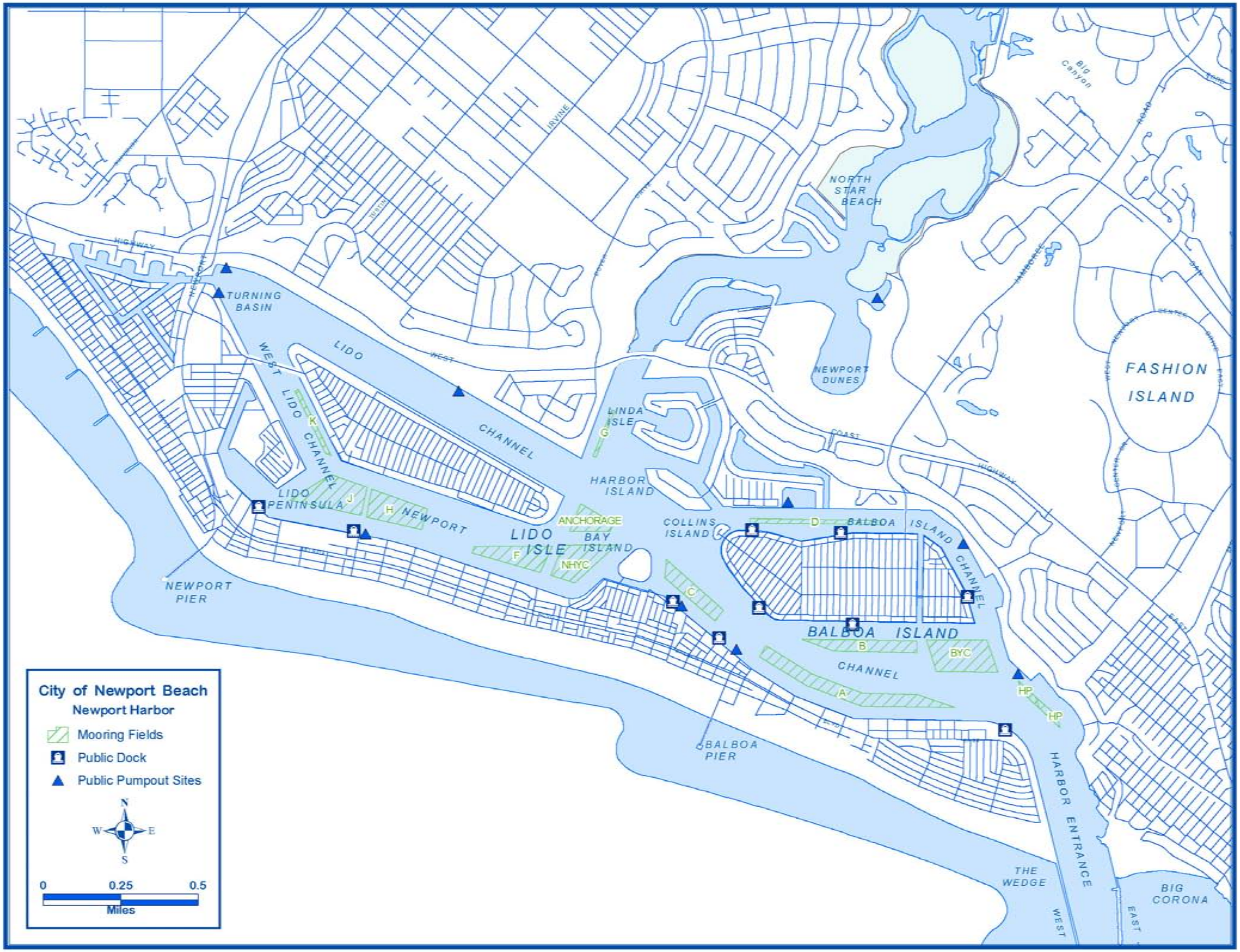
Harbor Area Management Plan

April 2010
FINAL

Prepared by:
Weston Solutions, Inc.
Everest International Consultants, Inc.
Coastal Resources Management, Inc.
NewFields LLC
Tom Johnson, Ph.D.

Prepared for:
Harbor Resources Division
City of Newport Beach
829 Harbor Island Dr.
Newport Beach, CA 92660


City of Newport Beach
Newport Harbor
Mooring Fields
Public Dock
Public Pumpout Sites
N
S
E
W
0
0.25
0.5
Miles
FASHION ISLAND
NORTH STAR BEACH
NEWPORT DUNES
Big Canyon
TURNING BASIN
LIDO CHANNEL
WEST LIDO CHANNEL
LIDO PENINSULA
NEWPORT
LIDO ISLE
LINDA ISLE
HARBOR ISLAND
COLLINS ISLAND
ANCHORAGE
BAY ISLAND
NHYC
BALBOA ISLAND
BALBOA ISLAND CHANNEL
CHANNEL
BYC
HP
HARBOR ENTRANCE
THE WEDGE
BIG CORONA
NEWPORT PIER
BALBOA PIER
A
B
C
D
F
G
H
J
K
IRVINE
COAST
HIGHWAY
WEST
EAST

Vision

"The management and preservation of Newport Bay in a sustainable manner by balancing the community, economical and environmental beneficial uses of this keystone estuary ecosystem and community asset"

Harbor Area Management Plan Workgroup

Mission

"To protect and improve the resources of Newport Harbor, Upper Newport Bay, and the ocean beaches to ensure their proper use and enjoyment by all things that derive life, recreation, or commerce from our City's most important asset"

City of Newport Beach Harbor Commission

Elements

The Harbor Area Management Plan (HAMP) uses an integrated approach. Integrating these HAMP elements results in multiple benefits. These colored symbols appear throughout the document and indicate a link to another element. These symbols are hyper linked in the PDF document to the beginning of the corresponding element's section.

- Dredging Requirements and Contaminated Sediment Management
- Eelgrass Capacity and Management Tools
- Beach Replenishment Strategy
- Water Quality
- Harbor Channel and Pierhead Lines
- Hydrodynamic and Water Quality Numerical Modeling Requirements
- Regional General Permit
- Sea Level Rise and Flood Control Management
- Upper Bay Sediment Control
- Upper Bay Restoration and Management

Document Structure

This document includes first an Executive Summary-style presentation of the HAMP. This beginning summary document provides an overview of the Plan's objectives, the elements listed above, challenges, element goals, suggested steps forward, and the level of benefits achieved. This summary document is then followed by more detailed reports on each element, provided in the appendices.

Contents

Purpose of the HAMP

The purpose of this Harbor Area Management Plan (HAMP) is to develop a resource management tool for the City of Newport Beach (City) to move forward with key sediment management, water quality, restoration, and public use projects critical in meeting the following overall goals:

- Maintain the beneficial uses of the Upper and Lower Newport Bay and economic value of the Bay;
- Provide a practical framework to meet regulatory requirements in the current and anticipated municipal discharge permits, sediment management permits, total maximum daily loads (TMDLs), and other regulatory programs for Newport Bay; and,
- Support a sustainable estuary ecosystem able to be integrated with upstream sustainable watersheds and adjacent coastal area systems.

Purpose of the HAMP

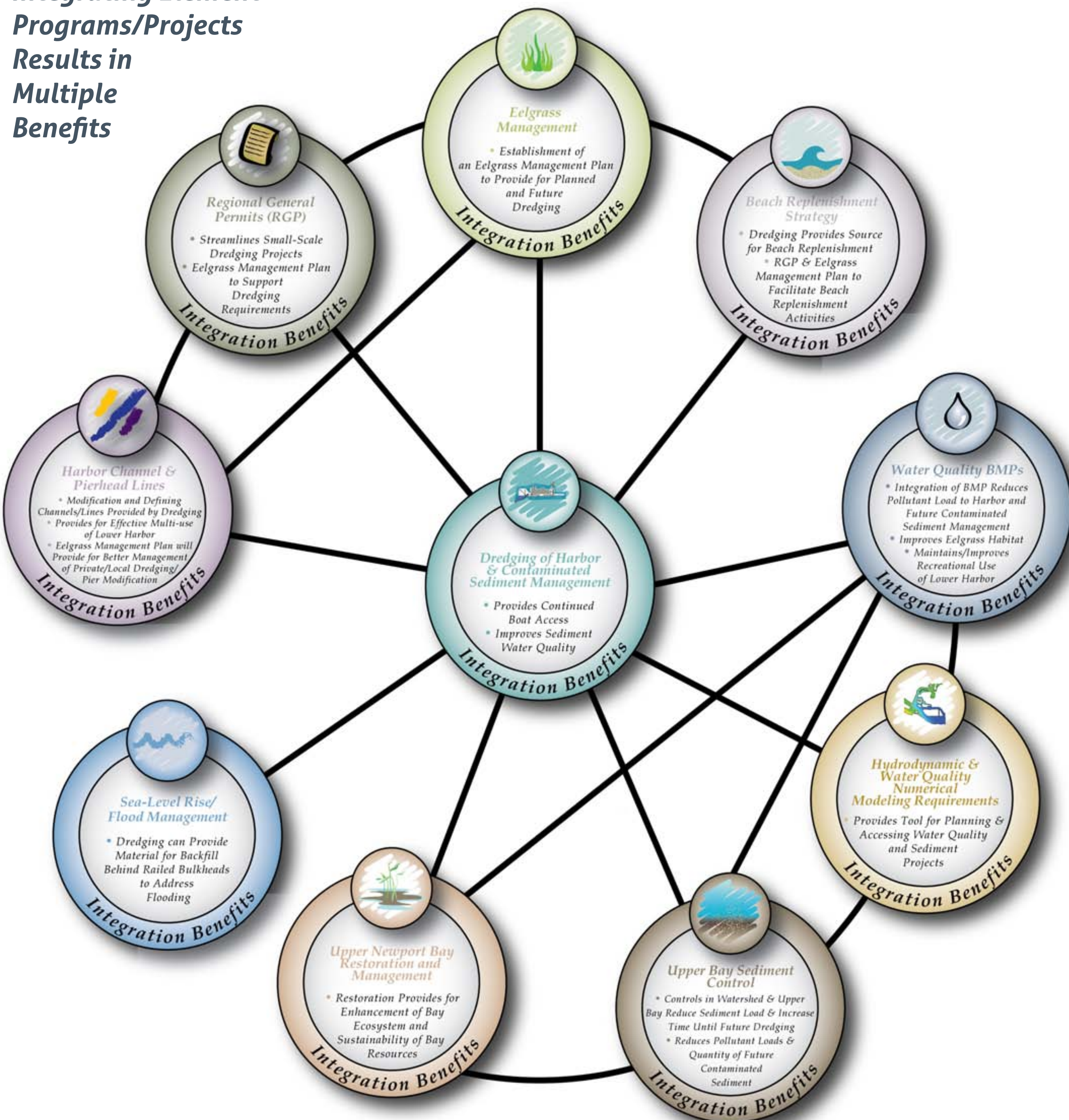
The benefit of this plan is the integration of these various projects where previous plans have focused only on a single or a smaller set of projects. This plan presents the linkages of these projects and highlights the inter-connection of the City's efforts. This plan also provides the City an assessment of these multiple projects using equally-weighted end goals of benefits. Previous plans have targeted only certain benefits, and therefore have not considered these projects in a more holistic manner.

This plan is not a recipe for project implementation, rather a framework that the City can use as a guide to planning and developing more project specific plans. Without the demonstration of the integration of the various projects provided in the HAMP, the full benefits and cost-effective solutions can not be fully realized. This plan also provides a prioritization tool for the City in considering how best to use available resources. By comparing projects to an equally weighted set of benefits, project can be better prioritized based on cost and final benefits realized.

This plan also provides the City with a management framework to provide as the basis for future state and federal grant applications to augment City resources for the implementation of projects in the Bay. State grant programs require jurisdictions to have a planning document in place and approved by management that supports the proposed projects for which grant funds are being requested.

HAMP Integrated Approach

Integrating Element Programs/Projects Results in Multiple Benefits



Introduction

Newport Bay is a vital asset to the City of Newport Beach (City) that includes some of the state's largest marinas, vibrant beach communities, and a keystone estuary ecosystem linking a diverse watershed with critical coastal habitat. Recognizing that the Lower Newport Bay serves a variety of important uses and users, including recreation, navigation, wildlife, and business and that multiple stakeholders have an interest in the management of this resource, the City has undertaken this effort to develop a Harbor Area Management Plan (HAMP) to integrate and balance everyone's efforts and goals.

The 13.2 square mile Newport Bay Watershed drains into the Santa Ana Delhi Channel and San Diego Creek that discharges into Upper Newport Bay. Upper Newport Bay is characterized by mudflat, salt marsh, freshwater marsh, riparian, and upland habitats that are protected within the 752-acre Upper Newport Bay Ecological Reserve and the 140-acre County of Orange Regional Park. The Lower Newport Bay is characterized by diverse beach communities and world class marinas. Both the Upper and Lower Bays are linked as an integrated estuary ecosystem that begins with the mixing of fresh and salt water in the mud flats and tidal marshes of the Upper Newport Bay Ecological Reserve, continues into the eelgrass beds of the Lower Newport Bay, and finally reaches the coastal marine intertidal and subtidal habitats of the Newport Coast. Adjacent to the Bay entrance are the Newport and Irvine Areas of Special Biological Significance (ASBS). These coastal areas have been designated for their importance to the California coastal habitat. These natural resources attract visitors from around the world and provide recreational opportunities to Newport residences. The Newport Bay is vital to the economic health and growth of the region through its renowned residential, recreational, and commercial opportunities. The economical success of the region depends on the sustainable management of the Newport Bay.

One of the most critical outcomes of the HAMP will allow the City to move forward with key sediment management, water quality, restoration, and public use projects. The HAMP focuses primarily on the Lower Newport Bay. Restoration activities in the Upper Newport Bay Ecological Reserve are under a separate initiative that includes the planning, design, and implementation of restoration projects in cooperation with the California Department of Fish and Game which is responsible for the management of the 752-acre reserve. Linkages to the restoration projects underway and proposed in the Upper Newport Bay will be discussed.

As a Resource Management Tool, this plan provides integrated solutions that result in cost savings and positive return on investment paid to the triple bottom line of economic, community, and environmental benefits. The suggested actions in this plan provide the steps forward to meet the challenges in a cost-effective manner through the integration of projects. For example, unit costs for management of dredged material from the Harbor's channels can be significantly reduced through integration with beneficial uses for bulk head upgrades to address flooding, beach replenishment, and eelgrass management. This plan is based on the understanding that the "no action alternative" would lead to inaccessible channels, loss of property values, and regulatory action. Management measures are needed to maintain the vitality of the Harbor's assets that balance the beneficial uses cost-effectively.

The foundation for the Harbor Area Management Plan is the Harbor and Bay Element of the City's General Plan. The management measures that are developed and presented in this plan are evaluated using the beneficial uses developed in the Harbor and Bay Element. The goals of the Harbor and Bay Element therefore are consistent with those of the HAMP. This overall vision of the HAMP also mirrors the mission statement for the Harbor Commission:

> ***"To protect and improve the resources of Newport Harbor, Upper Newport Bay, and the ocean beaches to ensure their proper use and enjoyment by all things that derive life, recreation, or commerce from our City's most important asset"***

The HAMP is therefore built on the foundation of the Harbor and Bay Element and provides the framework to build an integrated and sustainable program that most cost-effectively addresses the beneficial uses. It is the integration of the measures that this HAMP provides in order to best meet the long-term goals and vision. The integration of elements that include dredging of the channels, eelgrass management, and water quality has not been fully integrated in previous documents. This plan therefore provides this needed function to best achieve the beneficial use goals in a cost-effective manner.

The Harbor Commission has been the guiding light to moving this process forward from the foundation of the Harbor and Bay Element to the development of the HAMP. The Harbor Commission was instrumental in obtaining the grant funding from the state for the completion of the HAMP.

The HAMP provides management and planning tools for the "water side" of Lower Newport Bay. The Local Coastal Program (LCP) provides the management plan for the "land side "of the Harbor Area. The LCP consists of the Coastal Land Use Plan approved by the California Coastal Commission and adopted by the City in 2005. There have been subsequent amendments to this plan to make it consistent with the General Plan approved by the voters in 2006. The land use plan indicates the kind, location, and intensity of land uses; the applicable resource protection and development policies; and where necessary, a listing of implementing actions. The implementation plan consists of the zoning ordinances, zoning district maps, and other legal instruments necessary to implement the land use plan.

Objectives and Goals to Achieve a Sustainable Newport Bay

The sustainability of the social, economic, and environmental values of this treasured estuary ecosystem and its beach communities depends on successfully managing the Newport Bay to achieve the following broad objectives:

- **Protect the recreational values** ***(social)***
- **Recognize the economic value of the Harbor and its channels to the local community** ***(economic)***
- **Assure a sustainable estuary system linked to watershed and coastal habitats** ***(environmental)***

These broad objectives are more clearly defined and measured through a more specific set of goals as follows:

Objectives	Goals
Protect the recreational values *(social)*	*Community/Public Access* *Recreational Opportunities*
Recognize the economic value of the Harbor and its channels to the local community *(economic)*	*Channel Maintenance* *Flood Control* *Berthing Management*
Assure a sustainable estuary system linked to watershed and coastal habitats *(environmental)*	*Water Quality* *Marine Resource Protection (ASBS)* *Habitat Protection/Improvement* *Sustainability*

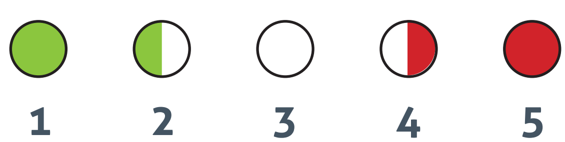
The following guiding principles have been identified as programs and activities that are being developed and coordinated:

- **Maintain the beneficial uses of the Upper and Lower Newport Bay and economic value of the Bay,**
- **Achieve regulatory requirements within a practical framework that meet the specified target in the current and anticipated municipal permits, sediment management permits, total maximum daily loads (TMDLs), and other regulatory programs for Newport Bay,**
- **Work toward a sustainable estuary ecosystem integrated with sustainable watershed and coastal area systems.**

Recommended Goals

The suggested priority projects and activities developed and presented for each Harbor challenge are integrated into the HAMP Management Tools section and assessed using a set of more specific beneficial use goals, consistent with the broad objectives defined earlier. These criteria include each of the beneficial uses defined in the Harbor and Bay Element and additional elements to achieve the long-term sustainability of the Bay. The table on the following page presents the goals used for the evaluation of the recommendations. Further description of the goals is also provided with the origin of the criteria. Several criteria have been added to achieve a more holistic and integrated approach with other regional plans, including the Central Orange County Integrated Regional and Coastal Watershed Management Plan, the Newport Coast Watershed Management Plan, and the Upper Newport Bay Restoration Plan. Several of these criteria also apply to state grant program as listed in the table. This evaluation provides an additional tool to demonstrate the importance of an integrated approach to achieve the overall goals.

The priority projects and activities for each HAMP challenge/element are evaluated using a scale of 1 to 5. A score of 1 indicates that the activities proposed for that element are the most effective at meeting the listed beneficial use goal and a score of 5 indicates those activities are the least effective at meeting the listed beneficial use goal. Scores 1 though 5 are indicated using the symbols in the legend below. On page 92, all of the scores for each element are averaged together to show that when integrated, these combined HAMP element activities result in a beneficial outcome. Therefore, although one element may have little or no benefit in a single criteria, when integrated and implemented as an overall program, the combined outcome achieves the stated goals.



Beneficial Use Criteria Table

Beneficial Use Goals	Descriptions	Origins
Water Quality	Create and maintain a sustainable watershed through protection, preservation, and improvement of water quality.	• Harbor & Bay Element Goals 8 & 10 • Proposition 50 • Proposition 84
Marine Resource Protection (ASBS)	Protect, preserve, and enhance marine resources, including marine plants, invertebrates, fishes, seabirds, marine mammals, and their habitats.	• Harbor & Bay Element Goals 7, 8, & 10 • Proposition 50 • Ocean Plan
Habitat Protection/ Improvement	Protect, preserve, and restore sustainable upland, wetland, and marine habitats, focused on Upper Newport Bay.	• Harbor & Bay Element Goals 7 & 10 • Proposition 50
Community/ Public Access	Maintain and improve public access to the shoreline, beach, coastal parks, trails, and bays through waterfront and infrastructure improvement projects.	• Harbor & Bay Element Goals 5 & 6 • Proposition 50
Water Conservation/ Urban Runoff Management	Reduce non-stormwater runoff and conserve water through education and the implementation of a watershed-based runoff reduction program to increase groundwater recharge and limit pollution to the Bay and its waters.	• Harbor and Bay Element 8 • Proposition 84
Channel Maintenance	Enhance and maintain deep-water channels through dredging and sediment management to ensure and improve navigation.	• Harbor & Bay Element Goals 13
Flood Control	Reduce the potential for catastrophic floods through identification of at-risk areas, maintenance of flood control facilities, and design of flood control projects.	• Proposition 50 • Proposition 84
Berthing Management	Ensure a variety of vessel berthing and storage opportunities at marinas, moorings, anchorages, and piers.	• Harbor & Bay Element Goal 5
Recreational Opportunities	Preserve and enhance water-dependent and water-related recreational activities.	• Harbor & Bay Element 1, 2, & 4 • Proposition 50
Sustainability	Integrate and maintain the balance of beneficial uses in the Bay by considering economic, recreational, and commercial interests.	• Harbor and Bay Element

The development of this management tool for the Lower Newport Bay requires coordination between multiple programs and requires addressing multiple challenges to achieving the overall goals. These programs and challenges that have been identified through the regulatory agencies, stakeholder groups and the City include:

Executive Summary: Page 16
Detailed Report: Appendix A

Dredging Requirements and Contaminated Sediment

In recent years, sedimentation in Lower Newport Bay has resulted in the narrowing and shoaling of the federal channels and adjacent non-federal channels that act as the main conduits to marina and harbor traffic. Although sediment catch basins constructed in Upper Newport Bay were somewhat effective in helping to reduce sedimentation, the Lower Bay has remained subject to heavy amounts of silt and sedimentation via tidal activity and storm events. By dredging the Lower Bay, the United States Army Corps of Engineers (USACE) and City of Newport Beach (City) hope to reestablish adequate water depths along the federal channels and to improve navigation for the high volume of sea-going vessels entering and leaving Newport Bay. The dredging of contaminated sediments may have a long-term positive effect on the environment due to the ongoing source of contaminants released to the environment if left in place. However, the handling and management of these sediments reduces the options for beneficial uses and placement of dredged material. Based on the June 2008 bathymetry survey conducted by the USACE, approximately 1 million cubic meters (1.3 million cubic yards) of sediment has accumulated above the authorized Operations and Maintenance depths within actively maintained Federal areas of responsibility (USACE). Based on the results of recent chemical and biological testing data of the accumulated sediments, conservative projections indicate approximately 60 percent of these sediment are suitable for ocean disposal (exact number to be determined during the dredging process), with the balance not likely to pass suitability for this management option. These remaining sediments will instead require some form of treatment or alterative disposal. Assuming sedimentation rates stay the same or diminish, an additional 650,000 cy will need to be dredged over the next 30 years to maintain harbor depths.

Executive Summary: Page 25
Detailed Report: Appendix B

Eelgrass Capacity and Management

While eelgrass serves an important ecological resource within Lower Newport Harbor, it often conflicts with other beneficial harbor uses, particularly those related to guest and residential boating and navigation. Dredging and maintenance of navigational channels; construction and maintenance of bulkheads, piers, and docks; and nourishment of beaches directly impacts eelgrass through burial or removal of vegetation and a loss of eelgrass function as a wildlife habitat. The eelgrass is a protected habitat that needs to be balanced with other beneficial uses and economic value of recreational and personal use of the Harbor. The City has an adopted Coastal Commission-approved Land Use Plan (LUP) that acknowledges the need for a balance between harbor maintenance and recreational activities and preservation of this important habitat. To mitigate the potential impacts to eelgrass of dredging and development, the LUP requires avoidance where possible and restoration where avoidance is not practical. The challenge is therefore to develop an Eelgrass Management Plan that balances existing harbor uses with maintaining a high value and sustainable eelgrass habitat.

Beach Replenishment Strategy

There are over 30 beaches located in Lower Newport Bay. The beach uses and needs vary. Several issues have prevented efficient management of beach replenishment projects. No formal system is in place to manage and prioritize beach replenishment projects and the beneficial

Executive Summary: Page 32
Detailed Report: Appendix C

uses of dredged material that can be used for these projects. Components of the Regional General Permit (RGP) restrict the placement of dredged material on beaches if eelgrass beds are within 15 feet. Under the RGP, only small volumes (<1000cy) of dredged material from the Lower Bay can be beneficially used to nourish compatible beaches. A more comprehensive management and priority system is needed to address these challenges.

Executive Summary: Page 37
Detailed Report: Appendix D

Water Quality Best Management Practices

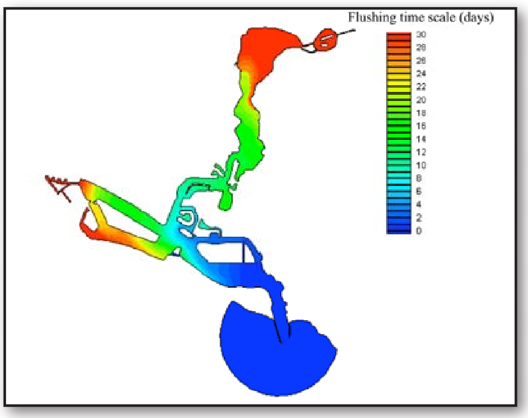
Key water quality challenges include understanding the extent and sources of water quality impacts to the Lower Newport Bay, and the development of a strategy to cost-effectively implement best management practices (BMPs) to meet the anticipated requirements of TMDLs. The TMDLs under implementation for the Lower Newport Bay include nutrients, pathogens, and sediment. TMDLs in the technical phase include organochlorine compounds and metals for the Rhine Channel. The water quality issues in the Lower Newport Bay are linked to the Upper Bay and watershed as they contribute to the constituent loading to the Lower Bay. This is highlighted by the dual listing of the San Diego Creek watershed and the Newport Bay on most of the TDMLs. Located just outside the Harbor are two areas designated by the state as ASBS that are subject to special protections under the California Ocean Plan (COP). Preliminary constituent transport modeling indicates a likely connection between the Bay and the ASBS. The strategy for BMP implementation therefore needs to integrate with watershed, Upper Newport Bay, and coastal plans and projects; and allow for effectiveness assessment of the program.

Harbor Channel and Pierhead Lines

After construction of the portion of Newport Bay below Pacific Coast Highway (Lower Bay), the federal government, through the USACE, established harbor lines (project lines, pierhead lines, and bulkhead lines). These lines define the federal navigation channel dredging limits, and the limits on how far piers, wharfs, bulkheads,

Executive Summary: Page 45
Detailed Report: Appendix E

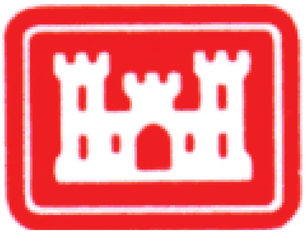
and other solid fills can extend into Lower Bay waters. These lines are important for maintaining safe navigation conditions throughout the Lower Bay. The harbor lines have not been systematically adjusted since their original development in 1936 even though the Lower Bay has been altered extensively since this time, and there have been changes in uses as well. As part of the HAMP, this section identifies and addresses issues related to the harbor lines throughout the Lower Bay and provides recommendations to update these lines which will impact dredging needs, eelgrass management, and areas defined under the RGP. Specific changes have been suggested, and methods for implementing those changes have been provided.



Executive Summary: Page 49
Detailed Report: Appendix F

Hydrodynamic Model

Numerical models are widely used as a management decision-making tool in addressing sediment and water quality problems, including several numerical modeling efforts specifically for Newport Bay. Numerical models are used to simulate hydrodynamic conditions (e.g., flows, water surface elevations, and velocities) and water quality transport (e.g., sediment or salinity) within a river, estuary, or Bay. Changes to hydrodynamic and water quality conditions are used to evaluate alternatives or management decisions, such as dredging strategies or storm drain diversions to improve water quality. Numerical models are also used to understand the physical environment of the Bay and to aid in decision making to address water quality issues. Development of a hydrodynamic and water quality numerical model for Newport Bay can be used to evaluate many of the proposed strategies and BMPs developed for the HAMP. Accurate models are needed to assess future dredging and beach replenishment needs, effectiveness of water quality, and sediment control BMPs.



Executive Summary: Page 53
Detailed Report: Appendix G

Regional General Permits

In Lower Newport Bay, in-water maintenance activities are carried out under a variety of federal, state, and regional permits, the principal one being the federal Regional General Permit 54 (RGP 54), issued by USACE and managed by the City of Newport Beach Harbor Resources Division. The RGP, which is valid for a term of five years, governs maintenance dredging and disposal of sediments and the repair and replacement of docks, piers, and seawalls. The current RGP contains a number of special conditions. Several issues have hampered the efficient administration of the RGP and resulted in significant delays and additional costs for necessary harbor maintenance. These include the long and costly permit renewal process, sampling plan approval, restricted range of activities covered by the permit, no consistent disposal options for impacted sediment, and Special Conditions that prevent many minor maintenance dredging operations within 15 feet of eelgrass beds.

Executive Summary: Page 56
Detailed Report: Appendix H

Sea Level Change and Potential Shoreline Flooding

Historical measurements indicate a steady increase in global sea levels. Continued sea level rise will increase the risk of nearshore flooding during storm surges that correspond to high tide events. The potential for flooding in the Lower Harbor has not been evaluated with regard to this documented rise in sea levels. Flood modeling is needed to evaluate this potential and to develop recommendations regarding the modification of existing bulkheads and other flood control structures and municipal infrastructure.

Executive Summary: Page 62

Upper Bay Sediment Control Plan

The Upper Newport Bay Sediment Control includes the management of sediment loading occurring from the watershed. Current restoration and dredging activities in the Upper Newport Bay include the establishment of sediment control basins to control sedimentation to the Bay. Further sediment transport modeling is needed to assess the efficiency of these basins and the effects of the current dredging regime. Long-term management of sedimentation patterns and sediment types will also need to be coordinated with TMDLs and other regulatory drivers. Dredge material management in the Lower Bay is dependent on aggressively addressing fine-grained sediments transported from San Diego Creek through the Upper Bay.

Executive Summary: Page 69

Upper Bay Restoration Management Plan

The Management Plan for the Upper Newport Bay Ecological Reserve is the framework for the implementation and management of the restoration activities and long-term sustainability of this Critical Coastal Area. The Ecological Reserve is managed by the California Department of Fish and Game. Due to funding constraints, this Management Plan is currently in a preliminary phase. However, the City and County are aggressively moving forward with several restoration projects. The challenges for the Upper Bay Restoration include securing funding for the restoration projects and the development of the Management Plan and coordination of the dredging activities with the restoration projects and water quality projects.

The intent of the development of the HAMP is to guide the City and the Harbor stakeholders in the implementation of activities that balance the beneficial uses with the long-term sustainability of the Bay. The Newport Bay stakeholders include the Newport Harbor Commission; Community Support Groups; Newport Beach Chamber of Commerce; Orange County Coastkeeper; County of Orange Watershed and Coastal Resources Division; Regional Water Quality Control Board; other environmental conservation groups, non-governmental organizations, industry professionals and private citizens that live, work and recreate in and around the Bay.

Integral in the development of this plan is the input provided by the stakeholders. The development approach to the HAMP includes feedback from the Harbor stakeholders as well as coordination with regional and coastal watershed plans, TMDL programs, and channel maintenance programs. Stakeholder input was provided at several phases of the plan development. These phases included the preliminary draft, draft, and final plan development. The content and format of the documents at each of these phases has been planned to allow for incorporation of stakeholder feedback.

The HAMP is composed of two sets of documents consisting of the main report and supporting appendices. The main report includes the Technical Report Summaries and HAMP Management Tools. The Technical Summaries are developed from the Technical Reports that are presented in the appendices. This plan incorporates comments from the stakeholder groups from previous drafts.

The HAMP integrates the potential steps forward presented in the individual Technical Summaries into an overall strategy with possible project prioritizations, potential funding sources and linkages to other projects. This overall strategy is presented following the Technical Summaries, and consists of a set of HAMP Management Tools. These tools include an implementation schedule that provides the suggested priorities, linkages, estimated costs, and potential funding sources for activities in the Lower Newport Bay to achieve the overall program goals. The suggested priority projects and activities are assessed using a set of evaluation criteria based on the goals of the program. These criteria include each of the beneficial uses defined in the Harbor and Bay Element and additional elements to achieve the long-term sustainability of the Bay. This evaluation provides an additional tool to demonstrate the importance of an integrated approach to achieve the overall goals. These criteria are further defined in the following subsection.

The development of this HAMP is funded by a State Water Resources Control Board (SWRCB) Grant to the City of Newport Beach. The City and community of Newport Beach appreciates this support from the state for the preparation of this plan toward the goal of a sustainable Newport Bay that is integrated into a sustainable watershed and coastal area. It should be noted that the contents of this document do not necessarily reflect the views and policies of the SWRCB, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Dredging Requirements & Contaminated Sediment Management

Beneficial Use Criteria/Rating	
Water Quality	◐
Marine Resource Protection (ASBS)	◐
Habitat Protection/ Enhancement	◑
Community/ Public Access	◐
Water Conservation	○
Channel Maintenance	●
Flood Control	◐
Berthing Management	●
Recreational Opportunities	◐
Sustainability	●

Dredging Requirement Study

Problem Statement: In recent years, sedimentation in Lower Newport Bay has resulted in the narrowing and shoaling of the federal channels and adjacent non-federal channels that act as the main passageway for marina and Harbor traffic. Therefore, there is a need for a plan to maintain the channels and berthing areas necessary for safe navigation of the Lower Newport Bay in an economically and environmentally sound manner. Sediment catch basins constructed in Upper Newport Bay were somewhat effective in helping to reduce sedimentation ; however, the Lower Bay has remained subject to heavy amounts of silt and sedimentation via tidal activity and storm events. The United States Army Corps of Engineers (USACE) and City of Newport Beach (City) plan to re-establish sufficient water depths along the federal channels and to improve navigation safety for the large quantity of sea-going vessels entering and leaving Newport Bay. Since 1929, there has been a long history of dredging within Newport Bay. This has served a dual purpose by addressing critical dredging needs such as improving navigation safety for sea-going vessels, and also by considering beneficial use alternatives.

Benefits of Dredging: By dredging the Lower Bay, USACE and the City of Newport Beach (City) hope to re-establish adequate water depths along the federal channels and to improve navigation safety for the high volume of sea-going vessels entering and leaving Newport Bay. The dredging of contaminated sediments may have a long-term positive effect on the environment due to the removal of contaminants that could potentially become exposed to marine life if left in place.

Overview of Dredging Requirements

Current Dredging Needs:

Based on the June 2008 bathymetry survey conducted by the USACE, approximately 1 million cubic meters (1.3 million cubic yards) of sediment has accumulated above the authorized Operations and Maintenance (O&M) depths within actively maintained Federal areas of responsibility (USACE). Based on the results of recent chemical and biological testing data of the accumulated sediments, conservative projections indicate approximately 60 percent of these sediment are suitable for ocean disposal exact number to be determined during the dredging approval process), with the balance not likely to pass suitability for this management option. These remaining sediments will instead require some form of treatment or alternative disposal. These totals are summarized below:

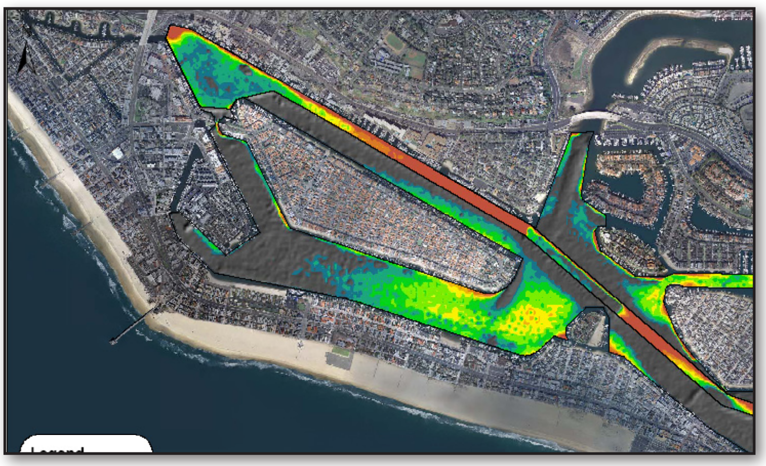
Summary of Operation and Maintenance Dredge Volumes by USACE Channel Reach[1]	
Federal Channel Segment	**Estimated O&M Volume (Cubic Meters)**
Entrance Channel	40,580
Corona Del Mar Bend	2,150
Balboa Beach	79,370
Harbor Island Reach	74,570
Lido Island Reach	157,500
Turning Basin	63,740
West Lido Area A	51,710
West Lido Area B	38,020
Newport Channel	187,050
Yacht Anchorage	359,220
Bay Island Anchorage	14,690
Upper Channel	37,050
North Anchorage Area	5,720
South Anchorage Area	9,800
Balboa Island Channel	40,520

1-Lower Newport Bay CAD Site Feasibility Study, Anchor QEA,L.P., 2009

In addition to the contaminated material from the federal O&M channel, there are several other areas of contaminated sediment in the Lower Newport Bay that also require some form of management. Not all of these areas are the responsibility of the City.

Non-Operations and Maintenance Sources of Contaminated Sediments from Lower Newport Bay[1]		
Source	**Estimated Volume of Contaminated Sediment (cubic meters)**	**Responsibility**
Rhine Channel	100,584	City and Various Shoreline Tenants
Private/Commercial Facilities	10,000+	Various

1-Lower Newport Bay CAD Site Feasibility Study, Anchor QEA,L.P., 2009



Future Dredging Needs:

Based on models developed by USACE in the late 1990s and historic depositional records, approximately 1 to 1.5 million cubic yards of sediment will be transported through, with a significant volume settling in the Lower Newport Bay in a 15-year cycle. However, these models do not account for hydrological changes that will be implemented with the most recent designs for the Upper Newport Bay Restoration Project. In addition, these models do not assess the impact of current dredging operations in Upper Newport Bay, which remove only the coarse grain size fraction. This model does not account for volumes by grain size fractions; therefore, sedimentation patterns cannot be predicted and are confounded by the current dredging operations in Upper Newport Bay. A model that incorporates grain size fraction information is needed. Additional data would need to be established to determine sedimentation rates and future dredging needs.

The City has a Regional General Permit (RGP) , which is a 5 year renewable permit that allows property owners to apply to the City for permission to dredge within their dock area. This permit allows for up to 20,000 cubic yards of sediment to be dredged each year. In the past 30 years, about 357,000 cubic yards of sediment was dredged under the RGP. About 170,000 cubic yards was disposed of at LA-3, and about 187,000 cubic yards was used for beach replenishment.

Based on recent bathymetry, the removal of approximately 1.3 million cubic yards (1 million cubic meters) is required to increase Harbor depths to design depths. Based on historic dredging efforts over the last 30 years, approximately 360,000 cubic yards were dredged under the RGP and 289,000 cubic yards were dredged by the USACE in the federal channels. Assuming sedimentation rates stay the same or diminish, additional dredging is needed over the next 30 years to maintain Harbor depths.

Options for Management of Sediment

Ocean Disposal

Suitability of dredged material for ocean disposal is based on MPRSA Tier III analysis as described in the Ocean Testing Manual. Tier III analysis includes sediment chemistry, solid phase toxicity tests, suspended particulate phase toxicity tests, and bioaccumulation tests. Dredged material from Newport Bay for ocean disposal will be placed in the USEPA designated LA-2 or LA-3 disposal sites. LA-2 is located within Los Angeles County, approximately six nautical miles from the entrance of Los Angeles Harbor. LA-3 is located within Orange County, approximately 4.5 nautical miles from the entrance of Newport Harbor.

Sustainable Sediment Management Alternatives

Dredging requires processing and handling of sediments, which are typically removed from a system and placed in nearshore ocean disposal sites or in confined disposal facilities (CDF). Often this is done without considering alternative beneficial uses of the sediment. For some dredging projects, disposal issues can be problematic resulting in postponements or even cancellation of dredging at harbors. However, sediments which do not exceed predetermined criteria may be a viable source for beneficial use projects where some type of soil or fill is needed.

Beneficial use includes a wide variety of options that utilize dredged material for a productive purpose. Beneficial uses of dredged material may make traditional placement of dredged material unnecessary or at least reduce the level of disposal. The broad categories of beneficial uses, based on the functional use of the dredged material or site, defined by the USACE (1987) are as follows:

- *Beach nourishment-* the strategic placement of large quantities of beach quality sand on an existing beach to provide a source of nourishment for littoral movement or restoration of a recreational beach

- *Shoreline stabilization-* the use of material to create berms or embankments at an orientation to the shoreline that will either modify the local wave climate in order to improve shoreline stability, or alter the wave direction to modify the rate or direction of local sediment transport

- *Landfill cover for solid waste management-* the use of material at landfills as daily or final cover, and as capping material for abandoned contaminated industrial sites known as “brownfields”

- *Material transfer-* the use of dewatered dredged material as construction fill for roads, construction projects dikes, levees

Management of Materials Not Suitable for Ocean Disposal

The long history of commercial and recreational boating uses, as well as the urbanization of the watershed, has contributed to sediment toxicity and chemical contamination of Newport Bay. Contaminant chemicals and metals have accumulated within the Bay's sediments, reaching levels that exceed sediment quality standards in specific portions of the Bay, such as the Rhine Channel. As a consequence, sediment management and treatment strategies are necessary to control and remediate sediment contamination in order to comply with state regulations and enhance the environmental conditions within the Bay. In doing so, sediment management has the potential to contribute to the goals set forth in the Newport Beach Harbor and Bay Element.

Options for contaminated sediment management in Southern California are documented in the Los Angles Contaminated Sediment Task Force (CFTS) Long-Term Management Strategy (LTMS), and the Los Angeles Regional Dredged Material Management Plan (DMMP). These documents were used as the basis to develop potential management options for evaluation relative to Lower Newport Bay sediments. The options being considered by the City include:

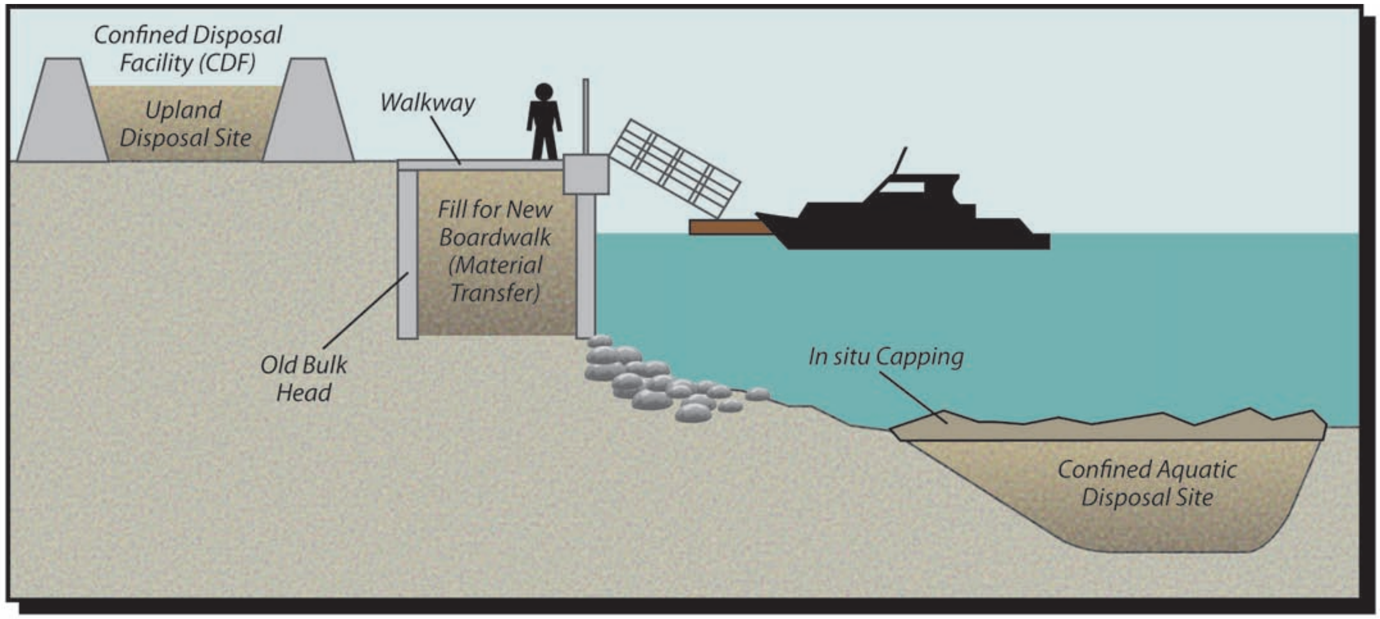
- Future Port Fill in the Ports of Los Angeles or Long Beach
- On-site (On-shore) Treatment Facility
- Upland Disposal to a Landfill
- Long Beach Confined Aquatic Disposal (CAD) site
- Newport Harbor Confined Aquatic Disposal (CAD) site

In order to address an ongoing goal of the Council, the Newport Beach Harbor Commission and the community, the City is working with USACE to take the necessary steps in planning for a Lower Bay dredging project. Before materials may be dredged, there needs to be disposal solutions for contaminated sediments. The City is currently studying these options and evaluating the most cost effective alternative.

Benefits of Managing Contaminated Sediment: Effective management of contaminated sediments within the Bay will have several environmental, social, and economic impacts. Upper Newport Bay is a State Ecological Reserve and one of the last large undeveloped wetlands in southern California. It is a home to a variety of threatened species. Removal and treatment of contaminated sediments can enhance the floral and faunal communities of the Bay, benefiting not only those organisms that inhabit the sediments, but also fish and invertebrates that feed on the benthic infauna. Lower Newport Bay is a major recreational destination for tourists and locals. Reducing sediment contamination will improve water quality, which has the potential to increase the level of recreational uses within the Bay, such as swimming, fishing, and sailing.

Potential management alternatives for contaminated sediment include:

- shoreline stabilization (fill behind bulkheads)
- landfill cover for solid waste management, and



Potential Management Options for Sediment

• material transfer (all discussed above)

as well as:

• ***Monitored Natural Recovery-*** the use of naturally occurring processes to contain, destroy, or reduce the bioavailability or toxicity of contaminants in sediment. It is necessary that contaminants are at relatively low concentrations throughout the area and the area does not require dredging to meet the City's needs. Given specific site characteristics, this remediation option is most appropriate if the expected risk of exposure to humans and aquatic organisms is relatively low and when the site is a sensitive habitat that may be permanently damaged by dredging or capping, such as eelgrass habitat.

• ***In situ Capping-*** the covering or capping the contaminated sediment in place with a clean material. In situ capping may be more appropriate than dredging/excavation when there is risk of contaminant exposure during removal activities, or residual contamination at a site.

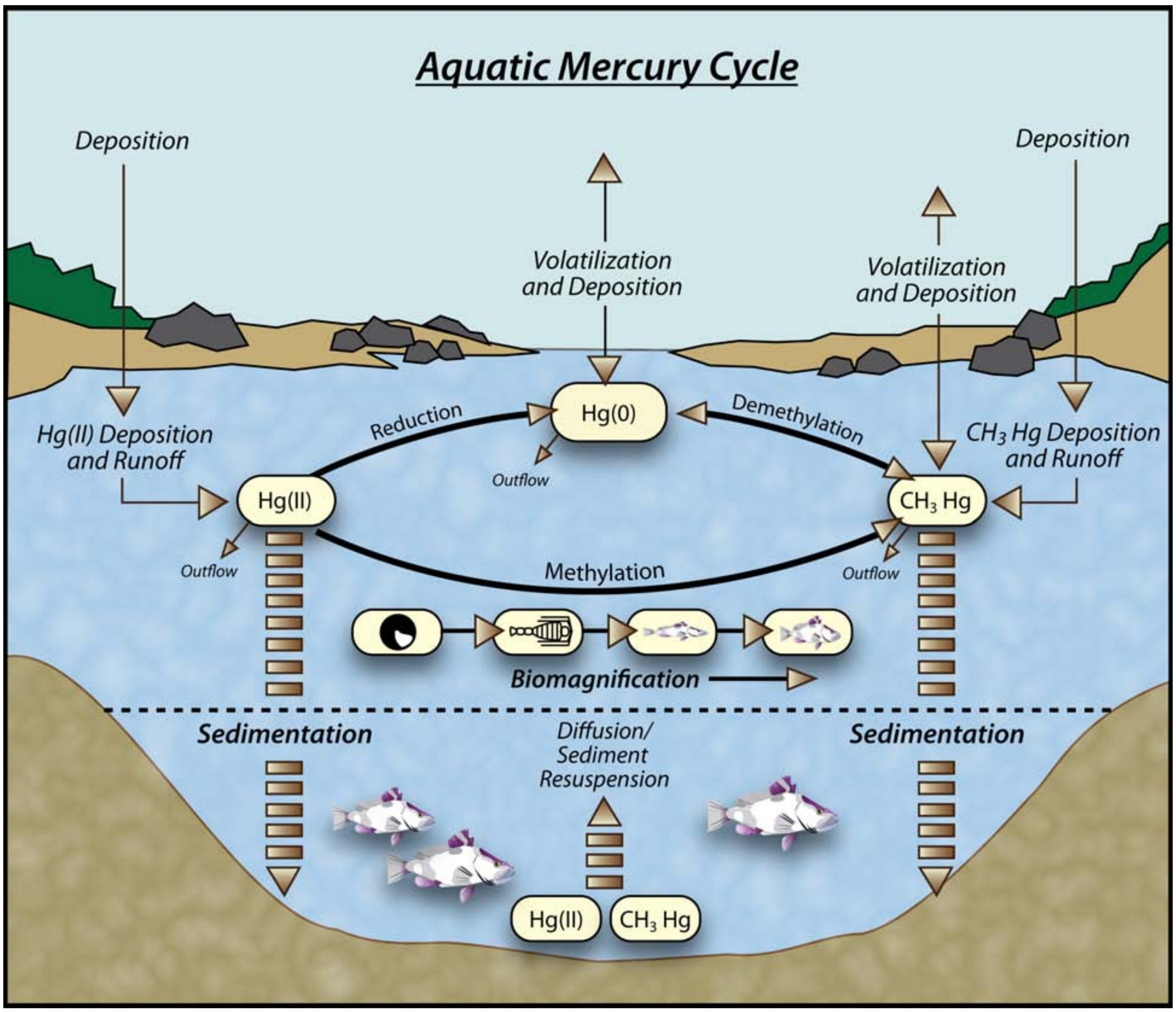
• ***Confined disposal facility (CDF)-*** an engineered structure bound by confinement dikes for containment of dredged material. CDFs serve as a dewatering facility and can be used as a processing, rehandling and/or treatment area for beneficial use of dredged material. Dredged material may be placed temporarily or permanently in the CDF.

• ***Confined aquatic disposal (CAD)-*** a process where dredged material is disposed at the bottom of a body of water, usually within a natural or constructed depression (i.e. created specifically for the disposal) or a relic borrow-pit created during previous construction activities. A CAD facility is under evaluation for the Lower Newport Bay. This option may also include the use of the CAD facility in Long Beach.

• *On-site Treatment-* Certain treatment technologies may be applied to the dredged material to reduce contaminant exposures to acceptable levels. Treatments involve reducing, separating, immobilizing and/or detoxifying contaminants, and could be applicable either as stand alone units or combined as part of a treatment train.

• *Upland Landfill Disposal –* Contaminated sediments are dewatered then transported to a permitted landfill for disposal. This requires an area for temporary storage and dewatering of the dredge material prior to transport off-site.

• *Fill Material for Future Port Expansion -* Expansions are planned for the Ports of Los Angeles and Long Beach. If dredging of the Lower Bay could be timed with these expansions, this options provides a very cost effective alternative since dredged materials can



be loaded on to barges and transported to the Ports. The challenge for this option is the coordination of schedules between the projects.

An evaluation of the alternatives favoring the use of a CAD site in Lower Newport Bay is presented in the Lower Newport Bay CAD Site Feasibility Study, Anchor QEA, L.P., April 2009.

Contaminants of Concern within Sediment

Agricultural activities, commercial and recreational boating uses, and urbanization of the watershed, has resulted in widespread contamination in Upper and Lower Newport Bay sediments. The primary contaminants of concern include DDTs, mercury, copper, and pyrethroids.

DDTs

Widespread DDT contamination in the Bay is the result of historical agricultural activities in the watershed. Organochlorine pesticides, such as DDT, were widely used as pesticides from the mid-1940s to the 1970s. San Diego Creek meanders through historical agricultural farmland that are impacted with DDT, and its breakdown products DDE and DDD. The soils are transported to the Bay by runoff.

Mercury

Possible sources of mercury in the Bay include historical antifouling boat paints, historical shipyard activities, the natural locally occurring geological material known as cinnabar, and mercury mining in the watershed. Mercury mining occurred at Red Hill mine between 1880 and 1939, and the San Diego Creek may have transported sediment containing mercury into the Bay. Natural processes can change the mercury from one form to another. In specific forms (methyl mercury), mercury can accumulate in living organisms and reach high levels in fish and marine mammals via a process called biomagnification (i.e. concentrations increase in the food chain). The figure below illustrates the complex chemical cycle in which mercury changes forms in the aquatic environment.

Copper

Sources of copper include antifouling paints, hull cleaning, cooling water, NPDES discharges, industrial processes, stormwater runoff, mining and point source runoff. Copper, in a variety of formulated fungicides, herbicides and algaecides, is widely used in antifouling paints to control the growth of bacteria and fungus. Copper has a lithic biogeochemical cycle, therefore, it has a strong propensity for sediments and soils.

Pyrethroids

A possible source of pyrethroids is historic agricultural uses and residential uses. Pyrethroids are used residentially in insecticides that previously had organophosphates as the active ingredients. Pyrethroids, which consist of 40% of all pesticide products, display high toxicity to a wide range of aquatic organisms including invertebrates. Many of these compounds are extremely toxic to fish. They are usually not sprayed directly onto water, but they can enter lakes, ponds, rivers, and streams from rainfall or runoff from agricultural fields and eventually find their way to coastal areas.

Potential Steps Forward

Related Potential Steps Forward for near- or long-term management of dredging programs and sediment management programs include:

Phase 1 – Near-Term Solution for Management of Dredged Materials and Maintenance of Navigational Depths

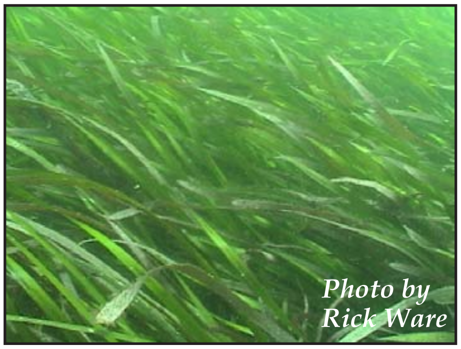
1. Sediment Management Plan – This Plan is currently under development. A Conceptual Development Plan focusing on the Lower Newport Bay CAD Site was completed in April 2009 (Anchor QEA, L.P.).
    a. Management of Materials Meeting Ocean Disposal Suitability Requirements
    b. Management of Materials for Beneficial Use
        i. Review of alternatives using logistical, technical, and economic feasibility evaluation criteria.
        ii. Geotechnical evaluation for construction or bulkhead restoration suitability.
    c. Management of Materials Unsuitable for Either Ocean Disposal or Beneficial Use
        i. Identification of sediment rehandling facility.
        ii. Identification and evaluation of Confined Aquatic Disposal (CAD) facilities/ alternatives.
2. MPRSA Tier III Evaluation – 6 months
3. Master Dredging Plan and Schedule – 6 months
    a. Design and Dredging Requirements
    b. Schedule Including Consideration of Environmental Windows
    c. Identification and Mitigation of Potential Impacts: Habitat, Water Quality, Harbor Activities, Navigation and Public Access, Noise, Aesthetics, Air Quality
    d. Equipment and BMPs

Phase 2 – Long-Term Solution Management of Dredged Materials and Maintenance of Navigational Depths

1. Sediment Transport Study – 9 months
    a. Data Collection, Analysis and Modeling
    b. Forecasted Sediment Budget for Lower Newport Bay and Estimate of Future Dredging Needs
2. Sustainability Plan for Maintenance of Harbor Channels – 6 months
    a. Identification and Discussion of Significant Load Sources (Contaminants and Sediments)
    b. Identification and Discussion of Relevant BMPs for Reduction of Source Loadings
    c. Identification and Discussion of Potential Future Development Impacts
    d. Long-term Management Plan for Future Dredging Needs

Eelgrass Capacity and Management Tools

Beneficial Use Criteria/Rating	
Water Quality	
Marine Resource Protection (ASBS)	
Habitat Protection/ Enhancement	
Community/ Public Access	
Water Conservation	
Channel Maintenance	
Flood Control	
Berthing Management	
Recreational Opportunities	
Sustainability	



Introduction

The marine resources of Newport Harbor are diverse and rich, and are extremely important to the health and maintenance of nearshore coastal resources. The City is committed to achieving a sustainable Newport Harbor Area through the protection and improvement of harbor marine resources, balanced with the economic value of recreational uses of the Harbor.

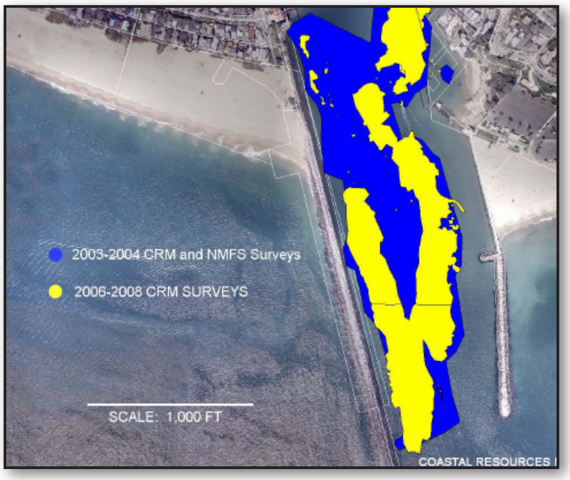
One of the most important biological resources within Newport Harbor is eelgrass (Zostera marina). Eelgrass meadows (and sub units called "beds" and "patches") are important habitat for invertebrates as a source of food, substrate for attachment, and protection for numerous fish and invertebrate species. The vegetation provides protection while it serves as a nursery for many juvenile fishes, including species of commercial and/or sports fish value (i.e., California halibut and barred sand bass).

Key Issues: While eelgrass serves an important ecological resource within Lower Newport Harbor, it often conflicts with other beneficial harbor uses, particularly those related to tourist and residential boating and navigation. Dredging and maintenance of navigational channels, construction and maintenance of bulkheads, piers and docks, and nourishment of beaches directly impact eelgrass through burial or removal of vegetation, shading impacts, and a loss of eelgrass function as a wildlife habitat. Thus, eelgrass is a protected habitat that must be safeguarded and balanced with other beneficial uses.

- *Eelgrass habitat is considered wetland habitat by State of California and federal wetland definitions and is protected by a no-net loss wetlands policy.*
- *Eelgrass is considered Essential Fish Habitat under the Magnuson-Stevens Fishery Management and Conservation Act*
- *Eelgrass is protected under NEPA and CEQA*

The City has an adopted, Coastal Commission-approved land use plan (LUP). The LUP acknowledges that the need to maintain and develop coastal-dependent uses may result in impacts to eelgrass. To mitigate the potential impacts to eelgrass of dredging and development, the LUP requires avoidance where possible and restoration where avoidance is not practical. Development of an Eelgrass Management Plan for Newport Harbor will protect eelgrass to ensure a sustainable population while maintaining all of the Harbor's beneficial uses.

Figure 1: Harbor Entrance Channel



Current Eelgrass Distribution

The distribution of eelgrass increased from about 3 acres in 1993 to over 100 acres in 2003-2004, and then decreased to 70.7 acres in 2006-2008. Areas of greatest eelgrass abundance in Newport Bay during 2003-2004 included the harbor entrance channel (Figure 1), and the shorelines of Corona del Mar (Figure 2), Balboa Island (Figure 3), Harbor Island/Beacon Bay, Balboa Channel yacht and marina basins, and the channels that surrounded Linda Isle (Figure 4). Upper Newport Bay (Figure 5) had a significant eelgrass meadow around the southern one-half of the DeAnza/Bayside marsh peninsula and nearby the Castaways site on the west side of the Channel. Recent mapping in 2006-2007 documented an eelgrass acreage decline of 24%. Declines occurred primarily in Upper Bay (Figure 6), in the channels surrounding Linda Isle and Harbor Island, and along the north shoreline of Balboa Island (Figure 3).

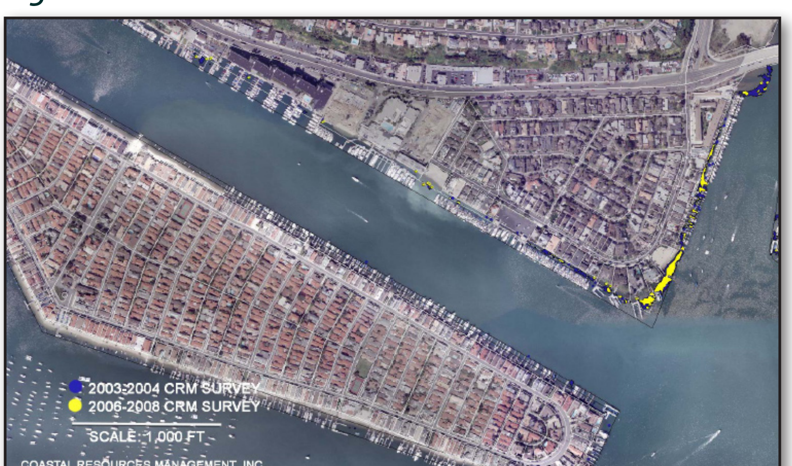
Figure 2: Corona del Mar Reach

Figure 3: Balboa Island

Figure 4: North Harbor, around Linda Isle

Figure 5: Upper Newport Bay

Figure 6: Lido Isle Ranch



Though variable on a biannual basis, the eelgrass population has increased in abundance over the last 15 years likely due to several factors:

- Improvement in water clarity;
- Highly favorable growing conditions during low rainfall years where the concentration of suspended sediments is decreased;
- Better management of dredge and fill projects;
- Increased environmental awareness of the importance of eelgrass; and
- More systematic, repetitive methods of mapping eelgrass vegetation

Current Challenges to Establish Sustainable Eelgrass Populations in Newport Harbor

The most critical challenges to eelgrass populations and their establishment are (1) the presence of availability of suitable intertidal and subtidal soft-bottom habitat (2) maintaining adequate water quality and underwater light conditions to promote eelgrass growth and health and (3) maintaining a balance between the natural resources within Newport Harbor with the uses of Newport Harbor as a viable recreational boat harbor so that the areal cover and health of eelgrass vegetation continues to serve an important function as a habitat for marine life.

These challenges are particularly important because eelgrass mitigation projects cannot be successful unless specific habitat requirements are met for the establishment and growth of eelgrass. Based on water and habitat quality, ecological zones of eelgrass population health are apparent. Eelgrass distribution in Newport Harbor can be divided into three zones: (1) a Stable Eelgrass Zone (green) that includes areas where tidal flushing is between approximately 0 and 6 days, (2) a Transitional Zone (yellow) where eelgrass acreage is susceptible to large-scale variability and tidal flushing is about 7 to 14 days; and (3) an Unvegetated eelgrass zone (red) where tidal flushing ranges between 14 days and 30 days and the amount of eelgrass present is insignificant.

Figure 7: Eelgrass Distribution Zones

Developing an Eelgrass Management Plan

Current and future Harbor infrastructural improvement projects such as maintaining safe navigable waters; the renovation and construction of piers, docks, and seawalls; and replenishing the Harbor's beaches will affect the distribution and abundance of eelgrass and will require programs to compensate for eelgrass habitat losses. Thus, understanding governing regulations, the constraints for eelgrass success in various regions of the Bay, and identifying specific mitigation options for eelgrass losses are important to consider.

Ensuring a Healthy Population

While eelgrass occurs throughout many regions of Newport Bay, its structure and function varies widely from region-to-region and from year-to-year. Mitigation for losses of eelgrass habitat must be focused in areas where suitable habitat requirements are met for size of the habitat, sediment types, depth, and light intensity, and where eelgrass will survive and flourish over the long term. Based on the historical changes of eelgrass distribution, on the results of eelgrass mitigation successes and failures, and on the limited suitable water and habitat quality that is needed to support a healthy eelgrass population, high priority should be given to maintaining and creating a sustainable eelgrass population in the Stable Eelgrass Zone (Figure 7).

Implementation of an Eelgrass Management Plan

The City of Newport Beach would be responsible for developing, overseeing, and enforcing compliance with the Eelgrass Management Plan. The City would be responsible for eelgrass surveying, implementing programs to establish eelgrass populations, monitoring the success of the programs, and conducting periodic, bay-wide eelgrass surveys. Under such a concept, the City would protect and promote a shallow water eelgrass population. As long as the sustainable eelgrass population remains above a determined quantity then a certain small amount may be impacted per year. Should the shallow water eelgrass population drop below the approved quantity, increased mitigation measures and decreased allowable annual impacts will be implemented in a phased manner.

Best Management Practices for Eelgrass

1. Avoid and minimize damage to existing eelgrass bed resources.
2. Educate boat owners and property owners as to the importance of eelgrass within Newport Harbor so that they take "ownership" in their project and view eelgrass as a positive outcome of their project.
3. Create and maintain a sustainable eelgrass population in the Stable Eelgrass Zone should the threshold value of eelgrass populations in Newport Harbor fall below the minimum amount.

Close coordination will be needed between the City of Newport Beach, the Department of Fish and Game, and the National Marine Fisheries Service in order to develop special conditions that will be effective in making the Newport Beach Long-term Eelgrass Management Plan a success, and at the same time, responsive to agency concerns.

The Eelgrass Management Plan would develop guidance to (1) maintaining a base amount of eelgrass based upon identified eelgrass threshold capacity measurements and using BMPs to ensure this threshold capacity is maintained, (2) implementing programs to maintain and establish sustainable eelgrass populations in areas affected by disturbances, or into the created habitat using innovative and cost-efficient methods if necessary to maintain a determined sustainable eelgrass population, and (3) monitoring the success of the sustainable eelgrass population over the long term.

Building a Sustainable Eelgrass Population

Establish a sustainable eelgrass population in the Stable Eelgrass Zone. The deeper channel waters beneath Mooring Area B seaward of the southern perimeter of Balboa Island encompass a maximum of about 28 acres of bay floor that could potentially be modified to support a sustainable eelgrass population. Selected site (or sites) could be engineered to provide for (1) long-term stability from the effects of sediment scour and/or sediment deposition, (2) appropriate depth ranges to support a sustainable eelgrass population, and (3) adequate depths to maintain safe navigation and boating. The creation of new shallow-water habitat in the Harbor would also present an opportunity to establish both a confined disposal site to manage contaminated, dredge sediments from Newport Bay dredging projects as well as maintain a sustainable eelgrass population.

Additional actions that can be taken to provide a healthy eelgrass population:

- Improving water quality by the reduction of nutrients from San Diego Creek.
- Decreasing sediment loading, specifically finer sediments, from San Diego Creek.
- Reducing shade associated with docks and piers to increase light penetration.

Potential Steps Forward

1. Identify appropriate needs relative to future watershed and harbor activities to gauge the extent of required sustainable eelgrass management. Develop an ecosystem approach Eelgrass Management Plan (EMP) rather than managing eelgrass project on an incremental basis.

2. Meet with stakeholders and identify concerns, constraints, and permitting issues based on what will be required for future dredging and infrastructure improvements in Newport Harbor. *It will be critical to assess the environmental permitting and fiscal constraints of the program early on to assess the ability of the City to implement an Eelgrass Management Plan. Early agency involvement with the Coastal Commission, U.S. Army Corps of Engineers, State Lands Commission, State Water Resources Control Board, and resource agencies (NMFS, USFWS, and CDFG) is critical to ensure that there is sufficient agency understanding and support for such a critical undertaking.*

3. The EMP will promote a system-based approach; the key metric of eelgrass protection is the maintenance of a sustainable shallow water eelgrass population of at least 20 acres. *The focus of the City's management will be to protect and promote shallow water eelgrass populations and as long as the sustainable eelgrass population is above 20 acres, no more than 2 acres of eelgrass impacts will be permitted per year conditioned on compliance with best management practices for avoiding eelgrass disturbance where possible. Should the shallow water eelgrass population fall below 20 acres, increased mitigation measures and decreased allowable annual impact will be implemented in a phased manner.*

4. The City of Newport Beach will assume lead responsibility for the preparation and implementation of the Eelgrass Management Plan. *The City will enforce compliance with the plan, subject to agency oversight. Consistent with its management role, the City, rather than individual residents, will be responsible for surveying and data gathering, while relieving individual property owners of a burden they generally lack the expertise to effectively carry.*

5. The City will of Newport Beach will identify primary and alternative locations in the Stable Eelgrass Zone capable of supporting the maximum amount of sustainable eelgrass required for future projects should it be necessary to create additional Stable Eelgrass Zone eelgrass populations. *Conduct coastal engineering and marine biological surveys to identify those areas with the Stable Eelgrass Zone that have a potential to be utilized for mitigation bank sites. Conduct side scan sonar mapping surveys, physical modeling, and field studies in potential sustainable eelgrass areas to evaluate erosion, sedimentation, and other process that will be required to refine site selection.*

6. The City will prepare a draft Eelgrass Management Plan (DEMP) and negotiate a Final Stable Eelgrass Zone Management Plan (FEMP) with the National Marine Fisheries Service, the California Department of Fish and Game, the U.S., Army Corps of Engineers, and the California Coastal Commission. *Upon completion of the FEMP, the City shall commence review of the plan for consistency with provisions of the City of Newport Beach Local Coastal Plan and the Regional General Dredging Permit (RGP).*

7. Once in place, the City will implement and manage the FEMP. Following implementation, the City will review the success of the EMP at five-year intervals to determine the effectiveness of the program, identify any required changes to the program, and implement if necessary, adaptive management to ensure the key program metrics are being met.

8. Establish an Eelgrass Management Plan web site. *Lastly, the City should consider establishing a web site that will track project implementation and achievement of key metrics for public review. This will also assist the City in providing suggested public educational outreach for the project.*

Beach Replenishment Strategy

Beneficial Use Criteria/Rating	
Water Quality	
Marine Resource Protection (ASBS)	
Habitat Protection/ Enhancement	
Community/ Public Access	
Water Conservation	
Channel Maintenance	
Flood Control	
Berthing Management	
Recreational Opportunities	
Sustainability	

Introduction

Natural beaches are dynamic landforms altered by wind and waves in a continual process of creation and erosion. River sediments are the source of 80 to 90% of beach sand; some beaches are built to great widths by sediments washed to the sea by large storm events and then gradually erode through wave and other process. After the construction of the Lower Bay, beaches are modified through human processes.

Definition: Beach replenishment or nourishment refers to the strategic placement of beach-quality sand on an existing beach to provide a source of nourishment for littoral movement or restoration of a recreational beach. Generally, beach nourishment projects are carried out along beaches where a persistent erosional trend exists. To carry out a beach nourishment project, sediment with physical characteristics similar to the native beach material is mechanically or hydraulically placed. Beach replenishment has proven to be cost-effective and environmentally acceptable method of maintaining the recreational, aesthetic, and shore protection aspects of beaches within the Lower Bay.

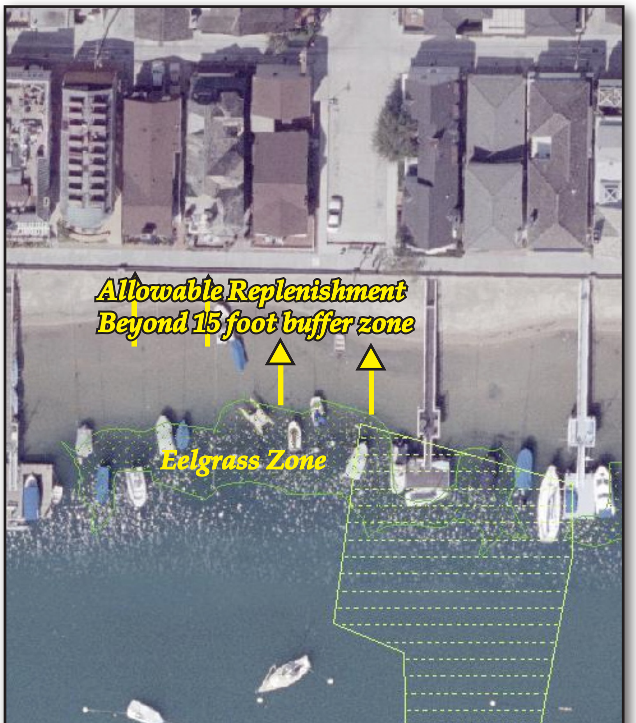
Key Issues: There are over 30 beaches located in Lower Newport Bay. The beach uses and needs vary. Several issues have prevented efficient management of beach replenishment projects. A formal system is not in place to manage and prioritize beach replenishment projects. Components of the RGP restrict the application of dredged material on beaches.

1. No management system in place to prioritize selection of beaches for replenishment.
2. No management system is in place to characterize and prioritize dredged material for beneficial uses.
3. Eelgrass habitat restrictions: The proximity of eelgrass beds can limit the opportunities to replenish the beaches. Currently, beach replenishment can-

not be conducted in areas where eelgrass is found within 15 feet of the replenishment footprint. If eelgrass is found within 15 to 30 feet of the replenishment footprint, pre-and post-monitoring surveys are required.

4. Under the RGP, only small volumes (<1000cy) of dredged material from the Lower Bay can be beneficially used to nourish compatible beaches.

5. Maintenance of sands on replenished beaches



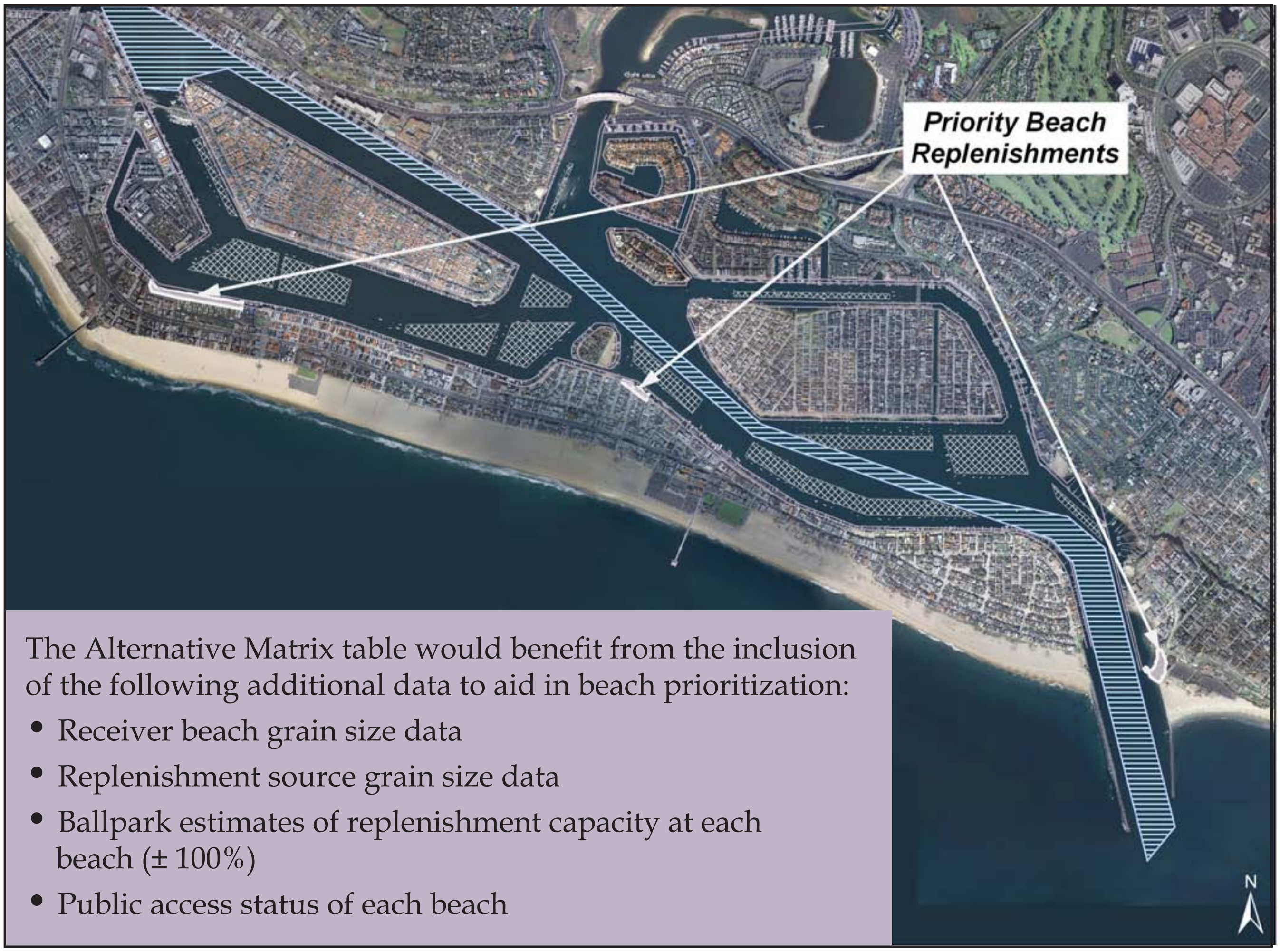
Development of a Beach Replenishment Program

The City will benefit from developing a centralized management program to be run by the Harbor Resources division. An Alternative Matrix has been developed as part of this program that can be used to develop a long-term analysis tool as data become available. This interactive table can be modified as priorities and opportunities change. The Alternative Matrix is a tool to qualitatively rank beaches for their replenishment capacity and need. All beaches are evaluated by their access and popularity, sand capacity, constructability, and proximity to eelgrass. Values for each criteria range from 1 to 3 with 1 being poor performance and 3 being good performance within that criteria. Also, the criteria are weighted from 1 to 3 based on their level of importance, with 3 being most important. For example, access & popularity is very important so that criteria receives a weight of 3, while constructability is least important, receiving a weight of 1. Each beach and criteria combination has a subtotal calculated as the criteria value times the importance weighting. The beaches that would benefit the most from replenishment have the highest total and the lowest rank.

Based on existing available data, the Alternative Matrix shows that Marina Park, Edgewater/Montero, and China Cove all rank very high for beach replenishment since these beaches all have a recreational need, can accept significant quantities of sand, are easily constructed, and are far enough from eelgrass to be permitted. Pirate's Cove, Lake St., 10th St., and M St. also rank well for beach replenishment.

Beach at Marina Park

Beach at Edgewater and Montero Avenues



The Alternative Matrix table would benefit from the inclusion of the following additional data to aid in beach prioritization:

- Receiver beach grain size data
- Replenishment source grain size data
- Ballpark estimates of replenishment capacity at each beach (± 100%)
- Public access status of each beach

As material is dredged, grain size compatibility information should be collected to determine the best location for placement options. Grain size data for the many receiver beaches is not yet organized in one report. Many of the beaches have been maintained by individual homeowners or homeowners associations and sampling data may be available from those individuals or groups. While it is beyond the scope of this study, development of an evolving database of all replenishment sources and receiver beaches would be useful for grain size compatibility analysis to support the Beach Replenishment Alternative Matrix. General rules for grain size compatibility are that the replenishment source material must be either greater than 80% sand or at least 75% sand and no more than 10% difference in sand content between the source and receiver beach.

- Increase volume of material to be beneficially used for beach replenishment in the RGP

- Include beach replenishment projects in the Eelgrass Management Plan

A sand study was begun in 2007 to assess sand management and beach improvement options for Balboa Island. The study is to focus on quantifying existing conditions of sediment transport and effects from natural and man-induced changes. Other studies can be conducted in areas with known sand erosion problems.

Potential Steps Forward:

The following steps are made for improving the effectiveness of the Beach Replenishment Program:

1) Include the following additional data in the current Alternative Matrix table: a) cost/benefit analysis; b) source and receiving beach compatibility; and c) quantification of how long beach sand will stay on each beach. Data needs include: receiver beach grain size data, replenishment source grain size data, estimates of replenishment capacity at each beach, and public access status of each beach. Based on the Alternative Matrix, Marina Park, Edgewater/Montero, and China Cove have a recreational need, can accept significant quantities of sand, are easily constructed, and are far enough from eelgrass to be permitted. Pirate's Cove, Lake St., 10th St., and M St. also rank well for beach replenishment.

2) Develop Eelgrass Management Plan and determine if these banks can be used for beach replenishment mitigation. This would significantly reduce restrictions on beach replenishment placement locations .

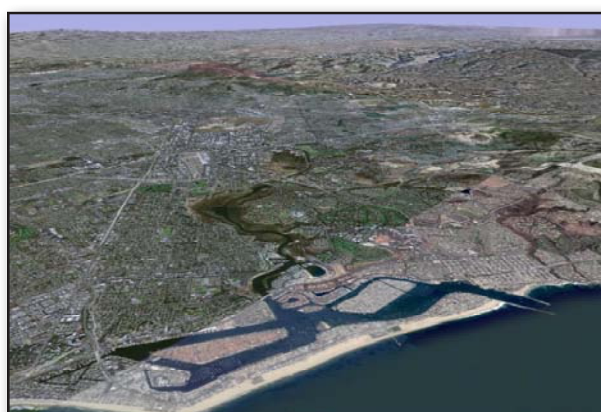
3) Modify the RGP to simplify and streamline the special conditions and increase the 1,000 cubic yard quantity limit. This would allow the resumption of maintenance dredging and beach replenishment by individual homeowners and homeowners associations.

4) Expand sand movement studies along Balboa Island to other areas within Lower Newport Bay to develop a better understanding of sand movement at other beaches in Lower Newport Bay.

Beneficial Use Criteria/Rating	
Water Quality	●
Marine Resource Protection (ASBS)	◐
Habitat Protection/ Enhancement	◐
Community/ Public Access	○
Water Conservation	◐
Channel Maintenance	○
Flood Control	○
Berthing Management	○
Recreational Opportunities	◐
Sustainability	◐

Introduction

The City of Newport Beach (City) is committed to achieving a sustainable Newport Harbor Area (Harbor Area) through protection and improvement of water quality. Water quality is a key link in addressing community needs, regulatory requirements, and the health and diversity of the surrounding ecosystems to the Harbor Area. The City's strategy toward achieving this vision begins with an evaluation of the current health and water quality of the Harbor Area and identifying the sources of impacts to it. Based on this understanding, strategies will be developed to protect water quality in the Harbor Area through the implementation of best management practices (BMPs) supplemented by coordination with other regional water quality protection measures, community outreach, and education. The end goal is to create a Strategic BMP Implementation Plan (BMP Plan)



	Agricultural Supply	Groundwater	Water Contact Recreation	Non-water contact recreation	Commercial and Sportfishing	Warm Freshwater Habitat	Limited Warm Freshwater Habitat	Biological Habitats of Special Significance	Wildlife Habitat	Rare, Threatened, or Endangered Species	Spawning, Reproduction, and Development	Marine Habitat	Shelfish Harvesting	Estuarine Habitat
Bays, Estuaries, and Tidal Prisms														
Lower Newport Bay			●	●	●				●	●	●	●	●	
Upper Newport Bay			●	●	●			●	●	●	●	●	●	●
Channels Discharging to Coastal or Bay Waters			●	●	●				●			●		
Ocean Waters														
SWQPA (formerly ASBS)			●	●				●				●		
Newport Bay			●	●	●								●	
Inland Surface Streams														
Buck Gully	●	●				●	●							
Morning Canyon						●	●							
San Diego Creek														
Reach 1 - Below Jeffries Road			●	●					●					

Table 1: Beneficial Uses for Waters in the Newport Harbor Area

to strategically implement water quality BMPs that is coordinated with Harbor Area beneficial uses and addresses current and future pollutants entering and discharging from the Upper and Lower Newport Bay. The strategic plan will also coordinate with the watershed, Upper Newport Bay, and coastal plans and projects to create a sustainable water quality improvement plan maintained through iterative effectiveness assessment of the implanted water quality protection, preservation, and improvement measures.

Overview of Water Quality Issues

The Newport Harbor Area faces significant water quality challenges as identified through regulatory action and a number of special studies recently undertaken by the City of Newport Beach and other watershed stakeholders. The Harbor Area, located in the Lower Bay, is the nexus between the highly urbanized upstream watershed, the ecologically sensitive Upper Newport Bay and the receiving waters of the Pacific Ocean. The Harbor Area is also functioning small boat harbor surrounded by small businesses, private residences, and municipal facilities and has over 9,000 boats berthed in the Lower Bay. The Lower Bay also serves as a major Southern California recreational destination, attracting both visitors and locals to take advantage of a variety of water-related activities.

The Upper Newport Bay in addition to supporting high value habitat serves a number of recreational uses that include a small boat marina for approximately 670 slips and 620 dry storage spaces (data from Newport Dunes and DeAnza), public boat launch ramp, and an aquatic recreational facility. Potential sources of pollutant inputs therefore also exists in the Upper Bay that need to be addressed as part of a watershed management program for which this HAMP provides a key element along with the Central Orange County Integrated Regional and Coastal Watershed Management Plan (San Diego Creek, Delhi Channel and Coastal Canyon Creeks Watersheds) and the Newport Coast Watershed Management Plan (ASBS).

Key water quality challenges in the Harbor Area include understanding constituent loadings from regional upstream sources in the San Diego Creek Watershed, contributions of constituents from local sources within the Harbor Area, potential cross-contamination from sources outside the Bay, and Bay discharges of degraded water quality to sensitive marine areas outside the Harbor. The Water Quality Control Plan for the Santa Ana River Basin (Basin Plan) lists Newport Bay as a tributary to the Pacific Ocean and also serves as the receiving waters for San Diego Creek. Located just outside the Harbor are two areas designated by the State as Areas of Special Biological Significance (ASBS) that are subject to special protections under the California Ocean Plan (COP). Table 1 summarizes the Basin Plan beneficial uses for the waters in and adjacent to the Harbor Area.

	Buck Gully Creek	Lower Newport Bay	Upper Newport Bay	Rhine Channel	San Diego Creek - Reach 1
TMDLs					
Nutrients		●	●		●
Pathogens		●	●		
Pesticides		●	●		●
Sedimentation			●		●
303(d) Listings					
Chlordane		●	●		
Copper		●	●	●	
DDT		●	●		
Fecal Coliform	●				●
Lead				●	
Mercury				●	
Metals			●		
PCBs		●	●	●	
Sediment Toxicity		●	●	●	
Selenium					●
Total Coliform	●				
Toxaphene					●
Zinc				●	

Table 2: Impaired Water Bodies and Pollutants of Concern in the Newport Harbor Area

Based on the Basin Plan beneficial use designations and the COP, water bodies within and near the Harbor Area are subject to regulatory action from the USEPA, the State Water Resources Control Board (SWRCB) and the Santa Ana Regional Water Quality Control Board (RWQCB). The EPA and the RWQCB have implemented total maximum daily loads (TMDLs) for various constituents in San Diego Creek and the Upper and Lower Newport Bay. Buck Gully Creek, the Upper and Lower Newport Bay, Rhine Channel, and San Diego Creek all are listed as impaired on EPA's 303(d) list (Table 2).

The development of a cost-effective strategy to implement (BMPs) to meet current and anticipated TMDLs, other regulatory drivers, and existing City planning documents and ordinances is a key component in effectively addressing water quality issues in the Upper and Lower Bay.

Key Questions and Coordination with Current Programs

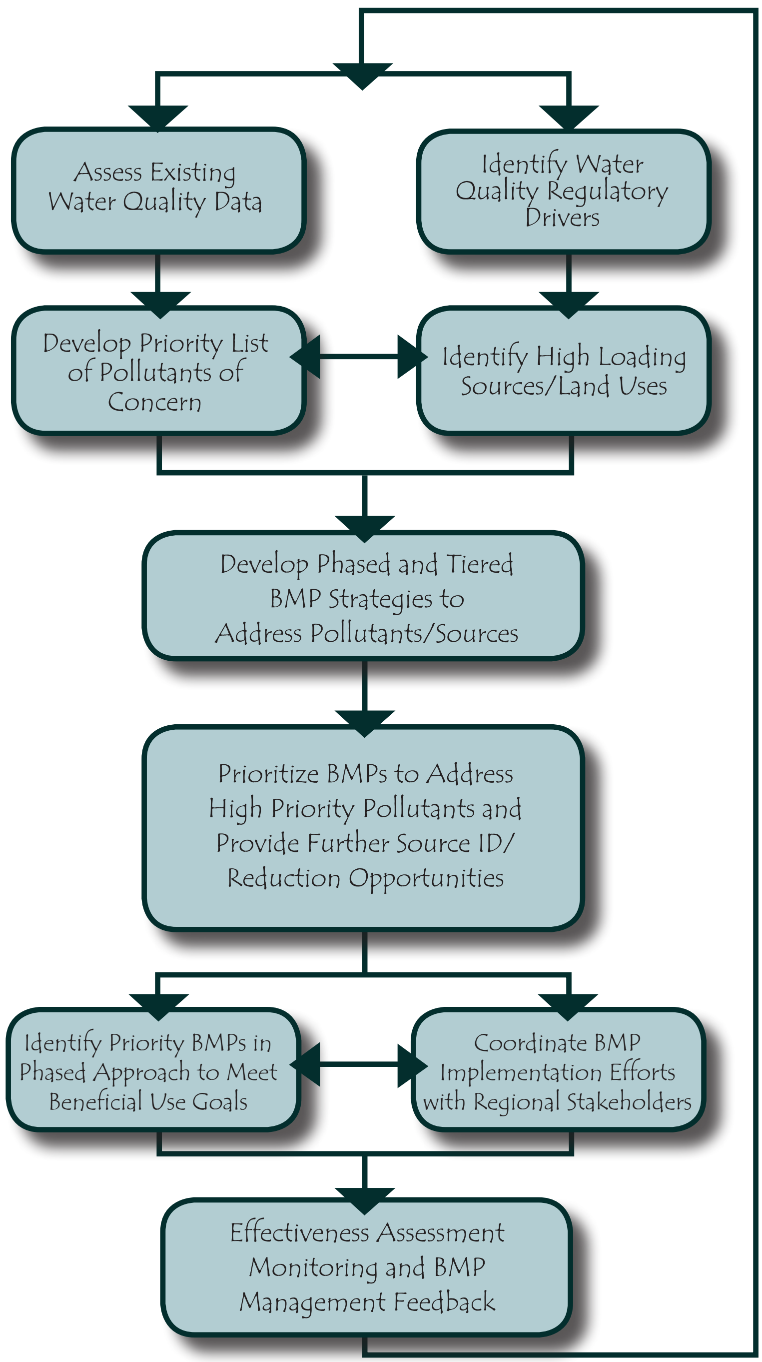
Water quality is a key component to bring together diverse water resource and land use agencies, environmental groups, and other stakeholders within the region to develop management strategies. The objective of the BMP Plan is to coordinate regional and local water quality protection and improvement efforts to meet both Harbor Area beneficial use criteria and regulatory drivers within and outside the Lower Bay. Many of the issues in the Harbor Area involve aquatic resources and/or the presence or transport of pollutants in water; therefore, water quality protection and improvement is a key aspect of successful Harbor Area Management. The water quality BMP implementation strategy will include ongoing effectiveness assessment to evaluate the performance of water quality improvement programs in meeting the water quality goals and integration with watershed, Newport Bay and coastal plans, and BMP projects.

Regionally, the Central Orange County Integrated Regional and Coastal Watershed Management Plan (IRCWM Plan) addresses overall water resources management needs for the Newport Bay and Newport Coast Watersheds (County of Orange, 2007). The IRCWM Plan has been submitted to the SWRCB to qualify for state and other grant funding to support numerous projects to improve water quality within and adjacent to the Harbor Area.

The City has been moving toward improving water quality in the Harbor through its partnering with other watershed leads on meeting the requirements of current TMDLs and requirements under its current NPDES Storm water Permit. The City has developed a Master Plan for the communities around the Harbor to include needed upgrades to storm drain systems to address flooding and water quality issues.

Other water quality-related programs under the jurisdiction of USACE, RWQCB, County of Orange Watershed & Coastal Resources Division, and local environmental and restoration groups are currently being conducted in Newport Bay and the San Diego Creek and Coastal Watersheds. Harbor Area stakeholder coordination with these groups is key to the success of water quality improvement projects in Newport Bay.

Within the Harbor Area, the City and other stakeholders have already implemented



some programs that align with other city-wide water quality improvement goals such as residential and construction BMPs and numerous clean water outreach efforts. However, water quality improvement efforts in the Lower Bay require special consideration given the sensitive habitats of the Upper and Lower Bay, current and future harbor maintenance requirements, and federal, state and local regulatory actions.

Harbor Area Water Quality BMP Identification and Prioritization

The BMP Plan is a strategic plan that builds on the projects identified in the IRCWM Plan and other planning documents. The BMP Plan provides guidance for water quality BMP efforts within the Harbor Area for issues specific to harbor stakeholders. The BMP Plan establishes an iterative activity prioritization process and implementation strategy for the identification of priority pollutants in the Harbor Area. The BMP Plan prioritization strategy is a process to implement BMPs in a cost-effective manner that considers current and future water quality issues so that BMPs are designed to accommodate future reduction requirements without expensive retrofits. The strategy also implements BMPs in a phased approach in order to both assess the effectiveness of the projects as they are implemented and to continually refine the prioritization process using all available data. The BMP Plan provides a road map for watershed activities within the Harbor Area that coordinates with the IRCWM and other watershed protection efforts.

Linkages to Other Programs

The BMP Plan has been developed in this HAMP to coordinate with existing planning documents for watershed and coastal areas. Specifically, the Phase I projects developed in the BMP Plan are consistent with projects proposed in the IRCWP for the Newport Bay Watershed for the Lower Newport Bay. Several of these projects have been included in recent grant funding applications under Proposition 84 and federal grant opportunities. These Lower Newport Bay projects are linked to water quality issues in the watershed and coastal areas that include the ASBS. Preliminary pollutant transport modeling has indicated a likely connection between the Lower Newport Bay and the ASBS; therefore, projects that improve the water quality of the Lower Bay will benefit the coastal habitats. These projects are further coordinated with the Phase I projects developed in the Newport Coast Watershed Management Plan for the seven coastal watersheds along the Newport Coast and the Upper Bay Restoration Planning. For example, the City is planning to expand the runoff reduction program to all the watersheds within its jurisdiction in order to reduce urban flows and associated pollutant loads into the Upper and Lower Newport Bay, and to the ASBS. Metals reductions projects in the Coastal Watersheds will be implemented on schedules similar to the copper reduction programs in the Lower Newport Bay.

As presented in the BMP plan, water quality improvement efforts will also need to coordinate with sediment control and dredge management projects. Siltation issues in the watershed and Upper Newport Bay have resulted in the migration of fine sediments and associated metals and pesticide pollutant loading to Lower Newport Bay. Siltation can also impact vital eelgrass beds and impact the quality of sediments and benthic communities. These issues can only be successfully addressed through an integrated program that reduces the siltation loading from the watershed, maintains the inline basins in the Upper Bay, and removes impacted sediments from the Lower Bay. Projects planned and underway in the watershed to reduce siltation include channel stabilization, agricultural BMPs, construction site BMPs, sediment monitoring, natural treatment basins and installation of inline channel basins in San Diego Creek. The inline basins in the Upper Newport Bay are undergoing maintenance to provide additional sediment removal. As discussed in the Upper Newport Bay Sediment Control section, the effectiveness of these basins to remove the fine-grained materials requires further assessment. The Big Canyon Restoration project includes water quality ponds for sediment and other constituent reduction before discharge into the Upper Bay. These projects, along with the implementation of BMPs during dredging activities and bulkhead maintenance and upgrades, will reduce the siltation to meet overall TMDL goals.

As outlined in the BMP Plan, a tiered and phased approach is suggested to meet water quality improvement and TMDL goals. The BMPs proposed in the first phase of the Lower Newport Bay program focus on source control and pollution prevention and runoff reduction while also providing for the collection of effectiveness assessment data that may also be used to identify additional water quality improvement program opportunities. These activities are consistent with the coastal watershed strategy.

Potential Steps Forward

The purpose of the BMP Plan is to develop a comprehensive Harbor Area activity strategy that addresses current and anticipated pollutants and associated regulatory drivers, community needs, and ecosystem health and sustainability. The iterative prioritization and implementation strategy developed for the Harbor Area provides the framework for stakeholder participation and coordination in the protection and improvement of water quality in Newport Bay. Ongoing effectiveness assessment of implemented strategies will assure the coordinated and efficient use of available resources in achieving a sustainable Harbor Area plan to protect and improve water quality.

Phase I of the BMP strategic plan involves using the iterative activity prioritization process to define the following water quality improvement projects.

Pollution Prevention/Runoff Reduction -
Copper Source Identification and Pilot Reduction Program

Controlling potential impacts from copper-based paints requires first further assessment of the specific activities/mechanisms in which copper is migrating to the sediments. Collaboration with ongoing studies is a potential step forward to assure the proper reduction BMPs are implemented. An initial pilot program may include implementation of a copper reduction program focused on the use of alternatives to copper-based boat paints and a BMP pilot project for boat maintenance to address potential cross-contamination impacts to the ASBS from Newport Harbor. The program will also implement an outreach program to further educate the boating community regarding the environmental effects of using copper-based antifouling paints.

Pollution Prevention/Runoff Reduction - Water Quality Enforcement Cross Training Program

Municipal inter-departmental coordination program designed to control non-point source discharges to the Lower Bay. The program will train Harbor Area oversight departments (Harbor Patrol, Lifeguards, Coast Guard, California Department of Fish and Game) in identifying potential sources of water quality degradation and increase communication to City Code Enforcement officers to report potential violations.

Green Marine Initiative

The Green Marina Initiative promotes and celebrates voluntary adoption of measures to reduce waste and prevent pollution from marinas, boatyards, and recreational boats. Designated “Green Marinas” are recognized as environmentally responsible businesses. The Newport Beach Harbor Commission is participating in the Green Marina Initiative program and is identifying opportunities to implement practices to control pollution associated with vessel maintenance and repair, petroleum storage and transfer, sewage disposal, hazardous and non-hazardous waste, storm water runoff, and facilities management.

Pollution Prevention/Runoff Reduction - Washing Activities

A Water Quality Education Program designed to provide brochures and posters for Harbor Area boat users informing them of the need to reduce pollutants entering the Bay as a result of boat and dock washing activities.

Pollution Prevention/Runoff Reduction- Water Quality Education for Short-term Slip Rentals

A municipal inter-departmental coordination program designed to educate harbor users and visitors on the importance of water quality protection. The program will provide literature to help short-term slip tenants and mooring renters identify and reduce potential sources of water quality pollution from their vessels.

Pollution Prevention/Runoff Reduction- Water Quality Inspections as part of Slip Transferability Permitting

A municipal inter-departmental coordination program designed to educate and enforce water quality improvement efforts as part of the Slip Transferability Program. The City could implement an inspection process linked to slip transfers so that harbor users are educated and potentially polluting vessels are identified prior to the slip transfer process.

Pollution Prevention/Runoff Reduction- Municipal Low Impact Development (LID) Assessments

A pilot assessment program to incorporate additional LID designs into municipal facilities within the Harbor Area and the Marina Park Conceptual Plan. Currently, the Marina Park Conceptual Plan indicates a Bio-Swale Filtration Area to be built adjacent to the Community Center.

Beneficial Use Criteria/Rating	
Water Quality	
Marine Resource Protection (ASBS)	
Habitat Protection/ Enhancement	
Community/ Public Access	
Water Conservation	
Channel Maintenance	
Flood Control	
Berthing Management	
Recreational Opportunities	
Sustainability	

Channel and Pierhead Lines Study

Definition: During and immediately following initial construction of Newport Bay, USACE established harbor lines (project, pierhead, and bulkhead lines). These lines define the federal navigation channel dredging limits, limits on how far piers and wharfs can extend into Bay waters, and the bayward extent of bulkheads and other solid fills into Bay waters. These lines are important for maintaining safe navigation conditions throughout Newport Bay.

Key Issues: The design and use of Newport Bay has been altered extensively, however the harbor lines have not been systematically adjusted since their original development in 1936.

1. Numerous basins and islands have been constructed since initial construction.
2. The type, size, and distribution of vessels within Newport Bay have changed over time to reflect changes in the market and the desires of boat owners and operators.
3. Changes in policy and regulations at the federal, state, and local levels have resulted in a different regulatory condition from that considered at the time the lines were initially established.

Harbor Lines: Rules and Regulations

Updating harbor lines is a multi-phase process beginning with the recommendations provided in this HAMP. After review and public input, the Harbor Commission would make recommendations to the City Council. City Council could formalize a request to the federal government to proceed with enacting changes to the harbor lines. The California Coastal Act does not regulate harbor lines, but it does regulate any construction taking place in the coastal zone. The harbor lines can be modified without a California Coastal Commission permit, but any subsequent construction dependent on those harbor lines would still be regulated by the California Coastal Commission. While there is no explicit requirement, the public should also be informed and consulted on the harbor line changes early in the process.

DEFINITIONS

harbor line n. **1.** the line set by the federal government, delineating the area in which no obstructions to navigation are allowed. **2.** In Newport Harbor, harbor lines include the project line, pierhead line, and bulkhead line.

project line n. **1.** the boundary of the federal project and limit of certain federal responsibilities.

pierhead line n. **1.** a boundary set by USACE beyond which a pier may not extend.

bulkhead line n. **1.** a boundary set by USACE beyond which solid fill may not be extended.

Specific Conflicts

- *Throughout the Harbor, many beaches extend beyond the bulkhead line. This practice has evolved over time and is likely in conflict with a strict interpretation of the bulkhead line definition.*
- *Promontory Bay and the Grand Canal (Balboa Island) lack bulkhead lines.*
- *Promontory Bay, Balboa Yacht Basin, Linda Isle, from Harbor Patrol through Pirate's Cove, and Balboa Coves have bulkhead lines crossing existing navigable waters and channels.*
- *There do not seem to be any locations where existing pierhead lines intrude excessively into the navigable channels.*
- *Pierhead lines are noticeably absent from Promontory Bay. Also, pierhead lines for Newport Island exist only in the Harbor Permit Policy.*
- *Existing structures extend beyond pierhead lines at numerous locations. This situation has developed over the decades and is one of the main reasons for performing this study.*
- *No project line exists around Newport Island, the Rhine Channel, Promontory Bay, or Linda Isle. These areas are not federal projects, however, and do not require project lines.*
- *Existing structures extend beyond project lines at numerous locations.*

Changing the Lines: Benefits, Constraints, and Solutions

Benefits

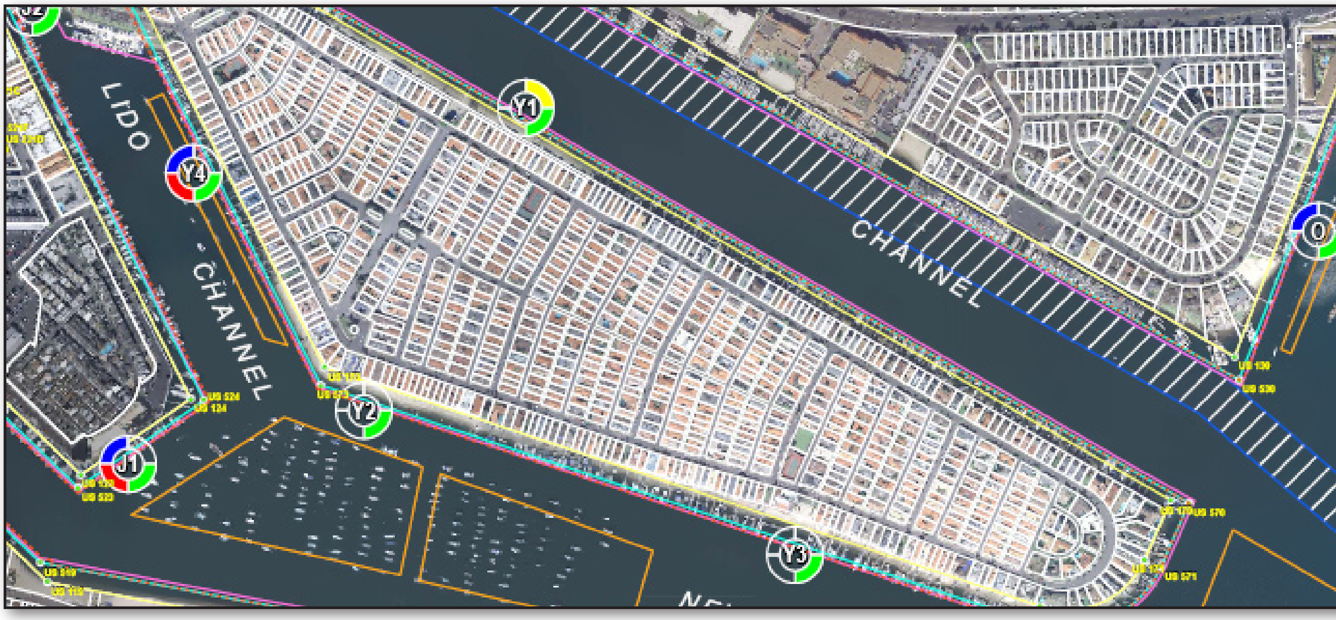
- Improving clarity and consistency of the harbor lines;
- Allow pier owners access to deeper, more navigable waters that are further offshore; and
- Updating the harbor lines allows the opportunity of bringing nearly all harbor structures into compliance.

Constraints

- The change should minimize pierhead encroachment into navigable waterways.
- Any change in the harbor lines require USACE approval.
- A navigation study should be performed to verify that changing the harbor lines to match existing conditions would not impact navigation beyond allowable standards. If the impacts are beyond allowable standards, the realignment should be modified.
- Any channelward realignment of the project line would transfer maintenance (e.g. dredging) requirements from the federal government to the City and/or County. In addition, the expansion of pierhead lines would allow increases in dock lengths which may extend over eelgrass beds.
- Widening of Federal Navigation Channel (reduction in pierhead lines) have a potential to reduce eelgrass habitat through the expansion of navigation channel lines into shallow existing eelgrass habitat .

Solutions

- Realign pierhead lines to bring potential structures into compliance. In other words, move pierhead lines channelward, connecting existing pierheads;
- Where necessary, move the project lines channelward to include the new pierhead lines. This is necessary to maintain project lines channelward of pierhead lines;
- To simplify and clarify bulkhead lines, move bulkhead lines landward to the existing bulkhead or property lines;
- Since no structures should cross navigation channels, remove bulkhead and pierhead lines that cross navigation channels;
- To improve consistency throughout the Lower Bay, add bulkhead and pierhead lines where they do not currently exist; and
- Update harbor lines to reflect the Harbor Permit Policy and then streamline the Harbor Permit Policy by removing area specific exceptions.



Potential Steps Forward

Based on existing and potential future harbor uses and considering the probable opportunities and constraints, the following items are suggested:

1. Develop a comprehensive plan for adjusting channel and pierhead lines to meet current and future harbor beneficial uses, including the following tasks (6 months):

   a. Realign pierhead lines to eliminate exceptions. In other words, move pierhead lines to where they make sense, given the varied bathymetry along the shore;
   b. Where necessary, move the project lines channelward to account for the new pierhead lines;
   c. Perform a navigation study to confirm appropriateness of proposed new pierhead lines;
   d. Move bulkhead lines landward to the existing bulkhead or property lines;
   e. Remove bulkhead and pierhead lines that cross navigation channels;
   f. Add bulkhead and pierhead lines where they do not currently exist; and
   g. Update harbor lines to reflect the Harbor Permit Policy and then streamline the Harbor Permit Policy by removing area specific exceptions.

Note: These suggestions may have an impact on properties and their values, so any plans that recommend modification to the lines will require review and approval by the City Council as well as possible approval by the federal government.

2. Coordinate channel and pierhead line adjustment plan with other beneficial use needs such as eelgrass habitat protection/restoration .

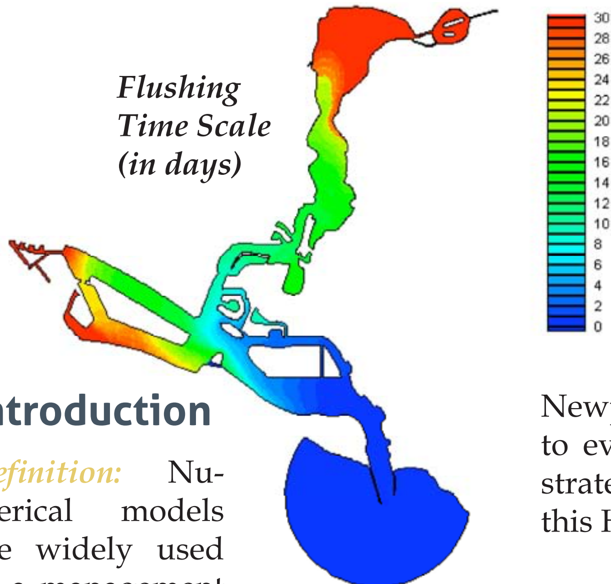
3. Phase line adjustment implementation to coordinate with other dredge requirements and potential eelgrass strategies .

4. Develop enforcement strategies to reduce future violations and minimize encroachment into navigable waters.

5. Perform similar evaluation for mooring area boundaries.

Hydrodynamic and Water Quality Numerical Modeling Requirements

Beneficial Use Criteria/Rating	
Water Quality	●
Marine Resource Protection (ASBS)	◐
Habitat Protection/ Enhancement	○
Community/ Public Access	○
Water Conservation	○
Channel Maintenance	○
Flood Control	◐
Berthing Management	○
Recreational Opportunities	○
Sustainability	◐



Introduction

Definition: Numerical models are widely used as a management decision-making tool in addressing sediment and water quality problems, including several numerical modeling efforts specifically for Newport Bay. Numerical models can be used to simulate hydrodynamic conditions (e.g., flows, water surface elevations, and velocities) and water quality transport (e.g., sediment or contaminants) to evaluate management decisions. In the past, two-dimensional (2D) models have been used to assess the effectiveness of sediment traps in Upper Newport Bay, to strategize the implementation of a storm drain diversion program to improve water quality in Newport Bay, as well as to study the potential transport of pollutants from Lower Newport Bay to the ASBS.

Key Issues: Based on past modeling efforts, it is concluded that a 3D hydrodynamic and water quality model would be required to fully capture the complex flow and transport of the Newport Harbor and Bay. A calibrated 3D model for Newport Bay and Harbor is needed to evaluate many of the proposed strategies and BMPs developed for this HAMP.

Numerical Model Evaluation

The most appropriate numerical model for Newport Bay was evaluated using the following objectives:

- Review existing water quality reports based on numerical modeling of Newport Bay.
- Identify the most compatible and efficient models that can address water quality issues and sediment transport throughout Upper and Lower Newport Bay.
- Provide recommendations for modeling enhancements of an existing model or the development of a new model.
- Provide a list of information or data requirements for the use of a numerical model for Newport Bay.

Overview of Hydrodynamic and Water Quality Numerical Modeling Requirements

The primary purpose of a numerical model for Newport Bay is a management decision-making tool to address water quality issues, and in particular, sediment deposition in the Bay. In determining the most compatible and efficient model for Newport Bay, model selection criteria were established, then the models were compared. Criteria were based on suitability of simulating the hydrodynamics and transport characteristics of Newport Bay, as well as the capability of anticipated applications of the model. Each model was evaluated in terms of the following aspects:

- Mathematical formulation for an estuarine system
- Numerical methods
- Water quality application
- Watershed model interface
- User-friendliness
- Prior application within Newport Bay and/or at similar locations

MODEL	*Mathematical formulation for an estuarine system*	*Numerical Methods*	*Water Quality Application*	*Watershed Model Interface*	*Prior Application within Newport Bay and/or at similar locations*	*User-Friendliness*
EFDC	+	+	+	+	+ *(TMDL use in So. Cal)*	+
RMA10 and RMA11	+	+	+	+	+ *(use in UNB)*	_
CH3D and CE-QUAL-ICM	-	-	+	-	-	_

Suggested Model

The simulation of hydrodynamics, water quality, and sediment transport can be accomplished using one or more of the available models: RMA10 and RMA11, CH3D and CE-QUAL-ICM, or EFDC. These models or combination of models were evaluated based on the evaluation criteria listed above. On the basis of the mathematical formulation and numerical method, EFDC and RMA10/RMA11 appear better suited to modeling Newport Bay than CH3D. Although CH3D is capable of simulating estuarine systems, it is better suited for channel flows as opposed to intertidal areas as is the case in Upper Newport Bay. All three models have similar water quality application capabilities. In terms of interfacing with a watershed model, EFDC and RMA10/RMA11 have greater flexibility.

There are no compelling reasons to select RMA10/RMA11 over EFDC or vice versa on the basis of the mathematical formulation, numerical methods, or water quality applications. However, there are some other advantages and disadvantages of each model. RMA10 and RMA11 have the advantage of being successfully applied in UNB for hydrodynamics and sediment transport. However, EFDC is becoming popular for TMDL applications, particularly in Southern California. RMA10 and RMA11 have an associated graphical user interface (GUI) to pre- and post-process model results, but require purchasing software, which can limit the use by other stakeholders. On the other hand, EFDC does not have an associated GUI, but can be modified to accommodate other GUI software. EFDC also has the advantage of using one model for hydrodynamics and water quality compared to two separate models. In addition, EFDC has the advantage of having the source code available for the public, making it easier for the development of the Newport Bay.

Model Data Requirements

Model data requirements include physical properties, inflows into the Bay, hydrodynamic conditions, and water quality conditions. Physical properties of the bay include bathymetry, creek and storm drain locations, and sediment bed properties. Inflows define the flow and pollutant loadings from creeks and storm drains into the Bay. Field data of hydrodynamic conditions (e.g., water levels and velocity) and water quality (e.g., salinity, temperature, or sediment) are required to calibrate the model. The calibration data should cover various locations throughout the Bay and concurrent periods of the time (hydrodynamic and water quality data) long enough to capture seasonal variations as well as dry and wet weather conditions. The accuracy of the model will depend primarily on the quantity and quality of data for inflows, and hydrodynamic and water quality conditions.

Potential Steps Forward

1. Develop a calibrated 3D hydrodynamic and water quality model for Newport Bay and Harbor using either RMA10/RMA11 or EFDC. (Development of such a model will take about 12 months and about $250,000.)

2. Implement a field data collection program to collect hydrodynamic and water quality data for the calibration of the 3D model. The field program will involve the collection of water elevations, velocity profiles and CTD data at three to four fixed locations throughout Newport Bay and Harbor for a period of about four months (to cover a range of dry and wet weather conditions), supplemented by a data collection with a boat for one dry and one wet weather events. These data will be used for the calibration of the hydrodynamic model. For the calibration of the water quality model, water samples will need to be collected throughout the Bay for one to two dry and wet weather events. The collected samples will be analyzed for sediment contents and contaminates of concern. (Takes about 8 to 12 months, about $500,000)

3. Use the developed 3D model for the evaluation and development of the various proposed strategies and BMPs developed in this HAMP. These may include:

- Evaluate the impact of fine sediments from Upper Bay to Lower Bay and ASBS.

- Evaluate the effectiveness of any proposed sediment control BMPs in reducing the source of fine sediments to Lower Bay.

- Help to select an optimal location for maintenance of an eelgrass population with the optimum hydrodynamic and water quality conditions.

- Help to evaluate the impacts of different proposed strategies for dredging of both clean and contaminated sediments.

- Evaluate the effectiveness of proposed water quality improvement strategies.

Regional General Permit

Beneficial Use Criteria/Rating	
Water Quality	○
Marine Resource Protection (ASBS)	○
Habitat Protection/ Enhancement	○
Community/ Public Access	○
Water Conservation	○
Channel Maintenance	◐
Flood Control	◐
Berthing Management	●
Recreational Opportunities	○
Sustainability	◐

Introduction

Definition: In Lower Newport Bay, in-water maintenance activities are carried out under a variety of federal, state, and regional permits, the principal one being the federal Regional General Permit 54 (RGP 54), issued by USACE and managed by the City of Newport Beach Harbor Resources Division. The RGP, which is valid for a term of 5 years, governs maintenance dredging and disposal of sediments and the repair and replacement of docks, piers, and seawalls. The current RGP contains a number of special conditions that set out the terms under which in-water maintenance activities can be performed, in particular the limits on quantities, permit administration, application and renewal procedures, eelgrass protection, structural work, and dredging and disposal.

Key Issues: Several issues have hampered the efficient administration of the RGP and resulted in significant delays and additional costs for necessary harbor maintenance.

1. Unduly long and costly permit renewal process every 5 years, including the difficulty reconciling the various agencies' agendas into acceptable permit language;

2. The need to revise portions of the RGP for the next renewal will make achieving acceptance by all agencies a challenge;

3. Difficulties and delays in sampling plan approval by all stakeholders;

4. The restricted range of activities and areas covered by the permit (Harbor Resources would like the permit to include areas with known contamination);

5. Numerous overly restrictive Special Conditions that prevent many minor dredging operations due to the presence of eelgrass or make them financially infeasible for private entities;

6. No consistent disposal opportunities for contaminated sediment, as previously detailed; and

7. Eelgrass *(Zostera marina)* beds constitute sensitive habitat under several programs. Losses of eelgrass, therefore, must be avoided and minimized to the extent practicable, and unavoidable losses must be mitigated. The RGP's special conditions prohibit dredging or disposal within 15 feet of established eelgrass plants unless mitigation can be provided. Given the widespread coverage of eelgrass under and adjacent to docks in Newport Bay, these restrictions have severely curtailed maintenance in some areas of the Bay.

Improvement of the RGP Process

The City's strategy for achieving the necessary balance between environmental protection and beneficial uses includes obtaining regulatory permits that recognize the particular circumstances of Newport Harbor, and administering those permits for the benefit of both the boating community and the natural environment. To that end, the implementation strategy will emphasize establishing sound relationships with the regulatory agencies, articulating clear goals and objectives for future permits, and developing a sound, cost-effective strategy for the permit renewal process. Coordination with other management programs and with the renewal process for the Coastal Development Permit (CDP) should minimize the delays and expense compared to the previous renewal effort. The goal is to obtain permits that have clear, flexible, effective conditions that allow the City to protect its natural resources while safeguarding its beneficial uses.

Permit Duration

A permit duration of 10 years would facilitate permit administration and reduce the financial and administrative burden on the City and the regulatory agencies and has the support of USEPA Region 9 headquarters. Nevertheless, USACE Los Angeles District apparently has no authority to grant a 10-year permit. Furthermore, the sediment test results would not be valid for a 10-year period, and the City would still have to go through a 5-year renewal cycle for the Coastal Development Permit. Accordingly, pursuing a 10-year RGP may be most productive at the level of USACE regulatory headquarters in Washington, D.C.

Streamline Sampling Plan Approval

A template for a Sampling and Analysis plan that specifically details all possible outcomes can be created with input from all involved agencies to ensure acceptance prior to sampling. The Sampling and Analysis Plan may include recommendations for phased testing to target specific disposal activities.

Geographical Coverage

It would be possible to extend RGP 54 to the currently excluded areas if the City could commit to placing the sediments in a previously-approved disposal site. As a disposal site outside the city is financially and logistically infeasible, identifying and developing an in-bay confined disposal site for contaminated sediments is a suggested course of action. The permit would have to incorporate appropriate restrictions on dredging, disposal, and other in-water work for contaminated areas. The potential benefits to the City and to the regulators from extending the permit's coverage make the effort worthwhile.

Streamlining Special Conditions

There is a need to (1) streamline the special conditions by simplifying the language and removing redundancies, (2) develop a system for monitoring the dredging and disposal activities , and (3) develop an Eelgrass Management Plan .

Contaminated Sediment

Handling of Contaminated Sediment Options: There is a need to include management options for contaminated dredge materials. Currently many of the RGP users do not have the financial resources to handle management of contaminated sediments;

guidance and options should be included in the RGP.

Eelgrass Management

The RGP could be modified to incorporate a comprehensive, bay-wide eelgrass management program in such a way as to achieve the twin goals of eelgrass protection and the facilitation of maintenance dredging and structural work. The Eelgrass Management Plan will describe a strategy for a concerted future effort that would incorporate sediment management while maintaining an eelgrass population. Close coordination would be needed with the Department of Fish and Game and National Marine Fisheries Service (NMFS) eelgrass management programs in order to develop modifications of the RGP's special conditions that would be effective and at the same time responsive to agency imperatives.

Beach Replenishment

Currently the RGP allows dredging projects of less than 1,000 cy to be used for beach replenishment, assuming the material is physically and chemically suitable. Increasing the volume of dredged material that can be beneficially used for beach replenishment under the RGP may increase opportunities to use the dredged material.

A Path Forward

The RGP renewal strategy should be based on an early, comprehensive effort to identify the key issues with the various stakeholders, provide necessary information, and conduct negotiations. The renewal effort needs to be undertaken with clear objectives in view and a strong sense of what can be negotiated and what cannot. This effort is best accomplished by preparation of a written renewal strategy that will guide the efforts of the City and its consultants. The strategy will describe how the various components will fit together and will provide guidance on negotiation strategies and desired outcomes.

Potential Steps Forward

Specific recommendations for future RGP renewals and for the administration of the RGP are put forward in the accompanying technical report. In general, however, the following six basic steps are suggested for the renewal process:

1) Eelgrass management
a. Negotiate modified eelgrass conditions to one of three possible models; and
b. Negotiate the Coastal Development Permit to allow more flexibility with respect to eelgrass conditions.

2) Negotiate the RGP conditions through a structured series of meetings with the stakeholders.
a. Establish agency information needs in order to improve the project approval process in the permit administration phase;
b. Gain early approval of the Sampling and Analysis Plan (SAP), using the SAP for the current RGP renewal as a template, with some changes (2 months, $15K);
c. Conduct sediment testing promptly in order to leave time to resolve anomalous results; and
d. Increase volume of material to be beneficially used for beach replenishment.

Sea Level Rise and Flood Control Management

Beneficial Use Criteria/Rating	
Water Quality	○
Marine Resource Protection (ASBS)	○
Habitat Protection/ Enhancement	○
Community/ Public Access	○
Water Conservation	○
Channel Maintenance	◐
Flood Control	●
Berthing Management	○
Recreational Opportunities	○
Sustainability	◐

Introduction

The extreme high tides in California threaten flooding of low-lying terrain and result from the coincidence of extreme astronomical tides and storm-induced sea level changes.

In Newport Harbor, these extreme conditions have occurred as recently as 1983 and also in 2005, and resulted in damage to 175 homes and businesses on Balboa Peninsula. Analysis of recent topographic survey shows that most shorelines in Lower Newport Bay fall below the height of present-day extreme high tides.

Sea levels have been rising for decades, but higher rates are forecasted for the coming century. This will impact not only mean sea level (MSL), but high water levels as well. Data reported for Los Angeles and La Jolla indicate faster rise over the past 50 years. Estimates of future sea level rise at Newport Harbor fall in the range of 1-3 ft/100 years range for Newport Harbor.

There is also evidence that North Pacific cyclones, which bring storm weather to Southern California in Winter, have intensified over the past 50 years. This has contributed to higher high tides and is thought to be a consequence of warmer ocean water. Future extreme tides constitute the most immediate flooding threat to low-lying coastal communities such as the Newport Harbor area, and are likely to be amplified by increasing sea levels.

The challenge for the City of Newport Beach is to assess its flood vulnerability using predictive models and evaluation of existing flood protection. Based on this vulnerability assessment management measures can be developed that are integrated into the overall HAMP program.

The final report of the assessment of flood vulnerability of the Newport Harbor Area caused by present and future extreme high tides and to identify those areas of the Harbor most vulnerable to flooding has been completed and is provided in Appendix H (Flow Simulation, 2008).

Overview of Flooding Issues

Ocean tides are predominantly controlled by the gravitational attraction of the moon and sun and therefore can be modeled by a number of astronomical harmonic constituents corresponding to different periods. Extreme high tides occur when these constituents are aligned (or "in phase") so their effect is cumulative. In California, extreme high tides occur in Winter and occasionally in Summer, but never in Fall or Spring (Zetler and Flick 1985, Flick 1986). The height of tides can be further amplified by storms associated with low atmospheric pressure, wind, and waves, as well as inter-annual phenomena such as El Niño (Flick 1986). The worst-case scenario for coastal flooding is a Pacific storm that approaches the California coastline from the Gulf of Alaska during an El Niño winter, and arrives coincident with the annual maximum astronomical high tide. Such a scenario occurred in late January, 1983, causing widespread damage all along the California coastline.

Coastal communities are in a position to plan for extreme tides. Their occurrence is predictable based on semi-annual and inter-annual cycles. In fact, there are only a few multi-day periods each Winter when extreme tides threaten the California coast. Only the most extreme cases are likely to cause flooding in the near future and the severity of extreme tides will hinge on atmospheric conditions.

Surface flooding is most likely to occur in low lying areas around the Harbor, and analysis of topographic data allows these areas to be identified. Parts of the Harbor such as Balboa Island are encircled by elevated bulk heads, or sea walls, that are designed to obstruct flooding by ocean water during episodes of high sea levels. Hence, land may not necessarily flood simply because of its elevation. Rather, it is necessary to consider the combined effects of sea levels, sea defenses, terrain heights, and flood control infrastructure, as well as hydraulic principles to identify those areas vulnerable to flooding.

Analysis of a 2006 Light Detection and Ranging (LiDAR) topographic survey shows that Balboa Island, Little Balboa Island, Newport Island, and nearly the full length of Balboa Peninsula along its bay-ward side fall below the height of present-day extreme high tides. A review of site conditions shows that flood control systems are in place to guard these areas against flooding. This includes a combination of public and private infrastructure (e.g. bulks heads and valves or plugs at storm drain outlets) and operational practices (e.g. City staff monitoring of tides, closure of storm drain outlets, sand berms, and cooperation with occupants to implement flood control measures).

A review of historical data shows that in January 1983 and January 2005 a tide height of nearly 8 ft. above Mean Lower Low Water (MLLW) was attained. Flooding was observed in the Harbor area in both cases (Figures 1 and 2). Several lines of evidence suggest that the onset of flooding on Balboa Peninsula and Balboa Island, when all tide gates are closed, occurs at a tide height above 7.0 ft. above MLLW.

Figure 1: Photographs of the January 10, 2005 high tide that reached the 7.8 ft (MLLW) level.

Figure 2: Photographs of the January 10, 2005 high tide that reached the 7.8 ft (MLLW) level.

The height of the bulk heads around Balboa and Little Balboa Islands were estimated to be between 7.9 to 9.2 ft (MLLW) and 8.7 to 9.8 ft (MLLW), respectively, based on LiDAR data and field measurements. Seepage cracks in these bulkheads have been observed and could cause flooding at lower tide heights.

As stated above, there are predictable and unpredictable aspects to the height attained by extreme high tides that need to be considered for short and long-term planning. The effect of astronomical factors (position of the moon and earth) is predictable. The effects of inter-annual phenomena such as El Niño/La Niña, weather conditions, and global warming on tide heights are more difficult to predict.

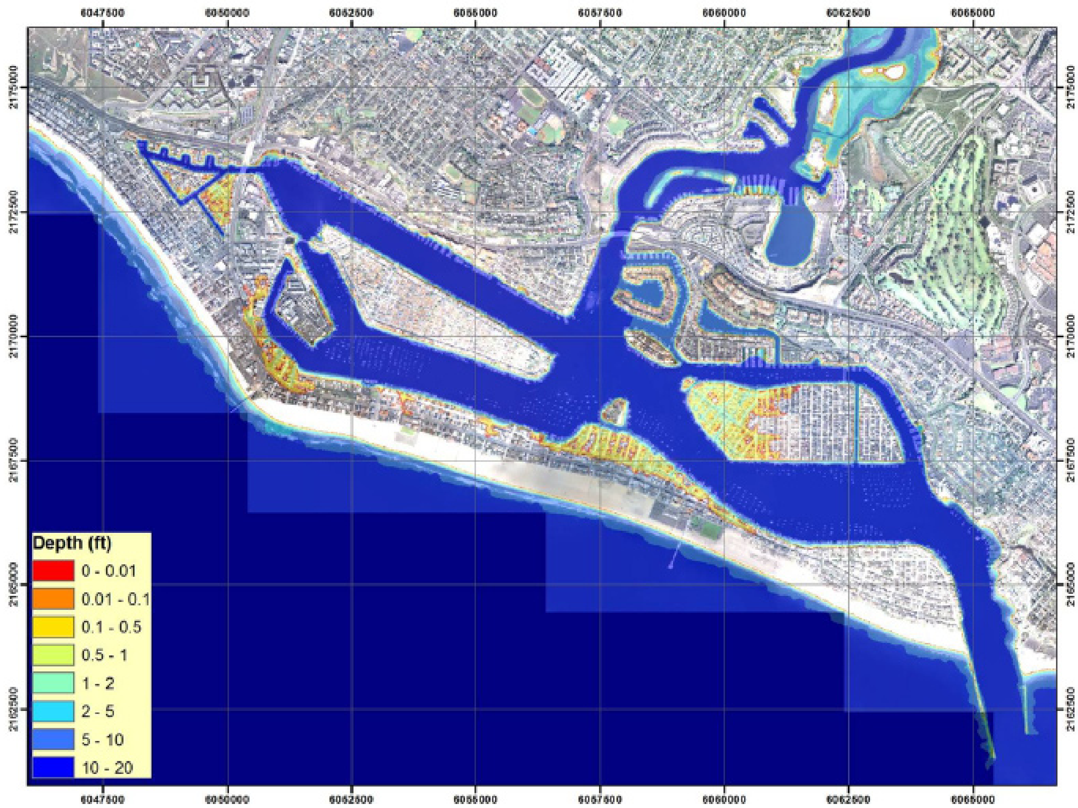


Figure 3:
Model simulations of the 8 ft tide show localized flooding along Balboa Peninsula and widespread flooding across the western half of Balboa Island

To identify and map the vulnerability of the Newport Harbor area to future flooding by extreme high tides, a flood inundation model was developed and applied. A total of nine model simulations were completed corresponding to three tide scenarios (tide heights of 8, 9, and 10 ft), two infrastructure scenarios (an "as is" scenario and an "improved" scenario corresponding to bulk head improvements presently planned or in progress), and two stream flow scenarios. These scenarios represent a range of tide heights that could occur through 2100 from the combined influence of astronomical tides, sea level rise, and environmental conditions such as storms.

Model simulations of the 8 ft tide show localized flooding along Balboa Peninsula and widespread flooding across the western half of Balboa Island as shown on Figure 3. This is largely consistent with historical observations. As shown on Figure 4, model simulations of the 9ft tide show widespread flooding along the bay side of Balboa Peninsula and near complete flooding of Balboa Island, Little Balboa Island and Newport Island. Model simulations of the 10 ft tide show near complete flooding of the developed areas of the Lower Harbor.

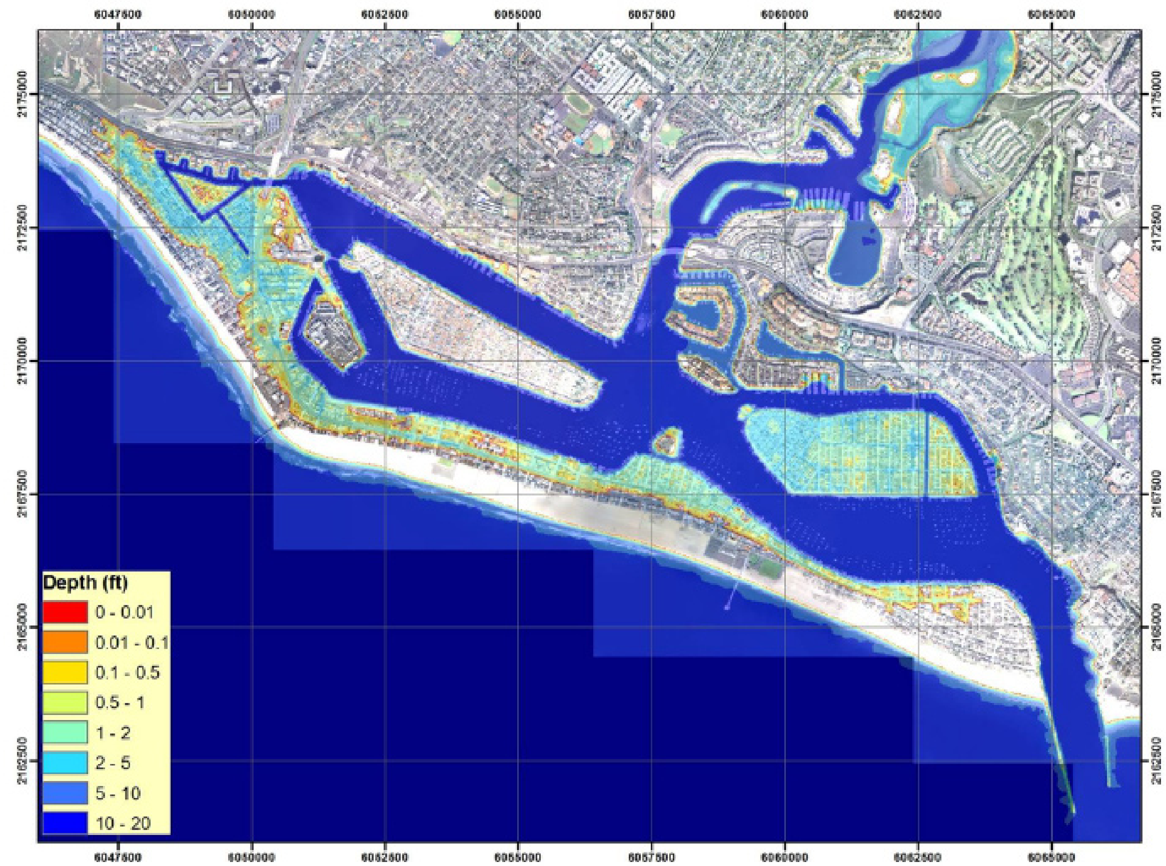


Figure 4:
Model simulations of the 9ft tide show widespread flooding along the bay side of Balboa Peninsula and near complete flooding of Balboa Island, Little Balboa Island and Newport Island.

Linkages to Other Programs

The results of the flood vulnerability assessment will be the basis for the development of management measures to reduce the potential for future impact to property from the coincidence of extreme astronomical tides and storm-induced sea level changes that are predicted to increase in the future. Linkages to other programs include the dredging of the channels and use of dredged material for backfill behind sea walls and bulkheads that may require raising to meet new elevation requirements. The beneficial use of the dredged material will lower both the unit cost for the channel dredging and management, and the cost of the bulkhead upgrades. Integration of these programs can therefore result in cost savings. In addition, the beach replenishment management program is linked to the flooding potential as beach sand provides a buffer from storm surges.

Potential Steps Forward

The purpose of the assessment is to address the City's challenge of flood vulnerability using predictive models and evaluation of existing flood protection. Based on this vulnerability assessment, management potential measures can be implemented to better prepare for future extreme high tides that are integrated into the overall HAMP program. The potential steps forward include:

Coastal Flooding Condition Monitoring Program Implementation

A potential step forward is creating a monitoring system for environmental conditions that effect coastal flooding. This system could improve the City's emergency response to flooding and help staff to prioritize and guide infrastructure improvement efforts (e.g. sand replenishment).

Database of Public and Private Flood Controls

The City should consider creating and maintaining a database, which is integrated into the City GIS, of public and private flood control infrastructure, and implementing a monitoring system to track key factors that bear on flood control. This data can then be used to update the flood models to be used to evaluate the benefit of the proposed flood control measures. The City should also consider obtaining through a registered surveyor the precise elevations of the bulkheads.

Legal and Policy Framework for Bulkhead Improvements

An additional potential step forward is exploring the legal and policy framework that would allow for more systematic improvement of the condition and continuity of the bulkheads (both public and private) in the future.

Flood Risk Management Plan

The City should consider developing and adopting a flood risk management plan for the Harbor before moving forward with any major efforts to improve flood control infrastructure (e.g. raise bulk heads). This plan would consider the economic, environmental and social consequences of flooding to identify the most optimal structural and non-structural measures for implementation.

Impact of Waves on Flooding

A final potential step forward is the examination of the impact of waves on flooding. Based on preliminary assessment data, it is not clear that there is adequate protection against the combined effects of an extreme high tide and ocean waves typical of storm conditions. Such a study could be used to guide future sand replenishment efforts.

Upper Bay Sediment Control

Beneficial Use Criteria/Rating	
Water Quality	●
Marine Resource Protection (ASBS)	◐
Habitat Protection/ Enhancement	●
Community/ Public Access	○
Water Conservation	○
Channel Maintenance	●
Flood Control	◐
Berthing Management	◐
Recreational Opportunities	○
Sustainability	◐

Introduction

The Upper Newport Bay contains the 752 acre Upper Newport Bay Ecological Reserve and the 140 acre County of Orange Regional Park. Within the Reserve are two in-bay sedimentation basins that have been constructed with the goal of capturing sediment loads from the San Diego Creek watershed, and reducing the siltation of the Upper and Lower Newport Bays. In 1999, a TMDL for sediment was implemented for the San Diego Creek watershed and Newport Bay. Continued sediment loading to the Bay has resulted in increased sediment accumulation and the need for maintenance dredging in the Upper and Lower Newport Bays. Maintenance of the Lower Bay channels will require more frequent dredging without the implementation of an effective comprehensive sediment source control and prevention program in the watershed. A comprehensive sediment control program to meet the goals of the TMDL is being implemented in the watershed of which the two in-bay basins are key elements. The elements of this program also include in-channel basins along San Diego Creek, channel stabilization projects, agricultural BMPs, construction site monitoring and BMPs, and foothill retarding basins (see Figure 1 on following page).

Dredging of the Upper Newport Bay is underway to remove accumulated sediments and provide adequate capacity for the in-bay basins. The current dredging activities in the Upper Newport Bay are enhancing habitats through improved circulation and creation of islands that protect nesting areas from predators.

Figure 1

Key Elements of the Sediment Control Plan

Agricultural BMPs

Land use in the San Diego Creek Watershed has significantly changed over the last 30 years, from primarily agricultural use to greater urbanization. Despite these changes, agricultural land has the potential to be a major contributor of sedimentation. An advanced BMP program has been implemented in the San Diego Creek Watershed.

Construction BMPs

Local governments are currently enforcing grading and erosion control at construction sites, especially during the winter when heavy rains have the potential to transport large amounts of sediment. The Orange County National Pollution Discharge Elimination System (NPDES) and Drainage Area Management Plan (DAMP) require construction BMPs. The RWQCB enforces the State General Construction NPDES which requires construction sites develop a Storm Water Pollution Prevention Plan (SWPPP; Tettemer 1993).

Channel Stabilization

Erosion from channels within the watershed is a source of sediment in Upper Newport Bay. Lining the channel with non-erodible material and controlling the flow of water can help stabilize the channel and reduce erosion. Several channel stabilization projects have been conducted in the San Diego Creek Watershed including sections of San Diego Creek, Peters Canyon Channel, Marshburn Channel, Trabuco Channel, Borrego Channel, and Bee Canyon Channel (Tettemer 1993). Channel stabilization is also part of the BMP program for agricultural land. A priority project proposed for the IRCWM Plan is the Serrano Creak Bank Stabilization and Sediment/Pollution Reduction Project (County of Orange RDMD Watershed and Coastal Resources 2007). This project involves stabilizing 1.2 miles of Serrano Creek to reduce erosion. Stream erosion in Serrano Creek threatens homes, has damaged the Los Alisos Water District sewer line, and cut channel banks in the storm season (ACOE 1998).

Foothill Retention Basins

To reduce sediment load to Upper Newport Bay from the Lomas de Santiago foothills, several retarding basins were constructed.

Retention In-channel Basins

In-channel basins are used to catch sediment in the San Diego Creek before they reach Upper Newport Bay. They are effective at catching coarser sediment particles, however they are less effective at removing fines (Sediment Control Plan 1982). Regular maintenance is necessary to ensure efficiency. Currently, there are 3 in-channel basins in the San Diego Creek. The design capacity of Basin 1, 2, and 3 is 210,000 cy, 73,000 cy, and 78,000 cy (Tettemer 1993). Removal of sediment from in-channel basins is more economical and has a smaller impact on the environment than dredging the in-bay basins. It is suggested that in-channel basins be maintained at 75% design capacity (Tettemer 1994).

In-bay Basins

There are two in-bay basins in Upper Newport Bay (Unit I/III and Unit II). The in-bay basins are effective at catching finer sediment that is not caught by the in-channel basins, however regular clean outs are necessary to ensure efficiency. Fine-grained suspended particles are difficult to remove through these techniques. These particles consist of clay and organic matter that attract and transport pollutants to the Bay. Pollutant loading to the Bay needs to be addressed through upstream measures and further transport modeling to improve removal effectiveness.

Overview of Upper Bay Sediment Management Issues

Upper Newport Bay Sediment Control includes the management of sediment loading occurring from the San Diego Creek watershed that migrates through the Upper Bay to the Lower Bay. Current restoration and dredging activities in Upper Newport Bay include the establishment of in-bay sediment basins to control sedimentation of the Lower Bay. The effectiveness of these basins to reduce sediment loads, particularly fine grained sediment needs further evaluation. These basins are only effective with regular clean outs. They have been designed to reduce sediment loading; however, the greatest reduction may be for coarse-grained sediments. Most sedimentation into Newport Bay is associated with major rainfall runoff when large amounts of fine-grained sediment enter Upper Newport Bay. The key issue with the efficacy of these basins is the reduction in fine-grained sediment loading that has resulted in reduction of channel depth and migration of impacted sediments to the Lower Newport Bay. Fine-grained sediments remain in suspension longer and require greater retention times. Fine-grained sediment also contained a greater fraction of organic and charge particles (clay) that attract and adsorb contaminants. These contaminants include metals, pesticides and nutrients. Loading of fine-grained particles to the Lower Bay at current rates will continue to negatively impact sediment quality and channel maintenance. Another issue that needs to be assessed is the potential contribution to fine-grained sediment loading to the Lower Bay from the ongoing dredging in the Upper Bay. This is a temporary issue, but understanding this component will allow for better assessment of the basin effectiveness.

Defining the effectiveness of the in-bay basins and watershed sediment control projects is vital to the long-term management of the Lower Bay. Data gaps exist to conduct this assessment. In addition sediment transport modeling is required as part of this process. In the 1990's, the USACE developed the RMA2 finite element hydrodynamic and RMA11 sediment transport model. In Phase II of development the models were reconfigured and calibrated to observed depositional patterns in Upper Newport Bay from 1985 to 1997 (USACE 1998). The model predicted sediment deposition in Upper Newport Bay within 2 percent, however the model was not calibrated for Lower Newport Bay. According to these models, over the next 50 years approximately 3.75 million cy of sediment will be deposited in Lower Newport Bay and approximately 3 million cy of sediment will be deposited in Upper Newport Bay. However, these models have several shortcomings. Sediment density values used in models are only estimates, the accuracy of the data are difficult to determine. In addition, the models do not include the effects of marsh plants in calculating sedimentation. An increase in marsh plant cover will increase sediment deposition. To more accurately simulate sediment deposition rates and patterns, the inclusion of marsh plants needs to be reflected in the model. Furthermore, to adequately manage sediments, sediment modeling needs to include information on grain size fractions in order to predict sedimentation patterns and future dredging needs. Finally, these models do not allow for an evaluation of the efficiency of the current sediment basins in the Upper Bay.

Long term management of sedimentation patterns and sediment types will also need to be coordinated with TMDLs and other regulatory drivers. Dredge material management in the Lower Bay is dependent on aggressively addressing fine-grained sediments transported from San Diego Creek through the Upper Bay.

Coordination with Current Programs

The sediment control efforts in the Upper Newport Bay need to be coordinated with sediment control projects in the watershed to address the TMDL, and with the dredging requirements and contaminated sediment management in the Lower Newport Bay. In addition to the sediment source control projects presented above, a series of approximately 30 natural treatment systems are planned throughout the watershed. These natural treatment systems will be managed by Irvine Ranch Water District. The City has participated and supported these projects through the Proposition 50 grant application under the Integrated Regional Watershed Management Plan. The City has supported these projects due to the importance of sediment control in the long-term maintenance of the Lower Bay and impact to sediments. Contaminants transported by sediment to the Lower Bay may impact the benthic communities and limit the options for reuse of dredged material removed from navigable channels. The TMDL for sediments includes both the San Diego Creek watershed and the

Newport Bay. The linkage of the watershed to the Bay is defined by the TMDL. In order to meet the goals of the TMDL the City is conducting dredging of the in-bay basins in the Upper Newport Bay. The efficacy of these basins and the source control efforts in the watershed needs to be more fully assessed to determine what additional measures are needed. This effectiveness assessment will require additional modeling efforts using a 3D hydrodynamic and water quality model. The selection and recommendation on the development of the 3D model are discussed in detail in the Hydrodynamic and Water Quality Modeling section .

Sediment migration to the Lower Bay from sources in watershed may also result in impacts to the coastal ecosystems that include the ASBS. Preliminary contaminant transport modeling has indicated a potential connection between the Lower Bay and the ASBS depending on wet weather condition and tidal regimes. Studies in the ASBS have indicated that sediment from Lower Bay may be impacting the ASBS. The City has included in the Proposition 50 grant application erosion control projects in the coastal canyons to reduce the sediment loading to the ASBS. These measures need to be coordinated with sediment control measures for the Bay and watershed to achieve the overall goal of reducing impacts to the ASBS.

Upper Newport Bay Ecosystem Restoration Project

The Upper Newport Bay Ecosystem Restoration is a $38 million multiyear project which includes restoring the capacity of the in-bay sediment storage basins, restoration of channels, restoration of wetlands, and creation/improvement of Least Tern Island. Approximately 70,000 cy of clean material dredged from Upper Bay will be placed nearshore to serve as nourishment for the beach. Dredging of the sediment storage basins in Upper Bay (Basins I/III and Basin II) is a major component of this project which coincides with the sediment control plan. Maintenance of these basins is critical to ensure they are effective at capturing sediment. When dredging is completed, approximately 950,000 cy will be dredged from Unit I/III Basin, and approximately 866,000 cy will be dredged from Unit II Basin. Open water area will be increased to about 19 acres at both locations. The access channel to Unit II Basin was dredged in April 2006. Dredging of Unit II Basin was finalized in December 2007. A portion of Unit I/III Basin was dredged in March 2007. Dredging of Unit I/III Basin was finalized in March 2008. The sediment basins were dredged to approximately -17 ft mean lower low water (MLLW). The access channels were dredged to approximately -11 ft MLLW and 100 ft wide. This project is a significant part of the restoration and management plan for Upper Newport Bay. It will also have a major affect on reducing frequency of dredging in Lower Newport Bay by increasing the effectiveness of the in-bay sediment catch basins.

Potential Steps Forward

The overall goals of the Sediment Control Management program should include:

- Reduce the sediment load to the Upper and Lower Bay through effective sediment control measures in the watershed
- Effectively manage the inline sediment basins in the Upper Bay and assess their effectiveness in reducing the load of sediment, particularly fine-grained sediments that can transport contaminant to the Lower Bay
- Address the data gaps and conduct sediment transport modeling to assess the effectiveness of the inline basins
- Coordinate sediment removal in the basins with restoration/beach replenishment/sustainable sediment management

In order to achieve these goals, the suggested priority activities should include:

- Coordinate ongoing dredging in the Upper Newport Bay to increase the capacity of the inline basins (ongoing – through 2010)
- Continue to support the Integrated Regional Watershed Management framework and process through coordinated grant applications for projects that reduce sediment loading from the watershed to the Bay and ASBS
- Address data gaps in current sediment loading and sedimentation rate patterns (start Nov. 2008-Dec 2009)
- Conduct sediment modeling using current restoration design options (start June 2009-Dec 2009)

Upper Newport Bay Restoration and Management

Beneficial Use Criteria/Rating	
Water Quality	◐
Marine Resource Protection (ASBS)	●
Habitat Protection/ Enhancement	●
Community/ Public Access	◐
Water Conservation	○
Channel Maintenance	◐
Flood Control	◐
Berthing Management	○
Recreational Opportunities	●
Sustainability	◐

Introduction

The Upper Newport Bay is characterized by functioning and intact mudflat, salt marsh, freshwater marsh, riparian and upland habitats that are protected within the 752-acre Upper Newport Bay Ecological Reserve and the 140-acre Orange County Regional Park. The area has been designated a Critical Coastal Area (CCA) under the CCA Program, a part of the State's Non-Point Source Plan (NPS Plan). The NPS Plan is a non-regulatory planning tool to coordinate the efforts of multiple agencies and stakeholders, and direct resources to CCAs. The program's goal is to ensure that effective NPS management measures are implemented to protect or restore coastal water quality in CCAs.

The California Department of Fish and Game (DFG) is tasked with managing the Upper Newport Bay Ecological Reserve (Reserve) and has developed a Preliminary Management Plan (Management Plan) for the Reserve. The Management Plan document is of primary importance in guiding the DFG, the City, and other stakeholders in the long-term management of one of the most important ecological habitats in southern California. The Management Plan for the Upper Newport Bay Ecological Reserve will be the framework for the implementation and management of the restoration activities and long-term sustainability of this CCA.

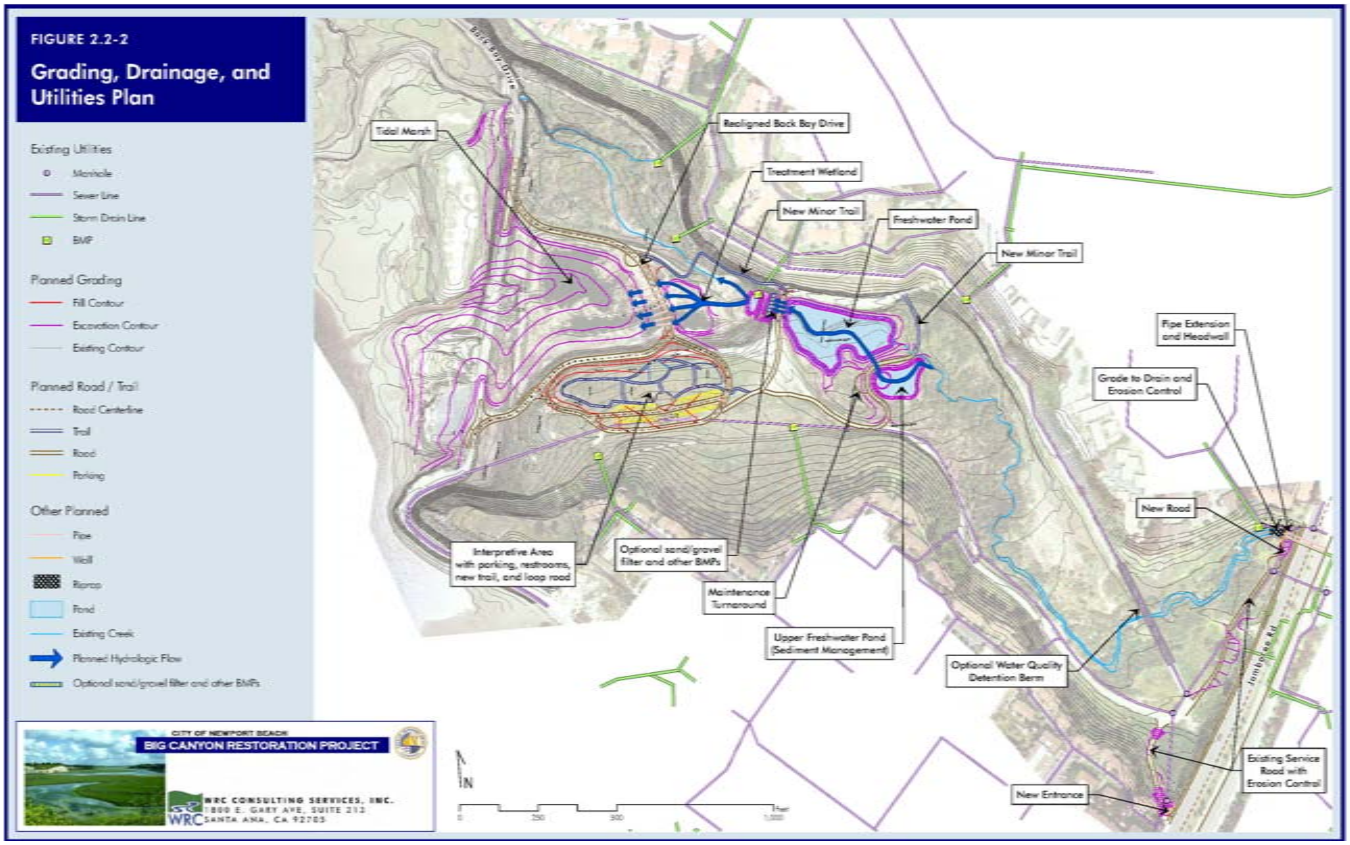
Upper Newport Bay in Newport Beach is an estuary - a place where fresh and salt water meet and mix. It is one of only a few remaining estuaries in southern California and is the home of nearly 200 species of birds, including several endangered species, as well as numerous species of mammals, fish, other critters and native plants. The Upper Bay is an important stopover for migrating birds on the Pacific Flyway and up to 30,000 birds can be seen here on any day during the winter months. Its proximity to urban Orange and Los Angeles counties makes the Upper Bay easily accessible to both local and regional visitors. Every year, thousands of people come here to hike, cycle, canoe, kayak, fish or simply enjoy nature.

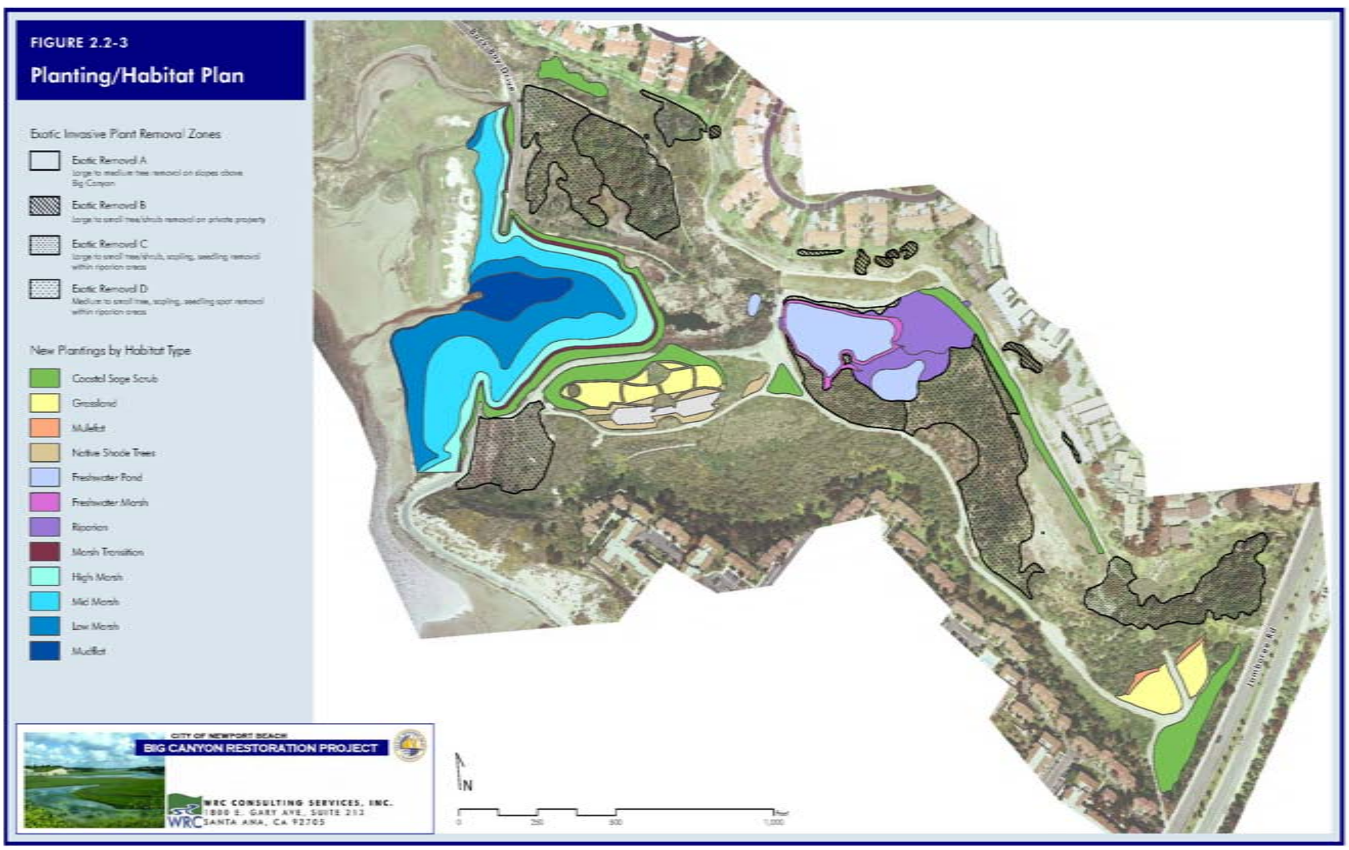
The Upper Newport Bay Ecological Reserve was created in 1975 as result of the purchase of 527 acres of land in and around the Bay from the Irvine Company and the transfer of 214 acres of tidal wetlands from Orange County to the State of California. An additional 11 acres of land in Big Canyon was added to the area in 1982 increasing the total acreage of the Reserve to 752 acres. In 1990 Orange County acquired 140 acres of bluffs on the north and north-west sides of the Bay and created a Regional Park. The Regional Park was rededicated as the Upper Newport Bay Nature Preserve in 2000.

Source:
Newport Bay Naturalists and Friends Web Site
www.newportbay.org

Overview of Upper Bay Restoration Issues

The Reserve was first purchased by the state in 1975 and is currently managed by the DFG. Due to State funding constraints, however, little preservation work has been completed to date, including completion of the Upper Bay Management Plan. Despite the absence of a comprehensive restoration and management plan for the area, the City of Newport Beach and County of Orange are currently moving forward with several restoration projects in the Upper Bay. These projects include a salt marsh demonstration project at Shellmaker Island for the Back Bay Science Center, the Upper Newport Bay Restoration Dredging Project, and the ongoing design and permitting phase of the Big Canyon Restoration Project (See Figures 1 and 2).





Figures 1 and 2: Conceptual plans for Phase II of the Big Canyon Creek Restoration Plan

The Upper Bay is also widely enjoyed by members of the general public. Several non-profit organizations provide valuable stakeholder input towards management efforts in the Upper Bay. The lack of a consistently funded governmental agency tasked with leading comprehensive and integrated management efforts may lead to a disjointed implementation of independently well-intended restoration efforts, and that way, ultimately fail to produce a healthy, fully-functioning estuary habitat.

Current dredging activities in the Upper Newport Bay are also enhancing habitats through improved circulation and creation of islands that protect nesting areas from predators. Challenges central to the integration of current and future Upper Bay restoration activities into an overall Harbor Area strategic plan include securing funding and development of a comprehensive Management Plan for ongoing and planned restoration projects, coordinating dredging and other Lower Bay maintenance activities with the restoration projects, and integrating local and regional water quality improvement projects to meet current and anticipated regulatory drivers in the San Diego Creek and adjacent watersheds.

Goals:

The goals of the Upper Newport Bay stakeholders are to:

- Identify opportunities and implement priority restoration projects for the Upper Newport Bay Ecological Reserve and
- Complete an integrated and comprehensive Upper Bay Management Plan

Coordination with Current Programs

DFG is the lead agency tasked with providing a comprehensive Upper Bay Restoration Management Plan. Due to funding constraints, however, the Management Plan is still in a preliminary format. A regional Integrated Coastal Watershed Management Plan (ICWMP) was submitted by the County of Orange in January 2008. The ICWMP proposes to implement an integrated suite of projects through a regional planning effort that has been prioritized to address watershed management challenges within highly urbanized Central Orange County.

The IRCWM Plan notes that, "The CCAs and ASBS may be directly impacted by urban activities within the planning area, including fresh water drainage carrying pollutants of concern from the upper watershed and coastal canyons, creek bed erosion due to the increase of impervious surfaces, legacy pesticides from former agricultural operations, contaminants from boat maintenance in Newport Harbor, and high levels of naturally occurring selenium and nitrogen in the groundwater that may rise to the surface and move downstream. These fragile coastal ecosystems are further impacted by heavy recreational use within the coastal zone."

The project bundles proposed in the ICWMP are summarized in the following table.

Receiving Waters of Upper Newport Bay (CCA 69)	
Serrano Creek Bank Stabilization, Sediment/ Pollution Reduction (Project A 02)	Constructing erosion control and bank stabilization measures in Serrano Creek Reach 2 will reduce sediment transport and related contaminant loads (including sediments from the Santiago Fire burn area in the creek's headwaters) to Upper Newport Bay. This supports the Upper Newport Bay Ecosystem Restoration Project (A10) by reducing a primary sediment source that has reduced in-bay sediment storage basins, impacted habitat, and reduced water quality.
Newport Bay Watershed Natural Treatment System – 2 sites (Project A 07)	Constructing two additional NTS sites within the planned regional system will improve water quality within Upper Newport Bay, the receiving water for nearly all of the drainage from the Newport Bay Watershed. This supports the Upper Newport Bay Ecosystem Restoration Project (A10) by reducing contaminant loads in the freshwater that is needed to maintain the estuarine habitat for threatened and endangered species.
Upper Newport Bay Ecosystem Restoration (Project A10)	By restoring the capacity of in-bay sediment storage basins, improving estuarine habitat for threatened and endangered species as well as other marine species, and improving tidal flows, this project will maintain the quality ecosystem needed to provide critical habitat along the Pacific Flyway and for other aquatic species. This project complements other water quality and habitat projects locally and statewide.

In addition, the Big Canyon Creek Restoration Project is a program designed to restore the 55-acre Big Canyon Nature Park between Jamboree Road and Upper Newport Bay. The Big Canyon project exemplifies an integrated approach to habitat restoration designed to provide multiple benefits across beneficial use goals. The project will increase valuable salt marsh habitat by re-routing the existing Back Bay Drive and increasing the area subject to Bay tidal flow. Design elements of the Restoration Plan will also improve water quality in Big Canyon Creek by reducing flows to allow for sediment and other potential pollutant removal. Additional habitat benefits will include removal of non-native vegetation and planting of native plants throughout the Nature Park area. Recreational use opportunities of the Nature Park area will also be enhanced through creation of additional trails and public access points into the Nature Park and posting of interpretive signage to assist the public in understanding the importance of the restored native habitat. The Big Canyon Creek Restoration Project will provide a valuable connection between urban development, restored coastal sage scrub, riparian, Upper Bay saltwater marsh habitat and the Lower Bay. The project will also provide a linkage to overall water quality improvement goals for the Upper and Lower Newport Bays ■ .

The Big Canyon Creek Restoration Project is in the final engineering and design phase. A Phase II Feasibility Study was completed in June 2007 and has undergone several stakeholder review sessions. Final project plans are in the approval stages.

Potential Steps Forward

As stated above, DFG is in the preliminary stages of preparing the Upper Newport Bay Management Plan, but to date has been hindered by a lack of funds in fully completing this task. It is suggested that, barring a comprehensive Upper Bay Management Plan, proposed restoration projects be designed to be inline with anticipated mandates within the Management Plan. This can be accomplished by developing an integrated project development approach that includes the following attributes:

- Solicit and incorporate Upper Bay stakeholder input in the early stages of project development.
- Assemble multi-disciplinary project teams to identify restoration project opportunities and constraints.
- Adopt and commit to provide commonly accepted regional and State project planning, permitting and performance criteria throughout project development.
- Develop potential funding opportunities early in project lifecycle.
- Identify opportunities to relate proposed restoration project objectives to other local, regional, state and federal restoration and habitat improvement efforts.

A secondary recommendation for the Upper Bay Restoration portion of the Harbor Area Management Plan is to lobby state legislators to provide more comprehensive funding to the DFG or provide alternate funding sources for the completion of the final Management Plan. When funding is secured to accomplish this task, it is suggested DFG finalize the Management Plan in the following steps:

- Complete field studies and synthesize existing data identified by the DFG to allow the completion of the Management Plan.
- Prepare Upper Newport Bay Management Plan.
- Solicit review and comments from stakeholders.
- Integrate Management Plan and Long-term Restoration of Upper Bay into the Newport Harbor Area Management Plan.

Harbor Area Management Tools

The purpose of this HAMP is to develop a resource management tool for the City to move forward with key sediment management, water quality, restoration and public use projects critical in meeting the following overall goals:

- Maintain the beneficial uses of the Upper and Lower Newport Bay and economic value of the Bay.
- Provide a practical framework to meet regulatory requirements in the cur rent and anticipated municipal discharge permits, sediment management permits, TMDLs, and other regulatory programs for Newport Bay.
- Support a sustainable estuary ecosystem able to be integrated with up stream sustainable watersheds and adjacent coastal area systems.

The aim of the development of the HAMP is to guide the City and the Harbor stakeholders in the prioritization and implementation of activities that balance beneficial uses with the long-term sustainability of Newport Bay.

The resource management tools presented in this section assist in balancing the economic, social, and environmental issues in the Lower Newport Bay (Newport Harbor). This includes balancing the environmental needs of the Bay with the day-to-day operation, maintenance and recreational activities. Throughout the development of this Plan we have recognized that the Bay is not only one of the most significant economic assets of our community, it is also a unique and vitally important ecosystem which includes the Harbor, Lower Bay, Upper Bay and upstream watershed.

Purpose of Harbor Area Management Plan:

To provide the City with a Resource Management Tool to assist in balancing environmental issues with the day-to-day operation, long-term maintenance and recreational use activities in Newport Bay.

The development of this management tool for the Lower Bay requires addressing multiple challenges across often dissimilar or even contrasting beneficial use interests to achieve the overall goals. These challenges, identified through regulatory agencies, stakeholder groups and the City include:

- Dredging Requirements & Contaminated Sediment Management
- Eelgrass Capacity Management & Tools
- Beach Replenishment Strategy
- Water Quality
- Harbor Channel and Pierhead Lines
- Hydrodynamic & Water Quality Numerical Modeling Requirements
- Regional General Permit
- Sea Level Rise & Flood Control Management
- Upper Bay Sediment Control
- Upper Bay Restoration & Management

Each of these different challenges has been evaluated and potential steps forward have been presented in Technical Report Summaries in previous sections. The Summaries have been developed from the Technical Reports that are presented in the Appendices.

This Harbor Area Resource Management Tool section presents the potential steps forward given in the individual Technical Summaries and integrated into an overall strategy with preliminary project prioritizations, potential funding sources and linkages to other projects. For each of the program elements above, this section first presents a summary of the issues/challenges and the overall goals. Based on the assessment of these challenges and the steps forward presented in the Technical Summaries, an implementation schedule is presented. This implementation strategy provides the suggested priorities, linkages to other program challenges, and estimated costs to achieve the overall program goals.

The suggested priority projects and activities are then assessed using evaluation criteria that are based on the goals of the overall integrated program. These criteria include each of the beneficial uses defined in the Harbor and Bay Element and additional elements designed to support long-term sustainability of the Bay. This evaluation provides an additional tool to demonstrate the importance of an integrated approach to achieve the overall program goals. The scoring for these criteria uses a five-point scale with a full red circle representing the least effective in meeting the criteria and a full green circle representing the most effective in meeting the criteria. A full description of the criteria is presented on page 7. Although one element may have little or no benefit in a single criteria, when integrated and implemented as an overall program, the combined outcome achieves the stated goals.

Following the presentation of each of the suggested priority projects and activities for each challenge, an integrated implementation schedule is presented for the entire Harbor Area Management program. The linkages of each priority project and activity to other elements are identified as dashed lines connecting the activities in the schedule. This overall implementation strategy provides the City with a management tool to identify the timeline for implementing the activities, the critical path linkages and the estimated costs. Potential funding sources are also identified in this strategic implementation tool. Following the implementation schedule is the overall assessment of the priority activities with regard to an integrated score for the program criteria. The results of this evaluation demonstrate the need for the integrated program set forth by the HAMP in order to effectively address the overall goal of balancing environmental issues with the day-to-day operation, long-term maintenance and recreational use activities in Newport Bay.

Harbor Area Management Tools:

Technical Summaries – Presents the challenges and goals for each element based on the Technical Report Summaries presented in the previous sections and the full Technical Reports in the Appendices.

I*mplementation Strategy Schedule –* Provide an integration of the suggested priority activities/elements for each of the HAMP challenges, the estimate timelines and the critical path linkages with other activities.

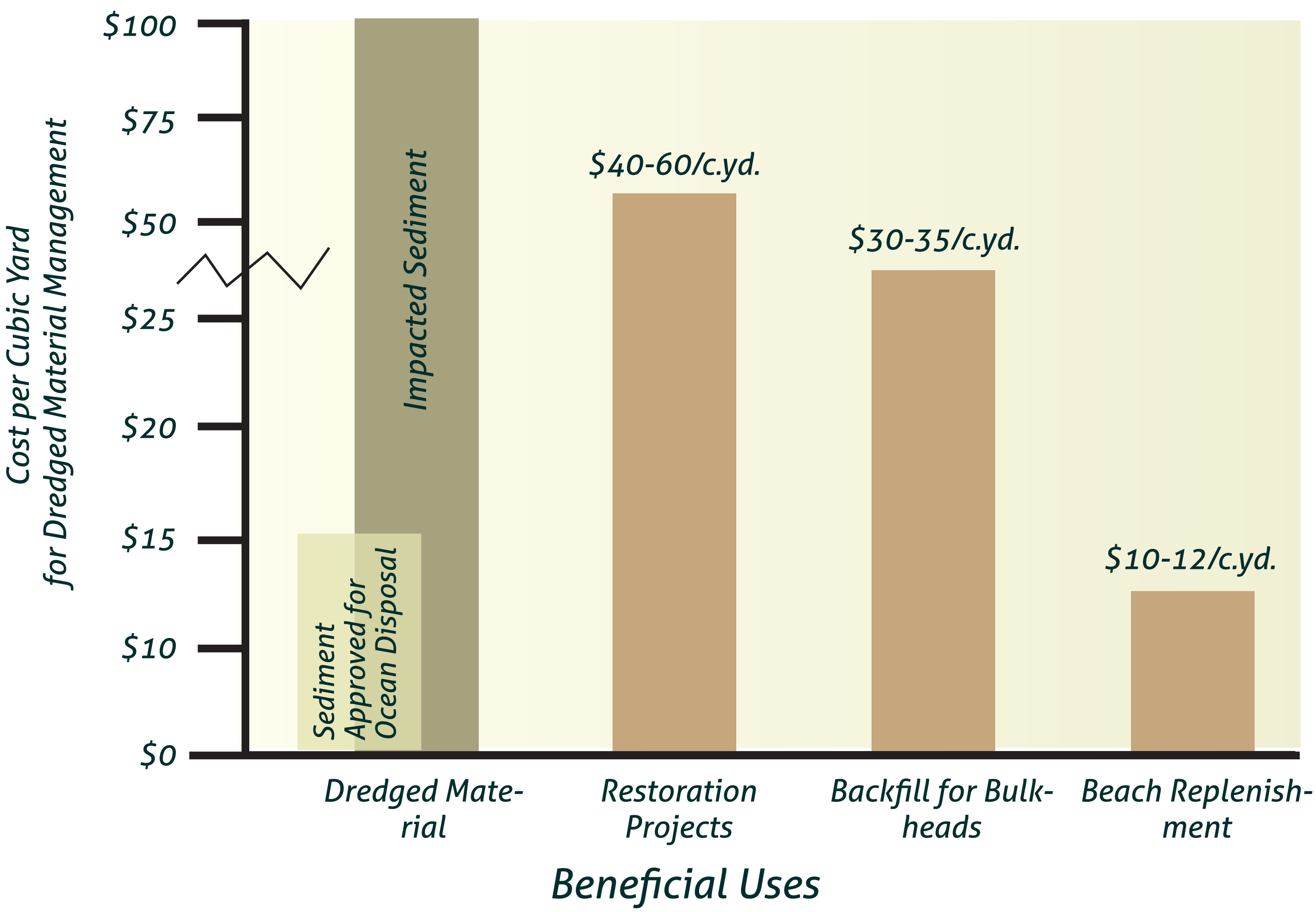
Cost Estimates – The Implementation Schedule also presents estimated costs and potential funding for planning purposes.

Integrated Project Scoring – Program elements are scored using the beneficial use criteria and the scores combined demonstrating the need for an integrated Harbor Area Management program.

Funding – The final discussion under these management tools covers potential funding strategies and options of the suggested projects.

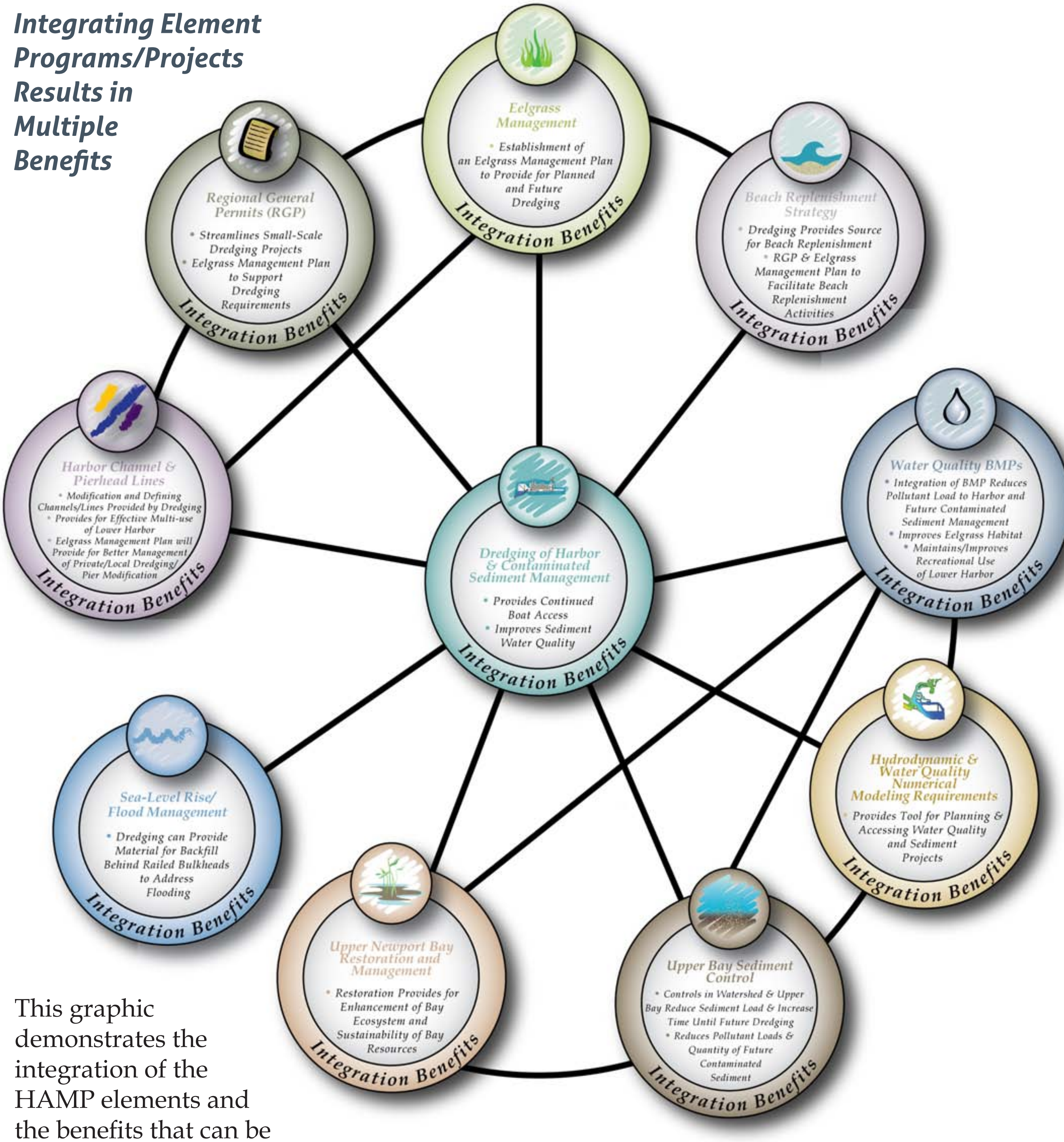
The HAMP is built on the foundation of the Harbor and Bay Element and provides the framework to build an integrated and sustainable program that most cost-effectively addresses the beneficial uses. The following management tools present the integration of the suggested projects to best meet the long-term goals and vision. The integration of elements that include dredging of the channels, eelgrass management, and water quality has not been fully integrated in previous documents. This plan therefore provides this needed function to best achieve the beneficial use goals in a cost-effective manner.

As shown in the graphic on the following page, the integrated approach of the HAMP results in benefits to the individual projects. For example, the integration of the dredging of the harbor with eelgrass management, beach replenishment and flood vulnerability provides for potential beneficial use opportunities that will lower the unit cost of dredged material management. This is illustrated in the bar graph of the unit costs for dredged material handling and placement. There is also a benefit to the other projects in the lower cost of materials for use in restoration projects by increasing the elevation of existing deeper areas, in replacing sandy material on Harbor beaches and backfilling behind modified sea walls to address future flooding.

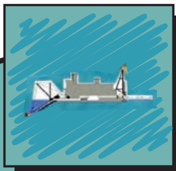


HAMP Integrated Approach

Integrating Element Programs/Projects Results in Multiple Benefits



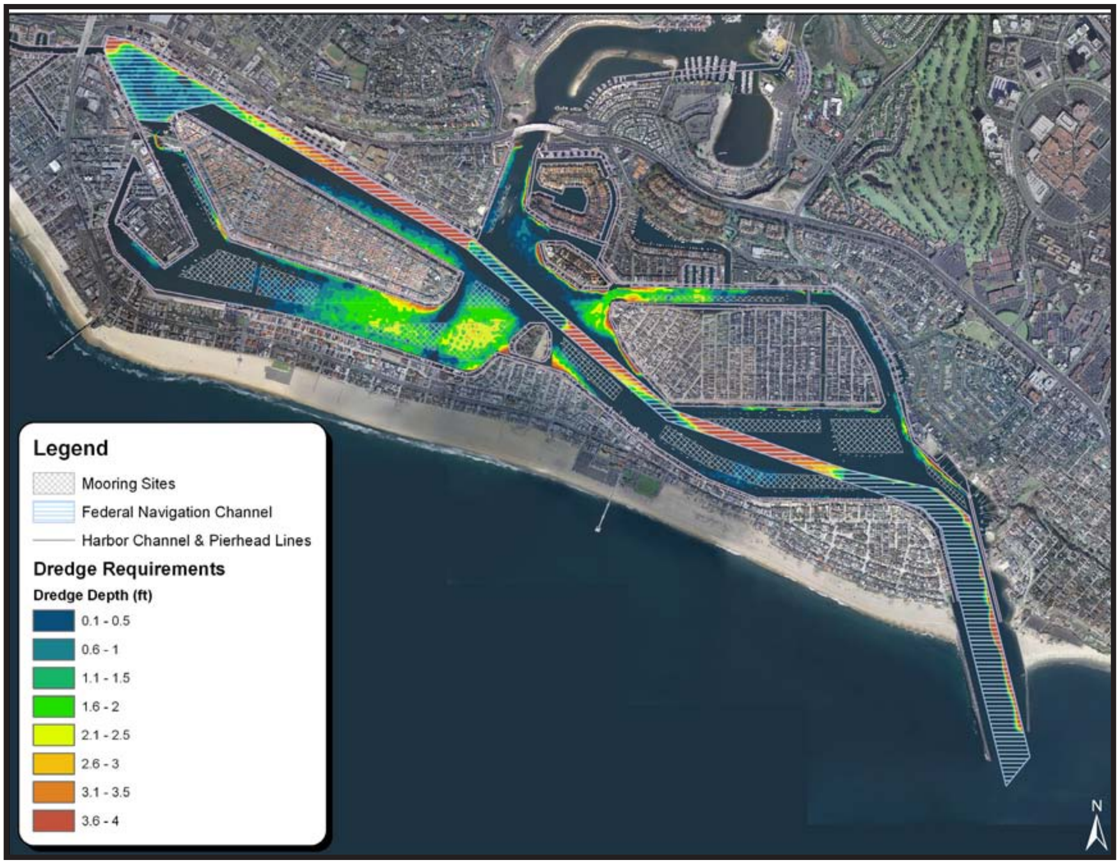
This graphic demonstrates the integration of the HAMP elements and the benefits that can be achieved through this integration.



Dredging Requirements & Contaminated Sediment Management

Challenges: *In recent years, sedimentation in Lower Newport Bay has resulted in the narrowing and shoaling of the federal channels and adjacent non-federal channels that act as the main conduits to marina and harbor traffic. The Lower Bay has remained subject to heavy amounts of silt and sedimentation via tidal activity and storm events.*

Goals: *Obtain dedicated federal funding and support for current phase of dredging of federal navigable channels to ensure safe and navigable waterways.*



Short-Term	Mid-Term	Long-Term	Est. Cost
Dredge Material Mgt. Plan			Ongoing
	Rhine Channel Remediation		Variable at this time
Ocean Disposal Evaluation			Ongoing
Sediment Sustainability Plan			Ongoing
	Dredging of federal channels		Variable at this time
		Dredging of non-federal channels	Variable at this time

Beneficial Use Criteria/Rating

- *Water Quality*
- *Marine Resource Protection (ASBS)*
- *Habitat Protection/ Enhancement*
- *Community/ Public Access*
- *Water Conservation*
- *Channel Maintenance*
- *Flood Control*
- *Berthing Management*
- *Recreational Opportunities*
- *Sustainability*

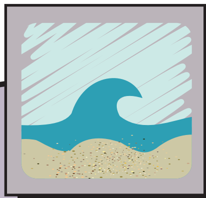
Eelgrass Capacity & Management

Challenges: *While eelgrass serves as an important ecological resource within Lower Newport Harbor, it often conflicts with other beneficial harbor uses, particularly those related to guest and residential boating and navigation.*

Goals: *Provide information to aid the City in developing and implementing an Eelgrass Management Plan for Newport Harbor. The plan will ensure eelgrass is being sustained while the City maintains all the beneficial uses of Newport Harbor.*

Short-Term	Mid-Term	Long-Term	Est. Cost
Habitat Value Assessment			$60K
Eelgrass Capacity Assessment			Funded
Eelgrass Management	Plan Development		$150K
	Management Plan - Agency Review and Approval		$50K
	Management Plan Implementation		$3-5M
	Assessment		$75K

Beneficial Use Criteria/Rating	
Water Quality	
Marine Resource Protection (ASBS)	
Habitat Protection/ Enhancement	
Community/ Public Access	
Water Conservation	
Channel Maintenance	
Flood Control	
Berthing Management	
Recreational Opportunities	
Sustainability	



Beach Replenishment Strategy

Challenges: *A formal system is not in place to manage and prioritize beach replenishment projects. Components of the RGP restrict the application of dredged material on beaches.*

Goals: *Develop a centralized system for efficiently tracking and utilizing compatible dredge material for beach replenishment. Increase volume of materials for beach replenishment under the RGP process.*

Short-Term	Mid-Term	Long-Term	Est. Cost
Enhance and Utilize Beach Replenishment Priority Matrix	Enhance and Utilize Beach Replenishment Priority Matrix		Covered under existing budget
Beach Erosion Studies			$150K
	Beach Erosion Control		$500K-$4M
Priority Beach Replenishment			$80K

Beneficial Use Criteria/Rating	
Water Quality	
Marine Resource Protection (ASBS)	
Habitat Protection/ Enhancement	
Community/ Public Access	
Water Conservation	
Channel Maintenance	
Flood Control	
Berthing Management	
Recreational Opportunities	
Sustainability	

Water Quality

Challenges: *Understanding the extent and source(s) of water quality impacts to the Lower Newport Bay, and the development of a strategy to cost-effectively implement BMPs to meet the anticipated requirements of TMDLs.*

Goals: *To develop an implementation strategy for water quality BMPs that is coordinated with regional and local water quality protection and improvement efforts to meet both regulatory drivers and Harbor Area beneficial uses.*

Short-Term	Mid-Term	Long-Term	Est. Cost
BMP Strategic Plan; Phase I BMP Implementation		Phase II BMP Implementation	Variable (1)(2)
Implementation with IRCWMP Projects			$26M (1)(2)
TMDL Implementation & Monitoring of Newport Bay/San Diego Creek Watershed			Variable (1)(2)

(1) Prop 50 IRWM Funding (Variable sources but requires partial City match)
(2) Potential State and Federal Grant Funding (Variable sources but requires partial City match)

Beneficial Use Criteria/Rating	
Water Quality	●
Marine Resource Protection (ASBS)	◐
Habitat Protection/ Enhancement	◐
Community/ Public Access	○
Water Conservation	◐
Channel Maintenance	○
Flood Control	○
Berthing Management	○
Recreational Opportunities	◐
Sustainability	◐

Harbor Channel & Pierhead Lines

Challenges: *The design and use of Newport Bay has been altered extensively; however, the harbor lines have not been systematically adjusted since their original development in 1936.*

Goals: *Update harbor lines to reflect current uses.*

Short-Term	*Mid-Term*	*Long-Term*	*Est. Cost*
Line Adjustment Plan			$60K
Line Adjustment - Agency Review			$50K
	Line Adjustment - Implementation		$50K

Beneficial Use Criteria/Rating	
Water Quality	
Marine Resource Protection (ASBS)	
Habitat Protection/ Enhancement	
Community/ Public Access	
Water Conservation	
Channel Maintenance	
Flood Control	
Berthing Management	
Recreational Opportunities	
Sustainability	

Hydrodynamic Models

Challenges: *Based on past modeling efforts, it is concluded that a 3D hydrodynamic and water quality model would be required to fully capture the complex flow and transport of the Newport Harbor and Bay. A calibrated 3D model for Newport Bay and Harbor can be used to evaluate many of the proposed strategies and BMPs developed for this HAMP.*

Goals: *To develop, calibrate, and use a 3D model for the evaluation and development of the various proposed strategies and BMPs developed in this HAMP.*

Short-Term	Mid-Term	Long-Term	Est. Cost
	Develop 3D Hydrodynamic Model		$250K
	Calibrate Hydrodynamic Model		$500K
	Implement Hydrodynamic Model		Covered Under Related Projects

Beneficial Use Criteria/Rating	
Water Quality	Full
Marine Resource Protection (ASBS)	Half
Habitat Protection/ Enhancement	Empty
Community/ Public Access	Empty
Water Conservation	Empty
Channel Maintenance	Empty
Flood Control	Half
Berthing Management	Empty
Recreational Opportunities	Empty
Sustainability	Half

Regional General Permit

Challenges: *The permit renewal process is long and costly, and the permit needs revisions. Approval of the plan by all stakeholders is difficult to attain. The permit restricts the range of activities and does not allow for consistent disposal opportunities. The result is a loss of eelgrass.*

Goals: *Streamline the RGP process. Include Eelgrass Management Plan opportunities under the RGP.*

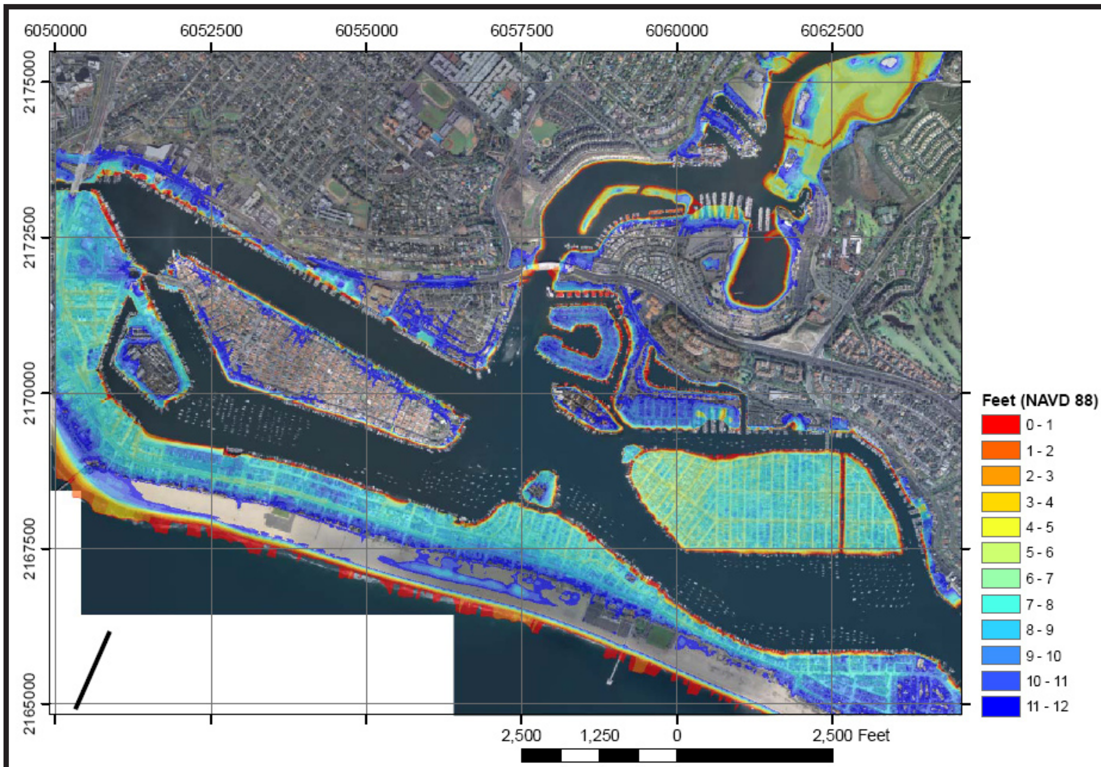
Short-Term	*Mid-Term*	*Long-Term*	*Est. Cost*
Revise RGP			$150K
Sampling Plan Template			$15K

Beneficial Use Criteria/Rating	
Water Quality	○
Marine Resource Protection (ASBS)	○
Habitat Protection/ Enhancement	○
Community/ Public Access	○
Water Conservation	○
Channel Maintenance	◐
Flood Control	◐
Berthing Management	●
Recreational Opportunities	○
Sustainability	◐

Sea Level Rise and Flood Control Management

Challenges: *The extreme high tides in California threaten flooding of low-lying terrain and result from the coincidence of extreme astronomical tides and storm-induced sea level changes. Estimates of future sea level rise at Newport Harbor fall in the range of 1-3 ft/100 years range.*

Goals: *Assess long-term flood vulnerability to the Harbor Area using predictive models and evaluation of existing flood protection. Based on this vulnerability assessment, develop management measures that are integrated into the overall HAMP program. These measures may include revisions to the required elevation of new bulkheads.*



Short-Term	Mid-Term	Long-Term	Est. Cost
Flood Vulnerability Assessment			*Not Assessed*
Develop Flood Management Measures			
Implement Revised Bulkhead Elev. Code			
	Implement Flood Protection Measures		

Beneficial Use Criteria/Rating	
Water Quality	○
Marine Resource Protection (ASBS)	○
Habitat Protection/ Enhancement	○
Community/ Public Access	○
Water Conservation	○
Channel Maintenance	◐
Flood Control	●
Berthing Management	○
Recreational Opportunities	○
Sustainability	◐

Upper Bay
Sediment Control

Challenges: *Current restoration and dredging activities include the establishment of sediment control basins to control sedimentation of the Lower Bay. The effectiveness of these basins to reduce sediment loads of fine grained sediments needs further evaluation. Data gaps exist to conduct this assessment.*

Goals:

- *Long-term goal is to reduce the sediment load to the Upper and Lower Bay.*
- *Effectively manage sediment basins.*
- *Coordinate sediment removal with restoration / beach replenishment / sustainable sediment management.*

Short-Term	Mid-Term	Long-Term	Est. Cost
Upper Bay Dredging of Inline Basins & Channels			$13M(3), $25M(4)
Sedimentation Data Gaps			$60K
Sediment Transport Modeling			$60K
IRCWMP Watershed Sediment Control Projects			Variable (1)
TMDL Implementation & Monitoring - Upper Bay/San Diego Creek Watershed			Variable (1)

Beneficial Use Criteria/Rating

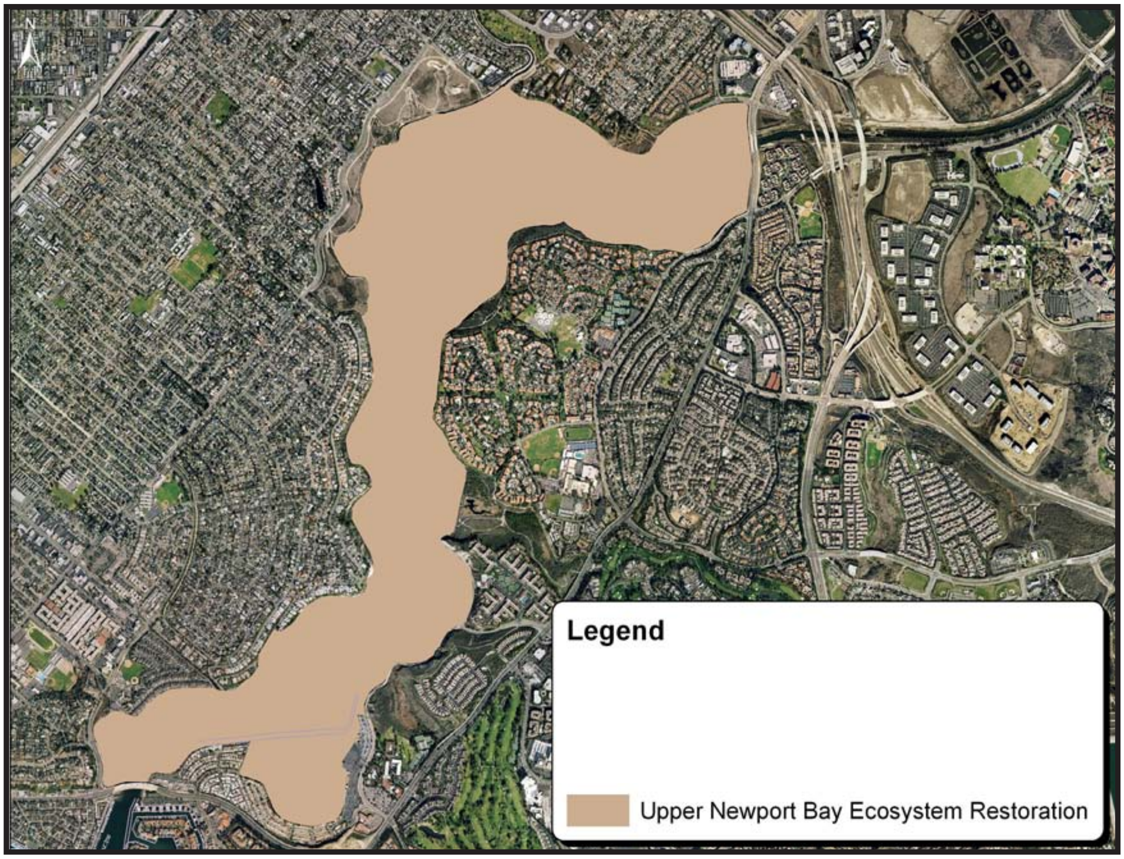
Criteria	Rating
Water Quality	
Marine Resource Protection (ASBS)	
Habitat Protection/ Enhancement	
Community/ Public Access	
Water Conservation	
Channel Maintenance	
Flood Control	
Berthing Management	
Recreational Opportunities	
Sustainability	

(3) Local Share
(4) Federal Funds

Upper Newport Bay Restoration & Management

Challenges: *The challenges for the Upper Bay Restoration includes securing funding for the restoration projects and the development of the Management Plan and coordination of the dredging activities with the restoration projects and water quality and Lower Bay dredging projects.*

Goals: *Implement the restoration projects for the Ecological Reserve and complete the Upper Bay Management Plan.*

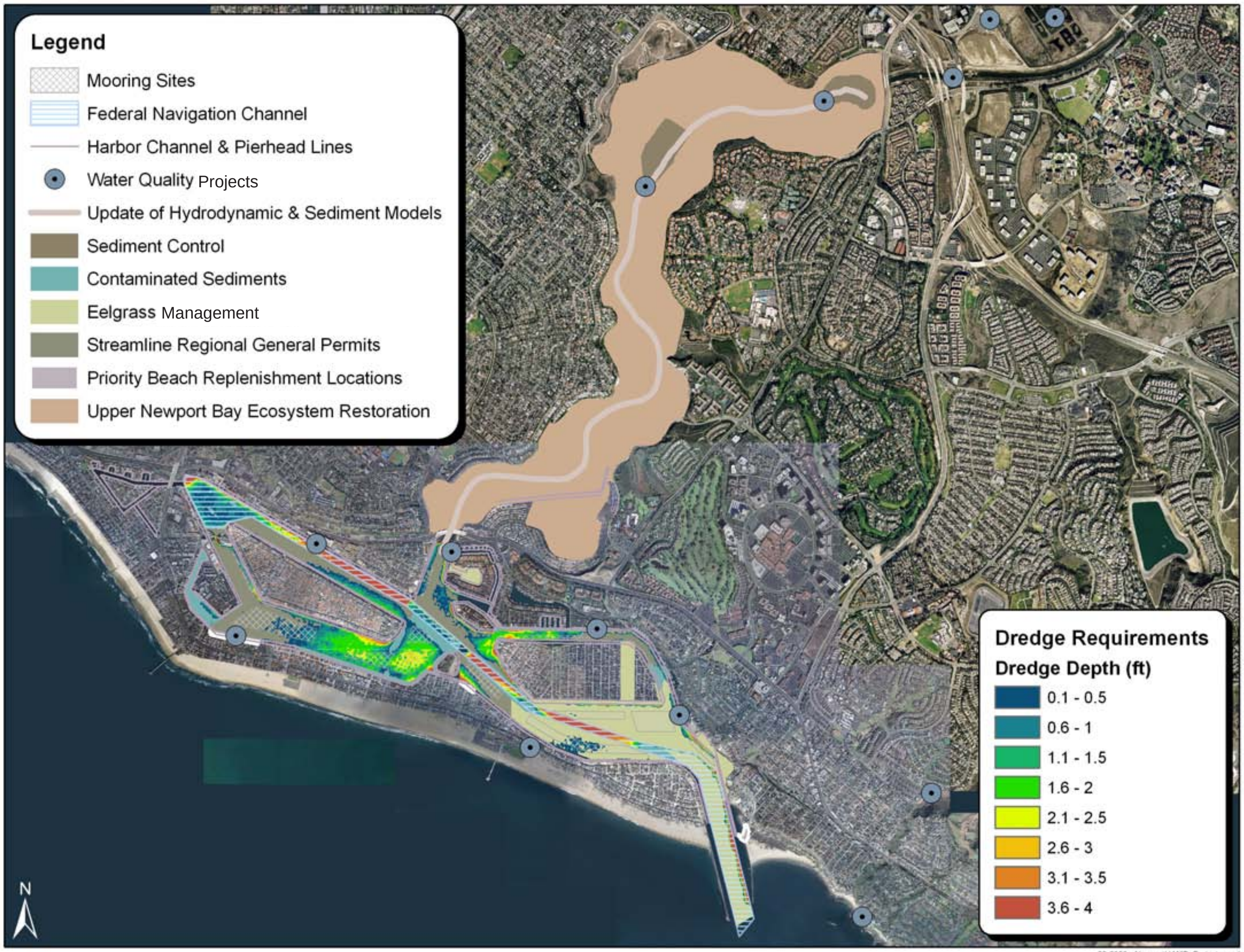


Short-Term	Mid-Term	Long-Term	Est. Cost
IRWMP Application Submitted			
IRWMP Funding Approval	IRWMP Restoration Projects		$45M(1)
Draft Upper Bay Management Plan	Final Upper Bay Management Plan		$150K
Big Canyon Design & Implement	Big Canyon Restoration Project - Implementation		$5M(2)

(1) Prop 50 IRWM Funding (Variable sources but requires partial City match)
(2) Potential State and Federal Grant Funding (Variable sources but requires partial City match)

Beneficial Use Criteria/Rating
Water Quality
Marine Resource Protection (ASBS)
Habitat Protection/ Enhancement
Community/ Public Access
Water Conservation
Channel Maintenance
Flood Control
Berthing Management
Recreational Opportunities
Sustainability

Map of Integrated Projects



This map represents the integration of the suggested projects to meet the stated goals and achieve the greatest balance of beneficial uses.

Implementation Strategy Schedule and Cost Estimates

The following Implementation Strategy Schedule presents the integration of the suggested projects/management measures that address the goals of each of the HAMP challenges. This tool provides a prioritization of the projects based on the timeline presented and the integration of the projects represented by the dash-line linkages. These linkages represent a critical path to complete the integrated projects cost-effectively and achieve the greatest balance of beneficial uses. Prioritization of projects is therefore based on required starting dates to fully implement the project and the linkages to the other integrated projects. For example, dredging of the non-federal channels in the Lower Bay needs to be coordinated with the completion of the Eelgrass

Management Plan, the streamlined RGP process, and the harbor and pier line activities to successfully meet the goals of each challenge cost-effectively with the greatest balance of beneficial uses. Prioritization of the projects will also depend on the availability of resources to complete the projects. Funding strategies and options are discussed in the final section and are listed as footnotes on the Implementation Schedule.

The Implementation Strategy Schedule and Cost Estimates represent the overall framework of the HAMP. As a Resource Management Tool, this Implementation Schedule provides integrated solutions that result in cost savings and positive return on investment paid to the triple bottom line of economic, community, and environmental benefits. The suggested actions in this plan provide the potential steps forward to meet the challenges in a cost-effective manner through the integration of projects. This plan is based on the understanding that the "no action alternative" would lead to inaccessible channels, loss of property values, and regulatory action. Management measures are needed to maintain the vitality of the Harbor's assets that balance the beneficial uses cost-effectively.

Integrated Project Scoring

The assessment of the suggested projects is presented in the table that lists the HAMP elements and the evaluation criteria. The HAMP elements listed represent the suggested projects presented in the summaries and listed in the Implementation Schedule. This table therefore represents the assessment of the suggested priority projects using the evaluation criteria that are based on the goals of the overall integrated program. These criteria include each of the beneficial uses defined in the Harbor and Bay Element and additional criteria to support the long-term sustainability of the Harbor.

This evaluation provides an additional tool that demonstrates the combined benefits achieved through the integration of the projects. As shown on the table, there are a number of negative scores for the projects under the single HAMP elements represented by red half circles. However, when the suggested projects are integrated, the overall scores result in a positive score for each of the beneficial use criteria.

Integration of the HAMP element projects results in a combined score that is positive to all the criteria based on beneficial uses. The integrated HAMP strategy therefore results in an overall balance of beneficial uses in accordance with the mission statement.

The overall outcome of the HAMP is illustrated by the figures on the following page.

These figures provide the framework for current and future planning to meet beneficial use goals.

p. 92 *Integrated Project Scoring Table*

p. 93 *Implementation Strategy Schedule and Cost Estimates*

The HAMP provides a framework for the development and integration of specific project plans and designs that address the challenges outlined and linked in this document. The HAMP will therefore be updated through these project plans that will include more recent data, polices and regulatory requirements. It was the Harbor Commission's intent to use the HAMP as a launching pad for the specific projects that address the outlined challenges, and to use available resources on the implementation of these projects rather than focusing on continual updates to specific issues in this document.

Integrated Project Scoring Table: Project Assessment and Integrated Benefit

Scores for each element are averaged together for each beneficial use

Suggested Projects by Element	Beneficial Use Criteria: Water Quality	Marine Resource Protection (ASBS)	Habitat Protection/ Enhancement	Community/ Public Access	Water Conservation	Channel Maintenance	Flood Control	Berthing Management	Recreational Opportunities	Sustainability
Dredging Require-ments/ Sediment	2	2	4	2	3	1	2	1	2	1
Eelgrass	2	1	1	3	3	4	4	4	2	2
Beach Replenish-ment	3	3	3	1	3	2	2	4	1	2
Water Quality	1	2	2	3	2	3	3	3	2	2
Harbor Channel/ Pierhead Lines	3	3	4	2	4	2	3	1	1	2
Hydro-dynamic Models	1	2	3	3	3	3	2	3	3	2
Regional General Permit	3	3	3	3	3	2	2	1	3	2
Sea Level Rise and Flood Control	3	3	3	3	3	2	1	3	3	2
Upper Bay Sediment Control	1	2	1	3	3	1	2	2	3	2
Upper Newport Bay	2	1	1	2	3	2	2	3	1	2
Combined Benefit of Integrated Approach	(2)	(2)	(2)	(2)	(3)	(2)	(2)	(2)	(2)	(2)

1 = Activities proposed for the element are the MOST effective at meeting the beneficial use goal

1 2 3 4 5

5 = Activities proposed for the element are the LEAST effective at meeting the beneficial use goal

Implementation Schedule	Short-Term / Mid-Term / Long-Term	Estimated Cost
Dredging Requirements/ Sediment	Dredge Material Mgt. Plan	Ongoing
	Rhine Channel Remediation	Variable at this time
	Ocean Disposal Evaluation	Ongoing
	Sediment Sustainability Plan	Ongoing
	Dredging of federal channels	Variable at this time
	Dredging of non-federal channels	Variable at this time
Eelgrass	Habitat Value Assessment	$60K
	Eelgrass Capacity Assessment	Funded
	Eelgrass Management Plan Development	$150K
	Management Plan - Agency Review and Approval	$50K
	Management Plan Implementation	$3-5M
	Assessment	$75K
Beach Replenishment	Enhance and Utilize Beach Replenishment Priority Matrix	Covered under existing budget
	Beach Erosion Studies	$150K
	Beach Erosion Control	$500K-$4M
	Priority Beach Replenishment	$80K
Water Quality	BMP Strategic Plan; Phase I BMP Implementation; Phase II BMP Implementation	Variable (1)(2)
	Implementation with IRCWMP Projects	$26M (1)(2)
	TMDL Implementation & Monitoring of Newport Bay/San Diego Creek Watershed	Variable (1)(2)
Harbor Channel/ Pierhead Lines	Line Adjustment Plan	$60K
	Line Adjustment - Agency Review	$50K
	Line Adjustment - Implementation	$50K
Hydrodynamic Models	Develop 3D Hydrodynamic Model	$250K
	Calibrate Hydrodynamic Model	$500K
	Implement Hydrodynamic Model	Covered Under Related Projects
Regional General Permit	Revise RGP	$150K
	Sampling Plan Template	$15K
Sea Level Rise and Flood Control	Flood Vulnerability Assessment	Not Assessed
	Develop Flood Management Measures	
	Implement Revised Bulkhead Elev. Code	
	Implement Flood Protection Measures	
Upper Bay Sediment Control	Upper Bay Dredging of Inline Basins & Channels	$13M(3), $25M(4)
	Sedimentation Data Gaps	$60K
	Sediment Transport Modeling	$60K
	IRCWMP Watershed Sediment Control Projects	Variable (1)
	TMDL Implementation & Monitoring - Upper Bay/San Diego Creek Watershed	Variable (1)
Upper Newport Bay	IRCWMP Application Submitted	
	IRCWMP Restoration Projects	$45M(1)
	IRCWMP Funding Approval	
	Draft Upper Bay Management Plan	$150K
	Final Upper Bay Management Plan	
	Big Canyon Design & Implement	
	Big Canyon Restoration Project - Implementation	$5M(2)

(1) Prop 50 IRWM Funding (Variable sources but requires partial City match)
(2) Potential State and Federal Grant Funding (Variable sources but requires partial City match)
(3) Local Share
(4) Federal Funds

Introduction

An important part of any management plan is the issue of funding. Many projects and programs have been identified in this plan and are at various stages of implementation. This section is intended to begin the process of describing existing funding sources to implement these activities, to point out the potential cost savings of implementing integrated projects and activities rather than single-purpose projects, and to identify next steps and a strategy for creating and attracting additional funding needed to complete these tasks.

Significant financial resources will be needed to implement the HAMP, and there are currently limited fund sources for this purpose. As discussed in this section, conceptual cost estimates have been developed for the priority elements/projects which suggest over $100 million would be required to complete these projects. Additionally, there are currently no estimates for additional projects that will need to be implemented to fully achieve the objectives and goals identified in the HAMP. A future task will be to identify measurable metrics that define success for each of these goals, and then a set of projects that will achieve these metrics, and cost estimates for these projects.

It is clear that existing local revenue sources will not be sufficient to fund either the priority projects or the expected future projects that need to be achieved. The local stakeholders have acknowledged that additional funding sources are needed, and these will likely be a combination of local, state, and federal sources. Following is a table summarizing the existing funding sources expected for the priority projects as well as discussion of the major activities needed to assure a comprehensive funding plan is developed and implemented in support of future funding.

Local Funding Strategy

The Harbor Commission has indicated that local funding measures (e.g. harbor use fee and local sales tax) should be considered as a part of their overall strategy to develop the appropriate revenue to implement priority elements and projects identified in this plan. This potential funding source may be used toward non-federally funded dredging costs.

Possible next steps in developing the local funding plan may include:

- Evaluate current federal, state and local sources of funding for Channel Maintenance, Flood Control, Berthing Management , Water Quality, Marine Resource Protection (ASBS), and Habitat Protection/Improvement, and determine funding gaps.

Potential Funding Sources

	Sources	Expected Contribution	Targeted Beneficiaries
Local	• Harbor use fee • Local sales tax • Utility fee or benefit assessment based on use of the property • Utility fee or benefit assessment based on total area and impervious area • Gasoline fee • Water sales • Parcel fee • General Obligation Bond	High (50%-100%)	Region's residents, environment, and economy.
State	• Competitive grants • Appropriations • State-wide assessments	Moderate (10-50%)	Statewide environment and economy.
Federal	• Appropriations • Competitive grants • Stimulus Block or Resource Grants	Moderate-High (10-80+%)	Navigable waterway under federal jurisdiction – ranks high in priority for federal funding. Areas of national environmental or economic significance.
Others	• Individual and corporate donors • Conservancy/Foundations and other non-profit organizations	Low-Moderate (<10%)	Particular communities or targeted interests in the region.

- Evaluate feasibility of implementing a local funding measure.
- Evaluate potential for state and federal partners and grant funding opportunities so that an estimate of the required local share of funding can be developed.
- Identify and rank potential local funding alternatives.
- Prepare draft local funding plan.
- Identify key local stakeholders.
- Meet with stakeholders to promote funding plan and partnerships.
- Compile feedback from stakeholders and revise funding plan based on stakeholders' input.
- Develop education and outreach campaign to educate the public on the HAMP targets, the need for infrastructure to achieve the targets, the need for additional local revenue, etc.
- Implement Local Funding Plan.
- Refine Local Funding Plan as needed.

State Funding Strategy

Voters of the State of California have passed a number of statewide water and watershed funding measures in the past several years, including propositions 12, 13, 40, and 50. Proposition 84 was approved in November 2006 and also provides opportunities to fund specific HAMP projects. Approximately $114 million is dedicated to the Santa Ana Funding Area, which includes Newport Bay. The HAMP is an integral component of the Central Orange County Integrated Regional and Coastal Watershed Management Plan (IRCWMP), and projects within the HAMP are therefore consistent with that plan and eligible for Proposition 84 funds. The local stakeholders have acknowledged that future statewide funding may play a significant role in implementing priority projects identified in this HAMP.

The following actions have been implemented within a state funding strategy:

- The Round 2 Proposition 50 application was submitted in December 2007 for the Orange County Central Watershed Management Area (which includes Newport Bay and the City of Newport). Unfortunately the application was scored just below the applications that were requested to submit Round 2 applications. The next steps should include meeting with the state selection board and obtaining feedback on the application.

- An application under Proposition 84 grant funding specific to ASBS was submitted in August 2008. The application was ranked number 3 and is positioned to receive grant funding pending available state resources. The projects included in this application include water quality projects in the Harbor.

Possible next steps in developing the state funding plan may include:

- Evaluate and apply for existing state funding opportunities under Proposition 84.

- Follow up on existing grant application submitted for Proposition 50, and find out what is needed to obtain a higher score to compete with available funds.

- Consider other chapters of Proposition 50 and their applicability to HAMP implementation.

- Evaluate other statewide funding opportunities, including Bay–Delta watershed program grants.

- Coordinate with other regional stakeholders who are implementing the IRCWMP and an integrated strategy for implementing Proposition 84 funds within the Orange County Central Watershed Management Area.

- Participate in crafting and/or providing leadership of future statewide funding measures.

- Participate in statewide discussions regarding the scope and projects to be funded in Proposition 84, as well as the appropriate distribution of funds statewide.

- Identify appropriate representatives to participate in discussions within the IRCWMP on development and interpretation of the language in any draft or final funding measures.

- Identify key statewide stakeholders.

- Meet with stakeholders to promote state funding plan and partnerships.

- Compile feedback from stakeholders and revise funding plan based on stakeholders' input.

- Implement Funding Plan.
- Refine Funding Plan as needed.

Federal Funding Strategy

The ability of USACE to dredge the federal channels has been limited by federal funding. Currently, efforts are underway to seek funding to bring all federal channels to design depths. To incentivise USACE, the City has taken an active role in pursuing federal appropriations.

Possible next steps in developing the federal funding plan may include:

- Develop a list of opportunities to leverage local funding for the design and construction of HAMP projects through partnerships with federal agencies.
- Identify specific existing federal programs with the ability to share funding for the design and/or construction of single/multi-purpose facilities to achieve progress with HAMP objectives and IRCWMP objectives.
- Identify ongoing joint local and federal investigations that could accelerate the future commitment of federal funds.
- Redefine existing federal investigations that would provide federal funding for continuing stages of watershed planning in 2009 and beyond.
- Summarize the various federal opportunities enumerating their pros and cons and recommending those best suited to the HAMP objectives.
- Describe the actions/timelines under existing programs to initiate new local partnerships to secure federal contributions for the design and/or construction of new facilities.
- Determine appropriate agencies that could act as the local cost-sharing sponsor for new federal studies/projects.

Current Funding Activities

- An application under a NOAA Restoration grant program was submitted in April 2009. These are monies provided under the federal stimulus package. The projects under this application include restoration projects in the upper and lower Harbor and along the coast, as shown in Figure 1.

Funding to Further the HAMP Program

In addition to the funding of capital projects and improvements described above, it is clear that additional planning is needed to refine projects that have been identified in the HAMP. Additional planning is also needed to develop fully integrated sets of projects and a comprehensive vision for the Harbor and the watershed over the next 20 years which will ultimately achieve (yet to be defined) measurable watershed planning targets.

To fund additional detailed HAMP projects, several funding options may be possible:

- Contribution from local sources (e.g., local stakeholders with a vested interest in the HAMP objectives).
- Grant from state funds (e.g., planning funding from Proposition 50 and/or Proposition 84, or future water quality funding measures).
- Legislative appropriation.
- Federal funds (e.g., via USACE participation or through stimulus monies).

Figure 1: Map of restoration projects in the upper and lower Harbor and along the coast, as submitted with the NOAA Restoration grant application