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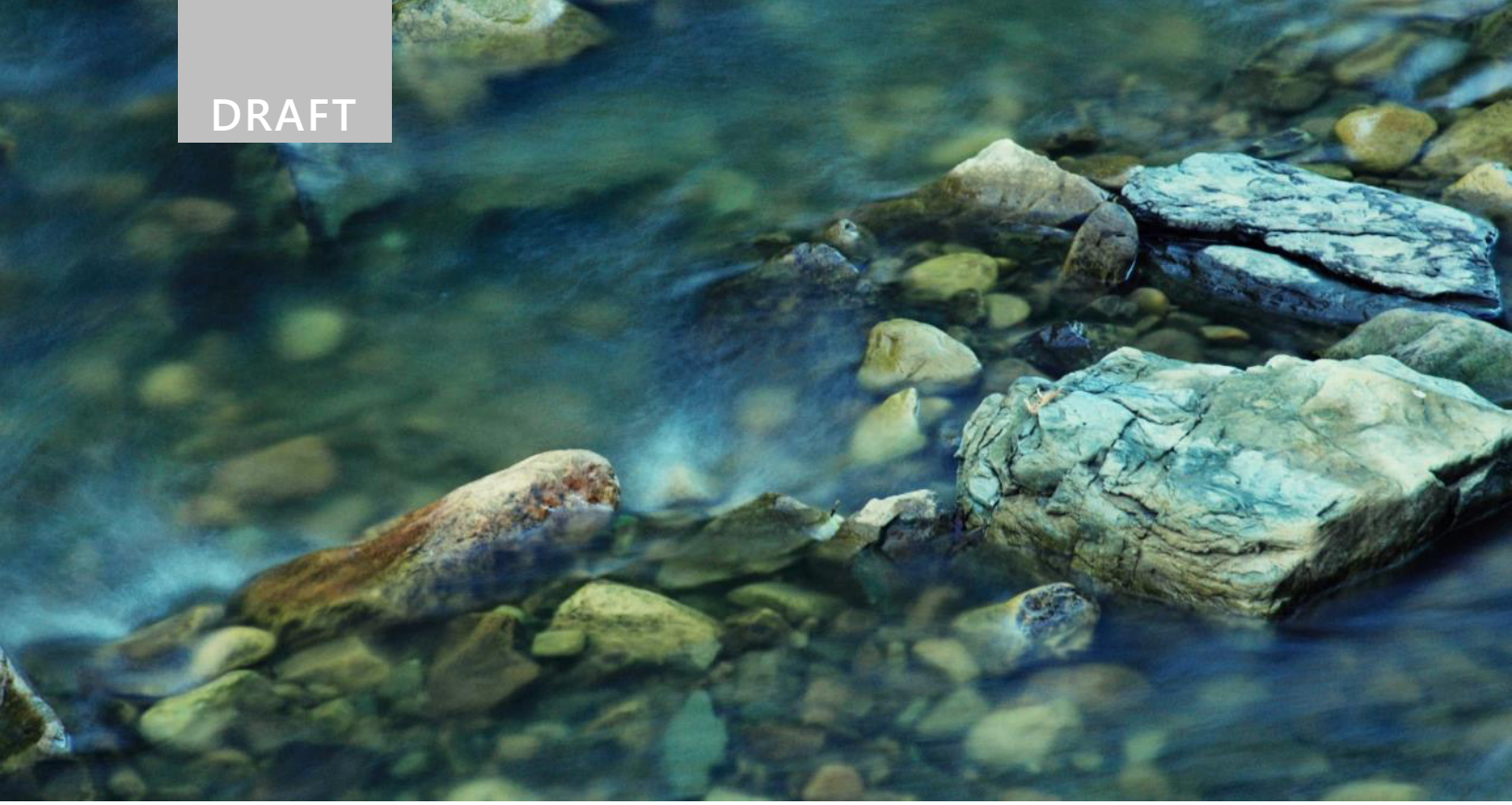

March 2024
South Orange County Regional Coastal Resilience Project

South Orange County Regional Coastal Resilience Strategic Plan: Working Draft

ANCHOR QEA

SUMMIT ENVIRONMENTAL GROUP

OCparks

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ABBREVIATIONS

BCR	benefit-to-cost ratio
BEACON	Beach Erosion Authority for Clean Oceans and Nourishment
Cal OES	California Office of Emergency Services
CAP	Continuing Authorities Program
CCC	California Coastal Commission
CEQA	California Environmental Quality Act
County	County of Orange
CCSMW	California Coastal Sediment Management Workgroup
cy	cubic yard
DBW	Division of Boating and Waterways
FEMA	Federal Emergency Management Agency
GHAD	Geologic Hazards Abatement District
HOA	homeowners association
IIJA	Infrastructure Investment and Jobs Act
JPA	Joint Powers Authority, Joint Powers Agency, or Joint Powers Agreement
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPA	Marine Protected Area
NEPA	National Environmental Policy Act
NGO	nongovernmental organization
NOAA	National Oceanic and Atmospheric Administration
OC CRSMP	*Orange County Coastal Regional Sediment Management Plan*
OC Parks	County of Orange Parks Department
OCCOG	Orange County Council of Governments
OCMPAC	Orange County Marine Protected Area Council
OCTA	Orange County Transportation Authority
OPC	California Ocean Protection Council
PED	planning, engineering, and design
Proposition 68	California Drought, Water, Parks, Climate, Coastal Protection and Outdoor Access for All Act of 2018
RBSP	Regional Beach Sand Project
SANDAG	San Diego Association of Governments
SCAG	Southern California Association of Governments
SLR	sea level rise
SOCIRWM	South Orange County Integrated Regional Water Management
State Parks	California Department of Parks and Recreation

Strategic Plan	*South Orange County Regional Coastal Resilience Strategic Plan*
TBD	to be determined
TOT	transient occupancy tax
UCI	University of California, Irvine
USACE	U.S. Army Corps of Engineers

Executive Summary

This *South Orange County Regional Coastal Resilience Strategic Plan* (Strategic Plan) has been developed to support the formation of a regional, multijurisdictional, multiagency collaborative whose mission and purpose is the implementation of a regional coastal resiliency program focused on public beach restoration through comprehensive and coordinated efforts.

The fundamental goal of this Strategic Plan is to build coastal resiliency capacity in the region by reducing current and future risks from coastal erosion hazards along a 10-mile stretch of shoreline from Dana Point Harbor in the north to San Clemente in the south, as shown in Figure ES-1. This Strategic Plan is intended to provide decisionmakers and other vital stakeholders the blueprint and foundation on which to advance regional coastal resiliency goals in a comprehensive, coordinated, and collaborative manner in South Orange County, California, for the benefit of the people, economy, and environment.

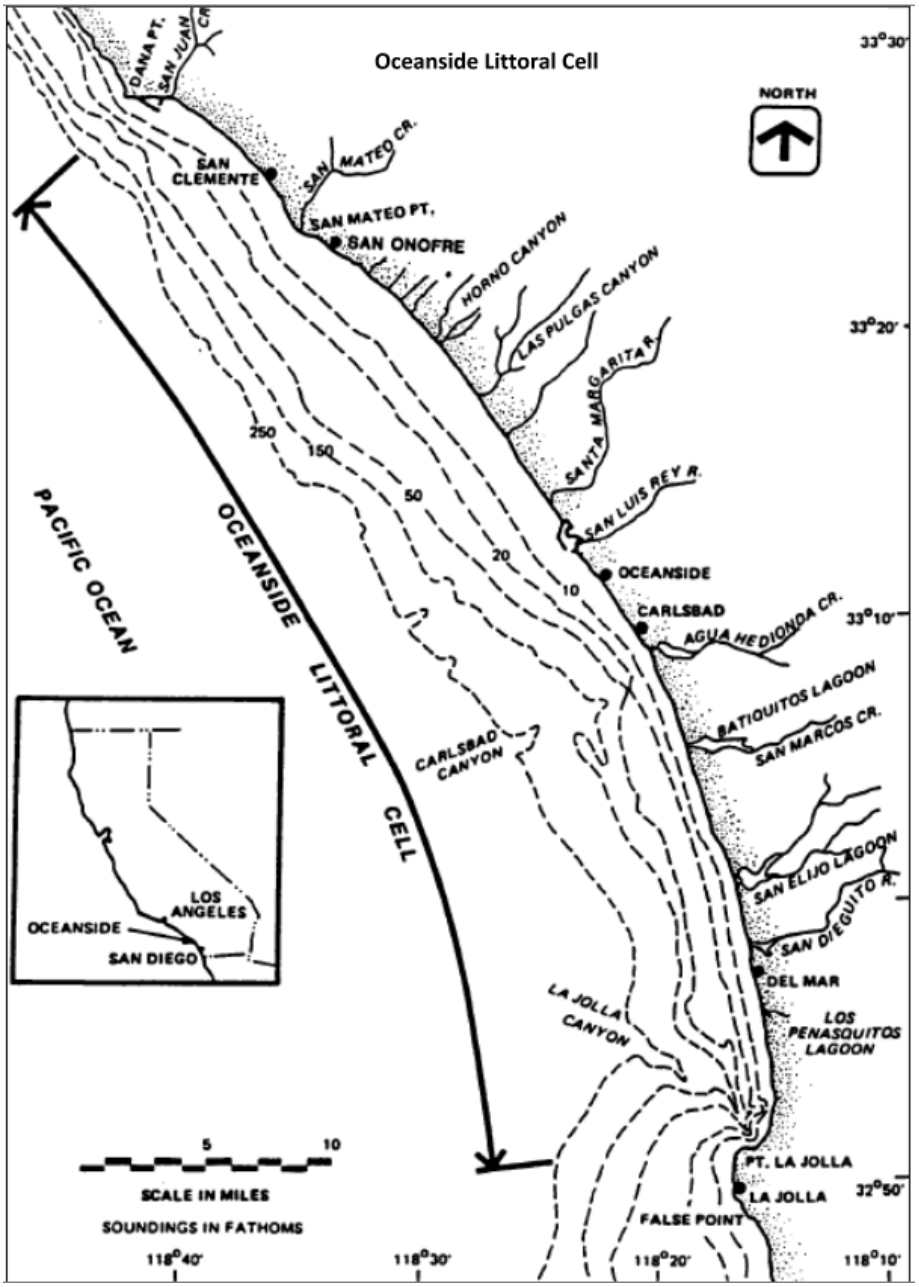
The overarching mission of a regional collaborative would be to serve the residents, visitors, businesses, and greater community interests through consolidated planning, permitting, funding, construction, monitoring, and operations and maintenance for coastal resiliency projects in South Orange County. The vision of the regional collaborative effort would be to actively pursue locally appropriate solutions to produce a more resilient coastline from Dana Point Harbor to San Clemente in an equitable, environmentally, socially, and fiscally responsible manner.

Figure ES-1
South Orange County Coastline

1 Introduction

The South Orange County coastline (the area between Dana Point and the southern county line) geographically falls within the Oceanside Littoral Cell illustrated in Figure 1-1. Sediment transport within this littoral cell, bounded by the shoreline headlands at Dana Point Harbor and the La Jolla/Scripps Canyon at the south end, provides a framework for analyzing erosion and accretion.

Figure 1-1
Oceanside Littoral Cell

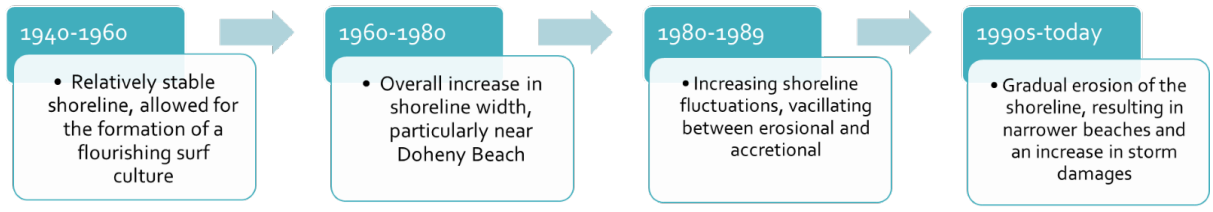


The South Orange County coastline is experiencing chronic, protracted regionwide beach erosion due to a significant regional sediment deficit largely attributable to lack of sand reaching the beach from the San Juan Creek, which has historically been the main source of sediment nourishing this region's beaches. The result has been the gradual narrowing of the beaches and an increase in storm wave damage to critical public infrastructure and public facilities along the South Orange County coastline.

1.1 Historical Shoreline Trends

A U.S. Army Corps of Engineers (USACE) study of shoreline changes in the Oceanside Littoral Cell suggests that from 1940 to 1960, the shoreline was relatively stable (USACE 1991). Shoreline changes between 1960 and 1980 showed an overall increase in the width of the shoreline, particularly in the area of Doheny State Beach. In the following decade, the shoreline fluctuations increased and vacillated in the alongshore direction between erosional and accretional. Overall, the shoreline changes from 1980 to 1989 indicated an eroding shoreline downcoast of Dana Point Harbor (USACE 1991). Since the 1990s, there has been a gradual erosion of the shoreline, resulting in narrower beaches and an increase in storm damage along the South Orange County coastline. A summary of these beach width trends is summarized in Figure 1-2.

Figure 1-2
Beach Width Trends from 1940 to Today



1.2 Urbanization Caused Sediment Deficit

Significant development in South Orange County and beyond resulted in the channelization of waterways for flood control, which disrupted the natural flow of sediment supply from creeks and rivers and essentially halted delivery of these sediments to the beach. The urbanization of watersheds, flood-control infrastructure (e.g., dams, reservoirs, detention basin, and channelization

and hardening of riverbanks) and sand mining has trapped a significant portion of the fluvial (riverine) sediment in the upper watershed, resulting in an overall reduction in the sand supply reaching the South Orange County coastline (USACE 1991, 2013). The now highly reduced sand supply is delivered to the coastline primarily during flood events. During drought conditions, the overall lack of sand in the littoral system is further exacerbated with almost no fluvial sand supply delivered to the coast to nourish the beaches.

Although the long-term net transport in South Orange County is to the south, variations in the wave climate, particularly from storm events, will move sand upcoast and downcoast, as well as onshore and offshore from beaches. The culmination of these factors has resulted in background levels of mild, long-term beach erosion along the entire South Orange County coastline. This regionwide beach erosion is evidenced by fluctuations in the sandy beach area, ranging from relatively narrow beaches during high wave energy and drought years to relatively wider beach during low wave energy and wet years.

Although several large-scale beach nourishment projects were conducted between 1964 and 1980 to place sand from coastal construction projects and upland sources in the vicinity of Doheny State Beach, the effectiveness has diminished over time in the absence of ongoing maintenance or coastal structures to keep the sand in place.

At first, this sand replenishment kept nearby beaches at a stable width. But over time, this sand supply has languished, particularly in recent decades, and now it is clear that an active beach sand replenishment program is required to restore the public beaches in the region.

1.3 Regionwide Beach Erosion

South Orange County is susceptible to coastal storm wave damage to public facilities, beach amenities, critical public infrastructure and existing structures along the coastline. By the early 2000s, beaches in South Orange County began to suffer major erosion during storms and diminished sediment flow from rivers and creeks due to drought, resulting in losses in beach width. Some recent examples of this ongoing coastal erosion include the following:

- **Capistrano Beach and Doheny State Beach:** Storm wave damage in 2018 undermined and collapsed parking lots, bike paths, and recreational facilities. Storms in 2018 damaged portions of a basketball court, a boardwalk, fire pits, and a restroom building at Capistrano Beach Park, all of which have been removed. In 2020, riprap and sand cubes (geotextile bags filled with sand) were placed.
- **San Clemente Municipal Pier**: Between 2023 and 2024, repeated storm waves have damaged the structure, requiring minor repairs. The west end of the pier was replaced in 1982 following that season's El Niño storm events.

- **Los Angeles to San Diego Railroad:** In 2020, wave damage occurred at several locations, particularly in San Clemente, where riprap has been placed in an emergency condition to maintain the important flow of passengers, freight, and security through this area.
- **City of San Clemente:** In 2022 to 2024, activation of ancient landslides has been attributed to the lack of sand supply, which has historically served as ballast on the west side of the railroad alignment to protect landside structures. Landslides at the Casa Romantica and Mariposa Bridge areas have further placed the rail infrastructure along the coastline in danger from erosion.
- **Oceanfront Residential Communities**: The existing structures within the Capistrano Bay District and Capistrano Shores communities and the railroad tracks are exposed to direct wave attack.

Beach erosion in South Orange County has historically been addressed on an ad hoc, individual, and largely emergency basis with agencies and individuals implementing projects on an as-needed, reactive basis. Factors such as El Niño, coastal erosion, land subsidence, sea level rise (SLR), and storm intensity contribute to this regionwide state of change that has become more readily apparent in the shoreline monitoring data for the South Orange County coastline. Following the ongoing storm damage and coastal erosion noted previously, public agencies are now actively collaborating to reduce risks and advance coastal resiliency in the region.

1.4 Benefits of Beaches

Beaches serve as a natural buffer that protects existing structures along the coastline from direct wave action. Beach erosion adversely affects coastal public access, including a reduction in recreational beach areas available to the public and an increase in the damaging effects of storm waves to coastal communities, existing structures, and public facilities.

Beaches are essential to the culture of southern California, serving as the epicenter of the surf culture that formed in the 1950s and 1960s and as an essential draw for tourism.

Orange County, California, is the fourth-most-visited area in the United States and the most-visited area in California. The region attracted 48.2 million visitors, who generated $11.6 billion, in 2016. Orange County has one of the most diverse and powerful economies in the United States, and one of its three largest employment sectors is tourism. Besides tourism, beaches serve as a primary source of regional recreation and open space for the residents, serving not only coastal cities but also inland cities and counties. Beach visits are a key no-cost and low-cost visitor-serving land use.

In simple terms, an increase in beach width contributes to an increase in the recreational value of a visit to the beach for both visitors and residents and, in turn, contributes to an increase in beach attendance and economic benefits to the community as a whole.

1.5 Efforts Toward Coastal Resiliency

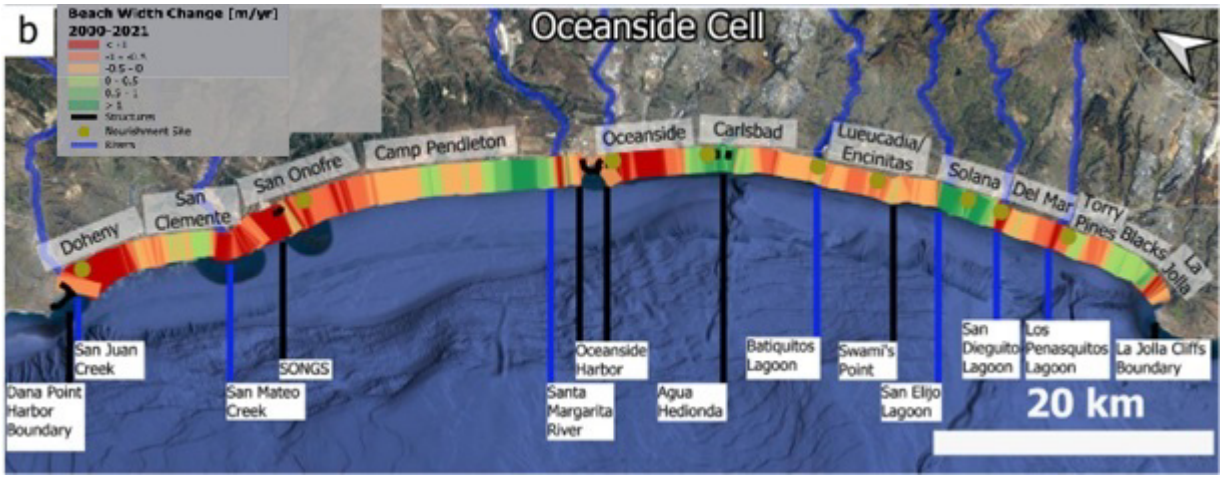
To avoid the need to respond to emergency conditions, public agencies in South Orange County appear ready to proactively address coastal erosion in a coordinated and collaborative manner. With the urbanization of the land, agencies and interested parties remain responsible for improving the function of our urban systems, rerouting the natural flow of sediment, and planning together for ongoing coastal resiliency. Coastal erosion knows no political or agency boundaries. Thus, ongoing collaboration is essential to working toward the development of regional solutions.

Here are some ways that coastal management agencies have already begun to collaborate in the South Orange County region:

- **Beneficial Sand Reuse:**
  - The County of Orange Parks Department (OC Parks) and California Department of Parks and Recreation (State Parks) placed 45,000 cubic yards (cy) of sand from flood control maintenance activities in the Santa Ana River for the beneficial reuse of sand at Capistrano Beach and Doheny State Beach.
  - USACE is planning to repair the breakwater at Dana Point Harbor and is arranging for the beneficial use of this sediment removed to be placed in the nearshore environment off Doheny State Beach.
- **Sand Nourishment:**
  - The County of Orange, the City of San Clemente, and the City of Dana Point are partnering with the San Diego Association of Governments (SANDAG) Shoreline Preservation Working Group, contribute to feasibility studies for this Regional Beach Sand Project III, benefiting the beach cities within the Oceanside Littoral Cell.
  - USACE and the City of San Clemente are working toward the placement of 250,000 cy of sand in San Clemente in 2024. This is a 50-year project that will repeat every 6 years.
- **Sand Retention and Nature-Based Projects:**
  - OC Parks and State Parks are pursuing grant funding to construct a nature-based shoreline adaptation project (living shoreline) composed of a vegetated sand dune overlying buried cobble to span the northern reach of Capistrano Beach and southern portions of Doheny State Beach for a total length of 1,150 linear feet.
  - The City of San Clemente is working on draft Nature-Based Sand Retention Concepts Study to address short-term and long-term coastal erosion by bringing sand to the City of San Clemente and developing ways of keeping the sand on its beaches.
- **Research and Monitoring**:
  - Several academic institutions are continuing to study and monitor the flow of sand within the Oceanside Littoral Cell to better understand the more nuanced flows of sediment:

– The University of California, Irvine (UCI), is analyzing satellite and drone monitoring and recently published "Characterizing Longshore Transport Potential and Divergence of Drift to Inform Beach Loss Trends" (Kahl et al. 2024). UCI's research uses aerial imagery to measure shoreline changes from CoastSat, a tool that uses satellite imagery (from 1984 to the present) to determine shoreline positions over time. For example, the data indicate an average shoreline change of 1.8 feet per year between Doheny State Beach to Capistrano Bay District. A simplified graphic showing the beach width changes between 2000 and 2021 is presented as Figure 1-3.

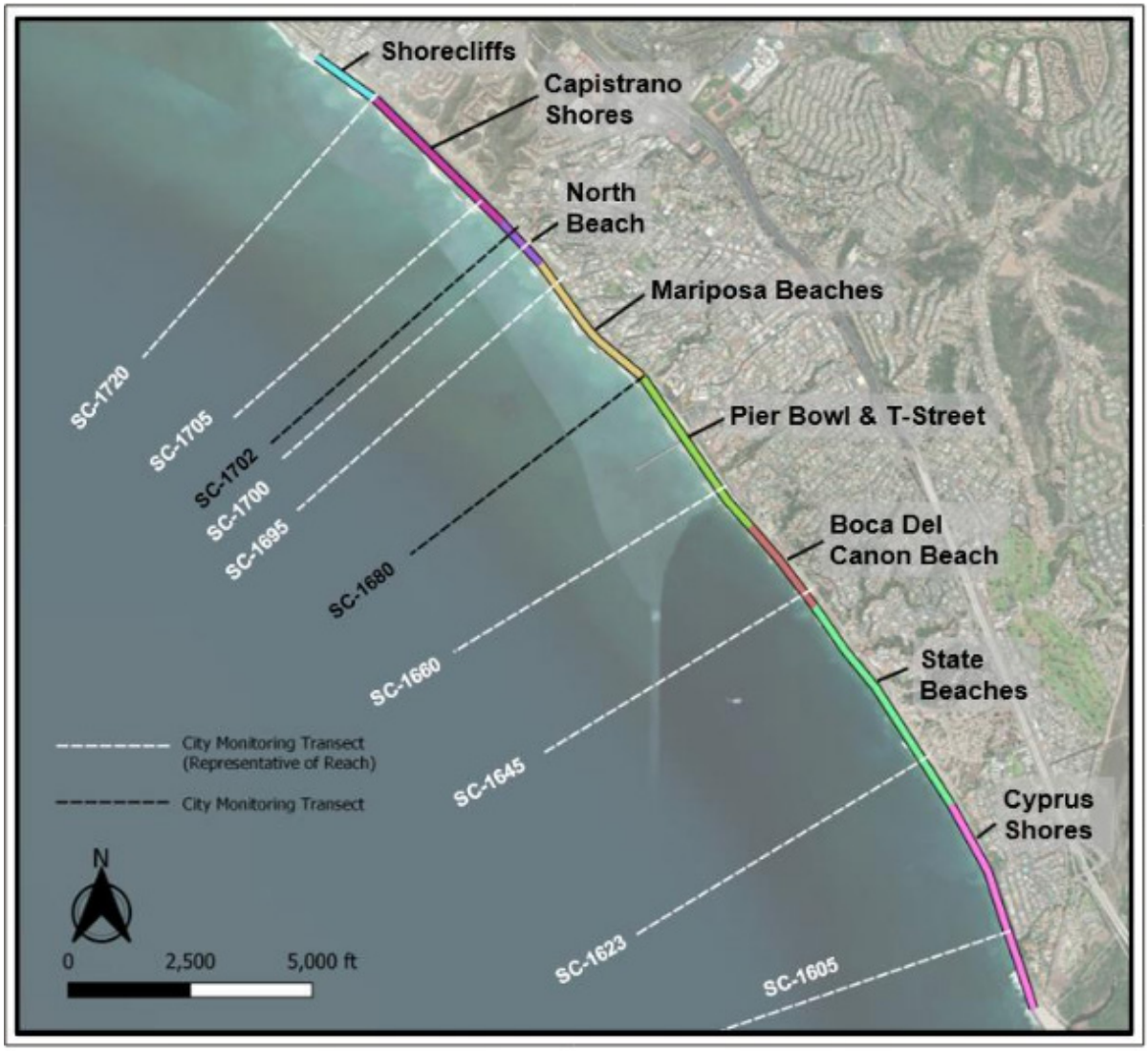
Figure 1-3
Satellite-Derived Beach Width Trends



Satellite-derived beach width trends analyzed by UCI and calculated between 2000-2021 for individual transects in the Oceanside Littoral Cell are colored in shades of green for growing and red for eroding

a. In September 2022, the City of San Clemente formally re-established a local shoreline monitoring program. The primary goal of the program is to build a database of information on shoreline changes in San Clemente and vicinity, thereby providing a basis for evaluating effects of sea level and El Niño conditions as well as beach sand replenishment projects. The data will be used to develop a comprehensive understanding of seasonal, annual, and long-term coastal changes in the region. The City of San Clemente's consultant, Coastal Frontiers, is conducting more traditional transect monitoring (back of the beach to the depth of closure) benefiting the City of San Clemente and adjacent areas. The transects are depicted in Figure 1-4.

Figure 1-4
San Clemente Shoreline Reaches and Transect Locations



Source: Coastal Frontiers Corporation, 2023

b. Partnerships with other academic organizations such as UCSD/Scripps Institution of Oceanography, which has studied San Diego County portions of the Oceanside Littoral Cell extensively, may also help to paint a fuller picture of the movement of sand throughout the littoral cell.

1.6 Formalizing Partnerships

The County of Orange (County) secured grant funding from the California Ocean Protection Council (OPC) to develop this *South Orange County Regional Coastal Resilience Strategic Plan* (Strategic Plan).

The Strategic Plan is intended to guide the formation of a regional collaborative, the mission and purpose of which would be to implement a program focused on beach restoration.

The next step in the effort toward advancing coastal resiliency is to formalize the agency relationships, responsibilities, and partnerships that have been formed through the development of these initial coastal resiliency projects. In creating a collaborative, these agencies can come together to implement projects that will benefit the coast at a regional scale.

1.7 Purpose, Goals, and Objectives

The primary purpose of this Strategic Plan is to establish a new regional collaborative to promote long-term coastal resiliency in South Orange County. The Strategic Plan was developed through a stakeholder-driven process and builds upon existing, localized coastal resiliency projects already being pursued by stakeholders. A key outcome of the Strategic Plan is to help facilitate larger, regional-scaled, sustainable coastal resiliency programs and projects. The Strategic Plan was guided by a focus on the following outcomes:

- Meet the deliverables of the California Drought, Water, Parks, Climate, Coastal Protection and Outdoor Access for All Act of 2018 (Proposition 68) grant work plan of OPC, which is organized under the California Natural Resources Agency.
- Address chronically eroding shorelines through regional shoreline management planning and project implementation in South Orange County.
- Assess, prioritize, and advance coastal resiliency projects in the region to deliver resources to areas identified as being most in need.
- Provide a formal platform for agencies to regularly coordinate and discuss coastal resiliency efforts.

The goals of the Strategic Plan were supported by the following objectives:

- Initiate public outreach to educate/inform stakeholders of the Strategic Plan purpose and objectives.
- Identify existing and planned coastal resiliency projects in South Orange County.
- Engage stakeholders to obtain their input regarding Strategic Plan priorities and outcomes.
- Develop a Strategic Plan
  - Elements would include a review and analysis of regional projects and programs, collaborative agreements, governance structures, and funding mechanisms.
  - The plan would be specific to, and focused on, South Orange County beaches and shoreline.
  - The plan would be technically, economically, and environmentally feasible.
  - The plan would be beneficial for coastal resources including public access.

  - The plan would advance equity and inclusivity of disadvantaged and severely disadvantaged communities.
  - The plan would consider regulatory requirements, costs, and benefits for the South Orange County regional community
- Integrate SLR projections into Strategic Plan development.

1.8 Benefits of a Regional Collaborative

A regional collaborative is a multijurisdictional collaborative the mission and purpose of which is the implementation of a regional coastal resiliency program. A regional collaborative approach provides a greater chance of achieving coastal resiliency success in the long term because it would achieve the following important public benefits:

- Close the southern California geographic gap in coastal resiliency collaborative governance structures (i.e., the SANDAG Shoreline Preservation Working Group to the south and the Los Angeles County Department of Beaches and Harbors and the Beach Erosion Authority for Clean Oceans and Nourishment [BEACON] to the north).
- Provide a formal platform for agencies to regularly discuss and coordinate coastal resiliency efforts to strategically deliver resources to areas most in need and where best suited to support the coastal ecosystem.
- Address chronic erosion of beaches through regional planning and management by providing regional leadership with enhanced opportunities and mechanisms for coordination and collaboration to solve mutual problems.
- Coordinate efforts to support natural processes and manage sediment based on resource behavior and functions rather than parcel boundaries.
- Reduce obstacles faced by stakeholders in implementing SLR adaptation measures by providing the leadership and coordination needed for regional solutions.
- Increase opportunities for, and enhance engagement with, private organizations, underserved communities, local Tribes, and other underrepresented communities.
- Take advantage of funding and grant opportunities and avoid having agencies compete for the same scarce public dollars.
- Expedite implementation of resiliency projects in a more efficient and fiscally responsible manner by reducing duplicative and/or redundant efforts.
- Increase cost savings by streamlining environmental review and regulatory compliance efforts for conducting technical studies and obtaining regulatory agency permits/approvals.
- Advance state, regional, and local coastal resilience adaptation objectives planning for rising seas through 2050 and beyond.

2 Overview of Strategic Plan Elements

OC Parks staff helped facilitate regional coordination and collaboration with a wide-ranging and diverse group of stakeholders, managed Strategic Plan development, and served as one of the key stakeholders. The Strategic Plan contains the following elements:

- **Stakeholder Engagement**: A stakeholder engagement process was developed to provide input regarding priorities and preferences on regional solutions for the South Orange County coastline, examples of cooperative agreements, governance structures, and consideration of a wide variety of funding method. This input was then used to develop this Strategic Plan.
- **Regional Collaborative Structure Analysis:** The regional collaborative could be formed with a new, special-purpose agency or a dedicated working group. The collaborative structure would ideally include a vision statement and work plan that outlines the roles, functions, goals and outcomes reflecting agreement/concurrence among potential agencies or entities with the appropriate jurisdictional authorities to implement the Strategic Plan.
- **Funding Approaches:** Potential funding sources would be identified for the implementation of Strategic Plan elements, including coastal resiliency project implementation.
- **Regional Collaborative Beach Nourishment Program:** Prioritize coastal resiliency projects to address beach erosion and restore the region's public beaches.
- **Green-Gray Nature-Based Approaches:** Explore longer-term projects to address beach erosion and restore the region's public beaches while co-benefitting the ecosystem.
- **Potential Regulatory Requirements:** Environmental review and regulatory compliance requirements associated with regional coastal resiliency projects or programs would be aimed at addressing beach erosion.
- **Economic Analysis: Costs and Benefits:** A range of costs for implementing a regional beach nourishment program would be based on similar projects that have been completed or are planned to be implemented in 2023 and 2024
- **Next Steps for Strategic Plan Implementation:** Next steps for regional collaborative and project implementation will be delineated.

2.1 Incorporated by Reference

In developing this Strategic Plan, several technical documents were prepared to support the conclusion derived in this document, or as otherwise required as a component of the OPC grant. This includes the following:

- Appendix A: Information Regarding December 2021 Meeting
- Appendix B: Information Regarding March 2022 Meeting
- Appendix C: Information Regarding July 2022 Meeting
- Appendix D: Regional Coastal Resiliency Options
- Appendix E: Governance Structure Approaches

- Appendix F: Historical Shoreline Data and Trends
- Appendix G: Ongoing and Anticipated Projects
- Appendix H: Sea Level Rise Analysis
- Appendix I: Potential Sand Sources
- Appendix J: Funding Approaches
- Appendix K: Economic Analysis
- Appendix L: Recreational Opportunities

3 Alignment with Other Relevant and Applicable Plans

This Strategic Plan was funded in part by a grant from the OPC Proposition 68 Chapter 10 Grant Program (Grant Agreement No. C0875009), which funds projects for advancing statewide coastal resilience through implementation, planning and design, adaptation planning and coordination, and research. The purpose, goals, and objectives of this Strategic Plan are in alignment with both the OPC's Strategic Plan (OPC 2020) and Proposition 68. The primary goals of OPC's Strategic Plan are to safeguard coastal and marine ecosystems and communities in the face of climate change and to build resiliency to SLR, coastal storms, erosion, and flooding. In alignment with Proposition 68's priorities, the Strategic Plan endeavors to lay a path for the establishment of an organization tasked with minimizing the detrimental effects of climate change by innovatively monitoring and progressively improving the long-term protection and conservation of ocean resources in California.

3.1 Orange County Coastal Regional Sediment Management Plan

Development of this Strategic Plan is also in alignment with the *Orange County Coastal Regional Sediment Management Plan* (OC CRSMP; USACE 2013), which was developed collaboratively by the County and California Coastal Sediment Management Workgroup (CCSMW) to address coastal erosion along the Orange County coastline. USACE and the California Natural Resources Agency co-chair the CCSMW, which includes federal, state, regional, and local agencies as participating members.

In the OC CRSMP, a regional sediment management approach was used to emphasize the importance of pursuing regional-level solutions to sediment management issues because they have implications beyond jurisdictional lines. The OC CRSMP addresses unique physical, environmental, ecological, and socioeconomic conditions in the South Orange County region.

Recommendations identified in the OC CRSMP included the following: 1) initiate outreach and education; 2) develop a governance structure; and 3) continue beach nourishment projects. As a continuation of the OC CRSMP, this Strategic Plan was developed as a stakeholder-driven plan to focus on regional solutions to address beach erosion in South Orange County as first contemplated in the OC CRSMP.

3.2 Local Sea Level Rise Vulnerability Assessments and Adaptation Plans

This Strategic Plan is also consistent with the SLR vulnerability assessments and adaptation plans for the Cities of Dana Point and San Clemente. Both cities' SLR adaptation measures recommend participating in a regional beach nourishment program to increase overall efficiency and cost-effectiveness of implementation. Importantly, the Strategic Plan recommends moving forward with coastal resiliency measures endorsed by the California Coastal Commission (CCC) in their 2021 *"Nature-Based Adaptation Strategies*" memorandum (CCC 2021), which encourage green or soft solutions such as regional beach nourishment programs.

4 Stakeholder Engagement Overview

Consistent with the OC CRSMP (USACE 2013), the County solicited stakeholder input through printed and interactive surveys online as well as at three in-person meetings held in 2021 and 2022 in developing this Strategic Plan.

The region impacted by the widespread coastal erosion, rests on the ancestral lands of the Juaneño (Acjachemen) Tribe of Native American Indians, Luiseño Tribe of Native American Indians, Kumeyaay Tribe of Native American Indians, and Tongva Tribe of Native American Indians, Rincon, Pala, Pechanga, and Kizh near the Pange and Toovunga village sites. The County acknowledges the people that lived on these coastal lands for generations prior to widespread development. The County continues to seek to work in partnership with Tribal members to create an inclusive platform for everyone dedicated to the protection of our natural cultural resources. To ensure the continued and rightful involvement of these Tribes, the County initiated communication with Tribal representatives and solicited comments on this Strategic Plan. A summary of outreach to Tribal representatives is included in Appendix C.

The comprehensive listing of agencies, entities, and organizations that participated in the stakeholder engagement process is as follows:

- Federal agencies and elected officials
  - U.S. Representative, 49th District – Mike Levin
- Native American Tribes
  - Gabrielino-Shoshone Tribal Council
- State agencies and elected officials
  - CCC
  - California Department of Transportation
  - State Parks
  - California State Lands Commission
  - California Senate, District 36 – Pat Bates[1]
  - California 74th Assembly District – Laurie Davies
- Regional agencies and elected officials
  - County
  - Orange County Transportation Authority (OCTA)
  - Orange County 5th District Supervisors Katrina Foley and Lisa Bartlett[1]
- Local agency representatives
  - City of Dana Point
  - City of Laguna Beach

[1] Indicates elected officials no longer in office

  - City of San Clemente
- Special districts and public utilities
  - Capistrano Bay Community Services District
  - San Diego Gas & Electric
  - South Coast Water District
- Private entities
  - Capistrano Shores Management, LLC
  - Cotton's Point Estates Homeowners Association (HOA)
  - Cyprus Shore Community Association
  - Cyprus Cove HOA
  - Shorecliffs HOA
- Academic institutions and science advisors
  - UCI
- Community advisors and nongovernmental organizations (NGOs)
  - Dana Point Historical Society
  - Surfrider Foundation

4.1 Stakeholder Meetings

The stakeholder engagement process was an iterative process that occurred via several meetings as listed as follows:

- December 13, 2021, stakeholder engagement planning meeting at Cyprus Shore Community Club
- March 24, 2022, stakeholder meeting at the Orange County Sailing and Events Center
- July 6, 2022, stakeholder meeting at the Orange County Sailing and Events Center
- Spring 2024 (March 13, 2024) stakeholder meeting at the Orange County Sailing and Events Center (planned event to solicit public comment on the Draft Strategic Plan)

The first stakeholder meeting was held on December 13, 2021, to introduce the problems facing South Orange County beaches and to introduce the team leading the development of this Strategic Plan. Following the meeting, stakeholders completed a survey that described current and historical threats to each stakeholder's assets, as well as an overview of the remedial actions that are planned or have already been implemented by each stakeholder (Appendix A).

The objective of the second stakeholder engagement meeting (March 24, 2022) was to present the results of the initial survey and provide an overview of the project development process. Additionally, this meeting sought to educate meeting attendees and to solicit their input on causes of beach erosion in the region and the specific issues that each segment faces. The content presented at this meeting and a list of attendees is included as Appendix B.

The third stakeholder engagement meeting, held on July 6, 2022, was designed to solicit more detailed information about stakeholders' preferences on projects and programs, governance methods, and funding mechanisms in consideration for inclusion in the Strategic Plan. In order to garner the best information possible, stakeholders attending the meeting were presented with information on the various proposed elements of the plan and then divided into three groups: property owners and representatives, NGOs, and resource and regulatory agencies. After information on each section (projects and programs, governance methods, and funding mechanisms) was presented, the stakeholders were then instructed to indicate their support, neutrality, opposition, and endorsement of the various proposed elements. The content presented at this meeting, as well as analysis of the results of the meeting activity and a list of the attendees, are included as Appendix C and summarized in Section 4.2.

4.2 Stakeholder Input Summary

The Strategic Plan stakeholder meetings were used to obtain stakeholder input and inform the priorities and preferences articulated in this Strategic Plan. The information gained from the printed and interactive surveys was analyzed. This section summarizes stakeholder input on the following: 1) perceived current and historical threats; 2) projects and programs; 3) governance structure; and 4) funding mechanisms.

4.3 Historical, Current, and Future Hazards

Surveys distributed to stakeholders on December 13, 2021, aimed to understand the stakeholders' understanding of the threats to their property or assets and to gain an understanding of the steps that each entity had already taken to address coastal erosion. The surveys were conducted as follows:

1. Stakeholders were asked to select what they believed to be the most pertinent of the following hazards, both current and historically, and in the future:
    a. Bluff stability
    b. Beach erosion
    c. SLR
    d. Lack of sediment delivery to the coast
    e. Increased storminess

    Beach erosion and lack of sediment delivery to the coast were identified as the top current and historical hazards to the stakeholders' property or assets, whereas increasing storminess and bluff stability were identified as the least.

2. Stakeholders were asked to identify the biggest threats to the coast from among the following options:
    a. Coastal development

b. SLR
c. Reduction in sediment delivery to the coast
d. Changes in wave height, frequency, and direction

Lack of sediment delivery to the coast from San Juan Creek was identified as the top cause of current and historical hazards to the region, with all respondents choosing that option.

3. Stakeholders were also asked to identify remedial measures and construction projects planned for their area of immediate concern, with the following identified as options and another space left blank for write -in responses:
   a. Bluff stabilization
   b. Placement of riprap on emergency basis
   c. Engineered rock revetment
   d. Seawall
   e. Beach nourishment without sand retention structures
   f. Beach nourishment with sand retention structures
   g. Relocation and realignment (i.e., managed retreat)
   h. Do nothing (i.e., accept/accommodate threats)

   Stakeholders indicated that they had taken a wide range of remedial measures to address these threats, most notably placement of riprap and of relocation and realignment, both of which were identified by approximately half of the respondents.

4. Finally, stakeholders were asked to rank the obstacles to implementing the following SLR adaptation remedial measures from 1 to 6 in order of largest obstacle to smallest obstacle:
   a. Ability to obtain regulatory agency permits
   b. Ability to obtain funding
   c. Lack of leadership, coordination, and political will
   d. Availability of technical information
   e. Lack of understanding of coastal processes
   f. Lack of understanding regarding remedial measures performance

   This survey revealed the top obstacles to implementing SLR adaptation measures as ability to obtain regulatory agency permits; ability to obtain funding; and a lack of leadership, coordination, and political will.

The results of this survey showed that stakeholders in the South Orange County region are well-versed on the issues that the region faces as a whole and are willing to advocate to address specific obstacles and challenges to advance regional coastal resiliency goals. They affirmed their high level of education and engagement in coastal resilience in the region by identifying projected

SLR and reductions in coastal sediment as the top causes of future threats. The inability to protect structures and beach erosion (due to regulatory constraints and challenges) were identified as the top two future threats to the stakeholders' properties or assets, reaffirming the mission and necessity of this Strategic Plan.

Stakeholders' survey responses demonstrated that their interests firmly align with the goals of this Strategic Plan. The Strategic Plan is intended to address these obstacles and identify opportunities for regional collaboration and leadership to advance a coordinated approach to implementing coastal resiliency goals and projects in the South Orange County region.

4.4 List of Potential Regional Resiliency Projects and Programs

The following stakeholder meeting on March 21, 2022, presented survey results. Based on the stakeholder survey, beach erosion was identified as one of the top current threats to property. A range of technically feasible solutions to minimize beach erosion were presented to stakeholders to gain feedback on their preferences. In the presentation to stakeholders, each potential solution was defined and pros and cons explained. Descriptions of the potential solutions are provided in Appendix D. The following regional coastal resiliency solution options were presented to the stakeholders:

- Beach Nourishment: Placement of sand onto beaches or in nearshore areas to widen beaches
- Beach Nourishment with Retention Structures: Beach nourishment coupled with retention structures that minimize the loss of beach sand (e.g., groins, nearshore breakwaters, and multipurpose reef)
- Sand Dunes (Living Shorelines): Raised sand feature along the back of beaches that provides habitat for wildlife and protects areas behind the feature from wave action
- Cobble Beach: A beach constructed from cobbles instead of sand
- Cobble and Sand Beach: Cobble beach base with sand placement on top
- Shoreline Protection: Structures such as riprap, seawalls, revetments, breakwaters, and groins

Stakeholder input revealed that regional beach nourishment continued to be the most widely supported project type across all groups. Stakeholders also emphasized the importance of retaining recreational benefits in the region. They recognized the importance of protecting the shoreline but did not want to sacrifice sandy beaches and favored natural or natural-looking solutions. Some members of this group were more opposed to hard shoreline protection methods and options that could impact surfing, swimming, and other recreational benefits enjoyed by beachgoers.

Additionally, property owners, their representatives, and NGOs spoke to a need to apply a contextual approach to coastal erosion, applying different solutions to different beaches with different problems. Many stakeholders emphasized that their opposition to a project or program in one context does not mean they are opposed to that project or program throughout the region. For

example, stakeholders from Capistrano Bay District, where the homes are located on the sand, opposed living shorelines in that area, given the narrowness/lack of beach, but were in favor of potentially implementing the solution at other places in the region where there was more room on which to build a living shoreline system.

Due to the specificity of needs of each subregion in South Orange County, beach nourishment emerged as the sole solution that could be implemented regionwide with full stakeholder support. Thus, beach nourishment emerged as the preferred regional solution, and the Strategic Plan was developed with a focus on implementing a regional beach nourishment plan.

4.5 Governance Structures and Collaborative Agreements

The next stakeholder meeting on July 6, 2022, explored options for coordinated, regional leadership, including the lack of political will. A wide range of potential governance structures was presented to stakeholders, and a discussion format was used to gain feedback on stakeholder preferences. The following governance structures were presented to stakeholders for consideration:

- **Council of Governments:** A voluntary association of local governments that can be situated in either a metropolitan or rural area designed to promote discussion and intergovernmental cooperation among its members concerning common and regional problems and to engage in planning on a multijurisdictional basis
- **Memorandum of Agreement (MOA)/Memorandum of Understanding (MOU):** Voluntary cooperative arrangements applicable to multiple government agencies of different levels, which can be used by government agencies and private entities
- **Geologic Hazards Abatement District (GHAD):** Enables property owners to collectively mitigate geological hazards that pose a threat to their properties (California Public Resources Code 26500-26601) designed to handle long-term abatement and maintenance of real property potentially threatened by earth movement
- **Joint Powers Authority (JPA):** Entity permitted under California State Code Section 6500 including two or more government agencies that have agreed to combine their powers and resources to work on addressing and resolving common problems
- **Ad Hoc Committee:** A temporary committee established by a board of directors to address a specific issue

The most supported governance structure that emerged was the JPA. The JPA governance structure was supported by property owners and representatives, NGOs, and agencies. All groups continued to emphasize challenges with the Strategic Plan's need to address multiple entities' goals and ensure alignment. The concept of a JPA, as well as other types of governance structures and collaborative agreements, are further described in Appendix E.

Special districts and interagency meetings (similar to a less-formal ad hoc committee) were also mentioned and well-supported in discussion. However, all the indications of support for interagency meetings came from the agencies that also proposed these governance methods. Special districts were also proposed as a viable governance method by a stakeholder in the property owners' and representatives' group. Special districts were described by the group as local governments created by the people of a community to deliver a specialized service essential to that community. While this option was widely supported within the property owners' and representatives' group, upon further discussion, many members of the group decided that many of the benefits of this governance method could also be achieved by a well-organized JPA.

The most opposed governance structure was the GHAD. GHADs were opposed by all stakeholder groups and particularly vehemently by property owners and their representatives. This group was concerned about a GHAD being led by a single engineer, rather than multiple stakeholders collaborating to make decisions for the region. They also expressed concerns about a perceived failure of the Broad Beach GHAD to realize its goals in a timely and cost-efficient manner and did not want a similar outcome for this region. Agencies were also against the implementation of a GHAD and highlighted that this method would place the financial burden on property owners in the region.

4.6 Funding Mechanisms

A wide range of options for funding sources was also presented to stakeholders at the July 6, 2022, stakeholder meeting. The following funding mechanisms were presented to meeting attendees as possibilities for funding projects and programs:

- USACE Hurricane Storm Reduction Damage, Section 103
- Infrastructure Investment and Jobs Act (IIJA)
- National Oceanic and Atmospheric Administration (NOAA) grants and National Fish and Wildlife Foundation grants
- Federal Emergency Management Agency (FEMA)
- California State Coastal Conservancy
- OPC Proposition 68
- State Parks Division of Boating and Waterways (DBW)
- Impact mitigation fees
- Public-private partnership
- Loans
- State revolving funds
- Municipal, environmental impact, or resilience bonds

The Strategic Plan recognizes there are a wide range of funding mechanisms for coastal resilience projects and programs, with some more appropriate than others. The goal of presenting these

funding mechanisms to stakeholders was to learn from their experiences with each of them and, in doing so, to learn more about the pros and cons of pursuing each option.

Additional funding mechanisms were also suggested by the stakeholders. Additionally, agencies proposed further investigation into CCC's Local Coastal Program Grants and Department of Transportation's Reconnecting Communities Pilot Program as a potential source of funding.

There was widespread support for pursuing all funding mechanisms by all groups present in this meeting. Due to the differing needs of subgroups in the region, no funding mechanisms were vehemently opposed, apart from public-private partnerships. It was suggested by all groups that all other funding mechanisms remain on the table for future funding needs. It was also emphasized that the search for funding should begin with grants but not rule out the possibility of additional/increased taxes and/or fees. Agencies also suggested using the railroad as a possible nexus for obtaining federal funds, specifically from the IIJA. Overall, stakeholders supported a variety of funding options, prioritizing grants but leaving the door open for other funding opportunities, as discussed in Appendix C.

5 Collaborative Structure Analysis

A fundamental goal of this Strategic Plan is the selection of the preferred governance structure to ensure coordinated, regional, coastal resiliency collaboration. The governance structure will reflect the coordinated implementation approach through which the appropriate jurisdictional authorities can solicit feedback as projects are advanced toward implementation. A governance structure provides the mechanism for the Strategic Plan to be updated as a living document, including recommendations for interpretations, updates, and specific projects and programs.

5.1 Stakeholder Input on Collaborative Structure

Development of this Strategic Plan has been largely driven by stakeholder input and feedback. When presented with potential governance structures for facilitating regional collaboration on coastal resiliency goals, most participating stakeholders preferred a collaborative framework in which the public agencies and other stakeholders in the region coordinate their efforts to promote a unified and comprehensive coastal resiliency program that spans the shoreline from Dana Point Harbor to the southern Orange County line.

The advantages/pros and disadvantages/cons of several types of governance structure originally considered in the stakeholder meeting on July 6, 2022, are outlined in Table 5-1.

Table 5-1
Pros and Cons of Various Governance Structures

Governance Structure	Description	Advantages/Pros	Disadvantages/Cons
Ad hoc committee	A temporary committee established by a board of directors to address a specific issue	• Facilitates focused approach • Easy to organize • Can facilitate standing committee formation • Example: Carteret County, North Carolina, used it to organize four towns to secure federal, state, and county funding	• Temporary so not well-suited for addressing recurring issues and significant long-term issues • Single committee focus • Nothing compelling the group to function or outlining responsibilities • Limited by committee mission, funding, and staff
Council of Governments	Voluntary association of local governments designed to promote discussion and intergovernmental cooperation among its members concerning common and regional problems and to engage in planning on a multijurisdictional basis	• Provides an arena in which elected officials and agency staff can meet and discuss regional issues • Facilitates horizontal cooperation on regional issues • Facilitates vertical cooperation with local, state, and federal government	• SCAG and the Orange County Council of Governments Technical Advisory Committee currently form the Council of Governments for Orange County, so creating another Council of Governments could be perceived as redundant. • Existing agencies are typically focused on housing and traffic topics versus coastal needs, which have a more limited direct impact on the region. • Community involvement is typically restricted to local agencies.

Governance Structure	Description	Advantages/Pros	Disadvantages/Cons
GHAD	State agency formed by local communities to provide prevention, rapid response, and funding to address hazardous geologic conditions. Enables property owners to collectively mitigate geological hazards that pose a threat to their properties. It is designed to handle long-term abatement and maintenance of real property potentially threatened by earth movement.	• Facilitates local approaches • Treated as a new state agency • Can be tailored to specific issues • Can enter contracts • Can issue bonds • May obtain funding • Can levy and collect assessments • May condemn or acquire property • Can construct improvements • Can maintain improvements	• Perceived failure of prior GHAD to realize its goals in a timely and cost-efficient manner • Not easy to dissolve • Only need majority vote to expand • Financed via supplemental tax assessments • Can levy and collect assessments • May condemn or acquire property • Led by a single engineer, rather than multiple collaborating stakeholders • Would place the financial burden on property owners in the region
JPA	1. Two or more public agencies contracted to jointly exercise powers common to all members **or** 2. Two or more public agencies to form a separate legal entity; this new entity has independent legal rights, including the ability to enter contracts and hold property	• May be easier to fund and implement projects • Facilitates regional approaches • Can be tailored to specific issues • Can enter contracts • Can hire dedicated staff • Can be renewed continuously • Nonpublic entities can participate in an advisory capacity.	• All members must approve formation. • Can be difficult to fund • Capabilities limited to union of member agencies. • Typically requires majority vote
MOA/MOU	Voluntary cooperative arrangements applicable to multiple government agencies of different levels. They can be used by government agencies and private entities.	• May be easier to fund and implement projects • Long-term history of use • Relatively easy to implement • Can be done administratively • Can be limited by duration	• Contracts run by parties • Funding via participating parties • Staffed by participating parties • Flexibility limited by MOA/MOU.

5.2 Overview of Alternative Approaches to Promote Regional Collaboration and Governance

Any governance structure selected would require consideration and discussion among stakeholders. This Strategic Plan lays out one recommendation and five alternative approaches for regional collaboration and coordination:

- Recommended Action: South Orange County Beach Coalition formed through MOA/MOU Approach
- Alternative 1: BEACON-Style Approach (JPA)
- Alternative 2: Local Collaborative (ad hoc or other informal group)
- Alternative 3: USACE-Centered Approach
- Alternative 4: Consultant- or Nonprofit-Led Approach
- Alternative 5: Individual Agency Approach

In the formulation of these alternatives, a GHAD governance structure was not considered because it was opposed by most stakeholders. Council of Governments were also excluded from the list of alternatives because creating another Council of Governments could be perceived as redundant.

5.3 Recommended Action: South Orange County Beach Coalition Formed Through MOA/MOU

The South Orange County Beach Coalition would be a multimember Agency Cooperative Agreement, including, but not limited to, ownership agencies such as the County of Orange, State of California, Cities of Dana Point and San Clemente, OCTA, and other members such as Capistrano Bay District and other special districts, public utilities, Tribal councils, HOAs, and federal and state elected representatives. Additionally, nonvoting members could be included as Community Advisors. To expedite formation and execution of the South Orange County Beach Coalition, subject to the Board of Supervisors' approval, it is envisioned that the County of Orange would serve as the lead agency, offering necessary support including County staff and initial financial resources.

The Executive Committee of the South Orange County Beach Coalition would include public ownership agencies.

The South Orange County Integrated Regional Water Management (SOCIRWM) area is an example of an MOA/MOU that represents a diverse group of stakeholders engaged in integrating water resource planning across multiple sectors, including, but not limited to, jurisdictions; water, wastewater, and groundwater agencies; environmental nonprofits; NGOs; academic institutions; transportation entities; and local residents. The SOCIRWM group has worked collaboratively for more than a decade, representing one of the longest-running recognized Integrated Regional Watershed

Management Group Regions in the state. A 22-member Agency Cooperative Agreement provides the requisite governance structure for the region.

Another example of a MOA/MOU, the Orange County Marine Protected Area Council (OCMPAC) is the state's oldest Marine Protected Area (MPA) Collaborative, started in 1999. OCMPAC is a collaboration of city and county officials, institutional representatives, environmental advocates, academic faculty, and nonprofit organization members. The OCMPAC currently has five dedicated staff members and a membership list of more than 40 participating representatives. OCMPAC seeks to provide beach visitors with consistent MPA-related information throughout the county. For nearly two decades, the organization has accomplished this by developing regional interpretive signage and regional brochures and holding annual docent trainings. OCMPAC's accomplishments also include countywide signage, enforcement trainings, education programs, research and monitoring, and teacher workshops.

This Recommended Action builds on the efforts started in the 2014 OC CRSMP, which recommended further collaborative discussions amongst the many local and regional agencies to consider entering into an MOA/MOU. A draft MOU/MOA is included in Attachment 1 of Appendix E, and is intended to serve as a reference point for developing the relationships, roles and responsibilities to best support Strategic Plan implementation.

5.4 Alternative 1: BEACON-Style Collaborative Approach (JPA)

BEACON is a California JPA established in 1986 to address coastal erosion, beach nourishment, and clean oceans within the Central California Coast from Point Conception to Point Mugu. The member agencies of BEACON include the Counties of Santa Barbara and Ventura, as well as the coastal cities of Santa Barbara, Goleta, Carpinteria, Ventura, Oxnard, and Port Hueneme. The BEACON board is made up of two supervisors from each county and one councilperson from each coastal city for a total of 10 board members.

5.5 Alternative 2: Local Collaborative Approach (Ad Hoc or Other Informal Group)

Under this alternative, a local collaborative would facilitate regional shoreline management, promote coastal resiliency projects, and obtain funding to implement this Strategic Plan. The collaborative would have strong support from the cities, OCTA, the County, and State Parks as other public agencies with land-management responsibilities in the South Orange County region. All participating entities would cost share in various efforts according to the shoreline mileage owned/managed by the entity relative to the volume of sand to be placed for a project. This approach could choose to utilize an MOA or MOU to formalize the interagency relationships, roles, expectations, and responsibilities to implement projects. Alternatively, a less-formal approach would provide agencies

with a forum to discuss topics, and project funding would be sought through the existing agency framework.

5.6 Alternative 3: USACE-Centered Approach

Under this alternative, the County and cities would formally request the assistance of the USACE, Los Angeles District to reduce coastal storm damage and erosion in the South Orange County region. If USACE determines there is a federal interest in developing a project in South Orange County from Dana Point Harbor south of the county line, USACE would be the federal sponsor, and the County, State Parks, and cities would be the local sponsors.

If USACE agrees to initiate a feasibility study, the preparation of the study would be cost shared with those participants wishing to enter into an agreement. A regional beach nourishment project could be similar in nature to the San Clemente USACE project, which will place sand beginning in late 2023 for a 50-year federal participation period through 2073.

USACE has several Continuing Authorities Programs (CAPs) that may be appropriate to meet the needs of the region, including the following:

- CAP 103 Beach Erosion and Storm Damage Reduction
- CAP 111 Shore Damage Mitigation Caused by Federal Navigation Projects
- CAP 204 Beneficial Uses of Dredged Material

5.7 Alternative 4: Consultant- or Nonprofit-Led Approach

Under this alternative, a consultant or nonprofit organization is retained by the County and the cities (and possibly others) to lead the effort to promote regional dialogue and the development of coastal resiliency projects. The consultant or nonprofit entity would take the leadership role in facilitating communications between the stakeholders, ultimately leading to the implementation of the recommendations and suggested next steps of this Strategic Plan.

5.8 Alternative 5: Individual Agency Approach

This alternative assumes that no regional entity is formed. Under this alternative, the County, cities, OCTA, and others (including private entities) continue to independently plan and construct their own coastal resiliency/shoreline protection projects on an as-needed project-by-project or emergency basis.

Under this alternative, there is no comprehensive SLR adaptation or coastal resiliency strategy implemented for South Orange County. Individual projects continue to be pursued, permitted, funded, and constructed by the individual stakeholders in the South Orange County region.

5.9 Desire for a Regional Collaborative Structure

Development of this Strategic Plan has been largely a stakeholder-driven process. This Strategic Plan builds on the efforts started by the OC CRSMP (USACE 2013) and recommends further collaboration among the local and regional agencies leading to cooperative agreements that facilitate coastal resiliency projects. Based on stakeholder input and recommendations during its multiyear coastal resiliency strategic planning effort, there is agency support to form a special-purpose collaborative to facilitate resource sharing for mutual support on the common problem of coastal erosion and to develop actions and goals.

A collaborative structure provides a framework for the Strategic Plan to be used, including for implementation of projects. This Strategic Plan is intended to serve as the catalyst for coastal resiliency project implementation in South Orange County. A collaborative structure through an existing or new entity provides for input from federal, state, regional, and local entities, as well as from citizens. A collaborative provides a platform to increase opportunities and enhance engagement with a wider range of stakeholders including the following:

- Local Tribes
- Private entities (e.g., HOAs)
- Academic institutions
- NGOs
- Other underserved or underrepresented communities

Formation of a cooperative agreement enables the region to capitalize on the momentum of this Strategic Plan process and numerous funding opportunities available. A comprehensive listing of potential member entities and organizations of the collaborative group is provided in Appendix E. At minimum, member agencies (i.e., voting member) such as the County, City of Dana Point, City of San Clemente, OCTA, and State Parks will need to be a part of the collaborative group because these agencies have primary ownership responsibilities within the study area. Other stakeholders that can provide valuable input generally include Tribes, community groups, HOAs, environmental nonprofit organizations, regulatory agencies, and science advisors.

The regional collaborative could be responsible for some of the following general tasks:

- Facilitating regional coordination and data sharing among the stakeholders
- Enabling public outreach and stakeholder input opportunities
- Applying for and obtaining funding
- Conducting environmental analyses
- Obtaining regulatory permits and approvals
- Conducting pre-construction monitoring
- Coordinating, prioritizing, and implementing one or more regional coastal resiliency projects

- Conducting post-construction monitoring and reporting

Lastly, the preferred, highest-priority community resiliency solution that emerged was a comprehensive, regional beach nourishment program that protects existing infrastructure in place in South Orange County and is implemented in a collaborative and cooperative multiagency effort.

6 Funding Opportunities

The regional collaborative will need to secure funding to implement the projects described in the Strategic Plan. There are also administrative cost considerations for forming a collaborative organization. Anticipated challenges will include acquiring the necessary funding for implementing strategies and gaining commitment and support from federal and state government agencies to collectively address local conditions in a coordinated and collaborative manner.

Identifying and obtaining funding commitments is an essential element of this Strategic Plan. To support its success, the member entities will continue to support the regional focus and encourage ongoing dialogue to identify, fund, and implement the full range of coastal resiliency projects. This Strategic Plan identifies a wide range of potential funding approaches; however, this is not an exhaustive list, as new funding sources periodically become available. A listing with summaries of potential known funding sources that should be considered is provided in Appendix J.

6.1 Regional Collaborative Cost-Sharing Framework

Following the establishment of a regional collaborative, there would likely be various cost-sharing agreements or arrangements utilized depending on whether the costs relate to the following:

- Governance structure and/or operations
- Project type (federal lead agency versus nonfederal lead agency)
- Project phase (planning versus construction)

In general, costs would be allocated among the member agencies (or participating entities) according to the land ownership or maintenance responsibilities and/or benefits derived by each member agency (or participating entity). Each scenario/consideration is described in the following subsections.

6.2 Cost Sharing by Governance Structure

Some of the governance structures described in this Strategic Plan would involve creating a new entity that is a Joint Powers Agency or JPA, whereas others rely on a Joint Powers Agreement, MOA, or MOU as the formal guiding agreement. The latter examples operate based on a governance structure framework embedded within an existing agency to take the lead role in coordinating and facilitating the efforts of the multiple entities toward resiliency project implementation. Depending on whether the South Orange County Coastal Resiliency Stakeholders choose to move forward with establishing a new governance structure or rely on an existing agency to coordinate and lead the coastal resiliency efforts, funding will be needed to carry out the mission, and cost-share responsibilities must be equitably allocated.

A new agency will need a new source of money to operate. The two most popular funding methods are either creating a revenue stream or raising capital by issuing bonds. Grant funding may also be an option to fund a startup coastal resiliency organization. An organization such as BEACON has staff, legal counsel, and physical offices and likely has higher costs compared to a new startup agency. A cost-sharing agreement will have to be defined and negotiated to ensure the new entity is fully funded and operational and that costs are allocated among the member agencies.

To establish a new coastal resiliency working group composed of the member agencies and other stakeholders, existing agency funding and staff could be utilized, thus building on optimizing organizational efficiency, which would likely serve to reduce costs associated with getting a newly formed South Orange County group-focused coastal resiliency fully operational. This effort would be comparable to existing local agency-led cooperative arrangements, including development of an annual budget and work plan approved by all parties and to which the local agency lead may charge direct labor, materials, equipment, and outside contract services to the program.

6.3 Cost Sharing by Project Type

Depending on whether a project is jointly developed with USACE as a federal partner or solely developed among the member agencies, there may be cost-sharing/cost-match requirements that have to be satisfied. For example, in the case of the San Clemente and Solana Beach and Encinitas USACE 50-year projects, each of the cities was required to sign a Project Partnership Agreement with USACE for each of the three project phases (i.e., Feasibility Phase; Planning, Engineering, and Design [PED] Phase and Construction Phase).

The general cost-share agreement with USACE and the cities for where the entities function like partners in these projects is 65% federal and 35% nonfederal for all three phases. Importantly, the cities applied for and were successful in obtaining grant funding from State Parks DBW for up to 85% of the required 35% nonfederal share. This supplemental funding from the State of California has been essential to advancing the project to the anticipated Construction Phase later in 2023. More information on funding opportunities (including grant programs) with these agencies can be found in Appendix J.

If the South Orange County coastal resilience group elects not to pursue a partnership with USACE, then additional funding sources would need to be obtained.

6.4 Cost Sharing by Project Phase

Typical coastal resiliency projects include the following general project development phases:

- Phase 1: Preliminary Planning/Plan Formulation
- Phase 2: Environmental Compliance Under California Environmental Quality Act (CEQA)/National Environmental Policy Act (NEPA) and Regulatory Permitting

- Phase 3: Preliminary and Final Project Design
- Phase 4: Pre-Construction Monitoring
- Phase 5: Construction
- Phase 6: Post-Construction Monitoring and Reporting

Cost-sharing frameworks for various project phases are distinguished as follows:

Equally: Project phases that benefit all member agencies equally; therefore, the cost share is the same for all member agencies (e.g., divide cost by the number of member agencies/entities and allocate all members an equal cost share)

  - Typically, this will include the Preliminary Planning/Plan Formulation, Environmental Compliance Under CEQA/NEPA and Regulatory Permitting, and Preliminary and Final Project Design phases and may include the Post-Construction Monitoring and Reporting phase.

- **Cost/Benefit Variations:** Project phases that have jurisdiction-specific cost variations and corresponding varying benefits for various members/entities
  - Typically, this will include the Pre-Construction Monitoring and Construction phases and may include the Post-Construction Monitoring and Reporting phase.
  - Costs may be allocated based on the following:
    - **Relative Length of Shoreline** as a percent of the total regional shoreline
    - **Volume of Sand** to be placed on the beach

A table illustrating the cost-sharing frameworks by project phase is provided in Appendix J. Further refinements to the cost-sharing frameworks would occur once the preferred governance structure is defined and the first regional coastal resiliency project is defined.

6.5 Cost-Sharing Account

Upon formation of a regional collaborative, the group will need to establish a cost-sharing account, which will serve as the primary account where all funds generated pursuant to furthering the efforts of the regional collaborative will be held. The regional collaborative will need to invest the cost-sharing account funds prudently. Responsibilities of the regional collaborative will include applying for and obtaining funding to operate the regional collaborative and implement projects.

6.6 Grant Funding

There are numerous grants funded through federal and state agencies, as detailed in Appendix J. Most grants, whether local, regional, state, or federal, have some cost-share or funding match requirement. The cost share can typically be contributed in the form of direct cash payments and can also often be contributed as a work-in-kind contribution of staff time, technical studies, monitoring data, or other work products needed to support project development and implementation. The

concept of work-in-kind must be negotiated at the outset of discussions of the cost-share requirements so all agencies can plan and budget accordingly.

Federally funded grants, such as those based on the Bipartisan Infrastructure Law, are managed through federal agencies, including the following:

- FEMA via the Building Resilient Infrastructure and Communities Program
- NOAA via the National Coastal Resilience Fund; Climate Resilience Regional Challenge; and science, service, and stewardship funding
- USACE via CAP Section 103 and Section 204 programs

Similarly, state-funded grants, such as those from Proposition 1 or 68, are managed through state agencies including the following:

- State Parks via the Shoreline Erosion Control Program, Public Beach Restoration Program, and Statewide Park Development and Community Revitalization Program
- California Department of Fish and Wildlife via the Restoration Grants Program
- Governor's Office of Planning and Research via the Regional Resilience Planning and Implementation Grant Program
- California Wildlife Conservation Board
- California State Coastal Conservancy

6.7 Local Hazard Mitigation Planning and Pre-Disaster Assistance

The California Office of Emergency Services (Cal OES) Hazard Mitigation Planning Division and FEMA's Hazard Mitigation Assistance grant programs are available to provide opportunities to reduce or eliminate potential losses to public assets through hazard mitigation planning and project grant funding. Currently, Cal OES and FEMA have three grant programs: the Hazard Mitigation Grant Program, Pre-Disaster Mitigation, and Flood Mitigation Assistance. The total value in each grant varies annually based on federal funding authorizations, and each is typically in the tens to hundreds of millions of dollars.

6.8 Impact Mitigation Fees

Impact mitigation, or in lieu fees, are another way to generate funds for coastal resiliency projects. Certain structured fees could be established to generate revenues for 1) covering the necessary planning, technical studies, design, and implementation of coastal resiliency projects; or 2) developing an emergency cleanup fund to be able to respond quickly and opportunistically following disasters. Disasters, through a different lens, are opportunities to implement changes.

There are currently two structured fees CCC uses to address the impacts of coastal structures: a Sand Mitigation Fee and a Public Recreation Fee. The Sand Mitigation Fee is intended to mitigate for the

loss of sand supply and loss of recreational beaches in front of structures attributed to a coastal structure. The Public Recreation Fee addresses impacts to the loss of public recreation based upon the loss of beach area physically occupied by a coastal structure. Additional details on these impact mitigation fees are provided in Appendix J.

6.9 Transient Occupancy Tax or Sales Tax

A transient occupancy tax (TOT) is paid by visitors from hotel stays and short-term vacation rentals, and the funds are remitted to the county or city. TOT can provide a source of general fund revenues for the County and cities and requires a public vote for approval. A dedicated increase in TOT (e.g., 2% for coastal resiliency) could be reserved specifically for resiliency approaches that maintain the region's beaches and shoreline. Presently, the TOT rate is 10% in Dana Point, in San Clemente, and for hotels located in unincorporated parts of the County. A potential increase of 2% could yield an additional $530,000 annually. A regionally coordinated increase in TOT could provide regional funding for coastal resiliency improvements, maintenance, or coastal infrastructure repairs as outlined in the Strategic Plan.

The County and cities may consider this approach or coordinate on a countywide approach such as a quality-of-life initiative (as contemplated by SANDAG, for example) to generate local revenues to be used to finance long-term coastal resiliency strategies. For example, the Cities of Solana Beach and Encinitas, both in San Diego County, instituted a dedicated 2% sales tax increase used as a dedicated source of funding for coastal resiliency building for public coastal infrastructure, facilities, and access projects. As with TOT, this would likely require a public vote for approval.

7 Regional Collaborative Priorities

On a regional scale, beach nourishment has the most support among stakeholders, as it has proven to be the most technically feasible and economically beneficial solution to minimize impacts of long-term erosion and reduce storm damage. Beach nourishment is the placement of new sand onto a beach (referred to a receiver beach) to build the beach in elevation and the berm seaward, thus providing wave protection and reducing beach erosion, while increasing recreational beach area available to the public and enhancing environmental resources (i.e., shorebird and grunion habitat).

Benefits of a regional sediment program include the following:

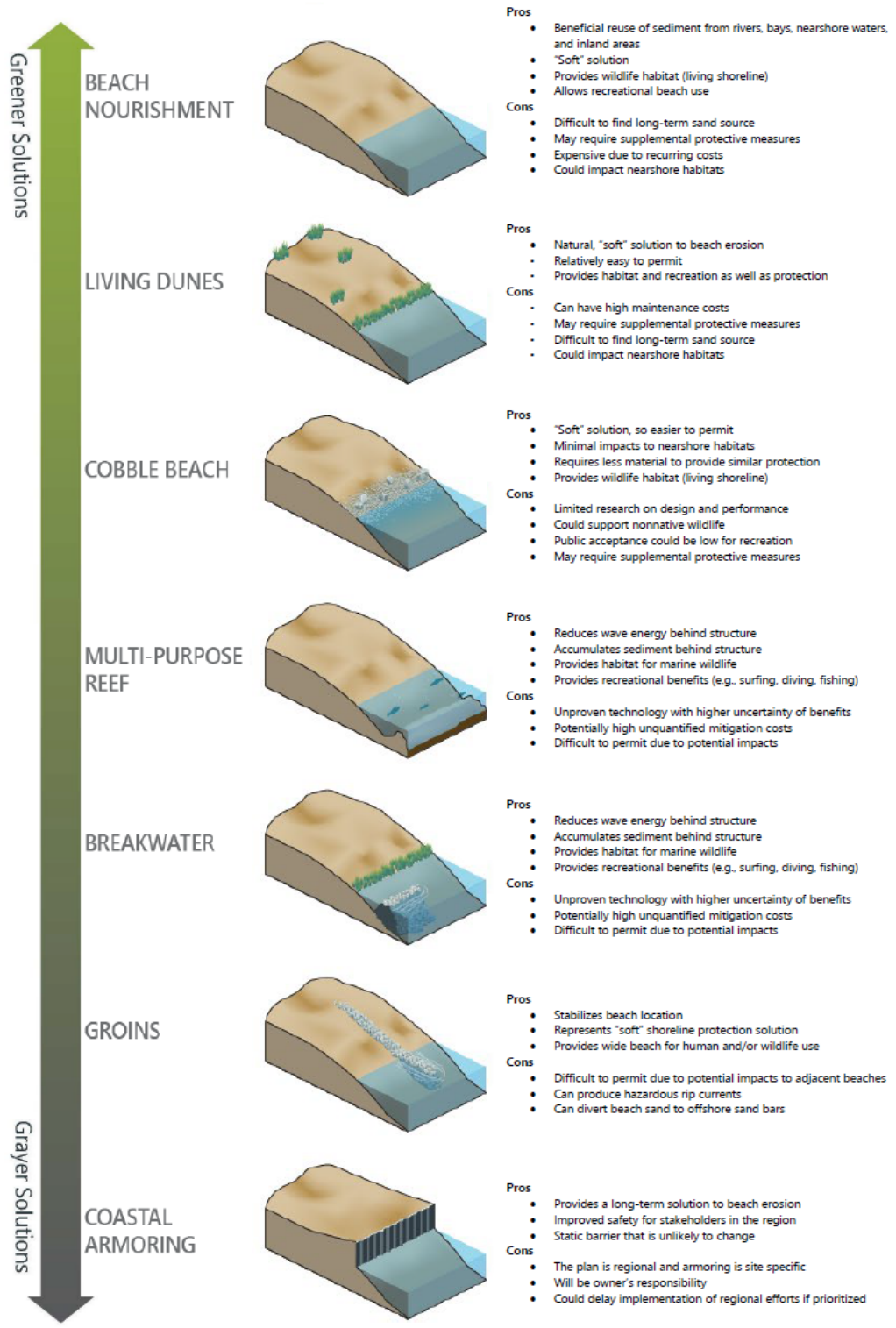
- Coordinates efforts to support natural processes that nourish the beaches
- Optimizes beneficial use of material available at offshore borrow sites, harbor maintenance dredging projects, and other opportunistic sources
- Restores natural sediment supply along the coastline in a nonstructural, nature-based manner
- Strategically places sediment to prioritize vulnerable areas and support the coastal ecosystem
- Increases public beach-based recreational opportunities and enhances coastal resources throughout South Orange County
- Provides wave protection and minimizes storm damage to public and private infrastructure and structures
- Supports and enhances ongoing and planned coastal resiliency projects
- Provides an economic approach to coordinating projects across jurisdictions
- Advances the state's target for resiliency of 3.5 feet of SLR by 2050
- Recommended in both the Cities of Dana Point and San Clemente's SLR vulnerability assessments and coastal resiliency plans
- Endorsed by CCC as a nature-based adaptation strategy in the *2021 Nature-Based Adaptation Strategy Memorandum*

Beach nourishment is considered a "soft" or "green" solution and requires an initial (near-term) placement of sand to build up the beaches to establish a foundation. Periodic maintenance (mid-term) is then required to maintain beach width. Supplemental, periodic nourishments would be required to maintain a given level of shore protection. The frequency of supplemental nourishments would vary based on sediment supply, wave climate, and longshore transport conditions in the littoral system, as well as the desired level of shore protection.

Finally (long term), the effectiveness of beach nourishment would decline with higher rates of SLR; thus, the regional collaborative would need to continue to pursue placing larger volumes of sand on the beach through adaptive management/planning or to pursue other more permanent adaptation measures such as the installation of shoreline protection structures (i.e., green, hybrid, or gray). The green-gray scale ranks shoreline protection structures from green, nature-based solutions such as

beach nourishment and living shoreline/sand dunes up to gray or hard solutions like sand retention structures (groin or breakwater) or shoreline protection structures (revetment or seawall). Refer to Figure 7-1 for an exhibit demonstrating structures in the green to gray scale. Based on stakeholder feedback, green solutions would generally be prioritized over more gray, hard solutions for sand retention.

Figure 7-1
Green to Gray Solutions



7.1 Regional Beach Nourishment Program

A near- and mid-term regional beach nourishment program would place new sand along the coastline south of Dana Point Harbor from Doheny State Beach to San Mateo/Cotton's Point in southern San Clemente to provide a relatively uniform increase in beach widths across the shoreline. This would require an initial placement of approximately 4.4 million cy of sand to create a 100-foot-wide beach along the 7.88-mile coastline, assumes the direct placement of sand onto the beach and is based on the beach fill calculation for the San Clemente Beach Nourishment Project.

The approximate beach lengths and percentage of total study area are listed in Table 7-1.

Table 7-1
Summary of Beach Lengths

Beaches	Length (miles)	Percent of Total Length
Doheny State Beach	1.35	17%
Capistrano Beach Park	0.21	3%
Capistrano Bay District	1.46	18%
Poche County and City Beach	0.04	1%
Shorecliffs HOA	0.24	3%
Capistrano Shores	0.69	9%
San Clemente City Beaches	2.13	27%
San Clemente State Beach	0.71	9%
3800 Block of Vista Blanca to Cotton's Point	1.05	13%
Total length:	**7.88**	**100%**

Supplemental renourishment events (i.e., maintenance) would be required every 5 to 10 years to maintain the recreational, environmental, and wave protection benefits of the wide sandy beach. This can be conducted either by placing sand directly on the beach or by placing sand in the nearshore area. (The latter method could be used for suboptimal sands or sediments.) Sand used for beach nourishment requires sediment that is free of chemical contaminants and has comparable grain size and aesthetic characteristics to that of the receiver beach.

7.2 Potential Sand Sources

Potential sand sources for a regional beach nourishment project would include upland or offshore sources. A listing of potential sand sources is provided in Appendix I. Sand mining sources should be considered for use in the South Orange County regional beach nourishment project due to direct access to local beaches from roadways and rail. These sources of sand could be cost competitive with other sand sources, as they do not need to be dredged from offshore but, rather, could be placed

directly on the beach via trucks and/or rail delivery. A listing of sand mining sources is available in the OC CRSMP (USACE 2013).

Upland sources represent the numerous sand sources from the watershed such as rivers, lakes, reservoirs, retention basins, and debris basins. Major rivers have been modified (e.g., channelized with armoring of riverbanks) for flood -control purposes, and, in some cases, sand deposits at the river mouth that are dredged to maintain flood capacity. Historically, sand from rivers has been used opportunistically for beach nourishment. This includes sand from San Juan Creek placed at Doheny State Beach and Capistrano Beach and sand from the Santa Ana River placed at North Beach in San Clemente. Major rivers have also been regulated with dams, reservoirs, and other flood-control infrastructure that have trapped a significant portion of sediment supply in the upper watersheds (USACE 2013). Dams, reservoirs, lakes, retention basins, and debris basins are additional potential sand sources.

Offshore sources are the potential sand sources from harbors, bays, lagoons, and offshore sand deposits referred to as "borrow sites." Sand sources from harbors and bays come from maintenance or access dredging conducted to remove accumulated sediment within navigation channels. Lagoon sand sources are from sediment dredged to maintain tidal inlets or removal of fluvial sediment deposition.

Offshore sources refer to sand sources just offshore of the active littoral zone and may include known borrow sites (Appendix I). An example of using an offshore source for beach nourishment is the large-scale SANDAG Regional Beach Sand Project (RBSP) that used approximately 3.5 million cy of sand from offshore borrow sites located off the San Diego County coastline. The planned San Clemente Beach Nourishment Project also plans to use an offshore borrow site near Oceanside Harbor.

There is a variety of ongoing independent agency projects with opportunities to coordinate sand nourishment on a regional level going forward. For example, the City of San Clemente recently applied for grant funding to identify additional beach-compatible offshore deposits that could be used to support a regional nourishment project. Additional offshore investigations and analyses will be required to identify suitable sand sources for a regional beach nourishment project based on availability of sand and compatibility with receiver beaches.

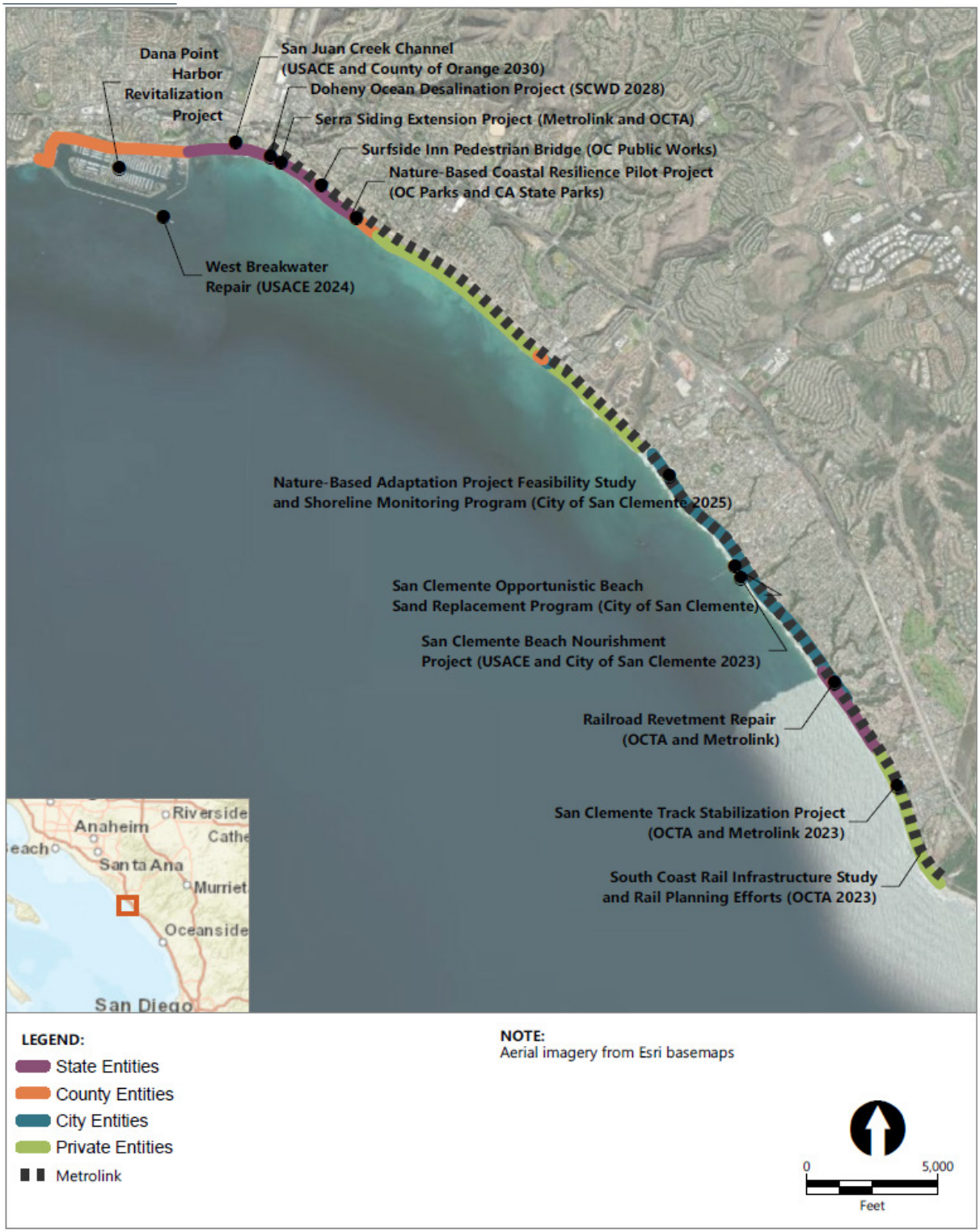
7.3 Prioritization of Future Projects

The intention of a regional beach nourishment program is to place sand along the entire South Orange County coastline, from Dana Point Harbor to San Mateo Point in southern San Clemente. Implementation of beach nourishment projects will be conducted in phases depending on the availability of sand and timing with other ongoing projects. Further development of a regional beach

nourishment project may require defining individual future projects that complement or integrate existing projects such as the Capistrano Beach and Doheny Beach Nature-Based Coastal Resilience Pilot Project, San Clemente Beach Nourishment Project, and San Clemente Nature-Based Adaptation Project Feasibility Study and Shoreline Monitoring Program.

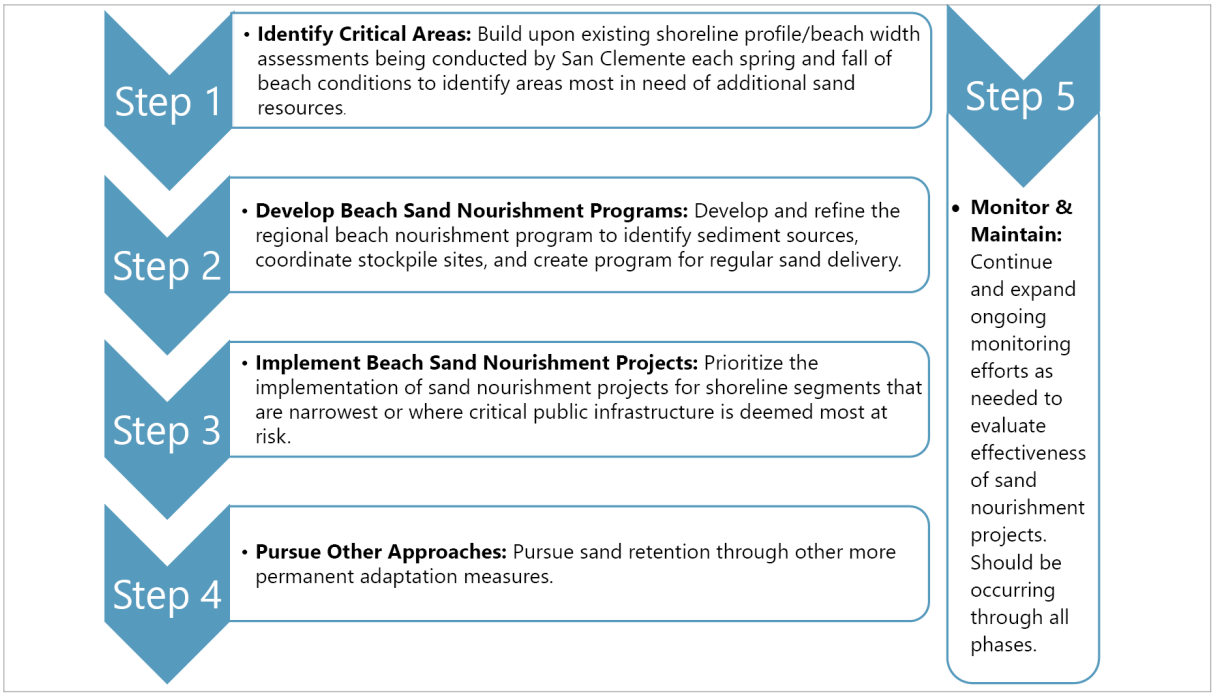
The existing and planned coastal resilience projects were identified by the County and stakeholders and are shown in Figure 7-2. A short description of each project is provided in Appendix G. The extensive list of projects highlights the efforts being made by individual agencies and organization to address beach erosion on a piecemeal and nonintegrated approach throughout the region and supports the need for a regional collaborative to coordinate efforts to achieve the optimal outcomes and reduce costs for all stakeholders.

Figure 7-2
Existing and Anticipated Projects in South Orange County



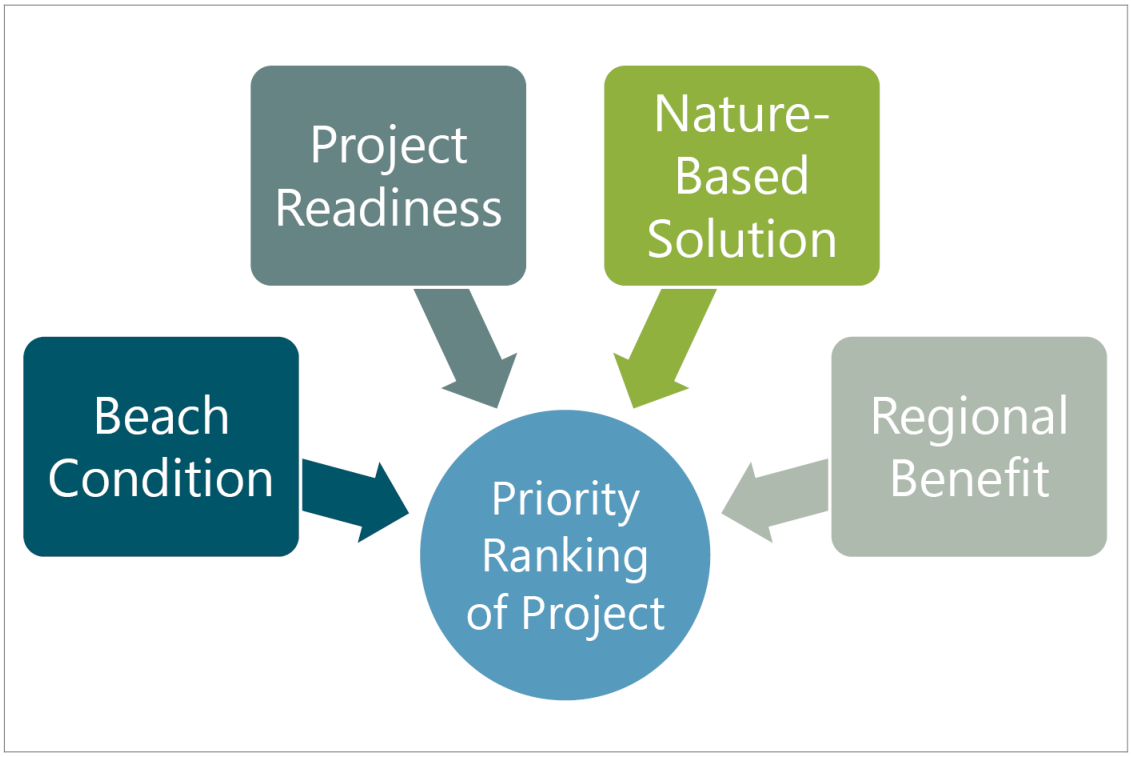
Establishment of a regional collaborative could incorporate existing projects being planned as part of the regional beach nourishment program (as summarized in Appendix G); consolidate existing projects into a larger project; or develop new projects that support existing project, as outlined and illustrated in Figure 7-3.

Figure 7-3
Process to Develop Solutions Within the Regional Collaborative



The public outreach process also identified interest in other coastal resiliency projects, such as one or more multipurpose sand retention structures located along the South Orange County shoreline. While this Strategic Plan focuses on implementation of a regional beach nourishment program as the highest-priority coastal resilience project, it is intended that other coastal resiliency projects will be pursued as longer-term, supplemental solutions to beach erosion and SLR. As an example, future and existing projects would continue to be prioritized using a ranking system based on beach conditions, project readiness, whether projects are nature-based solutions, and projects' regional benefit (Figure 7-4).

Figure 7-4
Framework to Prioritize Regional Beach Solutions



The elements of the ranking system would be defined in the following ways:

- Beach conditions: Critical areas based on erosion hot spots
- Project readiness: Status of project based on design phase, regulatory readiness, and funding
- Nature-based solution: Green-gray scale to favor green, nature-based solutions
- Regional benefit: Proportional to length of coastline or volume of sand

The ranking system based on numerical scoring could prioritize individual future and existing projects that favor critical beaches, project readiness for implementation, nature-based solutions, and the benefit that the region stand to gain from implementation. This type of ranking system could be applied to near- and long-term projects, with options to expand with additional criteria such as SLR adaptability or economic cost-to-benefit analysis.

Beach conditions could be determined using ongoing shoreline monitoring. For example, analysis of beach-width measurements as part of the San Clemente Nature-Based Adaptation Project Feasibility Study showed there are variations in the beach stability along the San Clemente coastline. A rating system was developed to identify critical, threatened, and stable beaches using beach width measurements. An example shoreline monitoring program under the County's research partnership with UCI, where ongoing drone and satellite monitoring across the beach width and the movement

of sand placed within the littoral cell is being conducted. Development of future projects under a regional beach nourishment program could prioritize sand placement based on the following:

- Critical beaches: Erosional hotspots with a high damage risk to coastal infrastructure, natural resources, and recreation
- Threatened baches: Erosional with a medium damage risk to coastal infrastructure, natural resources, and recreation
- Stable beaches: Stable with a low damage risk to coastal infrastructure, natural resources, and recreation

It should be noted that beach conditions can vary over time and may be influenced by ongoing activities such as other beach nourishment or shoreline stabilization projects. Thus, periodic updates of beach conditions may be required.

Project readiness would be ranked based on readiness for implementation in terms of design phase, status of regulatory permitting, and securing of funding for implementation. Scores for the design phase would be based on the project phase as follows: alternative, conceptual, feasibility, pre-design, final design, or construction. The status of regulatory permitting would be ranked based on completion of environmental studies, submission of permit applications, agency review, or secured permits. Ranking based on funding could indicate if funding has been either not identified, identified, budgeted, or appropriated.

The ranking system would also prioritize green, nature-based solutions such as living shoreline/sand dunes and beach nourishment. Lower-priority projects would be gray or hard solutions like sand retention structures (groin or breakwater) or shoreline protection structures (revetment or seawall) (Figure 2).

Regional benefit would account for the scale of the project. A ranking proportional to either the length of coastline or volume of sand could be used to prioritize larger regional projects that benefit more of the coastline.

Additional details on storm wave damage along the South Orange County coastline is provided in Appendix F.

The Strategic Plan identifies the optimal path forward for advancing coastal resilience projects that would provide direct benefits in the form of the following:

- Advances the scientific understanding of coastal processes in South Orange County.
- Supports enhanced public access and coastal resource protection.
- Provides solutions to address shoreline erosion.
- Improves coastal resiliency and SLR adaptability over the long term by building adaptive capacity.

- Regional collaboration would produce cost savings and economic efficiencies by avoiding duplication of efforts and avoiding public agencies in South Orange County from competing with each another for scarce public dollars.

This Strategic Plan was developed to identify a solution to minimize beach erosion and reduce wave storm damage and widen the region's beaches with the goal of project implementation. A range of regional solutions, as described in Appendix D, were presented to stakeholders to select a preferred regional solution, (Section 2.3). Through the stakeholder engagement process, beach nourishment emerged as the preferred regional solution that could be implemented over the next 50 years. While a regional collaborative beach nourishment project would benefit multiple stakeholders by addressing current beach erosion, regional beach nourishment could also be used as a coastal resilience project for adapting to rising sea levels. For beaches in South Orange County, SLR would worsen the already chronic beach erosion and reduce recreational beach areas. The effects of storm waves are projected to increase in magnitude with higher sea levels.

As summarized in Appendix H, key SLR thresholds were identified at 1.6 feet of SLR, which could occur between 2040 and 2060 and at 3.3 feet of SLR, which could occur between 2050 to 2100. Both the Cities of Dana Point and San Clemente's SLR adaptation measures recommend participating in a regional beach nourishment program to increase efficiency and cost-effectiveness (City of Dana Point 2019; City of San Clemente 2019). A regional beach nourishment program could be effective and feasible to offset beach erosion with up to 3.3 feet of SLR. With higher levels of SLR, additional volumes of sand would likely be required and could be accomplished through an adaptive management plan as is contemplated in the San Clemente and USACE 50-Year Coastal Storm Damage Reduction Project that will begin in late 2023. Beach nourishment may be initially prioritized, but other techniques should continue to be considered for mid-and long-term solutions.

8 Potential Regulatory Requirements

Robust technical studies, monitoring data, and biological information are typically required by the regulatory agencies to permit coastal resiliency projects. It is anticipated that there would be significant cost savings if a regional collaborative were to lead the effort to promote regional coastal resiliency project implementation. The establishment of a regional collaborative could streamline environmental compliance efforts for CEQA and NEPA, as well as cost savings related to preparing, submitting, and processing regulatory agency permits.

Cost savings-related regional coordination to develop one or more regional projects is one of the many benefits that can be achieved through regional planning, as opposed to permitting a patchwork of individual beach nourishment projects with redundant and overlapping environmental reviews and agency permits.

While the development of this Strategic Plan is exempt from CEQA and NEPA, conducting environmental review pursuant to CEQA and NEPA will be a required future task once individual projects have been identified.

Implementing projects under this Strategic Plan will require permits from several agencies, including the following:

- USACE (Permits for Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act)
- Coordination with U.S. Fish and Wildlife Service and NOAA/National Marine Fisheries Service for endangered species and Essential Fish Habitat
- CCC (Coastal Development Permit and/or Federal Consistency Determination)
- California State Lands Commission (land lease)
- Regional Water Quality Control Board (Section 401 water quality certification)
- California State Parks (Right of Entry or Encroachment Permit)
- HOA (Right of Entry Authorization)

Local agencies (City of Dana Point and/or City of San Clemente) may also require other permits such as grading, haul route, or Coastal Development permits (if authorized in Dana Point). The City of San Clemente does not yet have full authority to issue a Coastal Development Permit.

It is anticipated that compliance with CEQA and NEPA will be required for any/all projects implemented under this Strategic Plan.

Any separately funded projects, such as new or replacement shoreline protective devices, are not a component of this Strategic Plan and would continue to be permitted separately by individual entities.

9 Economic Analysis: Costs and Benefits

This section of the Strategic Plan discusses cost estimates and presents a high-level economic analysis for a range of potential projects and governance structures, focusing on beach nourishment and cooperative agreements, respectively.

The responsible party or parties for the various Strategic Plan components, along with cost-sharing requirements, will vary depending on the following:

- Project phase (e.g., planning and environmental review, permitting and design, construction, and post-construction monitoring and maintenance)
- Location (e.g., county beach, beach-fronting private property, municipal beach, or state beach)
- Amount of sand to be placed

9.1 Cost Estimates

Cost estimates for a South Orange County regional beach nourishment project can be derived from representative and relevant regional project examples (Table 9-1). Information in this table is based on data from the period 2001 through 2023 and provides a range of costs based on a per cubic yard basis from local relevant large-scale public beach restoration effort. The projects below include both federal and nonfederal projects. Additional supporting reference materials are included in Appendix K to this Strategic Plan.

Table 9-1
Cost Comparison for Recent and Relevant Public Beach Restoration Projects

Project Name	Total Project Cost	cy	Average cy Cost	Status
Cardiff Living Shoreline Project	$3,700,000	30,000	$123.33	Project completed in May 2019.
San Clemente and USACE Coastal Storm Damage Reduction Project	$15,019,000	251,000	$59.84	Started in fall 2023[a]
Solana Beach and Encinitas USACE Coastal Storm Damage Reduction Project	$43,331,000	1,040,000	$41.66	Completed March 5, 2024[a]
SANDAG RBSP III[b]	$40,200,000 estimated	TBD	TBD	Phase 1 cost: $200,000 for planning, design, and economic and borrow site analysis to be initiated in fall 2023. San Clemente Cost was $109,000 and Dana Point / County Cost was $126,000
SANDAG RBSP II[c]	$23,817,200	1,500,000	$15.87	Project completed in 2011–2012.
SANDAG RBSP I[d]	$17,500,000	2,102,048	$8.33	Project completed in 2001.

Notes:

a. This is a 50-year local-state-federal project with intermittent renourishment cycles planned over 50 years.
b. This project is currently in the planning stages and will likely be a repeat of the prior projects. Phase 1 will be completed in 2023/2024. Phase 2 would be CEQA/NEPA, and permitting would likely be implemented in 2024/2025. Phase 3 (construction) would likely commence in 2026 or beyond. No funding beyond Phase 1 has been secured (Greer 2023).
c. This second project was smaller in scale than the first project and only included five cities in two littoral cells.
d. This initial project included a total of nine cities in three littoral cells.

Upland Sand Sources: It is worth noting that upland sources of sand (including sand mines/quarries) should be further pursued for placement, given the proximity of the South Orange County beaches to major roadways, as well as a railroad, that can provide direct sand placement access to the beach.

Sand material costs from upland sand sources can range from $20 to $25 per cy (material only) based on recent estimates included in Appendix K. Sand truck transport costs are estimated at approximately $22 per cy but can vary widely based on transport distance and the need to load and screen the sand. This comparative cost analysis should be conducted as part of a next step and could provide significant cost reductions, as the single biggest cost of any of the above-listed beach restoration projects is associated with the cost to mobilize and demobilize a dredge.

The following is a brief description of the projects listed in Table 9-1, including project description and cost estimates for the planned/upcoming projects and actual costs for SANDAG RBSP I and II projects, as these two projects have already been completed.

San Clemente and USACE Coastal Storm Damage Reduction Project: The projected construction costs shown in Table 9-1 are current as of 2023 and include all construction costs, including mobilization and demobilization, dredge operations, permit acquisition costs, PED costs, and construction management. This project was initiated in November 2023 but was put on pause in January 2024 due to sediment quality issues. This is a 50-year federal project and the costs shown in Table 9-1 are for the initial fill and initial construction only. Future renourishment events are anticipated every 6 years on average to maintain the constructed beach berm profile.

Solana Beach and Encinitas USACE Coastal Storm Damage Reduction Project: The projected construction costs shown in Table 9-1 are current as of October 2022 and include all construction costs, including mobilization and demobilization, dredge operations, permit acquisition costs, PED costs, and construction management. This project was completed on March 5, 2024. Final costs will be available later and may be slightly different. This is a 50-year federal project, and the costs shown in Table 9-1 are for the initial fill and initial construction only. Future renourishment events are anticipated every 10 years on average in Solana Beach and every 5 years in Encinitas to maintain the constructed beach berm profile.

SANDAG RBSP III Project: This project is in the early planning stages, and it is not yet known how many member cities will participate. At a conceptual level, RBSP III would be designed to essentially repeat RBSP II and RBSP I, which placed up to 2 million cy of sand within three littoral cells (Oceanside, Mission Bay, and Silver Strand) using similar footprints and borrow sites as the prior SANDAG projects. Costs for Phase 1 (planning) are budgeted at $200,000 (Pesce 2023). Early estimates for Phase 2 (environmental and permitting) are budgeted at $3 million and for Phase 3 (implementation) at $37 million. Additional information will be added here as it becomes available, and these data are current as of the date of publication of this Strategic Plan. The SANDAG Shoreline Preservation Strategy has identified a regional need of approximately 30 million cy of sand to address existing and future public beach restoration needs. Thus, it is likely that there will be a need for many more RBSP projects in the future.

SANDAG RBSP II Project: In 2012, SANDAG implemented a second RBSP (RBSP II), which utilized the same general beach sand placement footprints and borrow sites as a previous project completed in 2001; however, only five coastal cities participated in RBSP II, compared to nine cities in RBSP I. Post-construction monitoring data and lessons learned from RBSP I were used to refine the RBSP II. RBSP II added approximately 1.5 million cy of sand to the region's local beaches.

SANDAG RBSP I Project: In 2001, SANDAG implemented its first RBSP (RBSP I), which placed more than 2 million cy of sand within three littoral cells (Oceanside, Mission Bay, and Silver Strand) in San Diego County. A total of nine coastal cities participated in RBSP I.

9.2 Economic Analysis

A full assessment of the economic benefits of South Orange County beaches is a recommended next step for Strategic Plan implementation. This analysis would evaluate the economic benefits of improving South Orange County beaches compared to the cost. Beach tourism is fundamentally ecotourism, and this information will be important for policy decisions by the cooperative agreement, as well as state and federal officials.

9.3 Project-Specific Economic Analysis and Developing a Benefit-to-Cost Ratio

Conducting a project-specific economic analysis is an essential component of project development and a required component of Strategic Plan implementation. Once a project has been defined, project costs and project benefits will be quantified such that a benefit-to-cost ratio (BCR) is developed. The purpose of developing a BCR for a project is to demonstrate that a public beach restoration, or shoreline stabilization project generates a net positive return on investment. The BCR will be valuable in enabling a project to obtain grant and other funding. Generally, the higher the BCR, the more competitive a project will be when it comes to securing grant or other funding.

The general types of data, both in terms of the costs and the benefits, that need to be collected to support a quantifiable project-specific economic analysis/BCR analysis follow:

- **Proposed Project Description:** What are the specifics of the proposed project, including sand volumes, offshore borrow site, placement footprints and beach berm design, and total costs?
- **Demographics:** Who visits the beaches in the region, and what are the growth projections?
- **Beach Attendance data:** How many visitors are at the beach on a given day, where do the visitors come from (local or nonlocal), and what percentage of them are overnight versus day-use visitors?
- **Shoreline Profile Data/Story:** What is the existing condition of the beach in terms of beach width, and what is the seasonal shoreline change noting critical erosion hotspots?
- **Existing Beach Infrastructure and Amenities:** Which amenities are available at the beach, including lifeguards, parking facilities, campground facilities, concession stand, showers, restrooms, and similar amenities?
- **Project benefits:** Quantify economic benefits generated from the beach restoration project, including coastal storm damage reduction, property damage avoidance, and public recreation benefits. Additionally, there will be local and regional benefits from valuing the beach as an economic generator from beach visitor spending on lodging, gas, restaurants, sundries, car rental, groceries, and parking.

All of the above inputs could be used to determine the economic impact of the project on the local and regional economy. The quantified benefits would be compared to the project costs to calculate a BCR. As noted, there are multiple methodologies available that can be used to quantify the value of the beach and thus quantify the economic value and benefits of a regional public beach restoration project in South Orange County. By dividing these benefits by the cost of beach nourishment, the BCR can be approximated for each nourished beach. In general, a BCR of greater than one is considered positive (the value of the nourishments being greater than the price paid for them) and thus justify the expenditure, while projects with a BCR of less than one are thus viewed as less economically justifiable (the value of the nourishments being less than the price paid; King and Gilliam 2015) and thus not necessarily a good use of public funds.

Any potential project in the federal interest must demonstrate economic "feasibility" by satisfying BCR requirements that are a minimum of 1:1 (costs to benefits) to allow federal participation in continued study and any project proposal that is to advance. State Parks DBW also requires the calculation of a BCR over a 20-year project lifetime. Thus, it is recommended that once a "proposed project" is identified, a project-specific economic analysis should be conducted as one of the follow-on tasks.

9.4 Economic Benefits from Having a Cohesive Functional Beach Region

South Orange County provides a wide variety of beaches and beach activities ranging from large, highly attended beaches with visible street parking/parking lots accessible from major roadways to smaller cove beaches accessible from within residential communities. Recreational activities available on South Orange County beaches also vary from sunbathing and swimming to surfing. Boardwalk activity is also important at some beaches, particularly at Doheny State Beach and the San Clemente Pier area. Volleyball and other beach activities are provided at some beaches, and scuba diving is popular in some areas. Additional details of the recreational opportunities and amenities along the South Orange County coastline is provided in Appendix L.

Although access to many beaches in South Orange County is free, there is a recreational "value" associated with each beach that measures how much, in dollars, a beach visitor is willing to pay for a visit to the beach. An increase in beach width contributes to an increase in the recreational value of a visit to the beach, which, in turn, contributes to an increase in beach attendance. According to King and Gilliam (2015), beach visitors typically state that an increase in beach width would lead to a corresponding increase in their annual attendance at a given beach. Larger recreational values for a visit to the beach express a greater desire for, and, therefore, a higher frequency of visits to, that beach. Therefore, having a cohesive functional beach region (i.e., an increase in beach width) would not only contribute to an increase in the recreational value of a visit to the beach, it would also be expected to contribute to an increase in the number of visits to that beach and the corresponding economic benefit.

According to King and Gilliam (2015), the SANDAG RBSP II project (2011 to 2012) generated $31.9 million in economic benefits, yielding a BCR of 1.16. In addition, the project generated $32.9 million in total economic impact for San Diego County and $37.3 million in total economic impact for the State of California.

According to King (2023), a new methodology for beach valuation is to use an approach based on the "carrying capacity" or "maximum capacity" of a beach with assumptions about the visitor turnover rate of that area of the beach. King recommends using a turnover of 100 square feet per person, assuming a turnover of 1.6 hours or more for large or wide beaches. For narrow or pocket beaches, such as those in South Orange County, this number would likely need to be modified with a lower turnover rate. Daily attendance in the summer is used as a proxy for overall annual beach attendance.

Having a standard approximation for the value of a beach trip allows city planners and researchers to understand the value of existing patterns of beach recreation and attendance. Applying this

methodology to the future of South Orange County beaches is possible, with additional analysis recommended for the next phase of Strategic Plan implementation.

Estimating the impact of SLR on the recreational value of beaches depends on the impact SLR has on beach attendance. As SLR occurs, beaches will lose area, and this loss in area will likely lead to a loss in attendance. The relationship between lost area and lost attendance can be modeled using the carrying capacity of a given beach. Carrying capacity, in this case, is the number of visitors that can visit a beach at one time—essentially, the maximum occupancy of a beach. Although visitors do not think in terms of explicit carrying capacity, people do make decisions and alter their visiting behavior based on how crowded a beach appears. When a beach becomes too crowded, people choose to go elsewhere or choose not to visit the beach. At this point, carrying capacity would be considered exceeded (King 2023).

Sheehan et al. (2022) uses an assumption that beachgoers generally require approximately 100 square feet of "towel space." However, most beachgoers do not spend an entire day at the beach. Thus, other people can occupy the same area of the beach within a given day, and this is considered the turnover rate (the rate at which visitors leave the beach and are replaced). The turnover rate will vary from beach to beach. The carrying capacity, therefore, is determined by dividing the area by required towel space and multiplying the result by the turnover rate.

Daily attendance is rarely equivalent to carrying capacity, except for at the more popular beaches in high season (such as Huntington Beach or Newport Beach on the Fourth of July). Many beaches are highly seasonal, with more than half of all visits taking place in the summer high season. At some of these seasonal beaches, the beach may be nearly at capacity for much of the summer (high utilization) and nearly empty in the winter (low utilization). Thus, a loss of area would impact the summer attendance far more than low season attendance. Therefore, models of SLR impact need to adjust for the average utilization rate at a given beach or how close daily visitation is to the maximum occupancy (carrying capacity) of the beach.

These economic benefits all underscore the importance of establishing a regional collaborative for South Orange County. The benefits of having a sustained beach are enhanced when it is connected to others in the region. Once the regional collaborative decides upon a regionally beneficial project, the group could move forward with establishing a well-supported BCR for that project using the methods outlined in Section 10.3.

10 Next Steps for Strategic Plan Implementation

Next steps for decisionmakers include the following:

1. **Form a Regional Collaborative:**
    a. Identify required member agencies. At a minimum, this should include ownership agencies such as the County, State of California, Cities of Dana Point and San Clemente, and OCTA but could be expanded as desired.
        i. Expanded organizations could include, but are not limited to, special districts and public utilities, Tribal councils, HOAs, and federal and state representatives.
    b. Refine governance structure and cost-sharing framework with member input.
    c. Execute a cooperative agreement or governing document with member agencies.
2. **Obtain Funding** for planning, design, and construction of priority projects.
    a. If appropriate, establish a cost-sharing account to implement projects.
3. **Develop a Near-Term Regional Beach Nourishment Program:**
    a. Identify critical areas and priority projects.
    b. Develop beach nourishment project design.
        i. Conduct sand source analysis to identify sand sources and potential stockpile locations.
        ii. Conduct an economic BCR analysis using various fill volumes and beach widths to determine the optimal beach width design and identify potential placement envelopes and capacity volumes for placement.
4. **Implement Priority Projects:**
    a. Conduct environmental review under CEQA and NEPA.
    b. Prepare the Sampling and Analysis Plan and Sampling and Analysis Report to ensure compatibility of borrow site sediments with receiver beaches' off-site borrow site data collection and analyses to identify, quantify, and characterize available sand/sediment sources for placement on local beaches.
    c. Obtain regulatory agency approvals and permits.
    d. Conduct pre-construction monitoring.
    e. Implement sand placement and construct projects.
    f. Conduct post-construction monitoring and reporting.
5. **Develop Mid- and Long-Term Goals:**
    a. Identify nature-based solutions and coastal structure solutions within the green-gray techniques scale in the Second Phase Coastal/Community Resiliency Projects/Pilot or Demonstration Projects and Innovative Solutions to be pursued.
    b. Consider development of multipurpose sand retention projects.

10.1 Pursue Future Pilot Studies and Seek Innovative Solutions

As part of the stakeholder input process, multipurpose sand retention projects have been identified for advancement as a second regional priority following beach nourishment. Regional consensus on preferred near-, mid-, and long-term solutions is an appropriate next-phase task and should be developed so the member agencies can begin a parallel process to advance one or more sand retention project(s) to retain the sand placed on South Orange County beaches.

Suggestions made by the stakeholders have included both shore-parallel and shore-perpendicular beach sand retention devices including green, hybrid, and gray solutions including offshore reef systems (scaled up from Wheeler North Reef concepts or reef balls or ECOncrete-type demonstration projects), living shorelines, and other innovative options that can provide multiple benefits for shoreline stabilization, habitat, and recreation.

Retaining the sand placed as part of a comprehensive beach nourishment program will make the beach sand replenishment program more cost-efficient and more effective in attaining regional goals for coastal and community resiliency over the long term.

The member agencies should also re-evaluate and potentially update previous studies conducted for the County and State of California DBW in 2007 and 2009, which evaluated the potential for leasing or acquiring a dredge to be available on an as-needed basis to replenish regional beaches.

10.2 Continue Regional Stakeholder Coordination and Collaboration

It is also recommended that the regional collaborative integrate and coordinate with other ongoing, parallel, and concurrent coastal resiliency planning efforts underway by OCTA, the City of San Clemente, and the City of Oceanside, all of which working on related, concurrent coastal resiliency planning efforts. Once a regional collaborative is formed, it could be expanded to serve as a countywide group, or a second group could be formed to support such coastal resiliency planning endeavors in the northern part of Orange County.

Preliminary discussions have also recently been initiated regarding the development of a southern California superregional collaborative with SANDAG, Los Angeles County, and BEACON encompassing the five counties geographically represented by these entities (i.e., San Diego, Orange, Los Angeles, Ventura, and Santa Barbara counties).

The member agencies should identify opportunities to integrate regional efforts and share and utilize technical data, monitoring data, and other work products generated by others to make the best use of public funds and avoid rework, which can occur when entities work in their own silos. Though each agency has its own responsibilities and objectives, the goal of establishing a formal regional alliance is to advance common and shared goals of promoting regional and local resiliency

in an economically efficient manner and to increase the opportunities for obtaining funding by advocating a cooperative regional resiliency framework.

Additional public outreach is scheduled to be held during the public review and comment period on this Draft Strategic Plan to obtain stakeholder input and feedback in spring 2024. The comments received on the Draft Strategic Plan will be reviewed and incorporated into the Final Strategic Plan, which must be completed per the terms of the OPC grant no later than June 2024.

It is recommended that following the public release of the Final Strategic Plan, regular meetings be convened by the local agencies to advance the regional collaborative goals toward project implementation. Building on the momentum created by the Strategic Plan will be essential to keep all stakeholders actively engaged and collaborating on promoting common regional coastal and community resiliency projects in a timely and effective manner.

10.3 Execute a Cooperative Agreement or Governing Document with Member Agencies

It is recommended that the member agencies execute a cooperative agreement or governing document, which will enable funding to implement a regional beach nourishment program and other sand retention projects.

Two example draft cooperative agreements have been included as Appendix E to this Strategic Plan. As drafted, the example agreements include local, regional, state, and federal agencies and special districts. These draft agreements are examples that have been provided as a starting point for formalizing the desired organizational structure that works best for the member agencies and should not be construed as limiting in any way.

11 Conclusion: Summary of Collaboration Toward Coastal Resiliency

This Strategic Plan represents an effort to close the regional gap in coastal resiliency collaboration. As described in this Strategic Plan, continued stakeholder engagement efforts have revealed the desire of stakeholders in the region to participate in a regional collaborative to address chronic beach erosion and thereby protect their assets and their lifestyles. A regional collaborative would reduce obstacles faced by stakeholders, expedite the execution of resiliency projects, and will establish funding and grant opportunities for projects that may not otherwise be possible. The options for collaborative structures, funding opportunities, and coastal resiliency options laid out in this Strategic Plan are presented and considered to further the goal of facilitating the development and maintenance of a more resilient coastline in this region. By using this toolkit, stakeholders in the region will be more easily and reliably able to pursue solutions to achieve this goal.

As stated in the Executive Summary, the overarching mission of this new regional collaborative would be to serve the residents, visitors, businesses, and greater community interests through consolidated planning, permitting, funding, construction, monitoring, and operations and maintenance of coastal resiliency projects in South Orange County. The foundation established by this Strategic Plan would facilitate advancement of regional coastal resilience adaptation planning objectives benefiting the community, economy, and environment.

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