

Final Report



COASTAL RESILIENCE VENTURA CATALOGUE AND ANALYSIS OF LOCAL SEA-LEVEL RISE PLANNING TOOLS

February 8, 2013

SUBMITTED TO:
Sarah Newkirk
Coastal Project Director
The Nature Conservancy
99 Pacific Street, Suite 200G
Monterey, CA 93940

SUBMITTED BY:
The Planning Center | DC&E
Orange County
3 MacArthur Place Suite 1100
Santa Ana, CA 92707
714.966.9220 | 714.966.9221 (f)
www.planningcenter.com

COASTAL RESILIENCE VENTURA CATALOGUE AND ANALYSIS OF LOCAL SEA-LEVEL RISE PLANNING TOOLS

Final Report
February 8, 2013

Submitted to:
Sarah Newkirk
Coastal Project Director
The Nature Conservancy
99 Pacific Street, Suite 200G
Monterey, CA 93940

Submitted by:
The Planning Center | DC&E
Orange County
3 MacArthur Place Suite 1100
Santa Ana, CA 92707
714.966.9220 | 714.966.9221 (f)
www.planningcenter.com



Contents

- EXECUTIVE SUMMARY ES-1
 - INCLUDING SLR IN A GENERAL PLAN..... ES-1
 - INCLUDING SLR IN A ZONING CODE UPDATE..... ES-2
 - MANAGING SAND DUNE AND WETLAND ECOSYSTEMS AS BARRIERS AND BUFFERS TO SLR..... ES-2
 - USE OF COST EFFECTIVE AND INNOVATIVE PROGRAMS TO RESPOND TO SLR ES-3

- INTRODUCTION 1

- PLANNING TOOLS INVENTORY 3
 - CALIFORNIA COASTAL COMMISSION 3
 - CITY OF OXNARD 6
 - CITY OF PORT HUENEME 8
 - CITY OF VENTURA..... 9
 - VENTURA COUNTY..... 11
 - NAVAL BASE VENTURA COUNTY..... 14

- KEY PLANNING DECISION CONTEXTS 17
 - FIVE SEA LEVEL RISE PLANNING DECISIONS..... 17

- DECISION VARIABLES ANALYSIS 19
 - WHAT ARE THE VARIABLES INCLUDED IN THE DECISION TO INCLUDE SEA LEVEL RISE IN A GENERAL PLAN UPDATE? 19
 - WHAT ARE THE VARIABLES ASSOCIATED WITH INCLUDING SEA LEVEL RISE IN A LCP UPDATE? 21
 - WHAT ARE THE VARIABLES INVOLVED IN INCLUDING SEA LEVEL RISE IN ZONING REGULATIONS?..... 22
 - WHAT ARE THE VARIABLES ASSOCIATED WITH THE USE OF SAND DUNE AND WETLAND HABITATS AS BARRIERS AND BUFFER ZONES FOR SEA LEVEL RISE?..... 24
 - WHAT ARE THE VARIABLES THAT WOULD LEAD AN AGENCY TO USE INNOVATIVE TOOLS SUCH AS TRANSFER OF DEVELOPMENT RIGHTS, MANAGED RETREAT, AND PROJECT DESIGN TO PLAN FOR SEA LEVEL RISE? 26

APPENDIX A SCREENING CRITERIA 33
 SCREENING RESULTS **35**
 FIVE SEA LEVEL RISE PLANNING DECISIONS..... **39**

APPENDIX B SEA-LEVEL RISE PLANNING TOOLS
CATALOGUE..... 41

Executive Summary

In response to forecasts predicting a substantial increase in the rate of sea level rise through the next 100 years, The Nature Conservancy has undertaken substantial effort to produce an analytical mapping tool for sea level rise (SLR) planning and impact analyses in Ventura County. In seeking to identify users and a regulatory framework to house the tool that would yield the most benefit, The Nature Conservancy allocated resources for this study.

This study examined many facets of SLR through the prism of planning at the County of Ventura; cities of Ventura, Oxnard, and Port Hueneme; and Naval Base Ventura County. However it should be noted that sea level rise planning activity in Ventura represents a small fraction in the evolution of this emerging field. More information can be brought to bear from other parts of the Country including southern Florida, Hawaii, and the San Francisco Bay Area—all of which are moving forward with sea level rise considerations.

Throughout the study, and in discussions with The Nature Conservancy regarding past experience from other Coastal Resilience projects in Long Island, New York, and in the Gulf Region, the following two key purposes for a sea-level rise mapping tool emerged:

1. To show the public that SLR is an issue that needs to be addressed. This should be done through the illustration of SLR impacts on public resources—not private resources that will distract users from developing meaningful solutions.
2. To show local agencies in detail where the impacts will be greatest, and to help them strategically plan for solutions to protect key infrastructure.

The list below summarizes key recommendations and methods to successfully plan for SLR in Ventura County that resulted from this study.

INCLUDING SLR IN A GENERAL PLAN

SLR is not required by the State of California to be included in General Plans. Local leaders may be hesitant to include SLR, given that the plans will be outdated prior to experiencing moderate impacts. However, locals should include SLR planning because the development built during the General Plan will eventually experience severe impacts beyond the time horizon of the plan.

- + Citizenry and interest groups can effectively request SLR analysis during the public comment periods of a General Plan update.
- + If a SLR map is included in a General Plan, it should be linked to one or more policies.
- + SLR policies should be firmly worded so that the issue is address, but not be overly specific in order to allow flexibility.
- + Including SLR in a Local Coastal Program (LCP) Update

- + Clear guidance from the Coastal Commission is necessary for a comprehensive and consistent approach to analyzing and mitigating SLR impacts in an efficient and effective manner.
- + Local jurisdictions are hesitant to include “anything extra” in an LCP unless they know it will streamline and not forestall certification—especially when considering additional development regulations for SLR.
- + Coastal Commission guidance should address the extent to which SLR can be included in environmental analysis under the California Environmental Quality Act—if at all, given the 2011 *Bellona Wetlands* opinion.

INCLUDING SLR IN A ZONING CODE UPDATE

The zoning code presents the appropriate regulatory context and scale to address SLR impacts as well as utilize The Nature Conservancy’s SLR mapping tool.

- + SLR development and land use regulations can be included in an overlay zone at any time, or imbedded during comprehensive rewrite of the zoning code. A SLR zoning overlay zone would implement SLR planning faster than a code rewrite.
- + Hazard and flood management regulations could be revised to include SLR, but SLR cannot be included in a flood zone overlay that is used for insurance purposes until FEMA includes SLR in its risk assessments.
- + Permitted land uses and development regulations that guide the form and intensity of new development can be utilized to moderate SLR risks in new development.

While most of these recommendations apply to a conventional planning framework, some innovative strategies to help plan for SLR are listed below.

MANAGING SAND DUNE AND WETLAND ECOSYSTEMS AS BARRIERS AND BUFFERS TO SLR

- + Sand dunes provide effective barriers to storm events that will be exacerbated by SLR, but generally conflict with public recreational uses. Wide beaches that accommodate both dunes and space for the public are preferable.
- + Wetlands reduce the speed and height of floods, but also slow the outflow of runoff. As sea levels rise, wetlands will need to migrate inland or be elevated through managed sediment deposition.
- + Sensitive species add regulatory complexity to the management of dune and wetland ecosystems. The level of detailed data necessary for Naval Base Ventura County to manage its resources also contains sensitive information that cannot be publicly distributed.

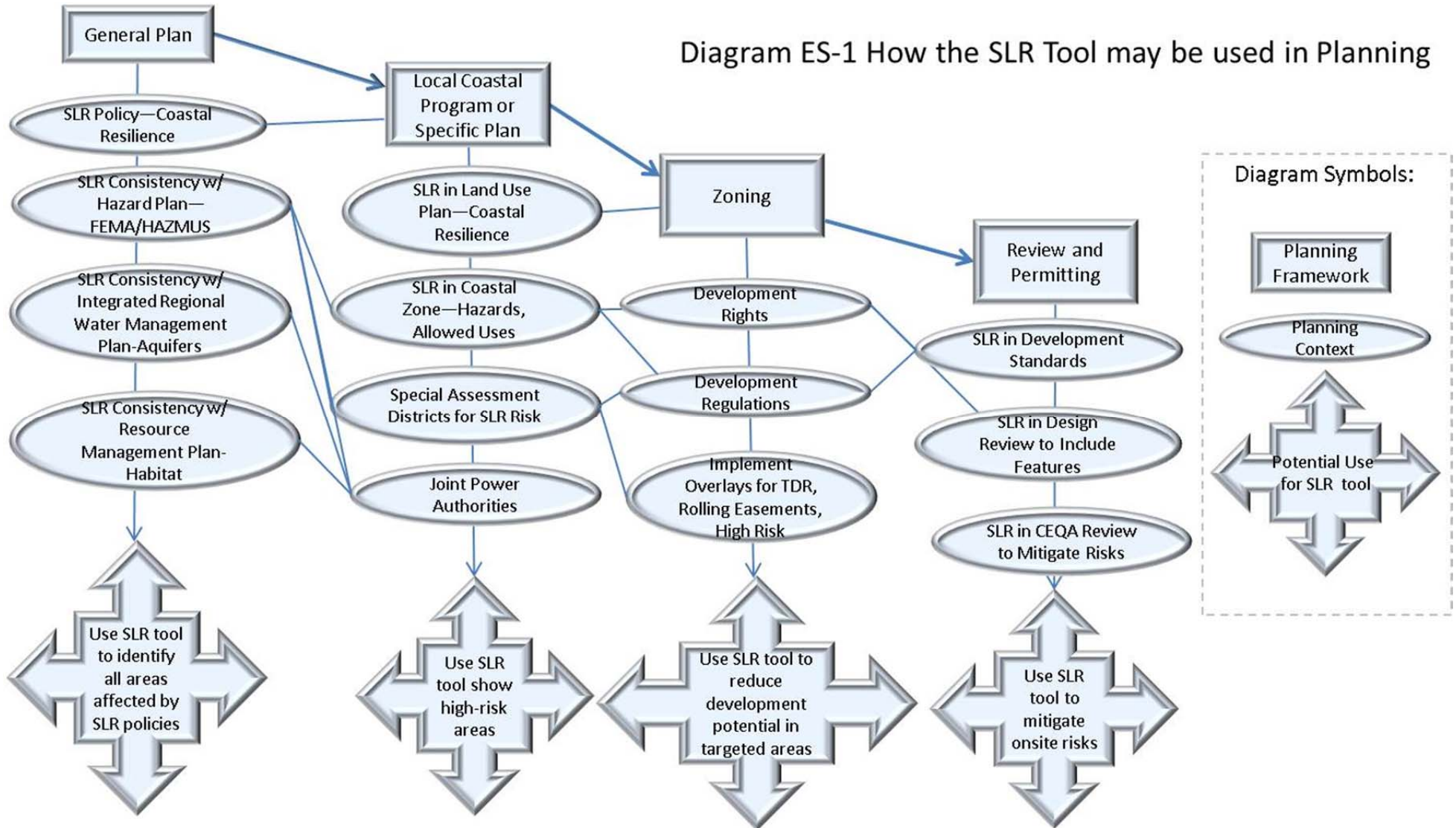
USE OF COST EFFECTIVE AND INNOVATIVE PROGRAMS TO RESPOND TO SLR

- + A transfer of development rights program could be used to transfer unused development potential out of areas forecast to be impacted by flooding and SLR. Transfer of development right programs are rarely used to transfer existing development, but could provide an alternative to rebuilding structures that are destroyed during a flood.
- + An in-lieu fee could be levied in Ventura County to mitigate public beach erosion as a result of private development. If the SLR tool provides a suitable level of information such that a wave uprush study is unnecessary, an in-lieu fee could be levied that permits a wave uprush study exemption in exchange for being permitted to use the sea-level rise tool for the uprush analysis. The fees could be collected and used to assist in critical habitat migration or execute conservation easements in at-risk areas. This fee could generate significant revenue without increasing costs.
- + The sale/leaseback of coastal property presents an innovative strategy in which an agency, planning well in advance of sea-level rise, would purchase at-risk coastal property, amortize the debt, and lease it back to the previous owners or the public while paying down the debt. Theoretically, when the likelihood of storm events punctuated by rising sea levels exceeds the risk tolerance of use, the property can be retired from use, with property owners fully compensated.
- + Hazard abatement assessment districts could be enacted in Ventura County. Conceptually, such districts would pass the cost of sea level rise adaptation along to private landowners through assessments. The advantages include:
 - o The assessment funds may accrue over time and made available when a response is warranted from damages associated with sea-level rise.
 - o Local governments can leverage the assessment district to issue bonds that pay for infrastructure and management plans today.
 - o The costs of private-property SLR adaption are borne to the landowners in the assessment district. There is less reliance on local, state, and federal governments to cover the costs of damage and emergency response due to flooding and storm-swells.

This page intentionally left blank.

In summary, diagram below illustrates the opportunities to include SLR analysis and the SLR tool into the hierarchy of the land use planning and permitting process.

Diagram ES-1 How the SLR Tool may be used in Planning



This page intentionally left blank.

Introduction

The Nature Conservancy has embarked on a “Coastal Resilience” project that seeks to raise awareness of the threat of sea-level rise and supports coastal communities’ ability to adapt. Through a framework of accessible information and tools that help to manage natural resources and protect communities, the Nature Conservancy’s efforts will help reduce risk as the impacts of coastal hazards are increasingly compounded by the effects of sea level rise.

The Coastal Resilience framework includes 4 critical elements:¹

- + **“Raise Awareness:** Develop integrated databases on social, economic and ecological resources critical to communities and provide mapping and visualization tools;
- + **Assess Risk:** Assess risk and vulnerability to coastal hazards including alternative scenarios for current and future storms and sea level rise with community input;
- + **Identify Choices:** Identify choices for reducing vulnerability focusing on joint solutions across social, economic and ecological systems. Provide decision support including web based guidance and scenarios to assess options;
- + **Take Action:** Help communities to develop and implement solutions.”

This project brings Coastal Resilience a step further with a catalogue of the current state of planning activities considering rising sea levels in Ventura County. Strategies and methods to improve sea level rise planning and permitting practices are presented.

Climate change – and sea level rise in particular – have created new challenges for coastal Ventura County in managing both public infrastructure and private development. The coastal communities in the county have a long history of careful land-use permitting and innovative approaches to land-use regulation. However, sea-level rise traditionally has not been a part of these communities’ thinking about land-use regulation.

This project underwent an iterative and collaborative process that accomplished the following objectives:

1. Evaluated existing and potential planning tools that are helpful in addressing sea-level rise and flooding.
2. Distilled five key decisions in which sea-level rise planning tools should be included.
3. Analyzed current variables and gaps that could be filled as Coastal Resilience Ventura and local agencies coalesce in response to sea level rise.

¹ <http://coastalresilience.org/>

This page intentionally left blank.

Planning Tools Inventory

Recent analyses conducted by The Nature Conservancy and the Pacific Institute suggest that impacts from the sea level rise in Ventura County will be significant and are likely to be compounded by coastal erosion and storm events. It appears likely that by 2100, most coastal areas without dunes or other elevated topography will be inundated at times. Some areas in Ventura County will experience more severe impacts than others. For instance low-lying coastal areas on the Oxnard Plain, including the Naval Base Ventura County and Ormond Beach, may experience more severe flooding.

Among permitting agencies and other major governmental players, the response to the threat of sea level rise is still in its infancy. Methods used to stabilize and protect coastal areas include hard engineering solutions that are generally forms of armory such as revetments, jetties, and breakwaters. Soft engineering solutions for coastal protection include beach nourishment and dune stabilization. This section describes the efforts used by local agencies in more detail.

This inventory catalogues the status and tools belonging to each local agency interviewed which included the Cities of Oxnard, Ventura, and Port Hueneme; the County of Ventura; Naval Base Port Hueneme; and the Coastal Commission. Existing sea level rise planning tools, as well as tools that may be used in the future, are discussed for each agency. Possible gaps between existing policies or regulations and preparation for sea level rise are highlighted. Appendix B includes a supplemental matrix describing coastal planning and resource management activities that are or may be used to address sea-level rise, titled “Planning Tools Catalogue.”



CALIFORNIA COASTAL COMMISSION

The California Coastal Commission is a regulatory agency created by the Coastal Act to protect and conserve California’s coastline. As a permitting authority for projects within its jurisdiction—an area called the Coastal Zone,—the Coastal Commission may be the most appropriate entity to require projects to plan for sea level rise.

Sea Level Rise Planning Tools

Planning tools for sea level rise at the Coastal Commission’s disposal are discussed below. The Coastal Commission has instituted some tools to address sea level rise today, has a few additional tools that may be refined to address sea level rise, and additional tools may be needed in the future.

Existing Tools

There is no set guidance for sea level rise in the Coastal Act, but it does contain provisions directly relevant to climate change and sea level rise including:²

- + Section 30253. This section calls for new development to “Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.” This is interpreted by the Coastal Commission in a way that discourages armoring bluffs and cliffs for new development projects.
- + Section 30235. This section authorizes construction of shoreline protective structures to protect existing development through the following language: “Revetments, breakwaters, groins, harbor channels, seawall, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal dependent uses or to protect existing structures or public beaches in danger from erosion, and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply.”

Stemming from the Coastal Act is the Coastal Commission’s permitting authority and its authority to certify Local Coastal Programs (LCPs). Certified LCPs allow local governments to streamline project permitting in the Coastal Zone.



Edison Peaker Plant under construction

<http://media.vcstar.com/media/img/photos>

An interim entitlement could be useful to limit the extent of new development in at-risk areas. In 2011 the Coastal Commission approved a 25-year interim entitlement authorizing the controversial Peaker Power Plant in Oxnard. The permit terms correspond to Southern California Edison’s estimate of the project’s 25-year lifetime expected operation. The entitlement, which is similar in concept to a temporary use permit, is valid for between 20 and 30 years and forbid construction of seawalls. The plant also included a water-level monitoring system for plant safety that could be useful to other development potentially impacted by sea level rise.

At the project level, there are a few instances when the permit conditions were modified to plan for sea level rise during the review process based on the generally accepted assumption that between 20 and 55 inches of sea level rise above 1990 levels can be expected by 2100.³ One example is in the coastal permit for the Ocean View Plaza project in Monterey. This 3.5-acre project was approved by the City in 2004, but the Coastal Commission determined during the Coastal Development Permit review process that the project was inconsistent with the Coastal Act concerning protection of coastal waters and public access requirements in 2008. A geotechnical report projected one foot of sea level rise over the next 100 years, but Commission

² California Coastal Act <http://www.coastal.ca.gov/coastact.pdf>, Accessed September 4, 2012

³ Impacts of Sea Level Rise on the California Coast, March 2009, The Pacific Institute, http://www.pacinst.org/reports/sea_level_rise/index.htm, Accessed September 5, 2012

staff requested further analysis: “Given that some experts are projecting a potential sea level rise of three feet over the next 100 years, Commission staff requested an analysis of the potential wave run-up impacts to the project if a three-foot rise in sea level takes place.” A reinforced concrete ledge and buildings designed to dissipate wave energy were determined to be sufficient to withstand the additional force.⁴

The agency has granted emergency permits to construct seawall revetments in response to storm events, such as at Broad Beach in Malibu. While the permits are intended for temporary mitigations, emergency revetments are rarely removed. Broad Beach stakeholders are applying for a permanent permit to retain the revetment and replenish the beach. The Coastal Commission may authorize with special conditions projects constructed under an emergency permit.⁵ Special Conditions often include an assumption of risk deed restriction, which places a higher burden of risk on private landowners.

Existing Tools That May be Used but Currently Are Not

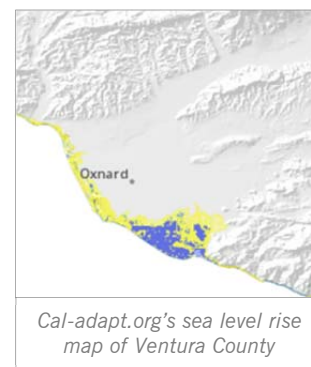
The Coastal Commission has general policies in Chapter Three of the Coastal Act that could be amended to address climate change impacts and sea level rise. The Coastal Commission is also in the process of updating its LCP guidelines for sea level rise hazard analysis.

Sand Management Plans are required for some projects that could be modified to include planning for sea level rise impacts. They generally require a 20- to 40-foot buffer between the structure and sand dunes.

In 2010, AB 2125, the marine spatial planning bill, added a section to the Public Resources Code that directs State agencies to gather and share scientific information and spatial planning tools pertaining to the effects of climate change with the Ocean Protection Council and public agencies.⁶ None of the stakeholders interviewed mentioned having access to spatial sea level rise data provided through the State, but the state recently launched a new informational website providing climate change information that can be found at Cal-Adapt.org.

Possible Future Tools

In 2006, the Coastal Commission formed a Climate Change Task Force which subsequently briefed the Coastal Commission in 2008 on climate change issues. Due to State budget cuts, little guidance has been set into motion. Local Coastal Commission offices shoulder the bulk of planning for sea level



⁴ California Coastal Commission, Coastal Development Permit Application 3-06-065, Ocean View Plaza

⁵ Th7a South Coast Area Office Staff Report describing Application No. 5-11-297, Request for Permanent Authorization of development undertaken under an emergency coastal development permit to repair damage to a shotcrete retaining wall.

⁶ New Laws Memo: 2010 Chaptered Legislation, Coastal Commission Legal Division and Legislative Unit, January 12, 2011. Accessed at <http://documents.coastal.ca.gov/reports/2011/1/W15-1-2011.pdf>, October 10, 2012.

rise by adapting current permitting activities and regulatory mechanisms to include sea level rise. The Ocean View Plaza project discussed above is an example of this practice, when the project was deemed to be inconsistent with the Coastal Act on water and public access issues, the Commission also requested additional planning for sea level rise impacts.

CITY OF OXNARD



Downtown Oxnard's transit center

The City of Oxnard is Ventura County's largest city and is situated on a large alluvial plain with some of the most fertile soil in the world. As a result of its geologic heritage, the landscape is relatively flat with few barriers to sea level rise. In addition to topographical features that make Oxnard an area of special consideration, the City is also home to the Ormond Beach wetlands and Channel Islands Harbor, and is bound by the Santa Clara River on its north. Three power plants, one water treatment plant, and beachside residential neighborhoods all contribute to making Oxnard a community of special interest on the topic of sea level rise.

Sea Level Rise Planning Tools

The City of Oxnard has instituted some tools to address sea level rise today, has a few additional tools that may be refined to address sea level rise, and additional tools may be needed in the future.

Existing Tools

The City's General Plan was updated between 2009 and 2011.⁷ The plan presents goals and policies requiring consideration of sea level rise on new projects in its Sustainable Community Chapter. Goal SC-2 states "Sea level rise is routinely considered relative to coastal areas and other City decisions, as relevant." This statement is followed by four policies, listed below:

- + "SC-2.1 Sea Level Rise and Updating the Local Coastal Program. Include the best-available information regarding possible sea-level rise in the next revision of the Local Coastal Program, which should be initiated within one year of adoption of the 2030 General Plan.
- + SC-2.2 Sea Level Monitoring System. Consider installation of a sea-level monitoring system that detects small changes to coastal sea level and tidal change.
- + SC-2.3 Sea Level Rise Consideration in Decision-Making. Ensure that all planning, public works, and related decisions take rising sea level into consideration and take steps to reduce risk of damage or loss of life and property.
- + SC-2.4 Avoidance of Coastal Armoring or Hardening. Wherever feasible, avoid coastal armoring or hardening in new development or in mitigating current and future risk to existing development."

⁷ In California, cities and counties are required to have a General Plan that is the primary blueprint for land use, safety, services and population growth.

Existing Tools That May be Used but Currently Are Not

The General Plan horizon is 2030 and most analyses suggest that within this timeframe the sea level will rise a few inches, which is generally a manageable amount under existing conditions. For decision makers, the requirement to “consider” sea level rise often relegates this long-term issue to the background of planning activities while more pressing short-term issues remain in the foreground of consideration.

The City intends to refine its overall approach during its local coastal program (LCP) update, currently underway. The LCP may include stronger policies and designate a “sea-level rise impact study area” that extends behind the existing Coastal Zone and regulates land uses in a manner consistent within the Coastal Commission’s sea level rise guidance. Currently, coastal sub-zoning designations within the vicinity of Ormond Beach include Resource Protection (RP) and Coastal Development Industrial (CDI).

- The RP zone is intended to protect and restore major resource and habitat areas within the City’s coastal zone. No structures and light recreational activities are permitted in this zone.
- The CDI zone supports energy and light industrial activities that are reliant on the sea. Sea level rise is not included in the description of these activities but may be in the next zoning code update. The CDI zone may be a valuable tool to manage retreat from sea level rise for the habitat and resources currently in the RP zone.

Possible Future Tools

General Plans are typically updated every 10-15 years. As the impacts of sea level rise begin to occur, forecast to be approximately 8 inches by 2025, Oxnard’s next General Plan update may institute stronger policies.⁸ Sea level rise and climate change could a standalone chapter, or the topic could be dispersed throughout the document along with other sustainability measures.

One planning tool that the City staff is considering is interim or time-limited entitlements to allow economic use of land, such as greenhouses, solar farms, port-related storage and vehicle processing facilities, which could be removed and/or relocated when sea level rise reaches a pre-determined risk level. During this “interim” time frame, the City may also refine its approach to land use policies and zoning requirements for sea level rise.

A study conducted in 1989 by a joint-powers agency called Beach Erosion Authority for Control Operations and Nourishment (BEACON) evaluated for suitability a handful of beaches in the region to test an experimental project



⁸ The Pacific Institute et al , May 2007, The Impacts in Sea-Level Rise on the California Coast, Figure 2. Scenarios of Sea-Level Rise to 2100, citing a 2008 study called Climate Change Scenarios Assessment.

that would pump 250,000 cubic yards of sand from offshore deposits into shallow water to gradually be pushed onshore by wave action. Oxnard Shores was selected as one of the most likely beaches to benefit from the project; however the experiment was estimated to cost \$1.3 million and was not conducted. Local decision makers viewed the project as a temporary solution to the long-term issue—lack of coastal sediment replenishment due to sand mining and dams in the region’s fresh water tributaries.⁹ BEACON consists of members from local coastal jurisdictions including Santa Barbara and Ventura County.¹⁰ More recently the coalition authored a Coastal Sediment Management Plan and EIR.¹¹

CITY OF PORT HUENEME



Port Hueneme boasts a rich maritime history

The City of Port Hueneme is a small coastal city generally bounded by Naval Base Ventura County on the west, the City of Oxnard to the north and east, and the Pacific Ocean to the south. The City is nearly completely built-out with approximately one acre of vacant residential land and five acres of vacant commercial land remaining. The General Plan was updated in 2000 and does not contain policies directly pertaining to sea level rise. The City of Port Hueneme was planning to update its General Plan in 2015, but the update may be delayed due to budgetary issues.

The Port of Hueneme itself is operated by the Oxnard Harbor District, a special district with a separately elected board. The City issues mostly ministerial land use permits to the Port of Hueneme for proposed projects that conform to the Port Master Plan. After a Naval expansion effort undertaken in the 1940s doubled the harbor’s size, the improved jetties began to starve the city’s beaches of sand nourishment. This severe erosion created the impetus for the Navy to build a tombolo sand trap in the Channel Islands harbor and the city’s beaches became dependent on the biannual dredging and slurry of approximately 2.2 million cubic yards from Channel Islands Harbor to replenish Port Hueneme’s beaches. Without this replenishment, the beaches would rapidly erode and destabilize.

Sea Level Rise Planning Tools

Planning tools for sea level rise at the City of Port Hueneme’s disposal are discussed below. The City of Port Hueneme has instituted some tools to address sea level rise today, has a few additional tools that may be refined to address sea level rise, and may need additional tools in the future.

⁹ Los Angeles Times, “2 Beaches Considered for Sand-Pumping: Technology: The Ventura County sites are being studied for use in an experiment to end years of erosion.” March 10, 1992.

¹⁰ California Joint-Power agencies have a separate-operating board of directors that can be given the power of membership agencies through an authorizing agreement, but they do not have sovereign land use authority similar to that of a special district.

¹¹ The plan and EIR can be downloaded on the BEACON homepage: <http://www.beacon.ca.gov/index.htm>, accessed September 12, 2012

Existing Tools

When the Navy intensified the port, the excavated fill was dumped on surrounding lands, creating small hills that elevated the topography along Surfside Drive and some other areas that will provide some protection for the city against sea level rise. One-third of the beach is also protected by revetments constructed by the Navy and maintained by the Oxnard Harbor District.

When the city's beachfront area was developed, it was done so with consideration for severe flooding and erosion impacts to the artificial beach. Improvements were engineered to collapse under severe conditions, and the area lacks underground utilities. The multifamily residential units fronting Surfside Drive have side-entry access points. Port Hueneme was one of few cities to plan a retreat from the sea so early, although for other reasons than projected sea level rise.



Surfside Drive was designed with consideration for rising sea levels

Existing Tools That May be Used but Currently Are Not

The City of Port Hueneme instituted a new flood hazard zone that requires a variety of standards and permitting requirements. Moving forward it may be possible to amend this zone to plan for flooding as a result of sea level rise. This zone may be amended to conform to FEMA's updated flood maps, as the agency is developing digital elevation maps with more detailed analysis of flooding hazards as a result of sea level rise.

Possible Future Tools

While the City of Port Hueneme has done some of the most advanced planning for sea level rise, further work in this respect has taken the public backseat to daily activities. Essentially the City is hoping that elevated development on its beachfront areas and its other planned retreat strategies will be sufficient. The City will continue to rely on beach replenishment and is exploring the use of more tombolos to soften storm swells and reduce beach erosion. The low-lying harbor area is likely to be the most at risk. The City is also waiting on new FEMA maps to decide if further action is needed. However, because FEMA plans map updates at around 20-to 30-year risk intervals, and studies have found the risk to be relatively low during this time, the agency is unlikely to include sea level rise in insurance maps.¹²



Some projects in Port Hueneme are built atop fill

CITY OF VENTURA

The City of Ventura is situated between the Ventura and Santa Clara rivers. Much of the city resides on elevated topography that will be relatively resistant to sea level rise; however it does have some low-lying at-risk areas that include residential neighborhoods at Pierpont and the Ventura Keys, the Ventura Harbor, and on the west side of city, where the downtown meets a mix of commercial and residential districts along the Ventura River. Similar to

¹² Evaluation of Sea Level Rise for FEMA Flood Insurance Studies: Magnitude and Time-Frames of Relevance, Brian K. Batten et al, Solutions to Coastal Disasters 2008.



the City of Port Hueneme, the City of Ventura is generally built-out along the coast with a few vacant parcels remaining in play.

Sea Level Rise Planning Tools

Planning tools for sea level rise at the City of Ventura's disposal are discussed below. The City of Ventura has instituted some tools to address sea level rise today, has a few additional tools that may be refined to address sea level rise, and additional tools may be needed in the future.

Existing Tools That Are Used

The City of Ventura does not have any policies pertaining to Climate Change and sea level rise in its General Plan or Downtown Specific Plan but it has considered sea level rise impacts on one project in Ventura Harbor. Known as the Sondermann Ring Partners Project, 300 apartment units and 21,300 square feet of retail is approved for the site. The impact analysis considered 55 inches of sea level rise over 100 years through project siting to minimize adverse impacts.

The city is known for its seven jetties and sand dunes between the Ventura Pier and the harbor. The jetties were constructed through a joint federal-County project that the County maintains. The jetties trap sediment and protect the beaches from storm events that will be worsened by sea level rise. The largest sand dunes reside on State Park land, although small dunes border residential neighborhoods throughout the area. In addition to broad beaches reinforced by the jetties, sand dunes may present an effective obstacle to sea level rise.

In 2011, the City of Ventura completed the Surfer's Pont Managed Shoreline Retreat Project in collaboration with other public and nonprofit agencies. The project was approved by the Coastal Commission in 2006 in response to severe erosion on the point located south of the Ventura River outlet. T

he project restored sand dune habitat, realigned a Class I bike trail, and shifted surface parking lots. This project was a successful example of multiagency collaboration to plan a managed retreat from coastal erosion, which is associated with planning for sea level rise. More on this project is discussed in the Decision Variables Analysis section.

Existing Tools That May be Used but Currently Are Not

The City of Ventura recently submitted LCP amendments for Downtown and Midtown planning areas to the Coastal Commission. The Coastal Commission added the following sea level rise analysis requirements to the City of Ventura's LCP Amendment for the Downtown Specific Plan in 2010:

"Development along the promenade, pier, and beach areas within the City of Ventura shall provide in advance of any new development approvals or redevelopment approvals, erosion and wave uprush studies based upon projections of the range of sea level rise that can be expected (at rates ranging from 5 to 15mm/yr) within the reasonable economic life of the structure (normally 75 years). The Planning Director may waive such studies on the basis of information contained in a certified EIR (environmental impact report) for the Promenade or Pier area, if such EIR includes maps of all areas in the City potentially impacted by storm waves and sea level rise and such maps include elevations of such impacts and estimation of likelihood of such events. All structures shall be sited and designed to minimize destruction of life and property during likely inundation events."

In November 2011, the *Bellona Wetlands* opinion ruled that the impacts of sea level rise on a project are not consistent with CEQA's legislative purpose.¹³ An Environmental Impact Report (EIR) is not required to include impacts from sea level rise, although the lead agency may still require the analysis in the EIR. If the EIR is for projects such as a hotel on the promenade, it is unlikely that a developer would be able to finance sea level rise analysis for the whole city. However, if The Nature Conservancy's sea level rise map tool served as a basis for the sea level rise impacts analysis, development could be significantly streamlined if wave uprush studies were no longer required.

Possible Future Tools

The City of Ventura should continue planning for sea level rise in its Coastal Zone. This can be completed through its General Plan and specific plans. The Coastal Commission and City of Ventura can work together to plan for sea level rise through the LCP, which continues to be certified on a project-by-project basis and through the General Plan, which is scheduled to be updated in 2015.

Public projects in the city can draw upon features of the Surfer's Point Managed Shoreline Retreat Project and the Sonderman Ring Partner's project, one such project should be the Ventura Freeway Cap Project, proposed to link downtown to the beach by replacing the unsightly freeway bridges with a tunnel topped with parks and amenities.

VENTURA COUNTY

Ventura County manages land use activities in areas that are vulnerable to sea level rise. Some of those areas include existing development along the coast,

¹³ *Ballona Wetlands Trust v. City of Los Angeles*; Case # B231965; Los Angeles County Second Appellate District, Division Three; December 2, 2011.

flood prone areas along the Ventura and Santa Clara River channels and Calleguas Creek, and sparsely populated south eastern areas around Point Mugu. Existing Communities vulnerable to sea level rise include Rincon Point, La Conchita, Mussel Shoals, Seacliff, Faria, Solimar and Solromar.¹⁴ Within areas vulnerable to sea level rise, most of the County's remaining development potential lies in infill development opportunities within existing residential areas.

Sea Level Rise Planning Tools

Planning tools for sea level rise at the Ventura County's disposal are discussed below. The County has instituted some tools to address sea level rise today, has a few additional tools that may be refined to address sea level rise, and additional tools may be needed in the future.

Existing Tools That Are Used

The Ventura County General Plan, Section 2.10 Flood Hazards, acknowledges that fluctuations in sea levels may be caused by a storm, tsunami or subsidence. It contains policies that rely on the Federal Emergency Management Agency (FEMA) Digital Flood Insurance Rate Maps to identify the regulatory floodway and floodplain. Policies 3 and 4 require development proposed within the floodplain to be designated and built to standards intended to mitigate, to the extent possible, impacts from a one percent annual chance storm. However, FEMA maps used to implement Policies 3 and 4 are related to existing flood hazards and do not reflect forecast flood hazards related to sea level rise.

Existing Tools That May be Used but Currently Are Not

With the exception of areas designated Existing Community or State/Federal Facility, land located along the County's coastline is designated Open Space or Agricultural by the Ventura County General Plan. The Open Space and Agricultural land use designations limit residential development to 1 dwelling unit per 10 to 40 acres, and require a minimum lot size of 10 to 40 acres respectively. Given this low-intensity development potential, new development on sites within the Open Space or Agricultural land use designation could, in theory, be situated on areas less vulnerable to sea level rise without modifying the County's General Plan land use map.

The County's General Plan policies currently do not address sea level rise, but the General Plan does include existing policies in the Resources and Hazards chapters that could be adapted to address sea level rise, such as the following:

- The Resource chapter of the General Plan includes Coastal Beaches and Sand Dunes. Policy 1.10.2 contains the following two subsections:

¹⁴ Existing Communities are identified in the General Plan.

“1. Discretionary development which would cause significant impacts to coastal beaches or sand dunes shall be prohibited unless the development is conditioned to mitigate the impacts to less than significant levels.” and,

“3. All shoreline protective structures which alter natural shoreline processes shall be designed to eliminate or mitigate adverse impacts on local shoreline sand supplies.”

- The Hazards chapter of the General Plan includes Section 2.12.2, Coastal Wave and Beach Erosion Hazards, contains the following two subsections:

“1. All permits for seawalls, revetments, groins, retaining walls, pipelines and coastal outfalls shall be designed to mitigate wave hazards and protect against further beach erosion, and shall obtain a Floodplain Development Permit from County Public Works Agency prior to the issuance of a building Permit and/or a Grading Permit. “

“2. Discretionary development in areas adjacent to coastal beaches shall be allowed only if the Public Works Agency with technical support from the Ventura County Watershed Protection District, determine from the applicant’s submitted Wave Run-up Study that wave action and beach erosion are not hazards to the proposed development, or that the hazard would be mitigated to a less-than-significant level, and that the project will not contribute significantly to beach erosion.”

Possible Future Tools

With respect to permits issued by the Ventura County Planning Division, potential future regulatory tools could include General Plan or Coastal Area Plan policies that address sea level rise. For example, a policy could direct new development to be sited in areas less vulnerable to sea level rise on low-density land designated Open Space or Agricultural to. Future tools that address existing or infill development within areas designated Existing Communities, however, would require significant amendments to the County’s existing regulatory framework.

Ventura County is currently engaged in the preparation of an update to its LCP, which includes the Coastal Area Plan (CAP) and Coastal Zoning Ordinance. Amendments to the CAP could include background information and/or policies related to sea level rise. However, since amendments to the LCP must be certified by the California Coastal Commission, the County is waiting for the Coastal Commission’s pending guidelines. In addition to Coastal Commission guidance, sea level rise analysis could be tied to forecast data associated with the planning period, which could be incorporated into a technical appendix for the CAP.

It should be noted that current revisions to FEMA’s Digital Flood Insurance Rate Maps are unlikely to result in regulatory changes that address future sea level rise, as those maps are limited to a depiction of existing flood hazards.

In 2013 the Watersheds Coalition of Ventura County is initiating an Integrated Regional Water Management Plan update. State guidelines require sea level rise analysis of areas served by coastal aquifers, such as Oxnard, and identification of suitable adaptation measures.¹⁵

NAVAL BASE VENTURA COUNTY



The Naval Base Ventura County- Point Mugu is a steward of rich wetland and dune ecosystems

The Naval Base Ventura County is composed of three sites, Port Hueneme, Point Mugu, and San Nicolas Island. The facilities are key elements in the Department of Defense (DoD) infrastructure. Point Mugu is home to approximately 2,500 acres of sensitive wetlands and coastal habitat, and Port Hueneme is an outlet to one of the few submarine canyons in southern California.¹⁶ The Naval Base is a significant economic driver for the county and steward of fragile ecosystems. The Navy serves a key role in sediment management between Channel Islands Harbor and the City of Port Hueneme’s beaches.

Sea Level Rise Planning Tools

Planning tools for sea level rise at the Naval Base’s disposal are discussed below. The Naval Base has instituted some tools to address sea level rise today, has a few additional tools that may be refined to address sea level rise, and additional tools may be needed in the future.

Existing Tools

Traditionally, the Navy has resorted to coastal armoring to address erosion issues. Southern areas of the Point Mugu facility, which are located on the edge of the submarine canyon area, have experienced increased rates of erosion since the 1980’s. The Navy has responded by constructing groynes and revetments to protect structures.

Existing Tools That May be Used but Currently Are Not

Land uses and resources on the base are managed through a handful of plans that could be amended for sea level rise. These plans are typically updated every five to ten years. They include the Installation Master Plan, the Encroachment Action Plan, and the Integrated Resources Natural Management Plan. Housed within the latter, a Sand Dune Management Plan provides a framework to manage the natural movement of sand and protect structures from sand accumulation. Such a plan is intended to balance protection of sensitive species that rely on the sand dunes, while maintaining

¹⁵ Climate Change Requirements -- Proposition 84 IRWM Plan Guidelines; hosted at <http://portal.countyofventura.org/portal/page/portal/ceo/divisions/ira/WC>

¹⁶ Submarine canyons are transport corridors for sand and sediment that also generate nutrient-rich upwellings that support biodiversity.

daily base operations. If not carefully updated, these plans and the manner in which they designate land uses may also constrain sensitive habitat. As sea levels rise, the plans will need to designate areas for habitat migration and retreat.

The Naval Base participates in local planning and research studies and submits comments on environmental impact reports (EIRs) for projects in its Military Influence Area. This interaction with local communities may promote sea level rise planning, both as the Naval Base completes further studies and implements policies for sea level rise impacts, and vice versa for local jurisdictions. The interagency relationship could foster local awareness of the issue and get local decision makers to say “since sea level rise is an important issue for the Navy, then it must be worth serious consideration.”

Possible Future Tools

As sea levels rise, sensitive habitats on the base may need assistance as they migrate inland or to more stable areas. At the national level, the DoD is funding studies evaluating sea level rise impacts such as the recently completed study “Modeling the Impacts of Climate Change on Birds and Vegetation on Military Lands” and “Understanding Data Needs for Vulnerability Assessment and Decision Making to Manage Vulnerability of DoD Installations to Climate Change”, scheduled to be completed in 2015.¹⁷ In addition to these studies, the Navy is relying on other federal agencies such as the Nation Oceanic and Atmospheric Administration (NOAA) and the National Aeronautics and Space Administration (NASA) to assess the vulnerability of its installations that are located throughout the continental US.

¹⁷ <http://www.serdp.org/Program-Areas/Resource-Conservation-and-Climate-Change/Climate-Change>, accessed September 8,2012

This page intentionally left blank.

Key Planning Decision Contexts

The Planning Tools Inventory was screened and ranked based on criteria that measure governmental support, scale of area impacted, timing and cost of implementation, and the available policy framework for sea level rise planning activities. Then the inventory was distilled to five key planning decisions with the potential to imbed and activate sea level rise response within the hierarchy of planning and permitting activity. This analysis is explained in detail in Appendix A, Catalogue Screening Analysis.

FIVE SEA LEVEL RISE PLANNING DECISIONS

Based on the results described above, and the Catalogue Screening Analysis in Appendix A, the following five decisions are analyzed further:

1. The decision to include sea level rise in a General Plan update. This decision focuses on how decision makers who are often elected officials can come to terms with sea level rise and direct staff to include sea level rise in General Plan updates. The process of sea level rise analysis, policy, and action development should also be addressed.
2. The decision to include sea level rise in an LCP update. This decision notes there is a disincentive to include sea level rise in an LCP because it adds material for the Coastal Commission to question during the certification process. The LCP certification process should encourage sea level rise planning and not inadvertently discourage it.
3. The decision to include sea level rise in zoning regulations. This decision focuses on the increased costs that more regulations imbue both to planning and development agencies as well as private development. It would also address how sea level rise can be integrated during the process of remodeling existing development as well as permitting new development.
4. The decision to use sand dune and wetland habitats as barriers and buffer zones for sea level rise. This decision focuses on ways to use existing sand dune and wetland preservation and management activities as sea level rise planning alternatives to armory and high-risk development.
5. The decision to include innovative tools such as TDR, managed retreat, and project design to plan for sea level rise. This decision focuses on passive tools to plan for sea level rise that include voluntary programs and forward-thinking project siting and design considerations that plan for sea level rise over the next 100 years.

These decisions envelope the highest-ranked sea level rise planning activities described below:

- + The Sustainability Chapter of the City of Oxnard's General Plan broadly institutes sea level rise planning across Ventura County's largest city. If

implemented, the policies and actions will profoundly impact many areas and all new coastal development within the city.

- + Transfer of Development Rights (TDR) is an adaptable growth management tool for sea level rise. TDR is innovative, cost effective, conserves sensitive habitat, and manages new development. However, TDR programs are voluntary and complex. This tool may not be effective in all planning contexts, and while the City of Oxnard's TDR program successfully transferred some TDRs, the program did not achieve all of its objectives.
- + The City of Oxnard's LCP update will include sea level rise planning activity stemming from General Plan policy. This update assumes the State LCP update recommendations for sea level rise planning will be included and that the LCP will catalyze sea level rise planning where it is needed--into a range of zones and across a broad area.
- + The City of Port Hueneme's Land Development Provisions and Coastal Development Provisions implement the LCP. The regulations can be amended for sea level rise planning and are applicable to new and existing development. This activity ranked higher than Flood Hazard Overlay Zone, because it would not rely on FEMA maps to include sea level rise.
- + Naval Base Ventura County's Resources Management Plan, if amended to use sand dunes to manage sea level rise, may present a promising method for managing this sensitive habitat to protect inland areas. The Naval Base also has the resources and authority to experiment and become a leader in this concept.
- + The Coastal Commission has integrated sea level rise planning into its permitting activities and utilizes wetland buffers as a "green option" for planning for sea level rise that conserves sensitive habitat and manages new development.
- + The Coastal Commission is completing revisions of its LCP Update Guide to include more information on sea level rise planning. Further State guidance on this matter will encourage local jurisdictions to increase sea level rise planning efforts and reinforce the Coastal Commission's role in sea level rise planning during Coastal Zone project permitting.



Ventura's Groynes
<http://farm5.static.flickr.com/>

The low scoring activities were sand replenishment in the City of Port Hueneme, and the groynes and jetties in the City of Ventura. These are examples of coastal resource management tools that will indirectly protect communities from sea level rise, since wide beaches provide protection from storm events, which will be exacerbated by sea level rise. Sand replenishment is expensive, indelicate, and temporary. The groynes in Ventura perform essential duties that are unlikely to change.

Decision Variables Analysis

Five key decision points on sea level rise planning were identified for further analysis. This section describes the variables involved in these decisions to plan for sea level rise, based on research and a second round of interviews with local agencies.

WHAT ARE THE VARIABLES INCLUDED IN THE DECISION TO INCLUDE SEA LEVEL RISE IN A GENERAL PLAN UPDATE?

Oxnard is the only General Plan of the four evaluated (including the City of Ventura, County of Ventura, and Port Hueneme) to expressly include sea level rise. The cities of

Ventura and Port Hueneme may be updating their General Plans in the near future. The City of Ventura is not planning to include sea level rise in the General Plan at this point. The status of local General Plan updates is described below:

- + Oxnard completed its General Plan update in 2011.
- + Ventura completed its General Plan update in 2005 and the next update is scheduled for 2015.
- + Port Hueneme completed General Plan update in 1997. The next update is scheduled for 2015, but is unlikely to proceed as planned.
- + Ventura County completed a focused General Plan update in 2005, to change the planning horizon from 2010 to 2020.

Variable 1: Where does sea level rise planning go in General Plan?

The General Plan is a policy document that guides long-range land use planning for a local jurisdiction in the range of 20 years. In order for sea level rise planning to be included, it should be linked to policies in the General Plan. The City of Oxnard opted to include sea level rise in its 2030 General Plan after the public comments and community workshops resulted in requests for a map showing sea level rise.

Oxnard decided to include the subject under the Global Warming/Climate Change section of the Sustainable Community Chapter, followed by a few policies that could provide an impetus to use The Nature Conservancy's sea level rise planning tool:

No other jurisdictions in Ventura County expressly include sea level rise in General Plans. Some other California jurisdictions have included sea level rise in their General Plans, here is a list of a few:

- + During its General Plan Update the City of San Clemente plans to include sea level rise in its Coastal Element.

- + During its General Plan Update the City of Capitola is evaluating sea level rise effects on flooding and erosion in its analysis of environmental resources and hazards analysis.¹⁸
- + The 2008 Solano County General Plan, Health and Safety Chapter, includes sea level rise to address flooding in the Bay-Delta Area and calls for identification of a sea level rise planning area.¹⁹

Variable 2: Who decides what to include in the General Plan and what is involved in the decision? Is sea level rise planning more likely to be embraced by the public, a General Plan Advisory Committee, planning commission, or council/mayor?

An inclusive process is typically undertaken when updating a General Plan to ensure that the document adequately reflects the entire community. This effort typically includes community marketing, workshops or charrettes, a General Plan advisory committee, and hearings before the planning commission and City Council or County Board of Supervisors. An adopted General Plan must include the state-mandated elements and an environmental impact report. During the General planning process, citizens, interest groups, stakeholders, planners and decision-makers can all decide to include sea level rise.

Most General Plans plan for approximately a 20-year horizon and profound impacts from sea level rise are not likely to occur until after this timeframe. Some jurisdictions may be hesitant to address an issue beyond the plan horizon. Decision-makers who run for re-election every few years, and are often managing stretched financial and staffing resources, may be hesitant to request sea level rise planning in a General Plan because the subject goes beyond state requirements and the plan horizon. If sea level rise is housed within a section on climate change, some may oppose one with the other. As was the case with the City of Oxnard, the effective method to get sea level rise policy adopted in the General Plan was early in the process when citizens and interest groups requested it. Given The Nature Conservancy’s local presence in Ventura County, the organization could comment on sea level rise during upcoming General Plan updates, as well as other comprehensive planning projects such as the Naval Base Ventura County Joint Land Use Study that is currently underway.

Variable 3: If a map showing sea level rise is included in the General Plan, would it need to show geographic boundaries that are linked to policies on sea level rise? Could there be other reasons to include a map in the General Plan?

If a map showing sea level rise is included in the General Plan, it should be linked to goals and policies in the plan. A sea level rise map may also be used for the analysis of the General Plan, typically in “white papers” or the environmental impact report. Under these circumstances a map of sea level rise is commonly linked to areas prone to flooding and coastal erosion. Solano

¹⁸ PlanCapitola.com, White Paper #4, April 2011

¹⁹ http://www.co.solano.ca.us/depts/rm/planning/general_plan.asp

County uses a “Sea Level Rise Planning Area” to identify areas that require levee and other infrastructure upgrades in order to reduce flood risks. The City of San Clemente is planning land uses on blufftops to account for increased erosion rates from sea level rise. The City of Oxnard included a sea level rise map to show that the community is aware of the issue and used it as a basis to guide future planning decisions. The scale of the Pacific Institute map is best suited for analysis at this level, since it lacks sufficient detail for zoning and site development planning purposes.

Variable 4: What are some of the ways to make sure that General Plan policies for sea level rise planning result in on-the-ground implementation?

The wording of goals, actions, and policy language dictate how a policy is carried forth. Weakly written policies carry little weight. For instance, a policy stating that an agency “may consider sea level rise planning” requires little action. In addition to the semantics, a number of other factors impact how the policies are integrated into zoning and project permitting processes that go beyond the scope of this project.

WHAT ARE THE VARIABLES ASSOCIATED WITH INCLUDING SEA LEVEL RISE IN A LCP UPDATE?

The Coastal Commission’s Sea-Level Rise Task Force is finishing guidance on including sea level rise policies into the LCPs and project permitting, although its district offices already request analyses and policies in LCP amendments and new development projects. According to the Coastal Commission Status Report, its staff is coordinating with the County of Ventura regarding provisions for sea level rise.²⁰ The Status Report did not note the City of Oxnard’s LCP update.

Variable 1: In light of recent CEQA case outcomes, is the Coastal Commission changing the guidance it is requiring local jurisdictions to include in Coastal Land Use Plan Amendments? If so what kind of guidance will it provide to the County of Ventura and City of Oxnard?

The official guidance will be released during the first quarter of 2013, although delays may occur. The guidance will be very general in nature and will address applicable topics such as public access, sensitive habitats, and new and existing development. These topics will be addressed through LCP and permitting guidance that provides broad recommendations for vulnerability assessments, sample policies, and permitting.²¹

Whether this guidance will address recent CEQA rulings is uncertain at this time. As stated in the Planning Tools Inventory section, The Coastal Commission added sea level rise analysis requirements to the City of Ventura’s LCP Amendment for the Downtown Specific Plan in 2010, but

²⁰ LCP Status Report, November 22, 2011. Downloaded from <http://www.coastal.ca.gov/lcps.html> on November 1, 2012

²¹ Personal Interview with Hilary Papendick, California Coastal Commission, Coastal Management Fellow November 18, 2012.

recent CEQA cases may nullify State-mandates that request analysis of the environment's impact on a project. CEQA alone cannot require sea level rise analysis and that a policy is needed in the LCP to address sea level rise, either through a project-level hazards analysis, or through a legislative action that invokes a development regulation to use the sea level rise tool. Additional development regulations can be difficult to implement in some jurisdictions, especially when they are prescribed in response to long-term impacts.

Variable 2: If the local jurisdiction verified that The Nature Conservancy's sea level rise tool is the best source of information for sea level rise analysis, would that be sufficient for Coastal Commission Certification of LCP amendments in terms of sea level rise?

Included in its guidance, the Coastal Commission is currently compiling a list of recommended tools that can be used to evaluate sea level rise. It will be between the local jurisdiction, project applicants, and Coastal Commission district offices to determine on a case-by-case basis if any of the tools listed are sufficient for the required analysis. For instance a developer may cite a web-based tool in his/her application for a coastal permit, and the district office can then decide if that tool is sufficient or if additional analysis is required. It is recommended that The Nature Conservancy submit information about the Coastal Resilience Ventura sea level rise tool and work with the Coastal Commission headquarters to ensure the tool is included on the recommended sea level rise analysis tools list.

Once the Coastal Resilience Ventura sea level rise tool is available and recommended on the Commission's list, then The Nature Conservancy should work with the Coastal Commission's district office and local jurisdictions to institute the tool as the preferred method of analysis for regulations and permits requiring sea level rise analyses.

WHAT ARE THE VARIABLES INVOLVED IN INCLUDING SEA LEVEL RISE IN ZONING REGULATIONS?

Zoning is the primary tool used to implement the General Plan and LCP, and it is the foundation of the permitting and entitlement process. There must be polices and legislative authority for sea level rise planning in order to regulate development for sea level rise through zoning. The relative scale at which zoning regulates, which is parcels and tracts of land, is generally consistent with the scale of The Nature Conservancy's sea level rise tool.

The Coastal Zone contains most of the areas that will be impacted by sea level rise and is jointly regulated by the Coastal Commission and local authority. Development costs are higher in the coastal zone due to heightened regulatory context, but there is also high demand for new development.

There are some zones in the City of Oxnard that are outside of the Coastal Zone, but are still forecast to be impacted by sea level rise. The City of Oxnard has authority to plan for sea level rise impacts in these areas, although

coordination with land use policies and regulations in the Coastal Zone will be essential.

Variable 1: Where would sea level rise go in zoning code?

Sea level rise can be addressed in multiple facets of a zoning code, including permitting, development regulations, permitted land uses, flood management, and zones that manage water resources.

- + The permitting or entitlement process is the process through which developers gain access to the development potential that is contained in zoning. Deed restrictions, temporary easements, and amortized development rights could be included during the entitlement process.
- + The development regulations guide the form and intensity of new development. Project siting and other sea level rise resistant project features can be included in the development regulations.
- + Permitted uses regulate the type of uses allowed on a site. The City of Oxnard is implementing policies to permit only uses that can eventually be moved in the Community Reserve Zone and other zones in sea level rise areas.
- + Hazards and flood management regulations execute safety policies that guide new development. Including sea level rise within zoning regulations for flooding and erosion could be the most appropriate place in zoning.

Variable 2: Is there any advantage for the municipality to include sea level rise planning prior to the Coastal Commission’s review?

Because of the Coastal Commission’s authority, some local jurisdictions are leery of including additional information or regulations for development in the Coastal Zone without clear guidance or a mandate. In lieu of clear guidance from Coastal Commission headquarters, different district offices may request different studies and information on a case-by-case basis. This uncertainty inevitably requires additional analyses and compounds budget issues, both for local jurisdictions and developers. Without clear guidance, some local jurisdictions are unlikely to include sea level rise in LCPs or zoning amendments.

The sea level rise tool will provide analysis of the potential impacts that local jurisdictions should not ignore. The analysis may result in planning activity without policy directives or new development regulations. For example, the sea level rise tool shows that segments of Interstate Highway 101 and Highway 1 will be impacted by sea level rise. Various agencies will need to work together to preserve critical infrastructure such as this and mitigate local impacts resulting from retrofitting key infrastructure in response to SLR.

Variable 3: Can zoning be amended for sea level rise (with an overlay zone) or should sea level rise be included in a zoning code update?

An overlay zone for sea level rise can be used until the zoning code is updated. When the zoning code is updated, sea level rise should be integrated into the regulations. An overlay zone is the simplest way to create a special district or require development regulations for sea level rise in the

short-run. This overlay may be retained or dissolved into future zoning updates as they occur.

WHAT ARE THE VARIABLES ASSOCIATED WITH THE USE OF SAND DUNE AND WETLAND HABITATS AS BARRIERS AND BUFFER ZONES FOR SEA LEVEL RISE?



Wetlands at Naval Base Ventura County—Point Mugu

The Ventura County coastline includes a few of the last remaining sand dune and coastal wetland habitats in Southern California. If sea level rise planning insufficiently addresses these habitats, they will be increasingly constricted by encroaching development and sea level rise, possibly until they cease to exist.

Protection of dune systems and wetlands is important for sea level rise because they may be used to protect developed areas while providing a substitute for grey infrastructure, and provide ecosystem services. Management of barriers and natural buffers should be considered when a local jurisdiction with these natural features includes sea level rise planning tools.

Variable 1: Can wetlands actually reduce sea level rise impacts? Do wetland buffers need to be paired with changes in topographic elevation to be effective for sea level rise?

Wetlands reduce the speed and height of floodwaters, but also slow the rate of outflow to the sea. With sediment supply and flora, wetlands stabilize coastlines from erosion impacts. Unlike the high-energy coastline, wetlands are characterized by low-energy hydrologic processes, and therefore experience lower duress than a shoreline that gets scraped by strong currents and storm events. At Naval Base Ventura County, existing development and the Santa Monica Mountains will restrict wetland migration; however there is currently farmland inland from the wetlands that may be suitable for wetlands migration. Where migration is restricted, and the coastline protecting the wetlands is stable, sediment can be deposited at a rate equal to that of sea level rise that also allows flora to adapt naturally, slowly elevating the wetlands.²²



Sand Dunes in Oxnard

Variable 2: Can sand dunes function in a similar fashion to levees or seawalls to resist sea level rise? What is required to manage their formation without impacting biodiversity?

Sand dunes do offer some protection from sea level rise. Both Naval Base Ventura County and the City of Ventura's Surfer's Point Managed Shoreline Retreat Project include dune management plans. The dunes add an estimated additional four feet of height in protection from sea level rise and storm surges at Surfer's Point. However, sand dunes and public access generally conflict—sensitive dune species are easily trampled. Beaches that are off-limit to the public, or wide beaches that have room for both dunes and flat

²² Michael Volk, MLA Thesis Research, University of Florida Department of Landscape Architecture

recreational areas can continue to protect from sea level rise and serve the public.

Variable 3: What is best way to include sea level rise planning in the management of natural resources and how can the sea level rise tool be useful for this process?

Spatial information for natural resources showing dune systems and wetlands would complement the sea level rise tool by including habitat types, topography, bathymetry, velocity and depth of modeled flood events. Naval Base Ventura County manages natural resources at the ecosystem level, and owns sensitive information on federally- and State-listed species of special concern, along with the location of archaeological sites. While these resources must be protected from sea level rise, Naval Base Ventura County cannot provide the specific information necessary to manage these resources in the sea level rise tool if it will be available to the public. An interface with a password exclusively for Naval Base Ventura County access could be a possibility. If the sea level rise tool includes coordinates, or if it is interfaced with Google Earth, then Naval Base Ventura County would be able to import data and conduct a detailed comparison of sea level rise impacts with its spatial information.

From a land use planning perspective, projects at Naval Base Ventura County are co-planned by an Asset Management department and an Environmental department. Both departments review new projects under National Environmental Policy Act (NEPA) guidelines that are applied through a two-phase process of site approval and a project review. Site approval confirms whether the site is available for use and is not contaminated, or planned for use by another tenant. The project review process scrutinizes the project through 18 different NEPA criteria, such as air quality, runoff, natural resources, safety, and fire. Environmentally superior alternatives are considered against the up-front and mid-range costs, but if wetlands or other habitat is slated for development, the Army Corps issues take permits, and an equal amount of habitat must be mitigated and restored elsewhere on the base. During site approval and project review, the sea level rise tool could be used to assist in project siting and design. When habitat takings are mitigated through restoration, the sea level rise tool may be used to show areas where the restoration could assist with wetland migration and retreat.

Naval Base Ventura County plans for erosion under the Stormwater Prevention Plan. This plan instructs the Army Corps to armor, fill or retreat in response to erosion that will be exacerbated by sea level rise. Studies at Naval Base Ventura County have shown that armoring does not always result in increased erosion down shore--when the down shore area is angled in a manner that is less susceptible to erosion. The sea level rise tool could provide further information about where arming would result in sever or minor erosion due to coastline dynamics. This information could help the base's, and other jurisdiction's, decision-making process about whether to armor, fill or retreat.



WHAT ARE THE VARIABLES THAT WOULD LEAD AN AGENCY TO USE INNOVATIVE TOOLS SUCH AS TRANSFER OF DEVELOPMENT RIGHTS, MANAGED RETREAT, AND PROJECT DESIGN TO PLAN FOR SEA LEVEL RISE?

This decision broadly evaluates planning tools for sea level rise that share the following characteristics:

- + Low implementation and maintenance costs
- + Low impact on developer costs
- + Provide flexible options
- + Consistent with green solutions and support biodiversity

Some projects and programs that include these characteristics are:

- + The City of Oxnard's TDR program
- + The City of Ventura's Surfer's Point Managed Retreat Shoreline Project
- + The City of Ventura's Sondermann Ring Partners Apartment Project

Variable 1: What are the project siting features that can be used to address potential sea level rise impacts? Do they include a buffer or area of planned retreat?

The City of Ventura was the lead agency for the Surfer's Point Managed Shoreline Retreat beachfront restoration project. The project consists of two phases, each of which restores amenities including a class I bike path and natural beach features across approximately 1,000-foot increments of beach front. Phase 1 was completed on land owned by the Ventura County Fairgrounds and State Lands Commission after 15 years of planning and outreach effort. Retreat is a less viable option for Phase 2 due to significant improvements that constrain retreat options, such as a sewer transfer station and a road.

Four key variables were identified for design and implementation of the managed retreat portion of this project, as listed below:

- + Multi-agency coordination and input was required to get the project approved with minimal opposition. Agencies involved include the City of Ventura, the State Lands Commission, the Bike Coalition, the Surfrider Foundation, the California Coastal Conservancy, the Coastal Commission, and the Federal Highway Administration. The sea level rise tool would provide a useful and widely accessible metric for any agency to use in order to understand potential sea level rise threats, and for permitting and review of managed retreat projects.
- + The Fairground Board of Directors had to be convinced during the planning process that some loss of land through retreat was worth the tradeoff of having a new bike path and recreational resources that attract visitors.

- + The Coastal Commission’s refusal to allow armoring with revetments, due to Coastal Act policies regarding public access and aesthetics, required the City to seek another solution.
- + The restored dunes are anchored by cobble, which is a naturally occurring local feature. Cobble is considered a middle-road option between sand replenishment and revetments. The cobble shifts with seasonal fluctuations, allowing ecosystem adaptation, and requires replacement only about once every decade.

Variable 2: What are the considerations in designing a transfer of development rights program that could be used to address sea level rise?

A transfer of development rights (TDR) program could be used to transfer unused development potential out of areas forecast to be impacted by flooding and sea level rise. The conservation mechanism could also reinforce the Save our Open Space and Agricultural Resource (SOAR) boundaries and reduce encroachment around Naval Base Ventura County. These goals could be achieved through outright purchase of development potential, but purchase of development right programs are cost prohibitive to fund and, unlike TDR, do not include a revolving fund that results in multiple waves of conservation. TDR programs are rarely used to transfer existing development, but could provide a useful alternative to rebuilding structures that were destroyed during a flood.

In order for a TDR program to be successful, the following characteristics must be inherent in its design:

Clear TDR Program Goals

Most TDR programs seek to preserve open space and limit development in a sending area, or area that is intended for conservation. It is important to note, however, that 100-percent conservation is rarely accomplished without a unified approach that includes other programs that preserve open space through other means, such as SOAR and the Coastal Conservancy. Thus, in addition to having clear program goals, it is important to understand the role that the TDR program can realistically play—as one strand in a web of multiple conservation mechanisms. The other mechanisms have shortcomings as well, for instance the land use regulation SOAR falls short of permanently conserving land, and the State has limited funds to purchase land.

Suitable Sending and Receiving Sites

It is not usually difficult to identify sending areas; indeed, a TDR program often emerges from a strong political consensus to preserve a certain set of properties by removing development potential from them. On the other hand, it can be extremely difficult to identify politically acceptable receiving areas to accept the transferred development rights. Local resistance to increased density is common, and politically one jurisdiction is rarely willing to “accept the density” from another. Areas that may be suitable receiving areas where there will be high demand for new development include California State University Channel Islands, in downtowns, and near transit station areas that will be upzoned.

Adequate Incentives for Sending- and Receiving-Area Landowners

Because TDR programs are usually voluntary, it is especially important for both sending- and receiving-area landowners to have strong incentives to participate.

For sending-area landowners, selling development rights must be equally profitable (or more so) and more feasible than pursuing by-right development of their property—which can be extremely valuable along the coast. For receiving-area landowners, building at higher densities (or another form of TDR bonus) must be more profitable and feasible than building under baseline regulations.

Typically, the tools used to create adequate incentives are a combination of proverbial carrots and sticks. These include:

- + Downzoning sending-area property.
- + Providing sending-area landowners with bonus development rights (through the “transfer ratio” or allocation process) that “make them whole” if those rights are sold rather than exercised onsite.
- + Designating receiving areas where market demand for higher-density housing or commercial floor area exists.
- + Designating receiving areas where infrastructure exists, reducing the need to provide additional infrastructure to support higher density.
- + Stipulating that purchase of TDR is the only method through which receiving-area landowners can obtain increased density.

Without adequate incentives to continue agriculture, farmers will be hesitant to sell their TDRs and enact permanent conservation easements. SOAR requires a public vote to upzone agricultural land located outside of the boundary in the near term (SOAR expires in 2020) and should be used in conjunction with the other ideas that encourage ongoing agricultural operations.

The Use of Banks and Other “Market-Making” Mechanisms

In many cases, banks or other mediating institutions are necessary to even-out the market. If market players are misinformed or unaware, they will not participate in the market in an effective manner. In addition, land markets frequently do not function in the same way as other markets. Often there are only a few market players, especially in undeveloped areas, and frequently those market players do not respond to typical economic signals.

The examination of funding mechanisms, including ways to capitalize a TDR bank as well as create direct buyer-seller markets, is especially important.

Variable 3: Can a fee be used to get private development to pay for the risks of building in a high-risk area?

Two options were identified for an in-lieu fee:

- + An in-lieu fee could be levied in Ventura County to mitigate public beach erosion as a result of private development. The compounded rate of

erosion due to rising sea level could be included in the fee calculation. BEACON may be an appropriate entity to collect the fees and administer the fund.

- + An optional in-lieu fee could be paired with the sea level rise tool to accrue funds for conservation or sea-level rise adaptation measures.

During the late 1990's, new residential projects in San Diego were requesting coastal armoring that would increase down-current beach erosion rates. San Diego County, the San Diego Association of Governments, the Coastal Commission, and the City of Encinitas together implemented an in-lieu fee for beach sand mitigation that collects project fees to mitigate offsite beach erosion.

In exchange for permits, in-lieu fees were levied in amounts generally ranging between \$3,000 and \$8,000. According to a Coastal Commission report "the amount of the fee was derived through a methodology developed by the Commission staff coastal engineer to quantify the amount of sand that would replace the lost beach area and replace the amount of sand denied to the littoral cell over the life of the structure. That volume of sand is then multiplied by the cost of transporting and depositing sand on the beach in the project vicinity to determine the fee to be paid in-lieu of placing sand on the beach to mitigate for the lost beach area and material."²³

Another in-lieu fee possibility is if the sea level rise tool provides a suitable level of detailed information such that a wave uprush study is unnecessary, and an optional in-lieu fee could be instituted that permits a wave uprush study exemption in exchange for being allowed to use the sea level rise tool for uprush analysis. The fees could be collected and used to assist in critical habitat migration or execute conservation easements in at-risk areas. This fee could generate significant revenue without increasing development costs since wave uprush studies generally cost between \$10,000 to \$25,000 each.

Variable 3. What other innovative tools can be used to mitigate the impacts to existing development that will be negatively impacted by rising sea levels.

Sale/Leaseback of Coastal Property and the creation of an assessment district were two additional options that were identified.

Sale/Leaseback of Coastal Property

The Coastal Resilience Steering Committee suggested an innovative strategy in which an agency, planning well in advance of sea-level rise, would purchase at-risk coastal property, amortize the debt, and lease it back to the previous owners or the public while paying down the debt. Theoretically,

²³ California Coastal Commission Report on In-Lieu Fee Beach Sand Mitigation Program: San Diego County, September 1997

when the likelihood of storm events punctuated by rising sea level exceeds the risk tolerance of use, the property will be retired from use.

A similar program was implemented in the Crystal Cove Historic District near Laguna Beach. An enclave of 46 vintage coastal cottages originally built in the 1920's and 1930's located a Crystal Cove State Park. In 1979 the land was sold to State Parks for eventual public use. Today 22 cottages are fully restored and leased nightly at greater than 95 percent annual occupancy rates. However, similar success cannot be guaranteed in similar programs because this district is highly unique.²⁴

Assessment District

Between 1974 and 2009 the shoreline on Broad Beach in Malibu retreated 65 feet inland. The Malibu West Homeowner's Association, with 114 affected homes, and The Malibu City Council, worked together to form a Geologic Hazard Abatement District in 2011 that annually assesses each homeowner \$170 to implement a shoreline protection plan that mitigates public and private beach erosion. Formulation of the assessment district also allows issuance of bonds, which the City is considering in the amount of \$19 million. The project has been delayed due to controversy regarding the source of the sand that will be used to replenish the beach.²⁵

Similar hazard abatement districts could be enacted in Ventura County. Conceptually, such districts would pass the cost of sea level rise adaptation to private landowners through assessments. The advantages include:

- + The assessments may accrue over time, until a response is warranted from damages associated with sea level rise.
- + Local governments can leverage the assessment district to issue bonds that pay for infrastructure and management plans today.
- + The costs of private-property sea level rise adaption are relegated to the landowners in the assessment district. There is less reliance on local, state, and federal governments to cover the costs of damage and emergency response due to flooding and storm-swells.

²⁴ Coastal Conservancy Staff Recommendation for Crystal Cove Historic District Restoration, September 25, 2008

²⁵ Malibu Surfside News, various stories posted between September 2011 and November 2012. <http://malibusurfsidenews.com/>

Appendix A: Sea-Level Rise Catalogue Screening Analysis

Existing and potential resource management activities pertaining to sea level rise were catalogued and screened with criteria designed to isolate five contexts in which a decision to plan for sea level rise occurs, or may occur, for more detailed analysis. This memorandum presents a discussion of the draft results.

This page intentionally left blank.

Appendix A Screening Criteria

This section lists screening criteria used to rank activities listed in the Sea Level Rise Resource Management Activity Catalogue (Catalogue). The criteria described below are abbreviated in column headings in the SLR Catalogue. The selected criteria were used to rank and score each activity listed in the Catalogue as “HIGH”, “MEDIUM”, or “LOW”. A “HIGH” ranking was scored as a 3, a “MEDIUM” ranking was scored as a 2, and a “LOW” ranking was scored as a 1.

Is there State-level guidance pertaining to this activity that includes, or can be modified for, sea level rise planning?

- + Mandatory planning for sea level rise (HIGH score);
- + Recommendations for sea level rise planning (MEDIUM score);
- + No Guidance on sea level rise (LOW score).

CRITERIA WEIGHT SCORE (described below)= 2

Is there an opportunity for local decision makers to modify this activity to plan for sea level rise? This question pertains to decision makers such as City Council members, Planning Commission Members, and Boards of Supervisors at the County and in Special Districts.

- + Decision-makers can make changes to this planning activity (HIGH);
- + Decision-makers have some influence over this planning activity (MEDIUM);
- + Decision-makers have no input on this planning activity (LOW).

CRITERIA WEIGHT SCORE (described below)= 2

Can mitigations or project features for sea level rise be included in this activity?

- + Mitigations or features are or can be included (HIGH);
- + This activity is included in, or leads to, a process that may require mitigations or special features (MEDIUM);
- + This activity has no relationship to mitigation measures or project design (LOW).

CRITERIA WEIGHT SCORE (described below)= 3

Are there “green” options available as mitigations or project features?

- + Green options include sand dune management, open space/habitat buffers, transfer of development potential, habitat migration opportunities, and project design are clear alternatives (HIGH);
- + The “green” options listed above are possible but there are significant constraints (MEDIUM);
- + The only options are “grey” options that perform essential duties such coastal armory (LOW).

CRITERIA WEIGHT SCORE (described below)= 1

Will the enabling regulations, guidelines, or plans for this activity be updated and therefore allow an opportunity to include sea level rise planning?

- + Updated frequently without a timeline (HIGH);
- + Updated at regular intervals (MEDIUM);
- + Generally never updated (LOW).

CRITERIA WEIGHT SCORE (described below)= 1

If this activity includes planning for sea level rise, or is modified to include planning for sea level rise, will it increase upfront/short-run administrative and development costs?

- + It will not significantly increase administrative (public agency) and development costs (private economic development) (HIGH);
- + It will increase some costs in either administrative or development costs (MEDIUM);
- + It will increase both administrative and development costs (LOW).

CRITERIA WEIGHT SCORE (described below)= 2

If this activity includes planning for sea level rise, or is modified to include planning for sea level rise, will it increase long-run administrative and development costs?

- + It will reduce costs in the long-run through ecosystem services and emergency response (HIGH);
- + The tradeoffs are even, there are some costs and some benefits (MEDIUM);
- + There are continual costs in the long run (LOW).

CRITERIA WEIGHT SCORE (described below)= 2

Is there a niche within the framework for this activity to include planning for sea level rise?

- + The existing policies and regulations include planning for sea level rise (HIGH);
- + There are existing policies and regulations, such as flooding and erosion control that can be amended to include sea level rise (MEDIUM);
- + There is no policy or regulatory framework suitable to include sea level rise (LOW).

CRITERIA WEIGHT SCORE (described below)= 1

Has the lead agency directing this activity historically instituted innovative and path-breaking policies and plans?

- + This agency often assumes a leadership role in innovative new planning activities and has the authority to do so for sea level rise (HIGH);
- + This agency has occasionally assumed a leadership role in innovative new planning activities and may do so for sea level rise (MEDIUM);

- + This agency proceeds cautiously and learns from others who implement innovative new planning activities, or lacks the authority to include sea level rise (LOW).

CRITERIA WEIGHT SCORE (described below)= 2

Would spatial information about sea level rise be useful to inform this activity?

- + GIS is always used for this activity (HIGH);
- + GIS is sometimes used for this activity (MEDIUM);
- + GIS is never used for this activity (LOW).

CRITERIA WEIGHT SCORE (described below)= 3

Does this activity apply to both new and existing development, as well as habitat conservation?

- + This activity applies to both new and existing development, or habitat conservation (HIGH);
- + This activity applies to either new or existing development (MEDIUM);
- + This activity applies to neither new or existing development, nor habitat conservation (LOW).

CRITERIA WEIGHT SCORE (described below)= 3

Does this activity have the potential to impact a broad area?

- + This area has the potential to impact a wide area such as multiple large tracts of land or neighborhoods (HIGH);
- + This activity has the potential to impact a tract of land or a neighborhood area (MEDIUM);
- + This activity will impact a small site of a few acres or less (LOW).

CRITERIA WEIGHT SCORE (described below)= 2

Given that some criteria are likely to have more impact on sea level rise planning than others, is it necessary to weight each criterion with the CRITERIA WEIGHT SCORES. Based on the scoring defined below, each criterion was assigned a score on a scale of 1 to 3 as shown on the preceding list.

- + A score of 1 means that the criterion has some importance to sea level rise planning, but is not essential;
- + A score of 2 means that the criterion is an important issue in planning for sea level rise;
- + A score of 3 means that the criterion is a crucial issue in planning for sea level rise.

SCREENING RESULTS

The scores associated with LOW, MEDIUM, and HIGH ranking were multiplied by the CRITERIA WEIGHT SCORES described above. The product of these results was added for each row to reflect an overall ranking score for each

activity. For example if a criterion was rated as MEDIUM, it was assigned a score 2. The score of 2 was then multiplied by its CRITERIA WEIGHT SCORE, which in this hypothetical example was 3, resulting in a factored score for the criterion of 6. The factored scores for all criteria were summed for each activity, resulting in the Total Scores shown in Table 1 below. The Average Score shown in the table represents the Total Score divided by 12—the number of criteria analyzed. The results of this screening process are shown for each sea level rise Catalogue activity in Table 1 below:

Table 1: Sea Level Rise Resource Management Activity Criteria Screening Results

TOTAL SCORE	AVERAGE SCORE	SEA LEVEL RISE PLANNING ACTIVITY
City of Oxnard		
62	5.2	Sustainable Community Chapter
60	5.0	Coastal Sub-zones, including Resource Protection (RP) sub-zone
55	4.6	Community Reserve (C-R) Zone
61	5.1	Transfer of Development Rights (TDR)
54	4.5	20-30 year interim entitlement
48	4.0	Breakwater/Tombolo
56	4.7	Sand dune breach to reduce flooding
54	4.5	Monitoring System
61	5.1	LCP Update
City of Port Hueneme		
45	3.8	Sand Replenishment Project
54	4.5	Surfside Apartments
63	5.3	Land Development Provisions Sections 10356 – Coastal Development, 10357 - Implementation
60	5.0	Flood Hazard (FH) Overlay Zone
City of Ventura		
43	3.6	Groynes and Jetties
60	5.0	Surfer’s Point Managed Shoreline Retreat Project
55	4.6	Ventura Harbor Apartment Project
County of Ventura		
51	4.3	Sea Walls
57	4.8	LCP Update
51	4.3	Ventura County Hazards Mitigation Plan
Naval Base Ventura County		
51	4.3	Groynes and Revetments
62	5.2	Integrated Resources Management Plan: Sand Management Plan
52	4.3	Commenting Agency on EIRs
Coastal Commission		
51	4.3	Coastal Act Chapter 3 Sections 30253, 30235, and 30236
57	4.8	Setbacks
55	4.6	Applied condition for assumption of risk/and or prohibit future seawalls in permit
61	5.1	Wetland Buffers
62	5.2	Local Coastal Plan Update Guide Section 8 – Coastal Hazards and Section 9 – Shoreline Erosion and Protective Structures
56	4.7	California Ocean Protection Council Resolution on sea level rise

In the table above, the highlighted cells represent sea level rise planning activities that scored the highest--an average score greater than 5.0, and the

lowest--an average score less than 4.0. The highest scoring activities can be attributed to some of the following factors:

- + The City of Oxnard's General Plan Sustainability Chapter broadly institutes sea level rise planning across Ventura County's largest City. The policies and actions will profoundly impact many areas and all new coastal development.
- + Transfer of Development Rights (TDR) is an adaptable growth management tool for sea level rise. TDR is innovative, conserves sensitive habitat, and manages new development. However, TDR programs are voluntary and complex. This tool may not be effective in all planning contexts, and the City of Oxnard's TDR program did not achieve all of its objectives.
- + The City of Oxnard's Local Coastal Plan Update (LCP) will include sea level rise planning activity stemming from General Plan policy. This update assumes the State LCP update recommendations for sea level rise planning will be included and that the LCP will infuse sea level rise planning into a range of zones and across a broad area.
- + The City of Port Hueneme's Land Development Provisions and Coastal Development Provisions implement the LCP. The regulations can be amended for sea level rise planning and are applicable to new and existing development. This activity ranked higher than the one below it, Flood Hazard Overlay Zone, because it would not rely on FEMA maps to include sea level rise.
- + Naval Base Ventura County's Resources Management Plan, if amended to use sand dunes to manage sea level rise, may present a promising method for managing this sensitive habitat to protect inland areas. The Naval Base also has the resources and authority to experiment with this concept.
- + The Coastal Commission has integrated sea level rise planning into its permitting activities and utilizes wetland buffers as a "green option" for planning for sea level rise that conserves sensitive habitat and manages new development.
- + The Coastal Commission is in the process of updating its LCP Update Guide to include more information on sea level rise planning. More direction from the State would encourage local jurisdictions to increase sea level rise planning efforts and reinforce the Coastal Commission's role in sea level rise planning during Coastal Zone project permitting.

The low scoring activities were sand replenishment in the City of Port Hueneme, and the groynes and jetties in the City of Ventura. These are examples of coastal resource management tools that will indirectly protect communities from sea level rise, since wide beaches protect communities from storm events, which will be exacerbated by sea level rise. But there is little evidence supporting modification of these examples to directly withstand sea level rise impacts. Given their multijurisdictional context and the essential duties they perform, these two examples scored low as potentially useful sea level rise planning tools because they are unlikely to be changed.

The Ventura County Hazards Mitigation plan received a medium score due to the potential obstacles associated with getting FEMA to include sea level rise in flood zones. The Hazards Mitigation Plan contains detailed information regarding the type and location of critical infrastructure, which should be incorporated into the sea level rise tool, but it is unlikely that the plan itself will include sea level rise unless FEMA decides to include sea level rise forecasts in its flood maps.

FIVE SEA LEVEL RISE PLANNING DECISIONS

The ultimate purpose of this exercise is distillation for further analysis five decision points where a decision is made on sea level rise planning. Based on the results described above, and the attached sea level rise Catalogue, the following five decisions are suggested to become the subject of the next task:

1. The decision to include sea level rise in a General Plan update. This decision would focus on how decision makers who are often elected officials can come to terms with sea level rise and direct staff to include sea level rise in General Plan updates. The process of sea level rise analysis, policy, and action development would also be addressed.
2. The decision to include sea level rise in an LCP update. This decision would focus on the current disincentive to include sea level rise because it adds another threshold for the Coastal Commission to certify. The LCP certification process should encourage sea level rise planning and not inadvertently discourage it.
3. The decision to include sea level rise in zoning regulations. This decision would focus on the increased costs that more regulations imbue both to planning and development agencies as well as private development. It would also address how sea level rise can be integrated during remodeling of existing development as well as new development.
4. The decision to use sand dune and wetland habitats as barriers and buffer zones for sea level rise. This decision would focus on ways to use existing sand dune and wetland preservation and management activities as sea level rise planning alternatives to armory and high-risk development.
5. The decision to include innovative tools such as TDR, managed retreat, and project design to plan for sea level rise. This decision would focus on passive tools to plan for sea level rise that include voluntary programs and forward-thinking project siting and design considerations that plan for sea level rise over the next 100 years.

This page intentionally left blank.

Appendix B Sea-Level Rise Planning Tools Catalogue

This page intentionally left blank.

Sea Level Rise Resource Management Activity Catalogue

Table 1: City of Oxnard

CATEGORY	NAME	DESCRIPTION	PRO	CON	DECISION CONTEXT	LAST UP-DATED/USED	MANAGER/LEAD	C-1 IS THERE STATE-LEVEL GUIDANCE?	C-2 CAN LOCALS MODIFY FOR SLR?	C-3 CAN MITIGATIONS OR PROJECT FEATURES FOR SLR BE ADDED?	C-3.A ARE THERE GREEN OPTIONS/ALTERNATIVES AVAILABLE?	C-4 DOES THE ENABLING LAW OR PLAN HAVE A HORIZON FOR UPDATES?	C-5 WOULD INCLUDING SLR INCREASE ADMIN OR ECON DEVELOPMENT COSTS?	C-6 WOULD INCLUDING SLR INCREASE COSTS IN THE LONG-RUN?	C-7 IS THERE A PLACE HOLDER FOR SLR?	C-8 WOULD THE LOCAL JURISDICTION BE A LEADER IN SLR PLANNING FOR THIS ACTIVITY?	C-9 WOULD SPATIAL INFORMATION ABOUT SLR BE USEFUL TO INFORM?	C-9.A LIST UP TO 3 PRIMARY SPATIAL DATASETS	C-10 DOES THIS APPLY TO BOTH NEW AND EXISTING DEVELOPMENT OR HABITAT?	C-11 WOULD THIS ACTIVITY IMPACT A BROAD AREA?
Existing Tools																				
General Plan	Sustainable Community Chapter	Consider Sea Level Rise (SLR), includes Pacific Institute map w/55' of SLR	Goals and policies to consider avoiding coastal armoring	Coastal armoring is not forbidden	Long-range planning	2011	City Council	LOW Not in 2003 State GP Guidelines, but 2013 update underway and will include "Climate Adaptation"	HIGH	MEDIUM Policies for SLR may be added	HIGH Green policies for SLR may be added	MEDIUM 2013 Guidelines update underway, but Oxnard just completed GP update. Another update may not be needed for 15 years	MEDIUM Administrative cost to including analysis policies and actions for SLR.	HIGH Long term benefits of SLR planning will outweigh costs/	HIGH SLR is included in this plan	HIGH GP Language Could be strengthened, but Oxnard has taken the lead in SLR planning compared to other communities evaluated	HIGH	Include SLR Inundation Map (bath) at City level	MEDIUM New Development only	HIGH
Zoning	Coastal Sub-zones, including Resource Protection (RP) sub-zone	These sub-zones require conformity with LCP. The RP zone conserves sensitive habitats and can be used as an interim designation	Requires conformance with LCP, RP zone could be updated to include areas impacted by SLR and plan for habitat migration	Requires LCP to address SLR. Areas that are downzoned to RP could argue that is a takings	Zoning Administration	LCP update underway	Development Services	LOW Not in 2012 State Planning and Zoning Laws, there laws for flood planning	HIGH	HIGH Menu of SLR options would provide most flexibility	HIGH Green Options for SLR can be included on menu	HIGH There is no standard, but zoning code amendments are frequent, complete overhauls very rare	LOW Additional requirements would be costlier for planning agency	HIGH by addressing SLR in zoning regulations, there will be less habitat at risk	HIGH SLR is included in this zone	LOW Coastal Commission retains permitting authority over ESH's and mean high tide line	HIGH	Overlay SLR on habitat maps with topography and hydro-logic flow	HIGH Protects Habitat	HIGH
Zoning	Community Reserve (C-R) Zone	The C-R zone protects open space in the interest of the community	Allows agriculture and limited development. Less likely to result in takings claim than RP zone.	May be rezoned for increased development in the future	Zoning Administration	One area was rezoned for C-R after the 2011 General Plan Update	Development Services	LOW Not in 2012 State Planning and Zoning Laws	HIGH	HIGH Menu of SLR options would provide most flexibility	HIGH Green Options for SLR can be included on menu	HIGH This zone is designed to be amended	LOW Additional requirements would be costlier for developers and permitting agency	LOW by addressing SLR in zoning regulations, there will be less development at risk	MEDIUM SLR considerations may be included when rezoned, but the site is not within the Coastal Zone	MEDIUM Even if LCP is certified Coastal Commission retains permitting authority over new development	HIGH	Overlay SLR on parcels maps with topography and hydro-logic flow	HIGH Both new development and re-models	MEDIUM
Zoning	Transfer of Development Rights (TDR)	The TDR program was designed to assist the City implement its LCP and control development in hazardous	This planning tool relies on the private real estate market to conserve open space and can be used to	While the program in Oxnard has resulted in some transfers, the program has been unable to persuade most beach-front	Zoning Administration	Implemented in 1984 and the last transfer occurred in 2001	Development Services	LOW	HIGH As a land use regulation decision-makers can amend	HIGH Menu of SLR options would provide most flexibility	HIGH Green Options for SLR can be included	HIGH Every few years is standard	MEDIUM TDR may increase short-term administrative and development costs if the program has low activity	MEDIUM TDR may increase long-term administrative and development costs if the program has low activity	MEDIUM Few TDR programs include SLR, but there is no reason TDR cannot be designed for SLR	HIGH Oxnard has a successful TDR program	HIGH	Zoning, Habitat, Assessor Data	HIGH Utilizes new development to protect habitat	MEDIUM There is potential to impact a broad area, but voluntary nature of programs limits impacts

CATEGORY	NAME	DESCRIPTION	PRO	CON	DECISION CONTEXT	LAST UPDATED/USED	MANAGER/LEAD	C-1 IS THERE STATE-LEVEL GUIDANCE?	C-2 CAN LOCALS MODIFY FOR SLR?	C-3 CAN MITIGATIONS OR PROJECT FEATURES FOR SLR BE ADDED?	C-3.A ARE THERE GREEN OPTIONS/ALTERNATIVES AVAILABLE?	C-4 DOES THE ENABLING LAW OR PLAN HAVE A HORIZON FOR UPDATES?	C-5 WOULD INCLUDING SLR INCREASE ADMIN OR ECON DEVELOPMENT COSTS?	C-6 WOULD INCLUDING SLR INCREASE COSTS IN THE LONG-RUN?	C-7 IS THERE A PLACE HOLDER FOR SLR?	C-8 WOULD THE LOCAL JURISDICTION BE A LEADER IN SLR PLANNING FOR THIS ACTIVITY?	C-9 WOULD SPATIAL INFORMATION ABOUT SLR BE USEFUL TO INFORM?	C-9.A LIST UP TO 3 PRIMARY SPATIAL DATASETS	C-10 DOES THIS APPLY TO BOTH NEW AND EXISTING DEVELOPMENT OR HABITAT?	C-11 WOULD THIS ACTIVITY IMPACT A BROAD AREA?
		areas	remove development rights from areas that will be impacted by SLR	landowners to sell their development rights																
Permitting	20-30 year interim entitlement	Used for Edison Peaker Plant	Forbids Seawalls and streamlines revisions to land use regulations for the site	High improvement costs decrease likelihood the facility will cease operations	Permitting	2012	Development Services	LOW	MEDIUM zoning can be amended but once powerplant is built, modifications for SLR will be limited	HIGH Menu of SLR options would provide most flexibility	HIGH Green Options for SLR can be included on menu	MEDIUM There is a planned time to revise the entailment language, but it is unlikely to be done sooner	HIGH Interim entitlements would allow development to proceed while land use regulations are created	MEDIUM When interim entitlements expire there may be conflicting goals for the site.	HIGH Forbids seawalls as response to SLR. When interim entitlements expire SLR mitigations can be reviewed and included	MEDIUM Oxnard retains some land use authority over the Peaker Plant, but the plant is required and permitted by the State	HIGH	SLR overlay on Master Site Plan with topography and hydrologic flow	MEDIUM New Development only	LOW Currently only used for one site
Infrastructure	Breakwater/Tombolo	Offshore Structures built to refract waves and capture sand. The wall outside Channel Islands Harbor is designed for this purpose	Proven method to slow beach erosion	Prone to weatherization. Sand management is required otherwise sediment accretion will form spits. May be considered a form of coastal armoring	Harbor Planning	Channel Islands Harbor, 1940's	Federal/State and Ventura County maintenance	HIGH State Lands Commission requires SLR planning on State owned-leas facilities.. Governor Executive Order S-13-08	MEDIUM State/local/federal partnerships are standard	HIGH Is or can be used as a feature/mitigation in response to SLR	LOW This mitigation would be difficult to replace due to the harbor	LOW Once built, general maintenance occurs, but not significantly altered	LOW Large infrastructure projects can be expensive to approve and construct	HIGH Once constructed, the maintenance costs are low compared to the services provided.	MEDIUM As a sand replenishment strategy, a connection needs to be made whether replenishment is an effective response to SLR	LOW The city of Oxnard has little control over this activity	MEDIUM	Marine resources and sediment layers	LOW Not applicable to development projects	HIGH Protects the Harbor and sand is crucial to replenish Port Hueneme beaches
Emergency Response	Sand dune breach to reduce flooding	Used during winter of 2010 to protect public and private improvements	As an existing tool that is used to reduce flooding impacts, may be applicable to SLR impacts	Reactionary and there is potential for unintended consequences. Requires emergency permit from Coastal Commission	Emergency Response	2010	Ventura County Public Works	LOW Local Government Emergency Planning Handbook does not discuss SLR	MEDIUM Emergency response permits may be needed and State/federal funding assistance	LOW as a response, pre-planning of SLR features/mitigations is irrelevant	MEDIUM Dune management options for emergency response should be studied	MEDIUM Emergency response scenarios are periodically reviewed and updated	HIGH SLR Planning will not increase emergency response costs	HIGH SLR Planning will reduce emergency response costs	LOW SLR will compound storm events and flooding, but the activity will remain generally the same with or without SLR planning	MEDIUM Oxnard has limited control over this activity	HIGH	Dune topography, infrastructure (access), land use	HIGH Impacts sensitive habitat and existing development	MEDIUM likely to protect some tracts of land
Infrastructure	Monitoring System	Monitors water levels for energy plant safety	Could be adapted to include a warning System for SLR	SLR will occur gradually over 100 years	Called for in General Plan	Project permitted in 2011	Southern California Edison	LOW No monitoring system required for SLR	HIGH Can be included in permitting/mitigations	HIGH Is or can be used as a feature/mitigation in response to SLR	LOW Natural alternatives may respond to SLR slowly	MEDIUM The permit conditions should include periodic updates to monitoring systems	LOW New development may need to pay to retrofit existing systems or purchase new systems for SLR	HIGH SLR Planning will reduce emergency response costs	MEDIUM It is reasonable to assume that flood monitoring equipment can be used to monitor SLR	HIGH Oxnard can take a lead roles in using monitoring equipment for SLR	MEDIUM	Include SLR Inundation Map (bath) at City level, or Overlay SLR on parcels maps with topography and hydrologic flow	MEDIUM New Development can be required to finance this	HIGH A monitoring system may be able to monitor the entire coastline

CATEGORY	NAME	DESCRIPTION	PRO	CON	DECISION CONTEXT	LAST UPDATED/USED	MANAGER/LEAD	C-1 IS THERE STATE-LEVEL GUIDANCE?	C-2 CAN LOCALS MODIFY FOR SLR?	C-3 CAN MITIGATIONS OR PROJECT FEATURES FOR SLR BE ADDED?	C-3.A ARE THERE GREEN OPTIONS/ALTERNATIVES AVAILABLE?	C-4 DOES THE ENABLING LAW OR PLAN HAVE A HORIZON FOR UPDATES?	C-5 WOULD INCLUDING SLR INCREASE ADMIN OR ECON DEVELOPMENT COSTS?	C-6 WOULD INCLUDING SLR INCREASE COSTS IN THE LONG-RUN?	C-7 IS THERE A PLACE HOLDER FOR SLR?	C-8 WOULD THE LOCAL JURISDICTION BE A LEADER IN SLR PLANNING FOR THIS ACTIVITY?	C-9 WOULD SPATIAL INFORMATION ABOUT SLR BE USEFUL TO INFORM?	C-9.A LIST UP TO 3 PRIMARY SPATIAL DATASETS	C-10 DOES THIS APPLY TO BOTH NEW AND EXISTING DEVELOPMENT OR HABITAT?	C-11 WOULD THIS ACTIVITY IMPACT A BROAD AREA?
Local Coastal Plan (LCP)	LCP Update	Should include requirement to evaluate SLR impacts of new projects	By setting standards upfront, the planning process is clear to all parties	Added requirements may make LCP certification more difficult to achieve	Long-range planning	Update underway	Development Services	HIGH 2007 LCP Update Guide: Coastal Hazards . This section is "currently under revision"	MEDIUM Locals can include SLR, but any additional information may impede certification	HIGH Project design with SLR recommendations can be included	HIGH Green Options for SLR can be included	MEDIUM UMLCPs are periodically updated, typically after a General Plan update	LOW Including SLR may significantly increase administrative and development costs	MEDIUM There will be continued administrative and development costs, but the reduced damage will begin to pay dividends	HIGH SLR will be included in update	MEDIUM Locals can include SLR, but any additional information may impede certification.	HIGH	Include SLR Inundation Map (bath) at City level	HIGH LCPs include provisions for habitat, new, and existing development	HIGH LCPs cover a broad area

Table 2: City of Port Hueneme

CATEGORY	NAME	DESCRIPTION	PRO	CON	DECISION CONTEXT	LAST UPDATED/USED	MANAGER/LEAD	C-1 IS THERE STATE-LEVEL GUIDANCE?	C-2 CAN LOCALS MODIFY FOR SLR?	C-3 CAN MITIGATIONS OR PROJECT FEATURES FOR SLR BE ADDED?	C-3.A ARE THERE GREEN OPTIONS/ALTERNATIVES AVAILABLE?	C-4 DO THE ENABLING REGULATIONS OR PLAN HAVE A HORIZON FOR UPDATES?	C-5 WOULD INCLUDING SLR INCREASE ADMIN OR ECON DEVELOPMENT COSTS?	C-6 WOULD INCLUDING SLR INCREASE COSTS IN THE LONG-RUN?	C-7 IS THERE A PLACE HOLDER FOR SLR?	C-8 WOULD THE LEAD AGENCY BE A LEADER IN SLR PLANNING?	C-9 WOULD SPATIAL INFORMATION ABOUT SLR BE USEFUL TO INFORM?	C-9.A LIST UP TO 3 PRIMARY SPATIAL DATASETS	C-10 DOES THIS APPLY TO BOTH NEW AND EXISTING DEVELOPMENT OR HABITAT?	C-11 WOULD THIS ACTIVITY IMPACT A BROAD AREA?
Existing Tools																				
Resource Management	Sand Replenishment Project	Every two years the federal government pipes sand from Silver Strand Beach to Hueneme beaches	Maintains form and integrity of coastline	Costly and subject to federal funding	The project is operated by public works and is the primary method used to prevent severe erosion	2010	City Engineering Department and the Navy	LOW Beach nourishment is discussed side-by-side with SLR in LCP Update Guide, but the two items not linked	LOW If this is suitable for SLR response, it is unlikely that locals will have sufficient resources to maintain this costly activity	HIGH Is or can be used as a feature/mitigation in response to SLR	LOW This mitigation would be difficult to replace due to the harbor	HIGH The reoccurring nature this example indicates that it readily be adjusted for SLR.	LOW High costs are associated with this activity	MEDIUM This costly activity may be useful to mitigate SLR	MEDIUM As a sand replenishment strategy, a connection needs to be made whether replenishment is an effective response to SLR	LOW This Activity is largely dependent on State and federal resources	HIGH	Marine resources and sediment layers	LOW Not applicable to development projects	HIGH This activity impacts a harbor and swath of coastline
Permitting	Surfside Apartments	Built in the 1970's and planned design and infrastructure with severe storm wave run-up considerations	Early example of planning for sea level rise	Implemented on a project-by-project basis without policy guidance or goals	Project planning and permitting	1970's	Community Development	LOW There was no guidance when this project was permitted	MEDIUM Activity can plan for SLR, but little new development potential in PH	HIGH Menu of SLR options would provide most flexibility	HIGH Dune management, buffers, project siting features and managed retreat can be included	HIGH Permitting regulations can be amended to include SLR	MEDIUM Some additional costs incurred, but likely not significant	HIGH These preventative measures may significantly reduce damage and emergency costs	HIGH In this case SLR was included with other flooding analyses	HIGH Much can be learned from this early example of planning for SLR	HIGH	SLR overlay on Master Site Plan with topography and hydrologic flow	MEDIUM This was applied to new development	MEDIUM Impacted three housing tracts
Potential Tools																				
Resource Management	Land Development Provisions Sections 10356 – Coastal Development, 10357 - Implementation	Describes permitting process for projects in Coastal Zone and Conformance with LCP	Section on Mandatory easements for Public Access. Could require conformance with a costal management plan. Applicable to any project that requires a permit	May be more effective to include provisions for SLR in zoning or LCP	Development Review/Permitting	Last Updated in 1993	City Council	MEDIUM Only guidance is provided if Coastal Commission requires SLR planning on a new project	HIGH Activity can plan for SLR, and applicable to all permits	HIGH Menu of SLR options would provide most flexibility	HIGH Green Options for SLR can be included	HIGH There is no standard, but zoning code amendments are frequent, complete overhauls very rare	LOW Additional requirements would be costlier for planning agency	HIGH By addressing SLR in zoning regulations, there will be less development at risk	MEDIUM This zone could include SLR	MEDIUM Even if LCP is certified Coastal Commission retains permitting authority over new development	HIGH	Include SLR Inundation Map (bath) at City level, or Overlay SLR on parcels maps with topography and hydrologic flow	HIGH Includes provisions for, new, and existing development	HIGH Covers a broad area

CATEGORY	NAME	DESCRIPTION	PRO	CON	DECISION CONTEXT	LAST UPDATED/USED	MANAGER/LEAD	C-1 IS THERE STATE-LEVEL GUIDANCE?	C-2 CAN LOCALS MODIFY FOR SLR?	C-3 CAN MITIGATIONS OR PROJECT FEATURES FOR SLR BE ADDED?	C-3.A ARE THERE GREEN OPTIONS/ALTERNATIVES AVAILABLE?	C-4 DO THE ENABLING REGULATIONS OR PLAN HAVE A HORIZON FOR UPDATES?	C-5 WOULD INCLUDING SLR INCREASE ADMIN OR ECON DEVELOPMENT COSTS?	C-6 WOULD INCLUDING SLR INCREASE COSTS IN THE LONG-RUN?	C-7 IS THERE A PLACE HOLDER FOR SLR?	C-8 WOULD THE LEAD AGENCY BE A LEADER IN SLR PLANNING?	C-9 WOULD SPATIAL INFORMATION ABOUT SLR BE USEFUL TO INFORM?	C-9.A LIST UP TO 3 PRIMARY SPATIAL DATASETS	C-10 DOES THIS APPLY TO BOTH NEW AND EXISTING DEVELOPMENT OR HABITAT?	C-11 WOULD THIS ACTIVITY IMPACT A BROAD AREA?
Zoning Classifications	Flood Hazard (FH) Overlay Zone	Provides additional provisions for new development within LCP areas	Development standards require anchoring, elevation and floodproofing, lower floors designed to equalize hydrostatic flood forces	Applicable to new projects only. Likely to require FEMA maps to include SLR projections	Zoning Administration	2010	Community Development	MEDIUM Only guidance is provided if Coastal Commission requires SLR planning on a new project	MEDIUM Uses FEMA maps as metric, but may be amended to include other metrics	HIGH Menu of SLR options would provide most flexibility	MEDIUM Leads to process that can require SLR features/mitigations	HIGH There is no standard, but zoning code amendments are frequent, complete overhauls very rare	LOW Additional requirements would be costlier for planning agency	HIGH By addressing SLR in zoning regulations, there will be less habitat at risk	MEDIUM This zone could include SLR but would likely require FEMA to consider SLR	MEDIUM Even if LCP is certified Coastal Commission retains permitting authority over new development	HIGH	Include SLR Inundation Map (bath) at City level, or Overlay SLR on parcels maps with topography and hydrologic flow	HIGH	HIGH Impacts a substantial area

Table 3: City of Ventura

CATEGORY	NAME	DESCRIPTION	PRO	CON	DECISION CONTEXT	LAST UPDATED/USED	MANAGER/LEAD	C-1 IS THERE STATE-LEVEL GUIDANCE?	C-2 CAN LOCALS MODIFY FOR SLR?	C-3 CAN MITIGATIONS OR PROJECT FEATURES FOR SLR BE ADDED?	C-3.A ARE THERE GREEN OPTIONS/ALTERNATIVES AVAILABLE?	C-4 DO THE ENABLING REGULATIONS OR PLAN HAVE A HORIZON FOR UPDATES?	C-5 WOULD INCLUDING SLR INCREASE ADMIN OR ECON DEVELOPMENT COSTS?	C-6 WOULD INCLUDING SLR INCREASE COSTS IN THE LONG-RUN?	C-7 IS THERE A PLACE HOLDER FOR SLR?	C-8 WOULD THE LEAD AGENCY BE A LEADER IN SLR PLANNING?	C-9 WOULD SPATIAL INFORMATION ABOUT SLR BE USEFUL TO INFORM?	C-9.A LIST UP TO 3 PRIMARY SPATIAL DATASETS	C-10 DOES THIS APPLY TO BOTH NEW AND EXISTING DEVELOPMENT OR HABITAT?	C-11 WOULD THIS ACTIVITY IMPACT A BROAD AREA?
Existing Tools																				
Infrastructure	Groynes and Jetties	There are seven jetties, each approximately 30 meters long, between the Ventura Pier and Ventura Harbor.	Proven method to slow beach erosion	Prone to weatherization. Considered a form of coastal armoring.	Shoreline Management	Ongoing Maintenance	State Parks and Ventura County	LOW The State has not endorsed armoring as a tool for SLR planning	MEDIUM State/local/federal partnerships are standard	HIGH Is or can be used as a feature/mitigation in response to SLR	MEDIUM It may be possible to replace some groynes if the Ventura River can increase alluvial activity, in part through deconstruction of Matilija dam	LOW Once built, general maintenance occurs, but not significantly altered	LOW Large infrastructure projects can be expensive to approve and construct.	HIGH Once constructed, the maintenance costs are low compared to the services provided.	MEDIUM As a sand retention strategy, a connection needs to be made whether retention is an effective response to SLR	LOW This Activity is largely dependent on State and federal resources	MEDIUM	Marine resources and sediment layers	LOW Not applicable to development projects	MEDIUM Impacts some beach neighborhoods
Resource Management	Surfer's Point Managed Shoreline Retreat Project	Project that planned for 65 feet of shoreline retreat	An example of how to shift land uses inland as sea levels rise and erosion rates increase	The land in play was public land—there were no private land ownership issues. The area was already severely eroded	Shoreline Management/Long Range Planning	Project Completed in 2011	City of Ventura	MEDIUM Only guidance is provided through Coastal Commission for project approval	HIGH This project is an example of planning for SLR	HIGH Menu of SLR options would provide most flexibility	HIGH Dune management, buffers, project siting features and managed retreat can be included	LOW The plan is complete and unlikely to be updated	LOW Large public projects can be expensive to approve and construct.	HIGH Once constructed, the maintenance costs are low compared to the services provided.	HIGH SLR is included in this activity	HIGH Much can be learned from this early example of planning for SLR	HIGH	Habitat/Dune Resources, SLR overlay with topography and hydrologic flow	HIGH Restores habitat and shifts some existing development	LOW This activity essentially impacted a linear park
Permitting	Ventura Harbor Apartment Project	300-unit apartment and 21,300 square foot retail project that planned for 55 inches of SLR through the next 100 years	Language in LCP requires hazards analyses of SLR. Analysis was upheld by Coastal Commission	No language on mitigation measures--states that project must be sited and designed to minimize adverse impacts during inundation events	Development Review/Permitting	The Project was recently approved by the City Council and is expected to begin construction within six months	Community Development Department	MEDIUM Only guidance is provided through Coastal Commission for project approval	HIGH This project is an example of planning for SLR	HIGH Menu of SLR options would provide most flexibility	HIGH Dune management, buffers, project siting features and managed retreat can be included	MEDIUM LCPs are periodically updated, typically after a General Plan update.	MEDIUM Some additional costs incurred, but likely not significant	HIGH These preventative measures may significantly reduce damage and emergency costs	HIGH SLR is included in this activity	MEDIUM LCP is not certified, Coastal Commission retains permitting authority over new development	MEDIUM	SLR overlay on Master Site Plan with topography and hydrologic flow	MEDIUM This was a new development project	LOW This activity impacted one development site

Table 4: County of Ventura

CATEGORY	NAME	DESCRIPTION	PRO	CON	DECISION CONTEXT	LAST UPDATED/USED	MANAGER/LEAD	C-1 IS THERE STATE-LEVEL GUIDANCE?	C-2 CAN LOCALS MODIFY FOR SLR?	C-3 CAN MITIGATIONS OR PROJECT FEATURES FOR SLR BE ADDED?	C-3.A ARE THERE GREEN OPTIONS/ALTERNATIVES AVAILABLE?	C-4 DO THE ENABLING REGULATIONS OR PLANS HAVE A HORIZON FOR UPDATES?	C-5 WOULD INCLUDING SLR INCREASE ADMIN OR ECON DEVELOPMENT COSTS?	C-6 WOULD INCLUDING SLR INCREASE COSTS IN THE LONG-RUN?	C-7 IS THERE A PLACE HOLDER FOR SLR?	C-8 WOULD THE LEAD AGENCY BE A LEADER IN SLR PLANNING?	C-9 WOULD SPATIAL INFORMATION ABOUT SLR BE USEFUL TO INFORM?	C-9.A LIST UP TO 3 PRIMARY SPATIAL DATASETS	C-10 DOES THIS APPLY TO BOTH NEW AND EXISTING DEVELOPMENT OR HABITAT?	C-11 WOULD THIS ACTIVITY IMPACT A BROAD AREA?
Existing Tools																				
Infrastructure	Sea Walls	A coastal armory structure designed to protect property improvements	Long term solution compared to beach replenishment	High construction and maintenance costs. May cause a range of environmental issues	Development Re-view/Permitting	No Current Permit Applications propose sea walls	County of Ventura Planning Division	MEDIUM Only guidance is provided through Coastal Commission for project approval	MEDIUM State/local/federal partnerships are standard	HIGH Is or can be used as a feature/mitigation in response to SLR	MEDIUM Managed retreat, TDR, project siting, and managed retreat may provide some options	LOW Once built, general maintenance occurs, but not significantly altered	LOW Large infrastructure projects can be expensive to approve and construct.	HIGH Once constructed, the maintenance costs are low compared to the services provided.	HIGH These structures are designed to withstand SLR	MEDIUM While the County has the authority it has limited resources and no directive to evaluate SLR	MEDIUM	High tide lines, flood zones, and SLR Inundation Map	MEDIUM Only new development is occasionally permitted to build sea walls	MEDIUM Sea walls are rarely effective for one site and are generally used to protect a tract or area
Potential Tools																				
Local Coastal Plan (LCP)	LCP Update	Phase one was certified by Coastal Commission February 7. Phase two is underway.	May present policies related to SLR	SLR to be acknowledged, policy and ordinance regulations TBD and may complicate LCP certification	Long-range Planning	Update underway	County of Ventura Planning Division	MEDIUM Locals can include SLR, but any additional information may impede certification	MEDIUM Locals can include SLR, but any additional information may impede certification.	MEDIUM Leads to process that can require SLR features/mitigations	HIGH Dune management, buffers, project siting features and managed retreat can be included	MEDIUM LCPs are periodically updated, typically after a General Plan update.	LOW Additional requirements would be costlier for planning agency	HIGH By addressing SLR in zoning regulations, there will be less habitat at risk	MEDIUM The County does not plan to include but could in erosion or flooding	MEDIUM LCP is not certified and Coastal Commission retains permitting authority over new development and ESHs	HIGH	Include SLR Inundation Map (bath) at County level	HIGH LCPs include provisions for habitat, new, and existing development	HIGH LCPs cover a broad area
Emergency Response	Ventura County Hazards Mitigation Plan	Multiagency plan that evaluates risk hazards	Plans on a regional level. Communities are eligible for grants	FEMA does not include SLR analysis, and FEMA approval is required	Risk Analysis and Hazard Abatement	Updated in 2010	FEMA must approve, Ventura County Board of Supervisors adopts	LOW This is a federal document	MEDIUM Locals can include SLR, but any additional information may impede FEMA Approval	MEDIUM Mitigations must be eligible for FEMA funding,	LOW Sensitive habitat are not listed under critical facilities, not are green options listed as possible measures	HIGH Updated every 5 years	MEDIUM Some additional admin. costs incurred for analysis, but likely not significant	LOW If included in FEMA the cost of SLR impacts may be relegated to taxpayers	HIGH If SLR is included in flood risks.	LOW FEMA will be hesitant to take a leadership role	HIGH	Critical Facilities and Infrastructure would be useful to show in SLR tool	HIGH The plan addresses impacts to both new and existing development	HIGH It is a regional plan

Table 5: Naval Base Ventura County (NBVC)

CATEGORY	NAME	DESCRIPTION	PRO	CON	DECISION CONTEXT	LAST UPDATED/USED	MANAGER/LEAD	C-1 IS THERE STATE-LEVEL GUIDANCE?	C-2 CAN LOCALS MODIFY FOR SLR?	C-3 CAN MITIGATIONS OR PROJECT FEATURES FOR SLR BE ADDED?	C-3.A ARE THERE GREEN OPTIONS/ALTERNATIVES AVAILABLE?	C-4 DO THE ENABLING REGULATIONS OR PLAN HAVE A HORIZON FOR UPDATES?	C-5 WOULD INCLUDING SLR INCREASE ADMIN OR ECON DEVELOPMENT COSTS?	C-6 WOULD INCLUDING SLR INCREASE COSTS IN THE LONG-RUN?	C-7 IS THERE A PLACE HOLDER FOR SLR?	C-8 WOULD THE LEAD AGENCY BE A LEADER IN SLR PLANNING?	C-9 WOULD SPATIAL INFORMATION ABOUT SLR BE USEFUL TO INFORM?	C-9.A LIST UP TO 3 PRIMARY SPATIAL DATASETS	C-10 DOES THIS APPLY TO BOTH NEW AND EXISTING DEVELOPMENT OR HABITAT?	C-11 WOULD THIS ACTIVITY IMPACT A BROAD AREA?
Existing Tools																				
Infrastructure	Groynes and Revetments	NVBC constructs these traditional coastal armory structures to protect areas with significant improvements from coastal erosion	Long term solution compared to beach replenishment	High construction and maintenance costs. May cause a range of environmental issues	Base engineers construct to protect facilities	Many built during the 1980's, a few more recently	Naval Base Ventura County)	LOW State has no authority on federal land	HIGH As a federal agency NBVC can built infrastructure for SLR	HIGH Is or can be used as a feature/mitigation in response to SLR	LOW These features would be difficult to replace	LOW Once built, general maintenance occurs, but not significantly altered	LOW Large infrastructure projects can be expensive to approve and construct.	HIGH Once constructed, the maintenance costs are low compared to the services provided.	HIGH These structures are designed to withstand SLR	HIGH NVBC has the authority and resources to analyze and test this activity	MEDIUM	High tide lines, flood zones, and SLR Inundation Map	LOW Not applicable to development projects	MEDIUM Used to protect tracts of land such as the air field
Potential Tools																				
Resource Management	Integrated Resources Management Plan: Sand Management Plan	Sand dune management plan	Dunes are natural buffers to sea-level rise	Dunes tend to migrate and can damage land uses	Natural Resources Management	Updated every 5-10 years	Natural Resources Department	LOW State has no authority on federal land	HIGH NBVC has a tradition of natural resources stewardship and is integrating SLR	HIGH Menu of SLR options would provide most flexibility	HIGH Green Options for SLR can be included	MEDIUM Updated periodically	LOW Additional requirements would be costlier for Natural Resources Dept.	HIGH By addressing SLR in plan, there will be less habitat at risk	MEDIUM Dune management can provide protection from SLR	HIGH NVBC has the authority and resources to analyze and test this activity	HIGH	Habitat/Dune Resources, SLR Inundation Map, Land Use/Important Facilities	HIGH Protects Habitat	HIGH Protects multiple tracts of land
Encroachment Action Plan	Commenting Agency on EIRs	NVBC comments on EIRs for proposed projects being planned near the base	If NVBC comments on SLR impacts, local jurisdictions will further consider SLR	NVBC does not have any land use authority for areas outside the base.	Development Review/Permitting	Updated every 5-10 years	Community Planning Department	LOW State has no authority on federal land	HIGH SLR will be increasingly important as NVBC considers SLR tools	MEDIUM Leads to process that can require SLR features/mitigations	HIGH Green Options for SLR can be included	MEDIUM Updated periodically	LOW Additional requirements would be costlier for Community Planning Dept.	HIGH by addressing SLR in plan, there will be fewer areas at risk	MEDIUM SLR can be included in comments and plan for managed retreat	LOW NVBC no authority over surrounding communities	HIGH	SLR Inundation Map (bath) at County level	MEDIUM Focuses on new development	HIGH May impact multiple communities and the NBVC

TABLE 6: CALIFORNIA COASTAL COMMISSION

CATEGORY	NAME	DESCRIPTION	PRO	CON	DECISION CONTEXT	LAST UPDATED/USED	MANAGER/LEAD	C-1 IS THERE STATE-LEVEL GUIDANCE?	C-2 CAN LOCALS MODIFY FOR SLR?	C-3 CAN MITIGATIONS OR PROJECT FEATURES FOR SLR BE ADDED?	C-3.A ARE THERE GREEN OPTIONS/ALTERNATIVES AVAILABLE?	C-4 DO THE ENABLING REGULATIONS OR PLAN HAVE A HORIZON FOR UPDATES?	C-5 WOULD INCLUDING SLR INCREASE ADMIN OR ECON DEVELOPMENT COSTS?	C-6 WOULD INCLUDING SLR INCREASE COSTS IN THE LONG-RUN?	C-7 IS THERE A PLACE HOLDER FOR SLR?	C-8 WOULD THE LEAD AGENCY BE A LEADER IN SLR PLANNING?	C-9 WOULD SPATIAL INFORMATION ABOUT SLR BE USEFUL TO INFORM?	C-9.A LIST UP TO 3 PRIMARY SPATIAL DATASETS	C-10 DOES THIS APPLY TO BOTH NEW AND EXISTING DEVELOPMENT OR HABITAT?	C-11 WOULD THIS ACTIVITY IMPACT A BROAD AREA?
Existing Tools																				
State Policy	Coastal Act Chapter 3 Sections 30253, 30235, and 30236	Policies regarding shoreline protection and flood management	Provides directive to analyze some impacts related to SLR	No policies explicitly targeting SLR issues	State level guidance for local permitting	Periodically Amended	Coastal Commission (CC)	MEDIUM State will eventually include policy for SLR	LOW Locals have little influence over State policy	MEDIUM Leads to process that can require SLR features/mitigations	HIGH Green Options for SLR can be included	MEDIUM Amendments to Coastal Act occur periodically	LOW Additional requirements would be costlier for planning agency	HIGH by addressing SLR in zoning regulations, there will be less habitat at risk	MEDIUM Erosion and flood policies can be adjusted to include SLR	HIGH This State guidance will set the precedent for SLR planning	LOW	N/A	HIGH Likely to focus on new development and habitat	HIGH All Coastal Zones would be impacted
Permitting	Setbacks	Assure site stability and proper engineering	Careful siting of projects can increase adaptability	Limited by site size considerations and data availability	Development Review/Permitting	Continual	Coastal Commission	HIGH SLR analysis is required	MEDIUM Depending on conditions locals can enforce with Coastal	HIGH Menu of SLR options would provide most flexibility	HIGH Dune management, buffers, project siting features and managed retreat can be included	HIGH Permitting regulations can be amended to include SLR	LOW Additional requirements would be costlier for planning agency	HIGH by addressing SLR in zoning regulations, there will be less habitat at risk	HIGH CC has considered evaluated setbacks and	MEDIUM Effective for large sites, but must allow some development	HIGH	SLR overlay on Master Site Plan with topogra-	MEDIUM Applies to new development	LOW Impacts individual development projects

CATEGORY	NAME	DESCRIPTION	PRO	CON	DECISION CONTEXT	LAST UPDATED/USED	MANAGER/LEAD	C-1 IS THERE STATE-LEVEL GUIDANCE?	C-2 CAN LOCALS MODIFY FOR SLR?	C-3 CAN MITIGATIONS OR PROJECT FEATURES FOR SLR BE ADDED?	C-3.A ARE THERE GREEN OPTIONS/ALTERNATIVES AVAILABLE?	C-4 DO THE ENABLING REGULATIONS OR PLAN HAVE A HORIZON FOR UPDATES?	C-5 WOULD INCLUDING SLR INCREASE ADMIN OR ECON DEVELOPMENT COSTS?	C-6 WOULD INCLUDING SLR INCREASE COSTS IN THE LONG-RUN?	C-7 IS THERE A PLACE HOLDER FOR SLR?	C-8 WOULD THE LEAD AGENCY BE A LEADER IN SLR PLANNING?	C-9 WOULD SPATIAL INFORMATION ABOUT SLR BE USEFUL TO INFORM?	C-9.A LIST UP TO 3 PRIMARY SPATIAL DATASETS	C-10 DOES THIS APPLY TO BOTH NEW AND EXISTING DEVELOPMENT OR HABITAT?	C-11 WOULD THIS ACTIVITY IMPACT A BROAD AREA?
									Commission						siting for SLR	potential on small sites that do not meet setback requirements		phy and hydrologic flow		
Permitting	Applied condition for assumption of risk/and or prohibit future seawalls in permit	Shifts risk and liability from permitting agency to property owner	Alerts property owners of the changing and dynamic ocean conditions	Property owners may be able to obtain emergency permits for seawalls and may still legally challenge the assumption of risk	Development Review/Permitting	Continual	Coastal Commission	MEDIUM This can be recommended for the site in question.	LOW Coastal Commission retains authority over oceanfront development	HIGH Menu of SLR options would provide most flexibility	HIGH Dune management, buffers, project siting features and managed retreat can be included	HIGH Permitting regulations can be amended to include SLR	LOW Additional requirements would be costlier for planning agency	HIGH by addressing SLR in zoning regulations, there will be less habitat at risk	HIGH When used this includes SLR	HIGH This agency is one of few with the resources to enforce and withstand challenges	HIGH	SLR overlay on Master Site Plan with topography and hydrologic flow	MEDIUM Applies to new development	LOW Impacts individual development projects
Resource Management	Wetland Buffers	Establish buffers that allow inland or upland habitat migration	Increases the chances that habitat will be able to adapt to SLR	It can be difficult to predict the scale and viability of habitat migration and many habitats are already geographically constrained	Land Use planning for conservation	Continual	Coastal Commission	HIGH SLR analysis is required	LOW Coastal Commission retains authority over sensitive habitat	HIGH Menu of SLR options would provide most flexibility	HIGH Dune management, buffers, project siting features and managed retreat can be included	HIGH Permitting regulations can be amended to include SLR	LOW Additional requirements would be costlier for planning agency	HIGH By addressing SLR in zoning regulations, there will be less habitat at risk	MEDIUM CC is beginning to consider retreat and habitat migration for SLR	HIGH Coastal Commission has taken a leadership role in wetlands preservation	HIGH	Sensitive habitat and SLR overlay with topography and hydrologic flow	HIGH New development and habitat are included	MEDIUM Likely to impact tracts of development near wetlands
Potential Tools																				
State Policy	Local Coastal Plan Update Guide Section 8 – Coastal Hazards and Section 9 – Shoreline Erosion and Protective Structures	According to the document, these sections have been removed and are currently under revision.	Should provide additional policy guidance for SLR planning in LCP updates	Coastal Act does not require agencies to revise and update their LCPs	State level guidance for local permitting	April 3, 2007	Coastal Commission	HIGH SLR analysis will be required, however the extent of SLR analysis is unknown	MEDIUM SLR can be included, but is CC decision to certify	MEDIUM Leads to process that can require SLR features/mitigations	HIGH Dune management, buffers, project siting features and managed retreat can be included	MEDIUM LCP Guidelines periodically updated, an update is underway	LOW Adequately planning for SLR will increase administrative costs and may trickle-down to development costs	HIGH Including detailed recommendations for SLR will reduce long term costs due to less property damage and ecosystem services	HIGH SLR is included in this activity	HIGH This State guidance will set the precedent for SLR planning	HIGH	SLR Inundation Map (bath) at County level	HIGH LCPs include provisions for habitat, new, and existing development	HIGH All Coastal Zones would be impacted
State Policy	California Ocean Protection Council Resolution on SLR	Result of Executive Order 5-13-08 requiring state agencies to consider a range of SLR scenarios for years 2050 and 2100 to assess project vulnerability	Presents guidance on how to measure and evaluate a range of potential SLR scenarios in new projects	Does not present planning and mitigation tools. Provides directive for Public Lands Commission, but falls short of addressing land under private ownership	Project or program implementation funded by the state or on state property	March 11, 2011	California State Lands Commission	HIGH SLR analysis is required	LOW Local decision makers have limited input on State Lands	MEDIUM Leads to process that can require SLR features/mitigations	HIGH Dune management, buffers, project siting features and managed retreat can be included	MEDIUM Executive Orders can be, but are rarely amended	LOW Adequately planning for SLR will increase administrative costs and may trickle-down to development costs	HIGH Including detailed recommendations for SLR will reduce long term costs due to less property damage and ecosystem services	HIGH SLR is included in this activity	MEDIUM This activity is limited to State lands and facilities leased by the State	HIGH	SLR Inundation Map (bath) at County level	HIGH Applies to habitat, new, and existing development on State lands and facilities leased by the State	MEDIUM Impacts individual sites and State parks in Ventura County

Creating better places, in collaboration
with our clients, for people to live, work,
learn, and enjoy their lives.



COMMUNITY PLANNING | DESIGN | ENVIRONMENTAL SERVICES
LANDSCAPE ARCHITECTURE | ECONOMICS | SCHOOL PLANNING