



A California Joint Powers Agency

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## NOTICE MEETING

### BEACH EROSION AUTHORITY FOR CLEAN OCEANS AND NOURISHMENT (BEACON) SCIENCE ADVISORY COMMITTEE (SAC) MEETING

**2026 Meeting**  
**Tuesday, April 14, 2026**  
**Time: 10:00 am to 12:00 pm**

**NOTICE IS HEREBY GIVEN** of a **MEETING** of the Beach Erosion Authority for Clean Oceans and Nourishment (BEACON) Science Advisory Committee.

The date, time, and place of the meeting shall be as follows:

**DATE:** Tuesday, April 14, 2026  
**TIME:** 10:00 am to 12:00 pm  
**PLACE:** Hybrid In-Person/Remote Meeting (see details below)

#### **IN-PERSON:**

**City of Carpinteria**  
**Carpinteria City Hall**  
**City Council Chambers**  
**5775 Carpinteria Ave**  
**Carpinteria, CA 93013**

#### **REMOTE:**

**USGS**  
**2885 Mission Street, Rm H108**  
**Santa Cruz, CA 95060**

**2885 Mission Street, Rm A108**  
**Santa Cruz, CA 95060**

**UC Santa Barbara**  
**Marine Science Institute, Room 2403**  
**Santa Barbara, CA 93106**

**BEACON Science Advisory Meeting Agenda – April 14, 2026**

The following alternative methods of participation are available to the public:

- 1 You may observe the live meeting of the Science Advisory Committee via Zoom Meeting:  
<https://us02web.zoom.us/j/89711038542?pwd=xo0V99cF84O2BlPDJRl0BFYcbOI78.1>  
Meeting ID: 897 1103 8542  
Passcode: 371286
- 2 You may call in to listen live to the Science Advisory Committee Meeting by dialing: 1 669 444 9171 and then entering the following when prompted: Meeting ID: 897 1103 8542 and Passcode: 371286.
- 3 If you wish to make a general public comment or to comment on a specific agenda item, the following methods are available:
  - a Distribution to the Science Advisory Committee. Submit comments via email to [Staff@Beacon.ca.gov](mailto:Staff@Beacon.ca.gov) prior to 5:00 p.m. on Friday, April 10, 2026, or through mail to BEACON Attn: Science Advisory Committee at 501 Poli Street, Ventura, CA 93001 to be received no later than 5:00 pm on Friday, April 10, 2026. Your comment will be placed into the record and distributed appropriately.
  - b Read into the record at the meeting. Submit comments of 250 words, or less, via email to [Staff@Beacon.ca.gov](mailto:Staff@Beacon.ca.gov) prior to 5:00 p.m. on Friday, April 10, 2026 prior to the SAC meeting. Please indicate if you would like to make a general public comment, a comment on a specific agenda item, or both. Please state in your email, or mail, if you would like the comment "read into the record." Every effort will be made to read your comment into the record, but some comments may not be read due to time limitations. Comments timely received on an agenda item will be placed into the record and distributed accordingly.
  - c By Zoom. Log onto Zoom as described above. The meeting will be controlled by BEACON staff. If you wish to make a comment during the agenda item for public comment, please raise your hand using the Zoom instructions on your computer. By using the typed messaging capability of Zoom you should also indicate to BEACON staff which Agenda Item you wish to speak on or if you wish to make a general comment that is not specific to an Agenda Item. BEACON Staff will make every effort to call you during the indicated item so that you may comment.

In compliance with the Americans with Disabilities Act, individuals needing special accommodations to participate in the meeting should contact BEACON at least three working days prior to the meeting.

**BEACON  
Science Advisory Committee (SAC)  
MEETING AGENDA  
Tuesday, April 14, 2026  
10:00 am to 12:00 am**

## MEETING AGENDA

### 1. Administrative Items

- A. Call to Order and Roll Call –  
Dr. Patsch and Dr. George, SAC Co-Chairs,  
Acknowledge BEACON SAC Meeting being held consistent with Brown Act teleconference rules and requirements allowing for remote and in-person meetings.
- B. Consideration and Approval of the Minutes of the BEACON SAC Meeting of November 8, 2024.

### 2. Public Comment for items not on the agenda

Receive public comment on items not on the agenda.

### 3. Presentation on California's 2026 Coast and Ocean Assessment

Receive presentation on California's 2026 Coast and Ocean Assessment from Dr. Jill Harris, Project Lead and Coordinating Author, California Ocean Science Trust.

### 4. Presentation on Update of the BEACON Science Research Agenda and Implementation Activities

Receive a report from the BEACON Science Staff updating BEACON initiatives implementing BEACON Science Research Agenda activities.

### 5. BEACON SAC Research Roundtable

BEACON SAC Co-Chairs will moderate round-robin presentations from SAC members regarding their latest research projects and initiatives.

### 6. 2026-2027 SAC Schedule

BEACON Staff present schedule of SAC activities in 2026-2027.

### 7. Adjourn

#### Late Distribution of Materials

*Any disclosable public records related to an open session item on a regular meeting agenda and distributed by the City Clerk to all or a majority of the members of the BEACON Board less than 72 hours prior to that meeting are available for inspection in the City Clerk Office, at 5775 Carpinteria Ave, Carpinteria, CA 93013 and on the Internet at: BEACON.CA.GOV.*

*Any written ex-parte communication subject to disclosure by members of the BEACON Board may be published online as an attachment to the corresponding item.*

**ITEM 1B - Consideration and Approval of the Minutes of the BEACON SAC  
Meeting of November 8, 2024**

**SAC Meeting Minutes – November 8, 2024**

# BEACON SCIENCE ADVISORY COMMITTEE MEETING MINUTES

DATE: Monday, November 8, 2024, TIME: 2:30 PM, PLACE: Live + Teleconference

Item	1A-B	Call to Order and Roll Call and Consideration of Minutes from February 27, 2023 – Co-Chair, Dr. Patsch and Dr. George
Minutes/ Actions:	<p><b>Members Present:</b></p> <ul style="list-style-type: none"> <li>• Dr. Kiki Patsch</li> <li>• Dr. Doug George</li> <li>• Mr. Robert Battalio PE</li> <li>• Dr. Jenifer Dugan (Virtual)</li> <li>• Dr. Lesley Ewing PE</li> <li>• Dr. Philip King</li> <li>• Dr. Charles Lester</li> <li>• Dr. Dan Reineman</li> <li>• Dr. Dan Hoover</li> <li>• Dr. Sean Vitousek (Virtual)</li> <li>• Dave Revell (Virtual)</li> </ul> <p><b>Absent:</b></p> <ul style="list-style-type: none"> <li>• Dr. Kristen Goodrich</li> </ul> <p><b>Manager Liaisons:</b></p> <ul style="list-style-type: none"> <li>• Mr. Aaron Engstrom</li> <li>• Ms. Melissa Hetrick</li> </ul>	

Item	1C	Consideration and Approval of Minutes of the BEACON SAC Meeting held on February 27, 2023 - Co-Chair Dr. Patsch and Dr. George and Executive Director Marc Beyeler
Minutes/ Actions:	<p>Mr. Beyeler presented minutes from the February 27, 2023, meeting.</p> <p><b>Motion to approve by Dr. Ewing, second by Dr. King. Unanimously approved.</b></p> <p><b>Public Comments:</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul>	

Item	2	Public Comment for items not on the agenda Co-Chairs Dr. Patsch and Dr. George and Executive Director Marc Beyeler
Minutes/ Actions:	<p>Co-Chair asked for any public comment for items not on the agenda.</p> <ul style="list-style-type: none"> <li>• None.</li> </ul>	

Item	3	2024-2025 SAC Schedule Co-Chairs Dr. Patsch and Dr. George and Executive Director Marc Beyeler
Minutes/ Actions:	<p>Co-Chair George indicated that for next year there is a proposed SAC meeting and a SAC-Managers Workshop meeting, similar to what was done last year. The dedicated SAC meeting is targeted for the Spring and in the Fall the SAC-Managers meeting.</p>	

## BEACON SCIENCE ADVISORY COMMITTEE MEETING MINUTES

	<p>Executive Director reported that he coordinates Jenna Wisniewski bi-weekly to support SAC. BEACON does not adequately serve the SAC but due to resource challenges but is trying to do better. Marc thanked the SAC for its patience and participation.</p> <ul style="list-style-type: none"> <li>• Dr. King suggested that the timing of the proposed meetings try to be aligned with other coastal conferences or other coastal events in southern California in order to optimize the time of the SAC members.</li> <li>• Executive Director Beyeler acknowledged this request.</li> </ul> <p>Public Comments:</p> <ul style="list-style-type: none"> <li>• None.</li> </ul>
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<b>Item</b>	<b>4</b>	<b>Nomination and Selection of SAC Member - Social and Environmental Justice Expert Co-Chairs</b>
<b>Minutes/ Actions:</b>	<p>Co-Chairs George and Patsch reported that a questionnaire was assembled on google forms and a call was released for interested candidates for the open Social and Environmental Justice Expert. The SAC has reviewed the candidates, and we have a recommendation for Jose Castro Sotomayor, an Assistant Professor and Cal State Channel Islands.</p> <p><b>Public Comments:</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul>	

<b>Item</b>	<b>5</b>	<b>BEACON Staff Recommendation on SAC Re-appointment for 2025-2026 Executive Director Marc Beyeler</b>
<b>Minutes/ Actions:</b>	<p>Executive Director reported that BEACON wants to keep the current SAC together and the Board is fully supportive. The SAC is doing important work that is vital for BEACON, and we hope all members are interested in being re-appointed. BEACON staff have asked all the SAC members if they are interested in being re-appointed and all responded to the affirmative. Assuming all members confirm their interest to be re-appointed, the BEACON Board will approve the SAC membership in 2025.</p> <p>Co-chair George indicated that he would get to the Executive Director any adjustments to the SAC membership list.</p> <p><b>Public Comments:</b></p> <ul style="list-style-type: none"> <li>• None.</li> </ul>	

<b>Item</b>	<b>6</b>	<b>Presentation on Status of BEACON Science Research Agenda Implementation Activities</b>
<b>Minutes/ Actions:</b>	<p>Co-Chair Patsch reported that in this item we will be receiving a presentation from USGS on physical shoreline monitoring program in the Santa Barbara Littoral Cell, followed by a report on the BEACON</p>	

## BEACON SCIENCE ADVISORY COMMITTEE MEETING MINUTES

Science Research Agenda and then individual reports on the latest research projects with which SAC members are engaged.

The Executive Director, Marc Beyer, indicated that BEACON has a long relationship with USGS and it is critical that this relationship continues in all ways possible.

Dan Hoover from USGS made a PowerPoint presentation.

Key take aways of presentation.

1. USGS has been monitoring in the SB littoral cell since 2009.
2. Overall, BEACON coast and focused areas.
3. Most monitoring was performed using ATV and jet ski, and plane cams.
4. COSMOS came in in 2012.
5. Work includes some work in the water sheds.
6. Surveying after Montecito Debris Flow.
7. USGS funding has been flat funded over last 10 years and now has been cut.
8. Funding for 2025 and onwards is uncertain.
9. Moving forward, we need to shift to a new the approach.
10. We have come up with a “shopping list” of the questions we want to answer.
11. Future includes new monitoring tools including satellites which can be applied to the BEACON Littoral Cell.
12. USGS will actively begin to process all monitoring data generated to date.
13. USGS is willing to work with local agencies/entities directly.
14. Satellite data is now available and is very useful to a high level of scale (to 10 cm accuracy). Data is being collected has much as every four days. Automated processing of satellite data is also ongoing.

QUESTIONS:

- Battalio. Can this data can be utilitied in COSMOS modeling routine?
- Sean – all satellite data and historic survey data is used in the modeling.
- Battalio: Is the satellite data providing more accuracy in the modeling?
- Vitousek: Yes.
- Hoover: While satellite data is extensive, the precision of the data is different from the ATV and water ski data. So we are trying to make the satellite data more precise.
- Battalio: The bathymetric data remains critical.

Marc Beyeler reported that the SAC has received a report on the project that we are working on. We have a broad gambit of projects including a RSM Governance Study, which will be completed in 2025, the Regional Coastal adaptation Monitoring Project (RCAMP) which actively continues, and our phone study on beach access, and a few others. But in the interests of time, it is best to hear from the SAC about recommendations for changes or modifications to the BEACON Science Research Agenda.

Jenna Wisniewski: The dunes project to make a comprehensive inventory on California Coast (current and historic), include access, tribal sites, dune change over time, and vegetation and ecology. The project also encompasses dune modification efforts.

## BEACON SCIENCE ADVISORY COMMITTEE MEETING MINUTES

	<ul style="list-style-type: none"> <li>• Lester: Three things. Wrapping up in 2025 OPC grant on SLR Adaptation work statewide. The second is another OPC grant to create a beach resiliency fund in California, which includes USGS team. Looking at 20 counties and how they will deal with resiliency. The third is a SLR adaptation strategy for UCSB. Jenny and Patrick both involved. The plan has been adopted by the Coastal Commission and includes managed retreat.</li> <li>• Battalio: I set up a company, Coastal futures and am available for work. Work on Ocean Beach in SF relating sea level elevation, beach width, and seaward extent of the in-place vegetated dunes (SFDI Report). Another project is a call for the report of a call to action to investigate the feasibility an artificial reef headland as a sand retention – City of Pacifica. Also, I would like to see as research topics, the question of how we track sand movement and, investigating dynamic sea water levels.</li> <li>• Reineman: Kiki and I continue work on equity and SLR and beach access in California. The distributional access changes in the last 10 years in terms of coastal access. We will then apply SLR changes to this access study. How do we define coastal access and measure equity? I am also interested in monitoring surfers and surfing resources.</li> <li>• Hoover. We are trying to put out a data service which would standardize all GPS data and make it available to all.</li> <li>• King: Making progress in looking at spending in the BEACON area. Cutbacks on funding are coming, and the local communities are going to have to fund more studies.</li> <li>• Ewing: I am looking at hazard responses. Need for more holistic responses to hazardous. Also, where do cobbles fall into the overall beach structures. Finally, looking at wave orientation and resulting energy changes and impact to shorelines.</li> <li>• Dugan: Funded to monitor fish and birds in the littoral cell for next 3 years. Also, studying diet of surf-zone fish and shorebirds. Also looking at coastal change and SLR impacts on ecological features. Getting COSNAP stations installed in BEACON areas so we can have public take photos over time.</li> <li>• Revel: Working on surf science work – how we look at surf breaks and economics of surfing. We just launched the RSM Survey for BEACON that we just launched. Also, some management retreat survey work.</li> <li>• Vitousek: Working on shoreline modeling across the country including California. Trying to improve California model with dune data.</li> <li>• Co-Chair Patsch. It is important to the depth of interdisciplinary study that is being done in the BEACON region and for us to think about how we do similar work to fill gaps elsewhere in the California.</li> <li>• Co-Chair George: As a focus for the research agenda update, recommend identifying ways to roll up all the data/research we have developed and into usable products for local agencies.</li> <li>• Jim Hausser CMAC. You are aware of Association of Wetland Manager – EPA looking at re-invigorating CSMW.</li> <li>• Co-Chair George: I have also been working on this effort – coming soon.</li> </ul>
	<p><b>No action was required to be taken.</b></p> <p><b>Public Comments:</b> None.</p>

## BEACON SCIENCE ADVISORY COMMITTEE MEETING MINUTES

<b>Item</b>	<b>7</b>	<b>Planning for 2024-2025 Manager/Scientist Workshop Co-Chairs and BEACON Staff</b>
<b>Minutes/ Actions:</b>	<p>Co-Chair. George introduced that we are planning for another Manager-Scientist Summit Workshop which will be Santa Barbara.</p> <p><b>No action was required to be taken.</b></p> <p><b>Public Comments:</b> None.</p>	

<b>Item</b>	<b>8</b>	<b>Adjournment Co-Chairs</b>
<b>Minutes/ Actions:</b>	<p>Executive Director, Marc Bayeler, emphasized the importance for SAC members to complete the Governance Survey mentioned by Dr. Revel.</p> <p>Co-Chair George adjourned the meeting.</p> <p><b>No action was required to be taken.</b></p>	

**Public comment was solicited after each agenda item. No public comment was received except where noted. Adjourn to next regular meeting to be scheduled. Meeting Minutes by Gerald Comati, Program Manager – BEACON Staff.**



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## **STAFF REPORT**

**Meeting Date: April 14, 2026**

**Agenda Item: 2**

**To: Science Advisory Committee**  
**From: BEACON Science Support Staff**

**Date: April 7, 2026**

**Subject: Public Comments for items not on the agenda**

### **RECOMMENDED ACTION:**

Receive public comments on items not on the agenda.



A California Joint Powers Agency

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*City of Carpinteria*

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## **STAFF REPORT**

**Meeting Date: April 14, 2026**  
**Agenda Item: 3**

**To: Science Advisory Committee**  
**From: BEACON Science Support Staff**

**Date: April 7, 2026**

**Subject: Presentation on California's 2026 Coast and Ocean Assessment**

### **RECOMMENDED ACTION:**

Receive presentation on California's 2026 Coast and Ocean Assessment from Dr. Jill Harris, Project Lead, and a Coordinating Author, California Ocean Science Trust.

### **DISCUSSION:**

California's 2026 Coast and Ocean Assessment, the state's first such assessment of California's coastal and ocean system, is intended to provide a "comprehensive, holistic, and synthesized understanding" of the status of California's coast and ocean. The report outlines an assessment framework and provides evaluations of 14 key indicators. The report utilizes the best available monitoring data from across California, providing a state-level analysis, with results reported for the state and at the regional level.

This effort is extremely important to Beacon's research initiatives, activities and actions, as it can help inform and support Beacon's ongoing and current research and science initiatives focused on regional beaches, including regional recreational sandy beaches.

Several 'key messages' included in the report can help to inform Beacon's research, policy and implementation actions in the near term, importantly, "recommendations for strategic investments in monitoring." Beacon's support for regional monitoring will benefit from stronger collaboration with state and federal agencies.

Other key messages included in the report support (and can inform) Beacon's current and on-going future research and assessment activities and actions, including: supporting down-scaled regional models, monitoring and analysis for better-scale assessment and planning; targeting monitoring efforts to gap areas and topics; developing sources, methods, and



frameworks to better integrate research and policy; and increasing interdisciplinary science initiatives.

The Report's 'Summary of Findings' includes multiple results and recommendations that support Beacon's research in the near-term, covering important coastal and ocean habitats and landscapes, including sandy beaches, coastal dunes, rocky intertidal habitats, tidal wetlands, and kelp resources. Additionally, Beacon's long-term research focus on the human use aspects regional beaches directly addresses critical topics and data availability and limits identified in the report, including beach water quality, coastal access and beach visitation, and equity.

Dr. Harris's presentation will provide summary of the project and review details of the Assessment Report. Her presentation will cover the purposes and goals of the Assessment, the project contributors, partners, and collaborators, the process for selecting the specific indicators or categories, data and information sources, analysis and assessment methods, results, as well as suggested actions supporting existing and continuing and future monitoring.

Attachment 1: California Coast and Ocean Report 2026

California's 2026 Coast and Ocean Assessment can be viewed [here](#).

**ITEM 3 – Presentation on California’s 2026 Coast and Ocean Assessment**

**ATTACHMENT**

# California Coast and Ocean Report

Status, Progress, and What's Ahead

## 2026 HIGHLIGHTS



California's iconic coast and ocean are core to the state's identity and economy, but these special places are on the front lines of climate change and biodiversity loss. In the face of unprecedented challenges, the state has taken bold action to combat threats and build resilience to help people and nature thrive. **Below are highlights from select indicators that tell the story of California's coast and ocean.**

### SEA LEVEL RISE

Sea level rise is already impacting habitats and coastal communities in California. In response, **historic investments in planning, restoration, and nature-based projects** are helping people and nature adapt to a changing coastline.



### MARINE MAMMALS

While California's marine mammal populations are generally thriving, entanglement in fishing gear, harmful algal blooms, and whale ship strikes are major concerns. California is addressing these threats through **improved monitoring, faster response, and new collaborations with fishermen** to develop and test safer gear.



### COMMERCIAL FISHERIES

While many fisheries in California are healthy and thriving, several – such as salmon and Dungeness crab – are in crisis due to the accelerating impacts of climate change. Through actions like the Klamath River dam removal and improved data collection, California is **restoring habitat and modernizing fisheries management** to build resilience for the ocean and coastal communities.



### KELP

California's kelp forests are increasingly vulnerable in a changing ocean, with more than 95% of Northern California's kelp forests vanishing over the last decade. California's **bold, no-regrets investments in kelp research, monitoring, and restoration** have shown promising results, with more work ahead to ensure the long-term health of these iconic ecosystems.



### COASTAL ACCESS

As climate change reshapes California's coast, public access – a fundamental right of all Californians – may be at risk. By **supporting inclusive, science-based sea level rise planning efforts and adaptation projects**, California is ensuring that our treasured coastline will remain accessible for future generations.

*Learn more about the full report...*

# California Coast and Ocean Report

Status, Progress, and What's Ahead

## 2026 OVERVIEW



### ABOUT THE REPORT

The 2026 California Coast and Ocean Report uses science to explore **14 key indicators** of California's coast and ocean. Developed through a public process and guided by more than 120 scientists, these indicators reveal both the threats facing our coast and ocean and the actions needed to protect people and ecosystems. This Report tells **a story of both pressure and progress**: while climate impacts are threatening wildlife, livelihoods, and coastal access, investments in sustainable solutions are improving the health and resilience of coastal and marine ecosystems and the people who rely on them.

#### PEOPLE



Community Benefits



Beach Water Quality



Coastal Access



Commercial Fisheries

#### WILDLIFE & HABITATS



Seabirds & Shorebirds



Fish



Marine Mammals



Kelp



Rocky Intertidal



Sandy Beaches

#### STRESSORS



Sea Level Rise



Ocean Acidification



Harmful Algal Blooms



Ocean Temperature



CALIFORNIA OCEAN SCIENCE TRUST

Dive into the indicators at [opc.ca.gov/report](https://opc.ca.gov/report)

— PEOPLE —



# COMMUNITY BENEFITS

## California Coast and Ocean Report *Status, Progress, and What's Ahead* 2026

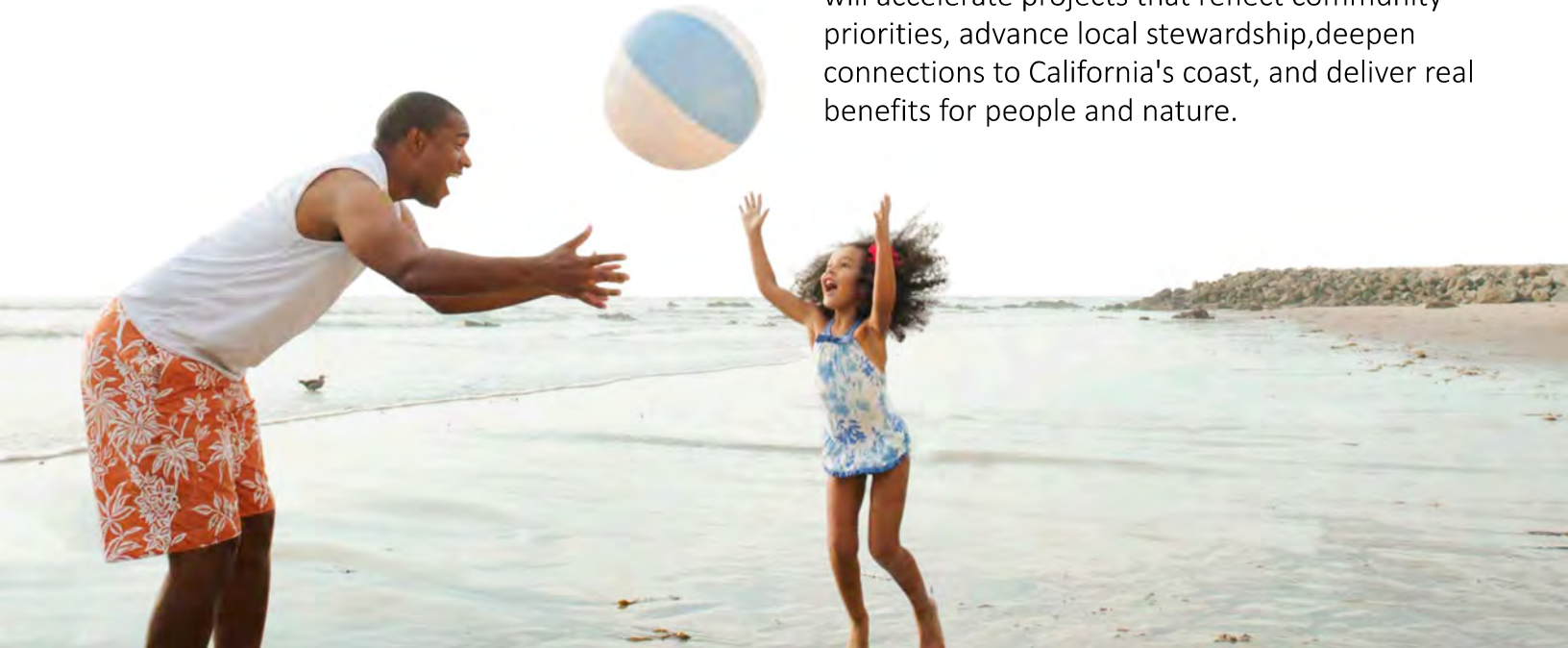
California is renowned for its extraordinary biodiversity and the incredible diversity of its communities. People from across the state visit our world-class coastline to recreate, connect with nature, and seek relief from the inland summer heat. However, historical and ongoing injustices, including the displacement of California Native American tribes, redlining, exclusion from land use decisions, and concentrated pollution, has impacted how many experience and access the coast. While the state has made progress to remedy these harms, much work remains – because access to a healthy coast and ocean is a shared right of all Californians.

### PROGRESS

California is actively breaking down barriers to coastal access and funding, and including communities in the decisions that impact them. Guided by OPC's first-ever **Equity Plan** and **Tribal Engagement Strategy** to center tribal and community needs, nearly **50% of OPC-funded projects** since 2022 have **directly benefited environmental justice communities** and California Native American tribes.

### LOOKING AHEAD

Intentional, community-led action is central to a healthy coast and ocean for all. Proposition 4, the **2024 Climate Bond**, directs a historic **\$10 billion to help the state prepare for a changing climate**, with at least 40% of all funds required to provide meaningful and direct benefits to California Native American tribes and other vulnerable communities. This historic investment, coupled with new state programs, will accelerate projects that reflect community priorities, advance local stewardship, deepen connections to California's coast, and deliver real benefits for people and nature.



## DEEPER DIVE: ENVIRONMENTAL JUSTICE ADVISORY BOARD

First convened in 2024, the **Environmental Justice Advisory Board for California's Coast and Ocean** advises OPC on the ocean and coastal needs of California communities. The inaugural seven-member Board elevates tribal and environmental justice community priorities, evaluates the state's progress on **maximizing community benefits**, advises on **equitable grantmaking**, and strengthens **regional networks and partnerships**.

## REDUCING BARRIERS TO FUNDING FOR COMMUNITY PROJECTS

- **Technical Assistance:** SB 1 Sea Level Rise Adaptation Program. OPC's first technical assistance program removed barriers for applicants and has resulted in over \$19 million awarded to tribes and local communities.
- **Environmental Justice Small Grants Program:** OPC funded two rounds of grants for community- and tribally-led projects increasing coastal stewardship and access, including a partnership with the Coastal Commission's WHALE TAIL® Grants Program.
- **Tribal Nature-Based Solutions Program:** Through a first-of-its-kind funding program, CNRA awarded \$101 million to support tribal multi-benefit nature-based solutions projects, including ancestral land return and habitat restoration.

## DEEPER DIVE: TRIBAL MARINE STEWARDS NETWORK

The **Tribal Marine Stewards Network** (TMSN) is an alliance of six California Native American tribes (the Tolowa Dee-ni' Nation, Pulikla Tribe of Yurok People, Kashia Band of Pomo Indians, Amah Mutsun Tribal Band, Santa Ynez Band of Chumash Indians, and Cher-Ae Heights Indian Community of the Trinidad Rancheria) stewarding, protecting, and restoring ocean and coastal resources across their ancestral territories. Launched as an OPC-funded pilot in 2020, the Network conducts tribally-led research, monitoring, and education to support **environmental stewardship, economic security, community well-being, and cultural vitality**.



In 2022, members of the Wiyot Tribe celebrated the purchase, with support from OPC, of one of the last pieces of undeveloped coastal wetland and upland near Humboldt Bay.



To learn more, visit  
[opc.ca.gov/report](https://opc.ca.gov/report)



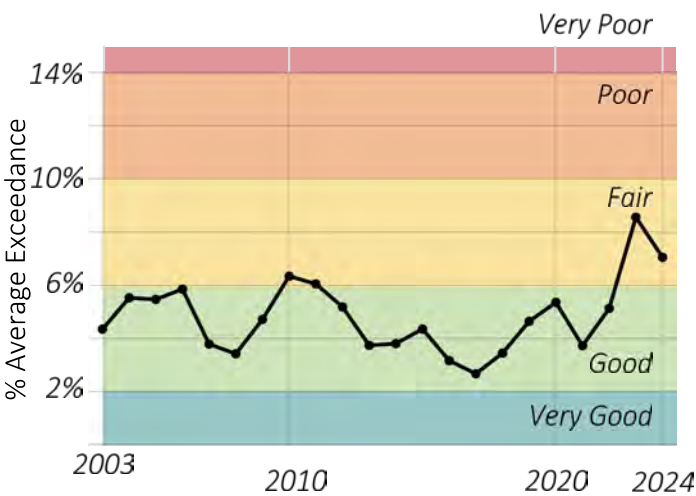
# BEACH WATER QUALITY

## California Coast and Ocean Report *Status, Progress, and What's Ahead* 2026

Every year, tens of millions of Californians swim, surf, and play in the ocean. Whether the water is safe depends on beach water quality, meaning how free coastal waters are from harmful bacteria and viruses that can cause illness. Poor water quality is closely linked to rainfall and runoff, which carry pollution from streets and farms into the sea. Routine monitoring and public reporting help people make informed choices about when and where it is safe to get in the water.

### STATUS

**Most California beaches are safe to swim with good water quality**, aside from the last two years, when water quality was slightly worse due to heavy rainfall. However, California struggles with **known problem sites** (e.g., beaches close to storm drain outlets) where poor water quality can persist.



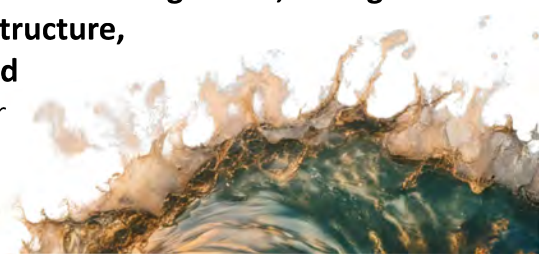
*Based on the statewide average of Enterococcus bacterial counts exceeding the health safety standards, beach water quality has been relatively stable since 2003 with more recent years being slightly worse due to heavy rainfall.*

### PROGRESS

**California now has one of the most sophisticated beach safety systems in the country.** A first-of-its-kind forecasting model can predict contamination risks before water testing results are even available, giving swimmers advance warning on high-risk days. **Faster bacterial testing methods**, developed with state support, have also cut the time it takes to issue a beach advisory from days to hours. These tools are working: **public awareness and safety at problem beaches have measurably improved.**

### LOOKING AHEAD

Climate change presents serious threats to coastal water quality, including from **increased extreme storms and wildfires**. Continuing to improve water quality will require **investments in improved stormwater management, sewage treatment infrastructure, and nature-based solutions** to filter contaminants.



## SOURCES OF POLLUTANTS

Urban and agricultural runoff, sewage discharge, and animal waste are the main sources of the bacteria and associated pathogens that contribute to poor beach water quality. In most of California, rain washes these pollutants into storm drains that flow into the ocean. This leads to years with more rainfall having worse water quality than dry years

## PROBLEM SITES WITH POOR BEACH WATER QUALITY

- Linda Mar Beach, Pacifica
- Santa Monica Pier
- Southern San Diego near the Tijuana River



### HOW TO STAY SAFE WHEN THE WATER QUALITY IS POOR

- Check your local beach water quality before visiting the beach
- Avoid entering the water for 72 hours after rain
- Avoid swimming near flowing storm drains



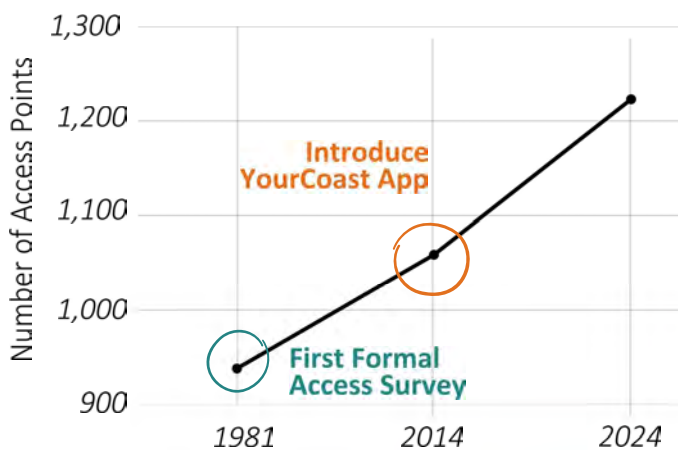
# COASTAL ACCESS

## California Coast and Ocean Report *Status, Progress, and What's Ahead* 2026

California's coast belongs to everyone, but getting there is not always easy. Since 1976, the California Coastal Act has protected the public's right to reach the state's beaches and rocky shores, recognizing that access to the ocean is essential to recreation, well-being, and California's identity. Even so, access remains limited in some areas where privately owned land or rugged terrain blocks the way.

### STATUS

**Coastal access has increased** since the formation of the California Coastal Commission fifty years ago. Now, **more than half of California's coastline (55%) is within walking distance of a coastal access point.**



*The number of coastal access points and parks managed by the California Coastal Commission have significantly increased since 1981.*



### PROGRESS

California has **added hundreds of new public access points** since the Coastal Commission was established 50 years ago, growing from under 900 to more than 1,200 today. The **YourCoast app, launched to help people find coastal access** sites near them, has been used by millions of Californians. The state has also **invested in making coastal access more equitable**, including **accessible facilities** for people with disabilities and adding new segments of the **California Coastal Trail** that open up stretches of coastline that were previously hard to reach.

### LOOKING AHEAD

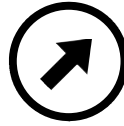
As sea levels rise, **some beaches may disappear** where the shoreline cannot move inland, threatening the public's ability to enjoy California's coast. But California is taking action. Through forward-thinking planning and targeted investments, the state is working to protect and expand coastal access for generations to come. The forthcoming statewide **Beach Resiliency Plan will identify beaches most at risk** from sea level rise and chart a clear path forward—guiding bold strategies to preserve public access as the shoreline changes.



## GREATER COASTAL ACCESS IN MORE POPULATED AREAS

2024 Status    Trend    Region

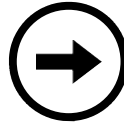
53%



### NORTHERN CALIFORNIA

Northern California, well known for its rugged coastline and inaccessible steep cliffs, has the least direct coastal access.

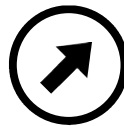
73%



### CENTRAL CALIFORNIA

In Central California, coastal access is limited by cliffs, the Amtrak rail line, military land use, and privately owned large ranching areas along the Gaviota Coast in Santa Barbara County. Less than 3% of the Gaviota Coast, a 76-mile stretch of coast along the Santa Barbara Channel, has any public access, making it one of the least accessible regions in California.

77%



### SOUTHERN CALIFORNIA

Southern California has the most accessible coastline in the state.

*Percentage of coastal miles in each region that are within walking distance of a public access point, excluding areas closed for military use or inaccessible steep cliffs. Arrows represent trends in the number of coastal access points over time.*



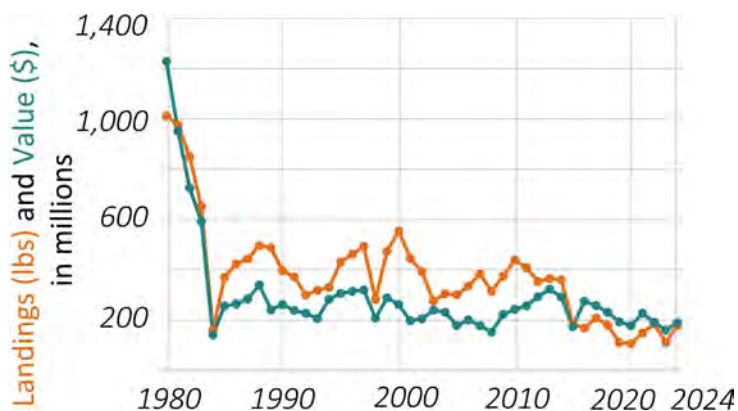
# COMMERCIAL FISHERIES

## California Coast and Ocean Report *Status, Progress, and What's Ahead* 2026

Commercial fishing is woven into the fabric of California's coastal communities, supporting thousands of fishing families and delivering local, wild-caught seafood to millions of Californians each year. State and federal agencies work to manage these fisheries sustainably, balancing the health of the ocean with the livelihoods that depend on it. But a changing ocean is putting both fish populations and the people who depend on them under growing pressure.

### STATUS

**Most commercial fisheries in California are in good condition**, with healthy stocks, stable catch, and consistent dockside value. However, **climate change is causing major disruptions to some of the most important fisheries in California**. These disruptions include continued impacts to the commercial Dungeness crab fishery and an unprecedented three-year closure of the commercial salmon fishery.



Over the last decade, two major metrics of fishery health – “catch,” or total pounds of fish landed, and “ex-vessel value,” or total amount paid for fishermen’s catch – have remained generally stable, despite an overall trend of decline in both of these metrics over the last fifty years.

### PROGRESS

In the last several years, the state has **taken major action to support healthy commercial fisheries**. California made history with the removal of four dams on the Klamath River, completed in 2024, as the largest dam removal and river restoration project ever undertaken in the United States. For the first time in over a century, salmon can reach hundreds of miles of spawning habitat once blocked by dams. State agencies are also working to improve the “climate readiness” and adaptability of fisheries management through innovative methods like **modernized fisheries data collection**.

### LOOKING AHEAD

The **accelerating impacts of climate change** – from drought and wildfire to warming waters and kelp loss – **pose significant risks to California’s commercial fisheries**. Through proactive, climate-ready fisheries management, technological innovation, and investments in coastal community resilience, the state will continue to **work with fishing communities to combat these threats and support healthy and profitable fisheries into the future**.

# FISHERY SPOTLIGHTS

## DUNGENESS CRAB

One of California's oldest and most valuable fisheries, the commercial Dungeness crab fishery generates tens of millions of dollars in revenue each year. However, the long-term health of this fishery is under threat due to multiple climate-driven issues, including increases in whale entanglements from crab fishing gear.



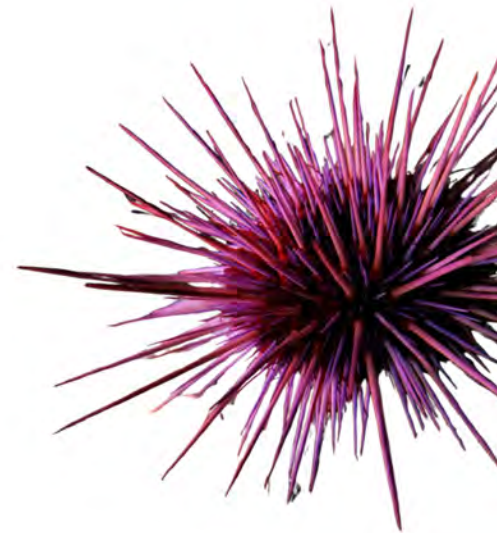
## CHINOOK SALMON

California's commercial chinook salmon fishery has been closed since 2023, largely because of impacts to salmon populations caused by drought, wildfires, and the loss of river habitat that salmon need to spawn. Chinook salmon was declared a federal fishery disaster in 2023 and 2024.



## RED SEA URCHIN

The health of the commercial red sea urchin fishery varies across the state. In Southern California, red sea urchins are generally abundant and the fishery is profitable. However, in Northern California, widespread kelp forest losses have led to fishery collapse. The federal government has allocated millions of dollars since 2016 to support the recovery of the Northern California red sea urchin fishery.



## MARKET SQUID

Generally considered the most valuable fishery in California, commercial market squid landings were worth \$78 million in 2024, with most landings occurring in Monterey Bay and the Channel Islands. However, the health of the market squid fishery is highly dependent on ocean conditions; landings decrease in warm-water years.



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## **WILDLIFE & HABITATS**

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# SEABIRDS & SHOREBIRDS

## California Coast and Ocean Report *Status, Progress, and What's Ahead* 2026

California's coastline and ocean support hundreds of species of seabirds and shorebirds, from brown pelicans soaring over the surf to tiny snowy plovers nesting on open beaches. These birds are part of what makes California's coast feel alive, and for many Californians, spotting them is one of the quiet pleasures of a day at the shore. They are also sensitive indicators of ocean health: when food is scarce, waters are toxic, or habitat disappears, birds are often the first to show it.

### STATUS

**Trends in seabird and shorebird population status are mixed.** Offshore species, like Black-footed albatross, are highly vulnerable to climate variability and changing prey availability, and are generally declining across the state. Nearshore species, like Brandt's cormorants, are generally doing well. **Coastal and estuarine species, like sandpipers, are showing concerning declines**, likely due to threats such as habitat loss and pollution.



*The seabird community has been generally stable over the last 30 years. Since 2019, more bird populations are decreasing than are increasing.*

### PROGRESS

**California passed the Migratory Bird Protection Act** to close a gap in federal law that left millions of birds vulnerable to incidental killing, making California a national leader in bird protection. **Restoration projects** along the coast are **rebuilding nesting habitat** for species like the western snowy plover that have been displaced by development and human disturbance. And at the Farallon Islands, the largest seabird breeding colony in the continental United States, **long-term monitoring supported by state funding** continues to track how species are faring as ocean conditions change.

### LOOKING AHEAD

California's seabirds and shorebirds face an uncertain future. As ocean conditions continue to change, these species will be threatened by **warming waters**, increased **harmful algal blooms** (which can be toxic to birds), **habitat loss**, and **changing food resources**. To help combat these threats, California is committed to **monitoring** marine birds, **protecting and restoring habitat**, and **mitigating land-based impacts** to the coast and ocean.

## SPECIES HIGHLIGHTS



**Brandt's cormorants** (upper photo) and **common murre**s (lower photo) have more than tripled in population size since the 1990s, largely as a result of increases in their main food source, Northern anchovies, and the successful protection of nearshore islands.



**Brown pelicans** were heavily impacted in the 1970s by DDT, a now-banned pesticide that was catastrophic for many birds. Since 2019, however, the abundance of this iconic species has increased by 89%.



**Ashy storm-petrels** had been increasing since the 1990s, but then began decreasing in 2019. Nest failure due to predation is a notable threat to these species.



## FARALLON ISLANDS: BIODIVERSITY HOTSPOT

Islands provide safe havens for seabirds to nest, and the waters around islands are often rich sources of food. The wind-swept Farallon Islands off of San Francisco, protected as a National Wildlife Refuge within the Greater Farallones National Marine Sanctuary, are home to the single largest seabird breeding colony in the continental United States. These islands are a critical site for long-term seabird monitoring and research.





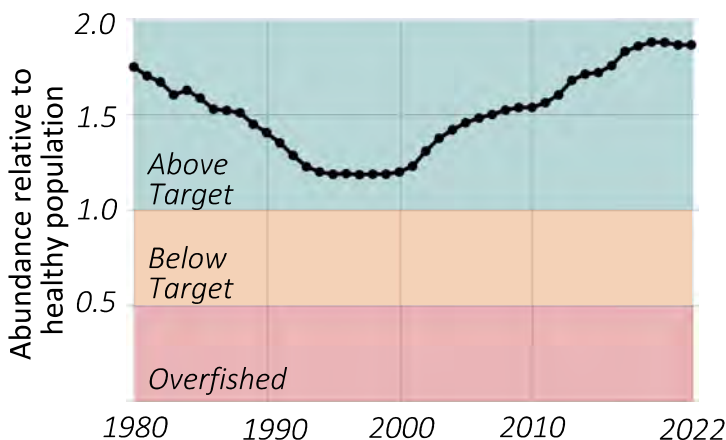
# FISH

## California Coast and Ocean Report *Status, Progress, and What's Ahead* 2026

California’s ocean waters are home to almost 600 species of fish. From the salmon that California Native American tribes have harvested for thousands of years to the iconic great white shark. In addition to playing a key role in coastal and marine ecosystems, fish support coastal economies through commercial, recreational, and subsistence fishing and are a critical food source for millions of Californians. Strict environmental protections and sustainable fisheries management help keep California’s fish populations some of the healthiest in the world. This indicator focuses on the ecological status of California’s fish based on abundance; a separate indicator explores the health of commercial fisheries across the state.

### STATUS

**Most fish species in California have healthy, abundant populations.** This includes species that are commonly commercially harvested in California. **Fluctuations in fish populations are generally caused by natural changes in ocean conditions,** though increased fishing pressure and climate-related impacts, such as kelp loss, can cause declines in fish abundance.



*Change in average abundance of 45 fish species compared to healthy population targets over time.*

### PROGRESS

Decades of science-based catch limits, California’s statewide network of marine protected areas, and habitat restoration have brought **dozens of species back from the brink of collapse,** including several rockfish populations that were severely overfished in the 1980s and 1990s. Today, many of **California's fish populations are among the healthiest and most carefully managed in the world.**

### LOOKING AHEAD

Many fish species, including more than half of commercially harvested species, are **vulnerable to climate change impacts such as ocean warming, ocean acidification, and hypoxia.** Continued support for **scientific research and monitoring,** and ongoing investments to **conserve and restore coastal and marine ecosystems,** will be critical to minimize negative impacts to fish and fisheries.

# FISH SPOTLIGHTS

## SARDINES AND ANCHOVIES

Sardines and anchovies are important fisheries in California and serve as a major food source for tunas, salmon, seabirds, and marine mammals. Sardines and anchovies experience alternating boom-and-bust cycles driven by natural changes in ocean conditions.



## VERMILION ROCKFISH

The vermilion rockfish is one of the most desirable targets for recreational fishermen. Though overfishing led to major declines in populations of rockfishes during the 1980s and 1990s, sustainable fisheries management – including catch limits, closures, and ongoing scientific monitoring – has helped rockfish recover in California.

## GARIBALDI

The bright orange Garibaldi, California's State Marine Fish, is a distinctive species often spotted by divers in Southern California's kelp forests and rocky reefs. Male Garibaldi cultivate and guard small "gardens" of red seaweed for their nests, creating unique patchy mosaics across the rocky seafloor. Take of Garibaldi is prohibited throughout California.





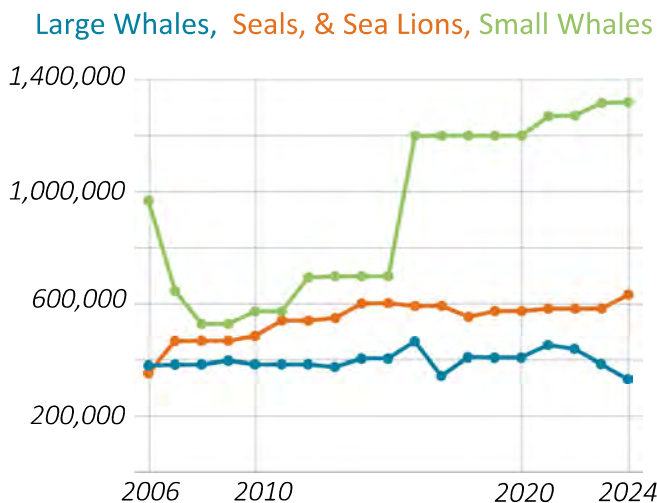
# MARINE MAMMALS

## California Coast and Ocean Report *Status, Progress, and What's Ahead* 2026

Few things stop a Californian in their tracks like a whale surfacing offshore or a sea otter floating in the kelp. California is home to nearly 40 species of marine mammals, including the blue whale, the largest animal on Earth. California's marine life are a source of wonder, ecological importance, and economic value through wildlife-based tourism. Most populations are rebounding from a century of hunting and whaling, but some, like the southern sea otter, remain threatened, and all face new risks from a changing ocean.

### STATUS

**Overall, marine mammal populations in California are healthy.** Stock assessments by the National Oceanic and Atmospheric Administration (NOAA) in 2024 showed that, out of 26 marine mammal species assessed, **most species are increasing or stable, and two species are in decline: killer whales and gray whales.** Gray whale populations have decreased by nearly 40% in recent years, likely due to environmental change.



Population of marine mammals over time (2006 to 2024), showing overall numbers to be stable or increasing.

### PROGRESS

California leads the country in marine mammal protection. Working with fishing communities, the state developed and tested new **'whale-safe' fishing gear to prevent entanglement-related deaths**, which had been rising since 2014. When whales do become entangled, a **faster emergency response system**, built in partnership with federal agencies, the fishing industry, academics, and conservation groups, is now saving animals that would previously have died. California scientists are also developing tools to **predict where harmful algal blooms (HABs) will strike**, giving marine mammal responders a head start in responding to HAB-related illnesses and marine mammal strandings along the coast.

### LOOKING AHEAD

Despite **encouraging signs of recovery and stability**, California's marine mammals are **still vulnerable**, especially in a changing ocean. The state is **doubling down on cutting-edge research and monitoring, technological innovation, and partnerships with fishing communities**, which will help protect these awe-inspiring species for generations to come.

# DEEPER DIVE: PROTECTING BLUE WHALES BLUE SKIES PROGRAM

Fatal collisions with large ships threaten whales off California's coast in high traffic areas that overlap with habitat critical for whale feeding, migration and reproduction. **Protecting Blue Whales and Blue Skies** (BWBS) is a partnership between government agencies, research partners and conservation organizations working to make our air cleaner, and the ocean quieter and safer for whales. The program achieves these goals through a Vessel Speed Reduction (VSR) zone in which ocean-going vessels of 300 GT (gross tons) and larger voluntarily slow down to 10 knots or less within sensitive whale habitats off California's coast.

Since 2014, the program has avoided over 200,000 metric tons of greenhouse gas emissions, 5,900 tons of NOx emissions, and resulted in an estimated 50% reduction in whale strikes. The California Legislature recently enacted Assembly Bill 14 (Hart, 2025) to expand the success of this program statewide.



## SPECIES HIGHLIGHTS



**HUMPBACK WHALE** populations have **increased** since monitoring began in 1990, but entanglement in fishing gear increased dramatically beginning in 2014, impacting humpback whales. Ship strikes are another ongoing threat to humpback whales.



**GRAY WHALES** Gray whales migrate along the entire West Coast, from the Arctic to Baja California. Gray whale populations have **decreased** by nearly 40% between 2019 and 2023 — a loss of tens of thousands of animals. This event was driven largely by ecosystem changes in Arctic feeding grounds that reduced birth rates and caused malnutrition, leaving gray whales more vulnerable in California waters.



**CALIFORNIA SEA LION** populations have fully **rebounded** to healthy levels under the protection of the Marine Mammal Protection Act. However, strandings of sea lions have recently increased, due to domoic acid poisoning caused by harmful algal blooms.



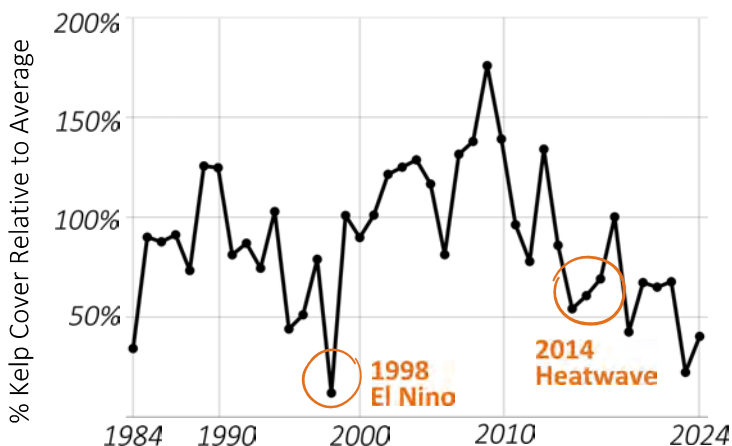
# KELP

## California Coast and Ocean Report *Status, Progress, and What's Ahead* 2026

Dive into the water off California's coast and you may find yourself in a kelp forest, towering columns of seaweed rising from the seafloor to the surface and sheltering hundreds of species of fish and wildlife. These ecosystems are among the most productive on Earth, and they are deeply woven into California's identity, economy, and cultural heritage. But California's kelp forests are in serious trouble, having shrunk dramatically over the past decade as the ocean warms.

### STATUS

In recent years, California has experienced severe **climate-driven declines** in kelp canopy. Overall, kelp canopy has been lower than normal since 2014, when a marine heat wave resulted in dramatic die-offs of kelp across the state. **In 2024, more than 75% of kelp forests were smaller than their long-term average.** However, preliminary data from 2025 indicate that kelp forests are **beginning to recover in much of Central and Southern California.**



Percent of kelp cover in 2024 relative to the long-term average (1984-2013).

### PROGRESS

**California has taken bold action** in the face of kelp loss, adopting a “learn by doing” approach that meets the urgency of the moment and **investing close to \$11 million in kelp research and restoration** over the last four years. These efforts are filling knowledge gaps to successfully restore kelp ecosystems and build resilience in the face of a changing ocean.

### LOOKING AHEAD

Early successes, driven by state investments, will directly inform the development of a statewide **Kelp Restoration and Management Plan – the first plan of its kind in California history.** Additionally, Proposition 4, the 2024 Climate Bond, earmarked **\$19 million specifically for kelp protection and restoration** – a landmark investment that will drive progress on the **state’s goal to restore 2,000 acres of kelp by 2030.**

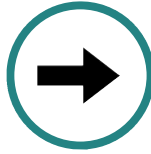




## STATUS VARIES ALONG THE COAST

2024 Status	5-Year Trend	Region
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-96%



### NORTHERN CALIFORNIA

Kelp cover in **2024** was the **second lowest in four decades** and lower than any other region. Substantial declines started in 2014 when a marine heatwave coincided with the **loss of sea stars and an explosion in kelp-eating purple sea urchin** populations. Generally, kelp forests in this area have yet to recover.

-53%



### CENTRAL CALIFORNIA

2024 was the third-worst year on record, with kelp cover at **half of the long-term average** size. Kelp cover has been **declining since 2019**, although the cause is still unclear.

-77%



### SOUTHERN CALIFORNIA

Kelp cover **improved compared to 2023, which was one of the worst years on record**, likely due to early-season storms.

+7%



### CHANNEL ISLANDS

Kelp cover in this region has increased over recent years. The southern Channel Islands, such as **San Clemente and Catalina, remain most abundant**. However, the northern islands, such as **San Miguel and Santa Rosa, are experiencing declines** in kelp cover.

Percentages are 2024 kelp cover compared to the long-term average (1984-2013). Arrows are the direction of change over the last five years (2020-2024).



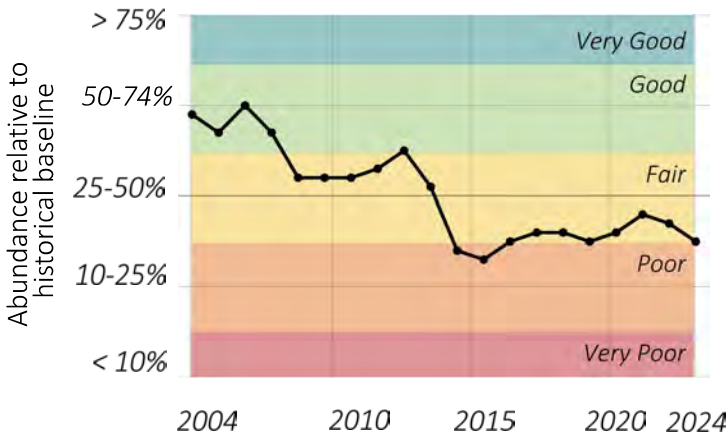
# ROCKY INTERTIDAL

## California Coast and Ocean Report *Status, Progress, and What's Ahead* 2026

Tidepools are one of California's most visited natural wonders, places where someone can crouch down and come face to face with sea stars, anemones, and hermit crabs without a boat or scuba gear. These rocky intertidal habitats, where the shoreline meets the sea, support remarkable biodiversity and offer Californians an unmatched window into ocean life. They are also surprisingly rare and fragile, already showing the effects of heat waves and pollution in ways that scientists are tracking closely.

### STATUS

From 2013-2015, a **major marine heat wave and disease outbreak caused populations of ochre sea stars, rockweeds, and other intertidal species to decline.** In some places, rocky intertidal ecosystems are starting to recover from heat wave impacts, but recovery has been highly variable across the state.



*The combined status of four key species abundance from 2004- 2023, compared to the historical baseline: rockweeds, surfgrass, mussels, and ochre sea stars.*

### PROGRESS

California has built **one of the world's most comprehensive tidepool monitoring programs.** The Multi-Agency Rocky Intertidal Network and the citizen science program Snapshot Cal Coast together track hundreds of species at sites across the entire state coastline, generating data that scientists use **to track change over time, detect early warning signs of ecosystem stress, and measure whether marine protected areas are working.**

### LOOKING AHEAD

As climate change accelerates, bringing with it impacts like heat waves, increasing ocean temperatures, and rising sea levels, **rocky intertidal ecosystems will be increasingly at risk.** Protecting these rare and sensitive habitats from **overharvest, trampling, pollution, and other human impacts,** as well as **making room for intertidal zones to move inland as sea levels rise,** will help to ensure the long-term health of these ecosystems into the future.

# PATTERNS OF CHANGE

California’s tidepools are home to algae, invertebrates, fishes, mammals, and shorebirds that feed in these areas. Many of these species are essential for healthy ecosystems. Rockweeds and surfgrasses, for example, provide food and habitat for other species, while ochre sea stars – voracious predators – help maintain biodiversity by keeping other species in check.

As ocean conditions have changed in the last decade, these keystone species have been impacted, resulting in changes to rocky intertidal ecosystems across the state.



## NORTHERN CALIFORNIA

Overall, rocky intertidal habitats have changed the least in this region over the last decade. This is the only region in California where ochre sea stars have shown recovery following a major disease outbreak in 2013.

## CENTRAL CALIFORNIA

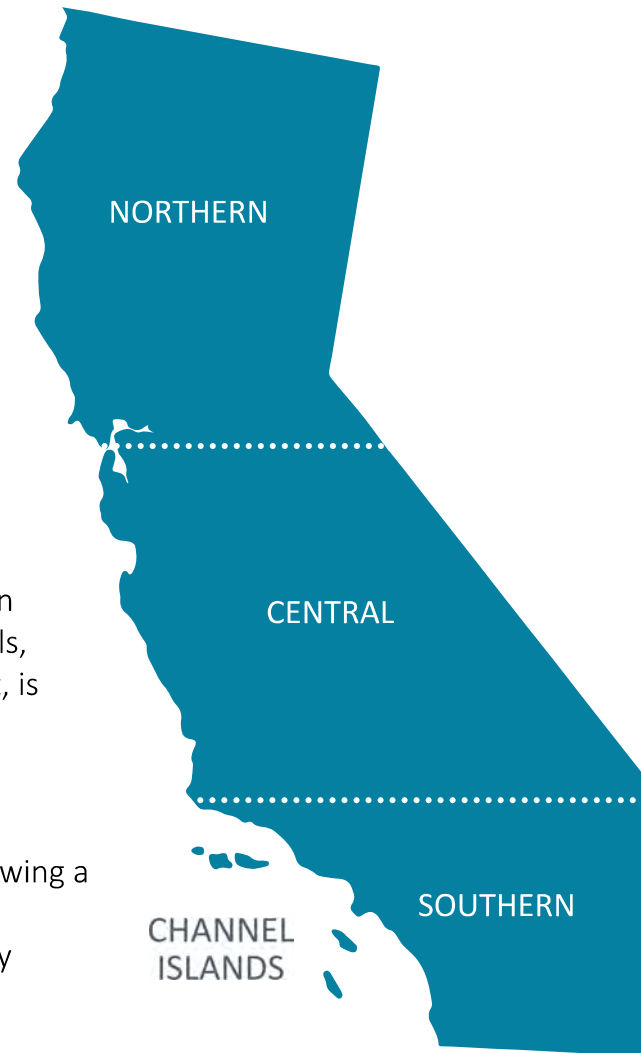
This region has seen major declines in foundational algae and plant species, such as rockweeds and surfgrasses, which began declining in 2019 and have yet to recover.

## SOUTHERN CALIFORNIA

Rocky intertidal habitats have changed substantially in this region over the last decade, with marked declines in rockweeds, mussels, and sea stars. Human impact, such as trampling and overharvest, is particularly high in this region.

## CHANNEL ISLANDS

In this region, both rockweeds and ochre sea stars declined following a major marine heat wave that lasted from 2014-2016, and these species have not recovered. However, populations of other rocky intertidal species, including the endangered black abalone, have increased in this region.





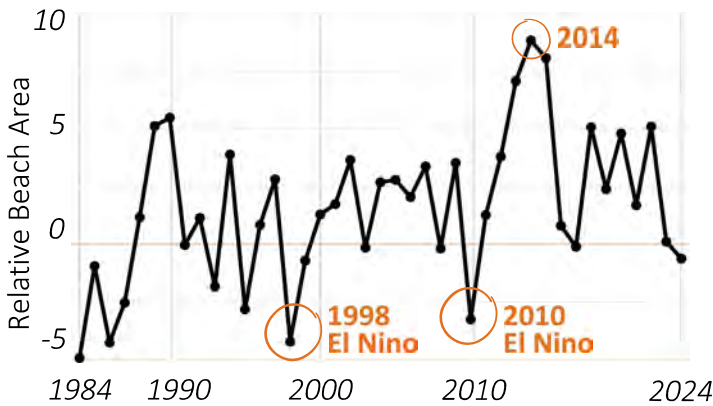
# SANDY BEACHES

## California Coast and Ocean Report *Status, Progress, and What's Ahead* 2026

For millions of Californians, the beach is one of the most visited and beloved places in the state, a place to swim, surf, fish, and gather. Beyond recreation, beaches protect coastal communities from erosion and flooding and provide essential habitat for wildlife. These defining features of California's coastline face a long-term challenge: they are slowly shrinking due to sea level rise and other stressors.

### STATUS

**Most California beaches have been shrinking, or narrowing, since the record-high widths in 2014.** Due to the strong winter storms of 2023, beaches in Central California have been shrinking more than beaches in Northern and Southern California.



*Changes in beach area as tracked by satellite measurements. Beaches were smallest during the El Niño storm years of 1998 and 2010, and largest in 2014 due to calm conditions that allowed sand to accumulate.*

### PROGRESS

Keeping California's beaches intact requires addressing the sources of sand that feed them. **Reconnecting inland sediment through healthy rivers, such as the historic Klamath Dam removal, can restore the natural flow of sand and sediment to the coast, replenishing beaches starved of naturally occurring sediment.** The state has also made **historic investments in dune and wetland restoration**, which not only protect beaches from erosion today but also create pathways for beaches to migrate inland as sea levels rise.

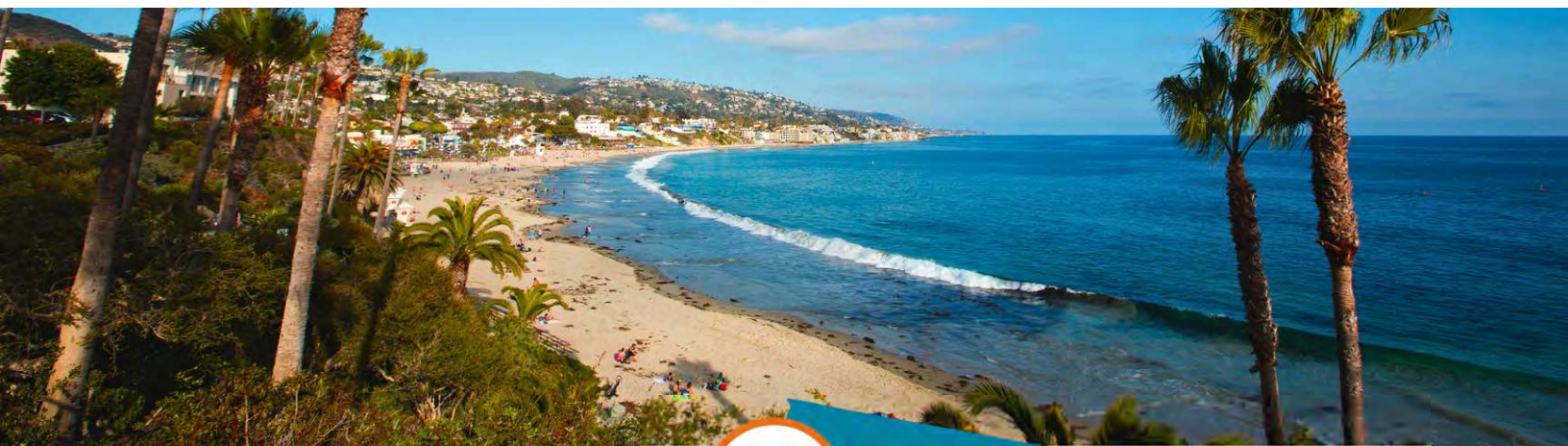
### LOOKING AHEAD

Beaches are dynamic environments that vary naturally from year to year, however **rising seas, beach erosion, and development** are putting California's beaches under long-term pressure — a problem scientists call 'coastal squeeze.' Through the development of a **Beach Resiliency Plan** and **planning for sea level rise**, the state is taking a proactive, coordinated, and consistent approach to support coastal planning that prioritizes beaches and the public's right to enjoy them.



# BEACH SIZE FLUCTUATES ALONG THE CALIFORNIA COAST

Following a considerable loss of sand in 2010 due to storms, California beaches recovered to near-record widths in 2014. Since then, those wide beaches have been shrinking, but these patterns vary considerably from beach to beach. More beaches are losing sand in Central California, and beaches are consistently shrinking in places like Surfside and San Clemente. The state and local planners must consider beach-specific differences when planning for sea level rise.



## NORTHERN CALIFORNIA

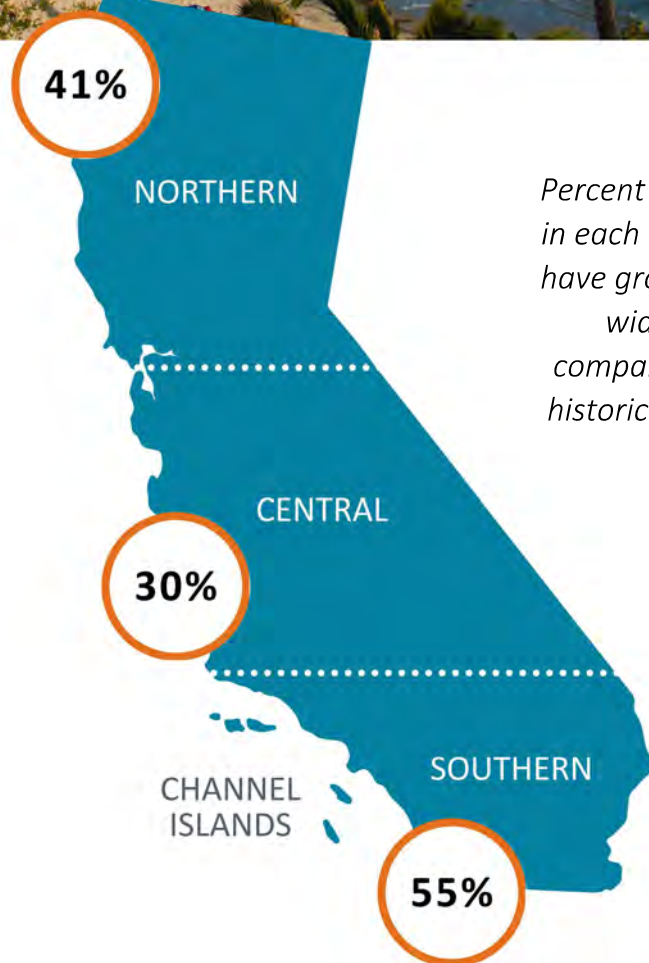
59% of beach segments are narrowing and **41% are widening**. There was a moderate narrowing trend over the past four years.

## CENTRAL CALIFORNIA

70% of beach segments are narrowing and **30% are widening**. There was a strong narrowing trend over the past four years.

## SOUTHERN CALIFORNIA

45% of beach segments are narrowing and **55% are widening**. There was a weak narrowing trend over the past four years.



*Percent of beaches in each region that have grown, or are wider, in 2024 compared to their historical average.*

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# STRESSORS

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# SEA LEVEL RISE

## California Coast and Ocean Report *Status, Progress, and What's Ahead* 2026

California has nearly 1,100 miles of coastline, and rising seas are affecting almost every stretch of it. Sea level rise, driven by warming oceans and melting ice sheets, is steadily pushing water higher onto shores, increasing flooding, erosion, and the risk of saltwater reaching freshwater supplies. For the millions of Californians who live, work, and play along the coast, it is one of the most consequential long-term threats they face.

### STATUS

Over the past century, **California's coast has seen about 6–8 inches of sea level rise** and is experiencing accelerated sea level rise, with a projected statewide average increase of **0.8 feet by 2050 and between 1.6 and 3.1 feet by 2100**. Sea level rise poses significant threats to coastal infrastructure, habitats and wildlife, and communities, with **some scenarios estimating over 5 feet of rise and over \$250 billion in property exposed to sea level rise-related threats** by the end of this century.



### PROGRESS

**California is one of the few places in the world requiring every coastal city and county to have a sea level rise plan** — a law passed in 2023 that sets a 2034 deadline and mandates use of the best available science. The state has backed that requirement with real money: the Ocean Protection Council's **Senate Bill 1 Sea Level Rise Adaptation Grant Program has invested more than \$36 million** across the state to help coastal and Bay Area communities plan and prepare for a changing coastline. The **2024 Climate Bond (Proposition 4) includes substantial new funding** to accelerate this program and support coastal resilience statewide.

### LOOKING AHEAD

Sea level rise planning and implementation of adaptation projects are expected to progress significantly in the coming years with **continued funding** from the Ocean Protection Council's **Senate Bill 1 Sea Level Rise Adaptation Grant Program and Climate Bond investments**. The Ocean Protection Council is also committed to **updating the best available science** on sea level rise approximately every 5 years.

# SEA LEVEL RISE PLANNING VARIES ACROSS THE CALIFORNIA COAST

Proactive, consistent, and long-term planning for sea level rise is essential for coastal communities to prepare and build resilience by minimizing threats to public health, infrastructure, and safety, while ensuring investments are smart and long-lasting. Statewide, planning for sea level rise is currently underway across 68% of coastal and Bay jurisdictions. This requires early and consistent community engagement to ensure local support and consensus, making adaptation efforts reflective of community values, and therefore more effective and sustainable for long term planning and local investments.

## NORTHERN CALIFORNIA

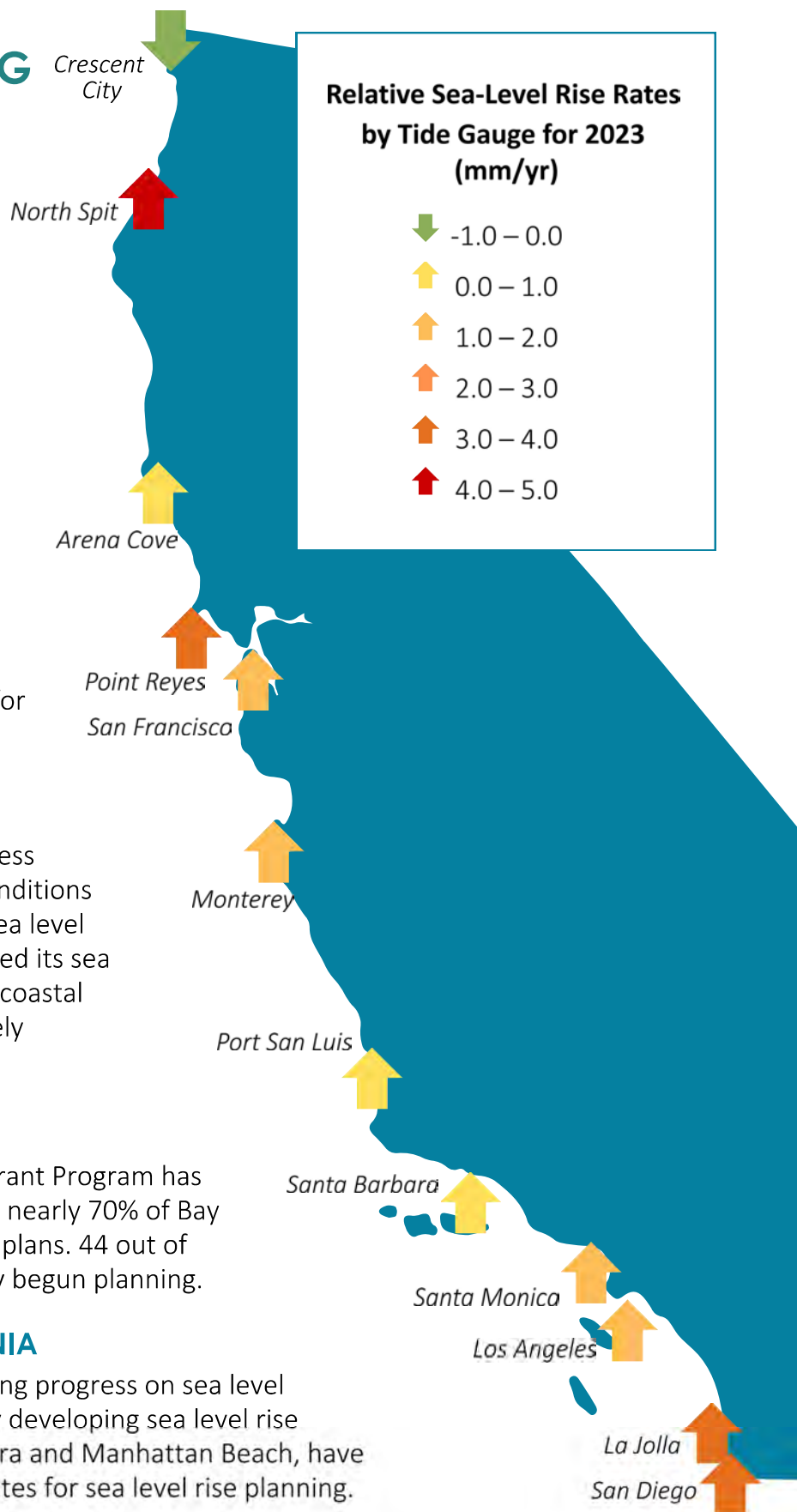
The North Coast is unique in its relatively less developed coastal areas and geological conditions that make some areas less vulnerable to sea level rise. While only Sonoma County has certified its sea level rise plan, 75% of Northern California coastal and Bay Area cities and counties are actively underway in planning.

## SAN FRANCISCO BAY AREA

Ocean Protection Council's Senate Bill 1 Grant Program has invested more than \$20 million to support nearly 70% of Bay Area jurisdictions to develop sea level rise plans. 44 out of 51 jurisdictions have formally or informally begun planning.

## CENTRAL AND SOUTHERN CALIFORNIA

The Central and South Coast are also making progress on sea level planning, with 64% of jurisdictions actively developing sea level rise plans. Two South Coast cities, Santa Barbara and Manhattan Beach, have certified Local Coastal Program (LCP) updates for sea level rise planning.



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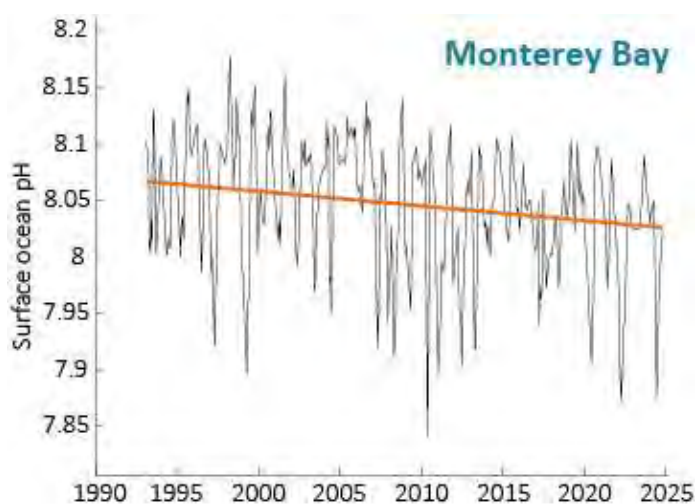
# OCEAN ACIDIFICATION

## California Coast and Ocean Report *Status, Progress, and What's Ahead* 2026

The ocean absorbs excess carbon dioxide that humans release into the atmosphere, and that is changing the chemistry of California's coastal waters. Ocean acidification makes seawater more corrosive, weakening the shells and skeletons of crabs, oysters, clams, and other animals that Californians harvest and depend on. For fishing communities, shellfish farmers, and tribes with deep cultural ties to the sea, this is not a distant threat. It is already affecting livelihoods and cultural connection, in addition to impacting ecosystem health.

### STATUS

The amount of **seawater that is corrosive to marine life's shells is six times larger** off California's coast than before the widespread use of fossil fuels. Acidification can be further **intensified by land-based sources of nutrients**, such as wastewater, especially near densely populated urban areas.



*Ocean acidification time series observed in Monterey Bay showing long-term acidification.*

### PROGRESS

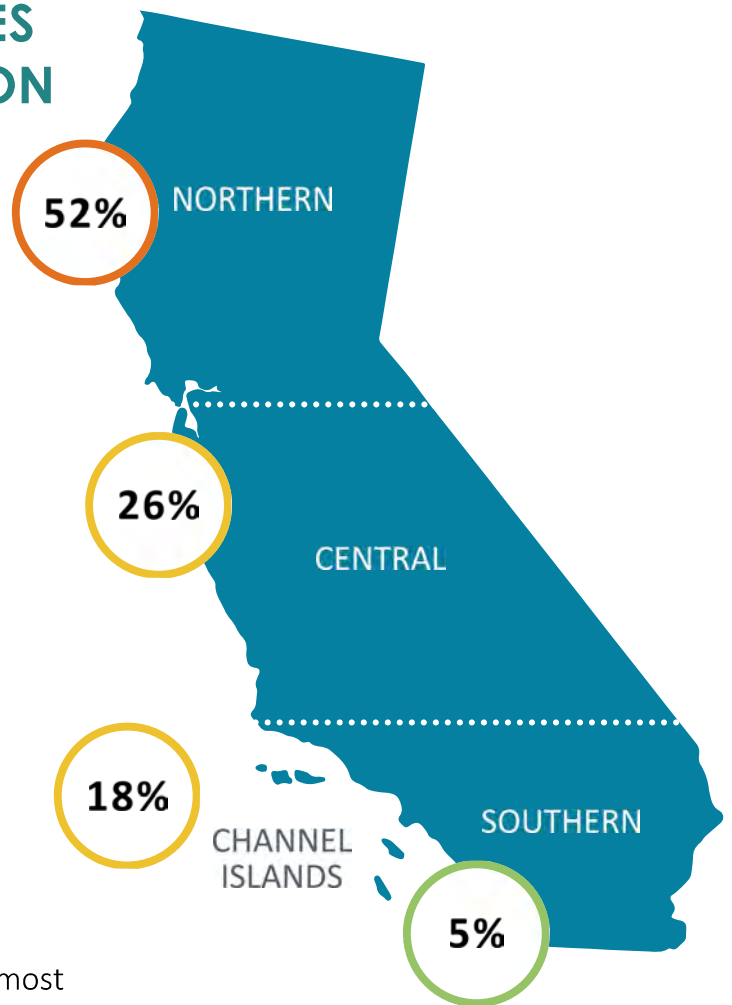
California is taking action on ocean acidification. The state is committed to **ambitious carbon emission reduction goals**, including 100% carbon-free electricity and economy-wide carbon neutrality by 2045 to directly address the carbon emissions driving acidification. California has also built **one of the most comprehensive ocean monitoring networks** on the West Coast, tracking acidity levels in real time and funding research to understand how acidification is already affecting fisheries and marine food webs.

### LOOKING AHEAD

As carbon dioxide emissions increase, **ocean acidification will continue to worsen and shrink the area of the ocean that is favorable to shell-building marine life**. In addition to California's ambitious carbon neutrality goals, the State Water Resources Control Board is also considering **taking action to address the impacts of land-based nutrients** on coastal acidification.

# OCEAN ACIDIFICATION VARIES SEASONALLY AND BY LOCATION

Ocean acidification is influenced by both natural (e.g., upwelling) and human-caused processes (e.g., atmospheric carbon dioxide and land-based nutrients). Its severity fluctuates seasonally and regionally across California. In the summer, strong winds push acidic, nutrient-rich water from the deep ocean to the surface, a process called upwelling. Upwelling is strongest in Northern California, where 50% or more of waters are corrosive during the summer months. Conditions in Northern California are more acidic compared to Southern California. California is particularly vulnerable to ocean acidification because of these natural upwelling processes.



## IMPACTS ON MARINE LIFE AND FISHERIES

Ocean acidification is already impacting California's most valuable fisheries and marine food webs. As seawater becomes more acidic, animals such as **crabs, oysters, clams, mussels,** and **pteropods** have a harder time building their shells and skeletons. To reduce these impacts, some California oyster farmers are testing strategies to make seawater more favorable to shellfish, like growing oysters alongside kelp.

*Typical values of the percent of corrosive waters in the summer. In some years, corrosive waters can exceed 80% off Northern and Central California and up to 30% off Southern California.*



*Pteropod shells dissolving under severe ocean acidification conditions.*



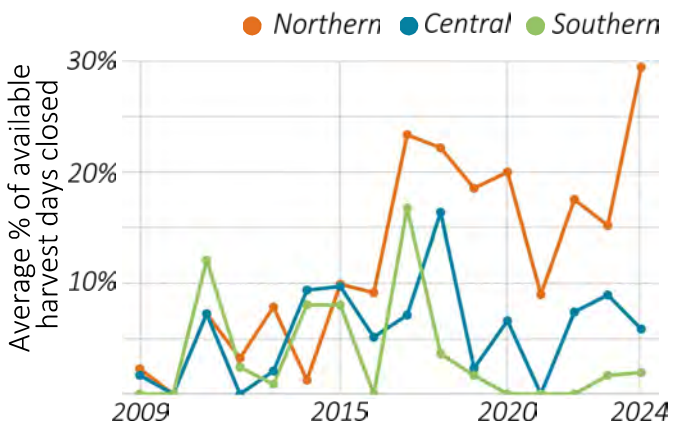
# HARMFUL ALGAL BLOOMS

## California Coast and Ocean Report *Status, Progress, and What's Ahead* 2026

Harmful algal blooms, or HABs, happen when certain algae grow out of control and produce toxins. For Californians who fish, gather shellfish, or spend time near the coast, HABs are a direct health concern: the toxins accumulate in seafood and can make people and marine wildlife seriously ill. Climate change is making these events more frequent and severe. When toxins are detected, managers often close shellfish harvesting to protect public safety.

### STATUS

In 2024, HAB-related shellfish harvesting **advisories or closures impacted 8 of the 15 coastal counties** in California, including four of the five Northern California counties. **Recreational shellfish harvesting closures due to HABs have been increasing in Northern California** since 2009 due to high levels of toxins in razor clams, however there was no change in the long-term trend for most coastal counties. In recent years, atypically high numbers of marine mammals have stranded in Central and Southern California due to suspected HAB toxins.



Percentage of areas with HABs-related recreational shellfish (oysters, clams, scallops, and mussels) advisories and closures.

### PROGRESS

**California runs one of the most proactive HAB monitoring programs in the United States.** Every year before the Dungeness crab season opens, the state tests for toxins along the entire coast, protecting both consumers and fishermen from the health consequences of a contaminated harvest. When **marine mammals strand** due to toxic algal blooms, **state-funded rescue and rehabilitation teams respond.** And a new forecasting effort is working to **predict where blooms will occur before they happen**, buying critical time for public health officials and fishery managers to respond.

### LOOKING AHEAD

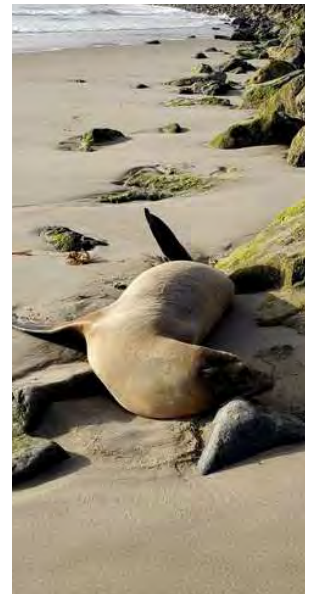
Warming and marine heatwaves are contributing to the northward expansion of HAB species, so **more HAB events in Northern California are anticipated.** In Central and Southern California **increases in marine mammal impacts** have been observed.



# DEEPER DIVE: MARINE MAMMAL STRANDINGS

HAB toxins can make marine mammals, such as sea lions, dolphins, and whales, physically sick, disoriented, and stranded on beaches. Strandings have increased in recent years, suspected to be due to HAB toxins.

- Strandings are often caused by domoic acid poisoning, which can happen when marine mammals are exposed to toxic algae – often a byproduct of warming oceans. Domoic acid poisoning can result in abnormal or aggressive behavior in sea lions, putting people at risk if they interact with sick animals.
- In Southern and Central California, strandings were already higher in the first half of 2025 (numbers through June) than in the previous six years and included more strandings of whales and dolphins than previously observed.
- The public can report strandings to 415-289-SEAL.



## NORTHERN CALIFORNIA

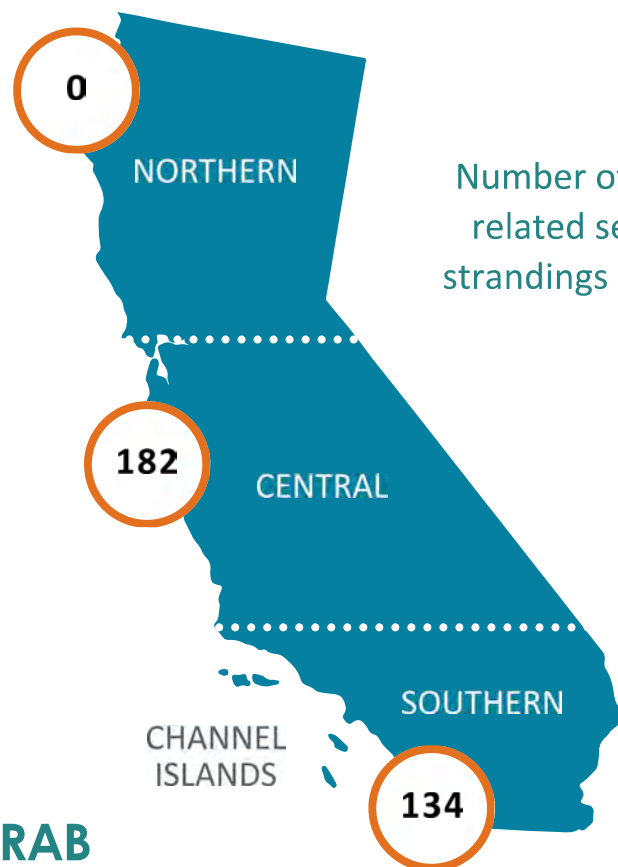
Climate change is causing HAB species to expand northward, however, impacts to marine mammals in Northern California have not been as severe, relative to other regions.

## CENTRAL CALIFORNIA

This region has experienced an uptick in marine mammal strandings three of the past four years (2022, 2023, and 2025), many of which were suspected to be associated with harmful algal bloom (HAB) toxin exposure.

## SOUTHERN CALIFORNIA

As of 2025, this region experienced its 4th consecutive year of significant marine mammal strandings.



Number of HABS-related sea lion strandings in 2024.

# DEEPER DIVE: DUNGENESS CRAB

In Northern California, Dungeness crab is a culturally and economically important fishery also impacted by HAB toxins. In 2024, health advisories against harvesting and eating Dungeness crab were issued all five Northern California counties. In addition to the routine in-season testing, the state conducts annual pre-season HAB toxin testing to help protect public health before the crab season begins.



To learn more, visit [opc.ca.gov/report](https://opc.ca.gov/report)



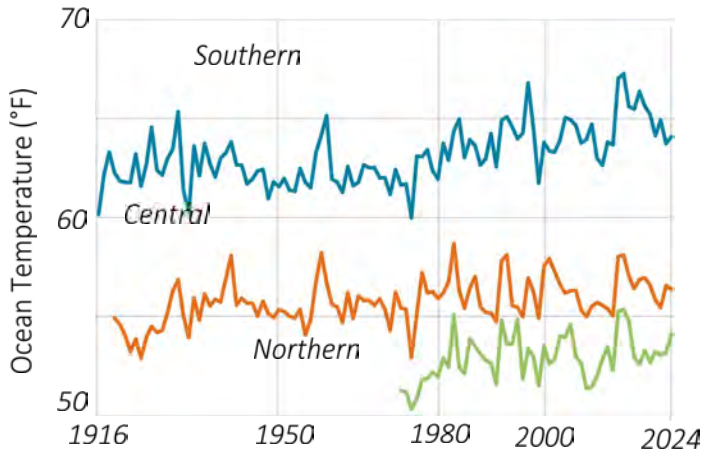
# OCEAN TEMPERATURE

## California Coast and Ocean Report *Status, Progress, and What's Ahead* 2026

Ocean temperature shapes nearly everything Californians experience along the coast: the health of kelp forests, the location of fish and other marine life, the timing of harmful algal blooms, and the severity of coastal storms. California's ocean is naturally cooled by upwelling, which draws cold, nutrient-rich water from the depths and supports some of the world's most productive marine food webs. But the ocean is warming due to human-induced greenhouse gas emissions. Extended stretches of unusually warm water, known as marine heat waves, are becoming more frequent, with cascading effects on ecosystems and people.

### STATUS

**Ocean waters off California's coast are warming by approximately 2°F per century.** In the past 50 years, ocean temperature in Southern California has warmed more than in other parts of the coast. Despite the long-term warming trend, 2024 temperatures were relatively close to average along most of California's coast. While the year started warmer due to El Niño, stronger upwelling brought cooler waters to the ocean surface in late 2024.



Since the 1970's, ocean temperature has increased 1.8F in Southern California. The temperatures in Central and Northern California show slower warming trends.

### PROGRESS

**California's network of 124 marine protected areas (MPAs), one of the largest ecologically connected MPA networks in the world, may help strengthen resilience to ocean warming.** Scientific monitoring suggests some ecosystems, such as kelp forests and tide pools, may recover from marine heat waves faster within MPAs than in unprotected areas. **California is committed to research and monitoring** to better understand the impacts of ocean warming, how to employ tools like MPAs to bolster resilience, and where to focus conservation and restoration efforts.

### LOOKING AHEAD

Climate change will continue to warm the ocean, leading to **more frequent and severe marine heatwaves**. Continued leadership and progress in reducing greenhouse gas emissions will help reduce the underlying driver of increasing ocean temperature and marine heat waves. **Investments in monitoring ocean conditions and ecological changes** will ensure managers can understand, predict, and respond to temperature-driven changes along California's coast.

# SPECIES MOVING WITH A WARMING OCEAN



As ocean temperatures rise, species move to water that is more suitable, reshaping ecosystems and food webs. Sensitive to temperature stress, animals and plants in the rocky intertidal zone are good indicators of ocean warming patterns. One in five species living in this zone is found further north than they were just two decades ago. Today, species such as the orange sea cucumber and wakame (winged kelp) can be found more than 200 miles further north than in the early 2000s.



Orange sea cucumber



© John D Reynolds

Wakame (winged kelp)

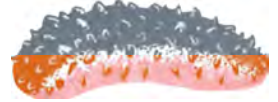
**Moving North**  
51 species



**Not Moving**  
182 species



**Moving South**  
10 species



*Of the 243 monitored rocky intertidal species, 51 species (21%) are now seen further north in cooler waters, and 10 species (4%) are found in southern locations.*



A California Joint Powers Agency

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## **STAFF REPORT**

**Meeting Date: April 14, 2026**  
**Agenda Item: 4**

**To: Science Advisory Committee**  
**From: BEACON Science Support Staff**

**Date: April 7, 2026**

**Subject: Presentation on Update of the BEACON Science Research Agenda and Implementation Activities**

### **RECOMMENDED ACTION:**

Receive a report from the BEACON Science Staff updating BEACON initiatives implementing BEACON Science Research Agenda activities.

### **DISCUSSION:**

BEACON Science Staff will provide an Update of BEACON research and activities of the Science Research Agenda. In 2021, the BEACON developed a multi-year Science Research Agenda focused on priority program areas and activities. Original priority activities included expanding and enhancing regional monitoring capabilities, addressing the complementary BEACON goals of regional sediment management (RSM), coastal resource, ecosystem management, and regional climate change and sea level rise (SLR) adaptation planning, expanded data collection efforts, and increased research funding and development of decision-support tools.

Since 2021, BEACON has initiated several on-going efforts addressing complementary research goals. BECON has reported on these multiple projects in several different outreach and input sessions, including before the SAC (eg., Manager-Scientist Workshop Summary March 2024). This 2026 Update includes recommendations to update research agenda priorities, it reports on the status of research activities and actions undertaken between 2021 and the present. Finally, the Update identifies priority research topics and activities planned for 2026-2030.

The 2026 Update provides current information regarding the complementary research and program topics in the original research agenda, briefly described below. These topics include: Stakeholder Outreach and Engagement; Tribal Consultation and Collaboration; Integrating RSM and Climate and SLR

Adaptation Planning; Regional Monitoring; Interdisciplinary Research; Modeling; Prototyping; Information Management and Decision-Support; and Governance, Operations and Funding.

### ***Stakeholder Outreach and Engagement***

BEACON received recommendations to include additional research activities focused on community and stakeholder engagement and equity analysis. In addition, BEACON received several suggestions to address program and knowledge gaps, including expanded focus on engaging target communities to better understand equity impacts and outcomes; and expanded research initiatives utilizing traditional knowledge. One important research topic recommended was the need to focus additional research addressing differential vulnerabilities facing underrepresented communities. Suggestions included research on hazards and risks, research on ‘extreme event’ response planning, and research on community-scale/neighborhood scale adaptation actions.

### ***Tribal Consultation and Collaboration***

BEACON has received input from representatives of the Chumash that BEACON should better engage the Chumash Tribes in program implementation, including regional data collection and regional monitoring. BEACON staff have included several suggestions in the Update to the SRA. For example, Chumash representatives have provided important comments on physical, ecological, and social science research areas, identifying assessment of sensitive coastal physical and ecological resources used for purposes of social-cultural and traditional practices as a gap not yet addressed in either current or planned physical and ecological monitoring planning. The input cited the lack of adequate social-cultural research on the use of sensitive coastal resources by traditional Chumash coastal communities. Finally, tribal representatives cited lack of adequate research on governance and engagement needs, especially new or innovative Tribal consultation models, and new collaborative community-based science and research models.

### ***Integrating RSM and Climate and SLR adaptation planning***

BEACON’s Coastal Resilience research and policy project was developed with multiple project collaborators, representing different subject matters and disciplines. The grant project was completed at the end of 2024 with results shared widely in 2025. The grant goals include providing integrated data and analysis to inform coastal regional sediment management and coastal climate adaptation. Several complimentary information and planning needs were addressed in this research project, including modeling of coastal sediment transport and fate; development of typology of different sandy beaches; development of impact assessment and regional permitting; and model beach nourishment projects.

BEACON has developed the Regional Coastal Adaptation Monitoring Program (RCAMP) in partnership with the City of Santa Barbara, identifying regional monitoring needs for regional and local climate and SLR adaptation. The RCAMP supports priority needs by developing regional monitoring program elements focused on coastal adaptation that can serve to support adaptation planning, including informing the implementation of adaptation actions and activities.

### ***Regional Monitoring***

The initial science research agenda identified gaps and voids in regional monitoring needed to support coastal sediment management, coastal access and recreation, coastal restoration and coastal climate and SLR adaptation. Since 2021 BEACON staff have been working with local agencies to identify opportunities for funding to support advancing regional monitoring programs addressing the multiple topic areas of physical, environmental, ecological, and social and human use. Current and on-going BEACON efforts are included in the Update.

**Physical Data:** The RCAMP (described above) supports on-going Physical Shoreline Data collection currently being undertaken as part of a long-term science partnership with the USGS. BEACON and the City are currently collaborating on pilot projects to start monitoring coastal conditions, build processes for analyzing monitoring data, and refine the RCAMP Monitoring Plan. The current pilot projects include partnership with USGS to analyze recent shoreline change combining shore transects with satellite imagery and develop recommended methods for future shoreline monitoring. In the past two decades the USGS has undertaken several complementary shoreline profiling efforts along the BEACON coast, including the shoreline and nearshore monitoring at more than 6 dozen locations, multiple special focus areas monitoring, and special study monitoring.

**Ecological Data:** The coastal Resilience project above includes review of the status of ecological monitoring and needs for expanding long-term regional ecological data development. The RCAMP similarly supports efforts to address gaps and shortfalls in ecological data, analysis and assessment frameworks focused on climate and SLR adaptation needs. The coastal resilience project provided a synthesis regarding the status of ecological research and knowledge of regional sandy beaches, expanded study and research is recommended.

**Social Science Data:** BEACON has received recommendations to expand research efforts addressing social-cultural data and information needs. Over the past three years, BEACON staff has been pioneering the use and applicability of new geo-located cell-phone location-derived beach use data. BEACON, and its project partners, completed a pilot project involving this use of mobile device location-derived data. Beacon has been working in the past two years to further develop an integrated coastal and beach access research effort. In the Summer of 2024, Beacon coordinated a beach count and beach survey exercise to update beach use and beach user data and information.

### ***Interdisciplinary Research***

BEACON's research efforts have emphasized the need to consider interdisciplinary approaches to research topics and efforts. Several of BEACON's research initiatives seek to address topics of physical, ecological and social science integrating multiple values. Both BEACON'S coastal resilience project and Beacon's RCAMP project have involved interdisciplinary research teams



and have sought to identify cross-cutting issues and identify research methods that can better integrate multiple disciplines.

### ***Modeling***

BEACON seeks to identify issues and topics that can benefit from the application of computer modeling. BEACON has been collaborating with USGS through its OPC Prop 68 Grant to undertake sediment modeling of transport and fate at select beach locations to expand our knowledge of the shoreline extent and character from beach nourishment deposition projects, focused on sediment fines.

BEACON staff are currently pursuing opportunities to extend this research to a fuller range of sediments, including fines and cobbles. The focus on fines and cobble has been identified as a gap in our knowledge of impacts of beach nourishment activities on coastal sensitive resources. BEACON staff will continue to emphasize data collection and modeling of sediment source, transport, and fate to help inform regional sediment management coastal adaptation activities.

### ***Prototyping***

BEACON has continued to support innovative prototyping efforts, including evaluation of nature-based stabilization and retention structures such as hybrid dune restoration elements in its long-standing demonstration pilot project at Surfers Point at the Ventura River mouth. Results of 10 years of monitoring efforts provide technical and scientific data and information to support outreach and education regarding project success metrics and successful prototyping.

### ***Data and Information Management and Decision-Support Tools***

Regional Data and Information Hub: Beacon is supporting evaluating the development of a regional data and information hub as part of implementing the Regional Coastal Adaptation Monitoring Program (RCAMP). Existing monitoring efforts provide some level of user availability with one or another management systems. Increasingly these are linked to Geographic Information System (GIS) spatial visualization tools. Beacon supports planning for monitoring management addressing any gaps or program needs.

ShoreCHAT: Beacon is collaborating with the USGS and with CSUCI to develop a planning, analysis and decision-support tool focused on shoreline change analysis. Currently available remote and satellite imagery offer improved data of shoreline change and shoreline erosion across time. The project partners are in active development of tool elements.

### ***Governance, Organization, and Funding***

In the past five years, BEACON executive and program staff have developed program elements addressing governance, organization, and funding. management and decision-support through a combination of BEACON in-kind and funding support, grant and contract funding, and partnership projects. BEACON recently completed an analysis of options for improving the governance integration of regional sediment management and regional Climate and SLR



Adaptation in California supported by grant funding from the Coastal Conservancy. The analysis report was completed by Integral Consulting in October 2025.

***Implementing Beacon's SRA: 2026-2030***

The Update includes a chapter describing a number of on-going and new research activities and actions to support BEACON's science and policy goals over the next three to five years. BEACON'S efforts are rooted in long-standing efforts to achieve multiple objectives and beneficial uses, which support current coastal adaptation and resilience planning. BEACON recognizes its research and planning initiatives require a co-production framework and supporting processes. Several on-going priority projects are identified for implementation between 2026 and 2030.

**ITEM 4 – Presentation on Update of the BEACON Science Research Agenda  
and Implementation Activities**

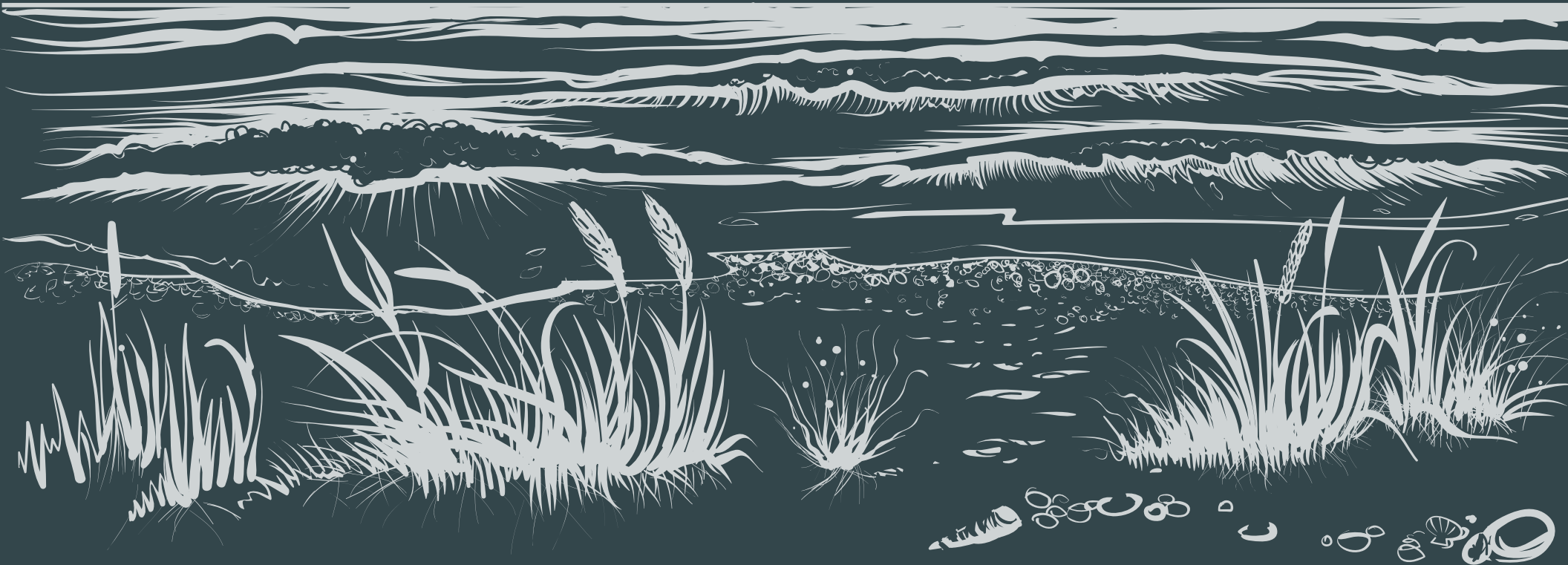
**ATTACHMENT**

# 2026 Update

## Science Research Agenda

### DRAFT

**BEACON:** Beach Erosion Authority for Clean Oceans and Nourishment



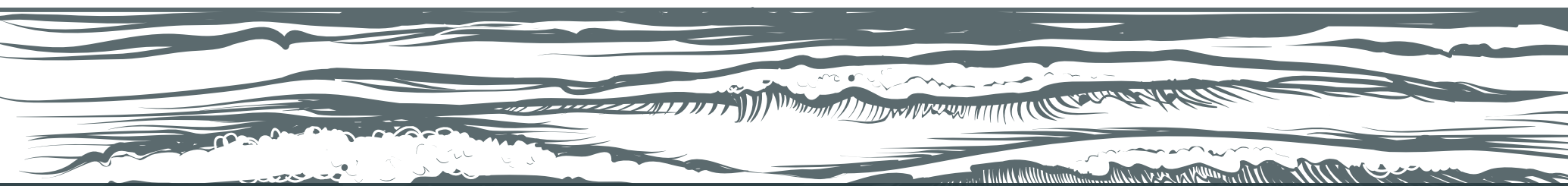
# The BEACON Coast



Coastal Santa Barbara and Ventura counties, encompassing the Santa Barbara Littoral Cell. Included rivers and watersheds.

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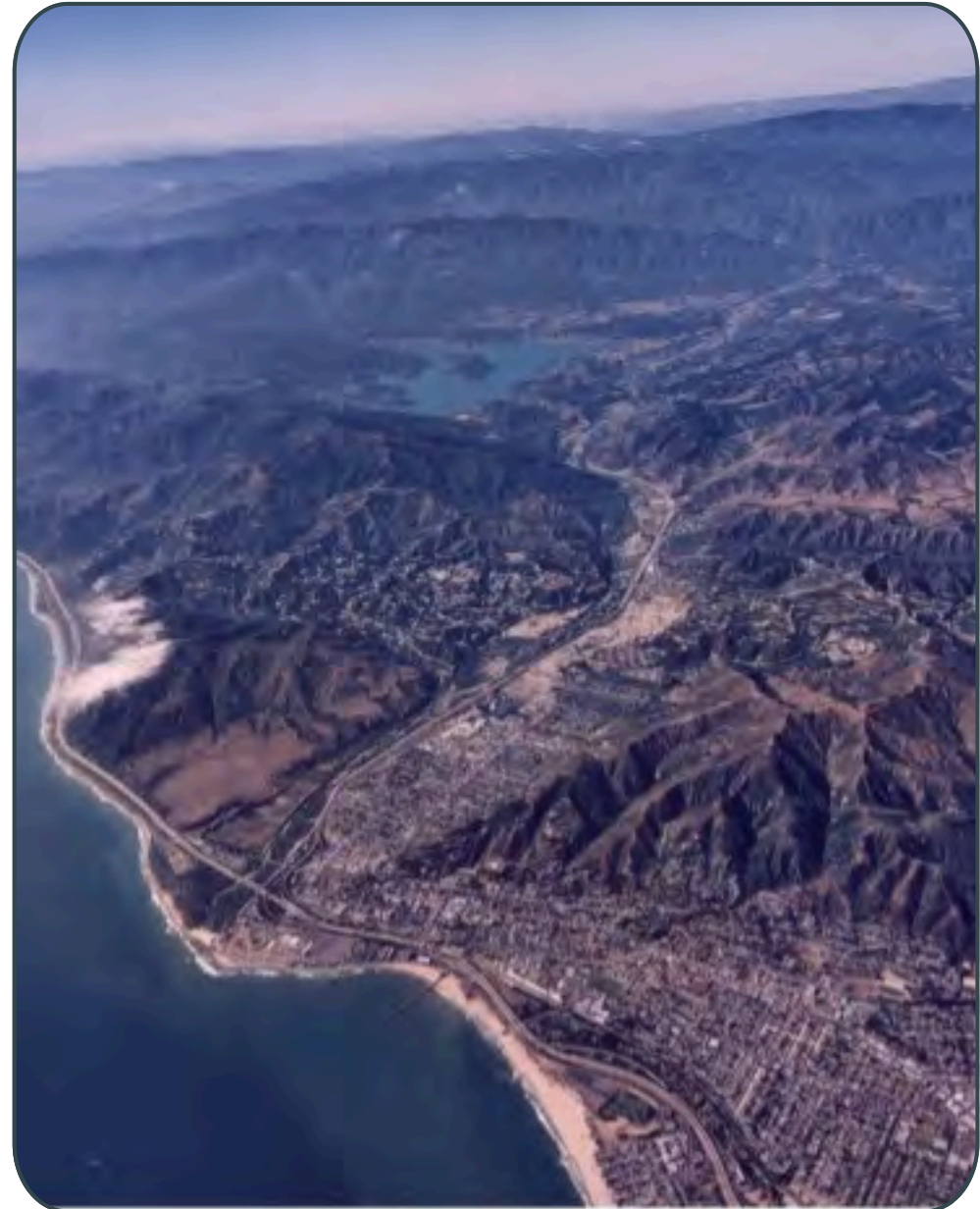
# Purpose of the Update

This 2026 update to the initial BEACON Science Research Agenda (2021) provides a summary of the current status of implementation actions and activities undertaken by BEACON, members of the Science Advisory Committee (SAC), its partners, or other researchers between 2020-2025 and provides information describing additions to the original research topics. This update identifies on-going and planned priorities to inform short and long-term science research activities and actions in support of BEACON's multiple complementary goals.

The BEACON Science Staff, with support from the SAC and extensive input from experts, managers, stakeholders, and the public, crafted this update to pinpoint the research actions needed to implement BEACON's core goals. It addresses key areas such as regional sediment management, coordinated coastal-resource planning, climate and sea-level-rise adaptation, community outreach, and tribal collaboration, and integrates

The BEACON "Coast", the coast of Santa Barbara and Ventura counties, includes the Santa Barbara Littoral Cell (SBLC), the largest littoral cell along the California Coast, stretching more than 150 miles from the Santa Maria River in the north to the Mugu Submarine Canyon to the south, draining several large coastal watersheds providing sediment and sand to the coast.

This important coastal region faces many threats and many challenges, including an array of management and governance demands, requiring BEACON to seek out the best available science and support new initiatives or activities that would assist with improved decision-making and outcomes.



## On-going Research Priorities

### **Expand Outreach and Engagement**

Increase transparency and encourage input from the community

### **Extend Shoreline Change Analysis**

Synthesize coastal change measurements and provide actionable coastal change information

### **SBLC Sediment Budget Analysis**

Produce updated sediment budget for the littoral cell to guide coastal adaptation.

### **Sandy Beach Habitat and Species Ecology**

Expand beach monitoring, focussing on sediment placement and habitat restoration

### **Prototyping and Demonstration Projects**

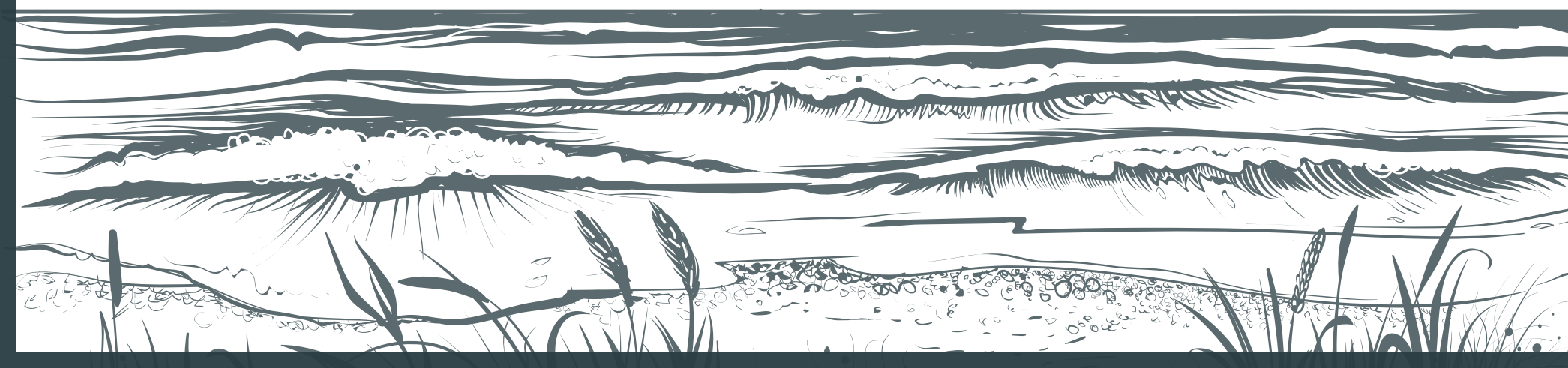
Develop proof-of-concept pilots for nature-based sandy beach and dune living shorelines adaptation.

### **Shoreline Retention and Stabilization Projects**

Develop reef and green-groin pilots to assess sand-retention and environmental impacts.

### **Socio-Cultural**

Develop integrated social-cultural beach-use data, dashboard, and comprehensive economic assessment tools statewide.



BEACON's integrated coastal management planning, including regional sediment management (RSM) programs and activities, and coastal sea level rise (SLR) adaptation planning seeks to support multiple complementary public policy goals. BEACON's science and policy work in the past five years has continued a focus on regional sediment management, watershed and coastal restoration activities supported by implementation of nature-based projects and initiatives, long-term monitoring of coastal natural resources, and the development of robust regional data and information.

BEACON is in a unique position to better connect science and policy as it acts as a boundary organization, translating science and technical information for decision makers and the public. BEACON serves as a facilitator, connecting regional to local coastal resilience, science, and decision making, linking these efforts to larger state and federal planning and management. As detailed in the original Agenda document, a key objective going forward remains bridging identified gaps between science and decision-making, focused on building decision support data, tools, and frameworks better integrating science into BEACON's program and project initiatives.

BEACON has received recommendations for additions to the initial Research Agenda supporting regional management and decision-making, integrating coastal resource management and regional climate change and sea-level rise adaptation planning, community and stakeholder outreach, and tribal consultation and collaboration. Since the original Agenda document was completed in 2021, the SAC has held two annual Manager-Scientist workshops, as well as organized additional meetings and workshops to support discussion and review of research needs and priorities. Annual Manager-Scientist meetings were held in 2022 and 2023, where discussions were



held regarding various topics addressed in this update. The status of SRA activities was reviewed at the November 2024 SAC meeting. This Update addresses the input received from these various and multiple outreach opportunities, highlighting gaps in research and data needs.

The original SRA outlined a multi-goal planning framework; this update adds a focus on implementing complementary environmental, ecological, and social research within a Social-Ecological Systems (SES) approach that evaluates the full suite of ecosystem services. It also frames scientific work as a co-production effort involving technical staff, stakeholders, the public, and tribal partners. The updated bibliography lists relevant studies, reports, and peer-reviewed papers, reflecting new recommendations to expand the Research Agenda for regional management, integrated coastal-resource and climate-SLR adaptation planning, community outreach, and tribal collaboration.

# Stakeholder Outreach and Engagement

BEACON has received substantial input regarding the need to recognize the importance of providing opportunities for the full involvement of members of the public and interested stakeholders to solicit input, plan review, program development and policy priorities.

The BEACON staff supports and recommends developing additional communication and engagement projects such as workshops and webinars, supported volunteering opportunities, and web resources that increase transparency and encourage input from the community. These communication efforts will emphasize outreach and engagement of underrepresented communities.

In 2024, BEACON appointed an additional SAC member, an Equity and Environmental Justice specialist, Dr. Jose Castro-Sotomayer of California State University Channel Islands, CSUCI. Dr. Castro-Sotomayer is highly experienced in planning approaches addressing social and environmental justice and his participation on the BEACON SAC will bring new research perspectives informed by environmental and social justice, community-based research, eco-cultural frameworks, and Indigenous worldviews.



# Chumash Tribal Consultation and Collaboration

Chumash representatives have provided recommendations addressing physical, ecological, and social science research areas, identifying assessment of sensitive coastal physical and ecological resources used for purposes of social-cultural and traditional practices as a knowledge gap not addressed in either existing physical and ecological monitoring. Tribal representatives cited lack of adequate research on governance and engagement needs, especially new or innovative Tribal consultation models, and new collaborative community-based science and research models.



The California Natural Resources Agency’s updated 2025 Tribal Consultation Policy defines meaningful, timely, government-to-government consultation that respects cultural values, tribal sovereignty, and confidentiality. As a state-authorized joint-powers authority, BEACON will follow this policy, seeking Chumash input on science activities and any projects of tribal interest.

Beyond compliance, BEACON will work closely with tribal leaders and networks to target future projects, partnerships, and funding that match tribal priorities. It will prioritize transparent, ongoing engagement to ensure shared decision-making, culturally informed research design, and long-term stewardship that reflect tribal values. In 2025, OPC added the Santa Ynez Band of Chumash Indians to its Marine Stewards Network; BEACON will coordinate with this network for collaborative opportunities, adhering to the CNRA policy throughout.

To strengthen tribal representation, BEACON staff recommend that the SAC add a tribal liaison. This dedicated role would provide a tribal perspective, support culturally informed technical review, guide project prioritization, and enhance ongoing consultation, ensuring that BEACON’s research and implementation align with tribal knowledge systems and stewardship practices.

# Integrating RSM and Climate and SLR Adaptation Planning

Multiple BEACON research activities address integrating RSM and Coastal Adaptation Planning:

### Coastal Resilience Prop 68 Grant Project:

BEACON's Coastal Resilience Prop 68 Grant, completed in December 2024, convened an interdisciplinary team that included CSU CI, USGS, UCSB, and SBF to advance regional sediment management and coastal climate adaptation. The project delivered an integrated suite of research and analysis tasks, such as sediment characterization, fate-and-transport analysis, evaluation of sediment placement protocols, beach-ecosystem assessment, and updates to regional permitting performance criteria and protocols. Focusing on three case-study locations—Carpinteria City Beach, Goleta Beach, and the Surfers' Point project—the team gathered high-resolution UAV aerial imagery, conducted vegetation surveys, and performed photo-point monitoring. Using the Coastal Storm Modeling System (CoSMoS) and ArcGIS Pro, CSU CI examined historical nourishment projects and projected sea-level-rise impacts on sediment dynamics within the Santa Barbara Littoral Cell, producing spatial models that clarified sediment behavior under various scenarios and offered actionable guidance for adaptive management.

The project's key outcomes include multiple beneficial uses of sediments and sand resources. The project documents opportunities for improved regional permitting systems including pre-application coordination to reduce overall approval times. The project contributed sediment-transport modeling expertise that identified timing, extent, and locations for sediment placement to meet ecological and operational goals. There were additional recommendations for future nourishment projects; and conceptual impact models that link sediment grain size, placement volume, proximity, timing, and frequency to predicted ecological effects, coupled with guidance for ecological monitoring, marine-protected-area protection, and sediment-reuse frameworks such as fines thresholds, expanded monitoring, and best-practice placement.

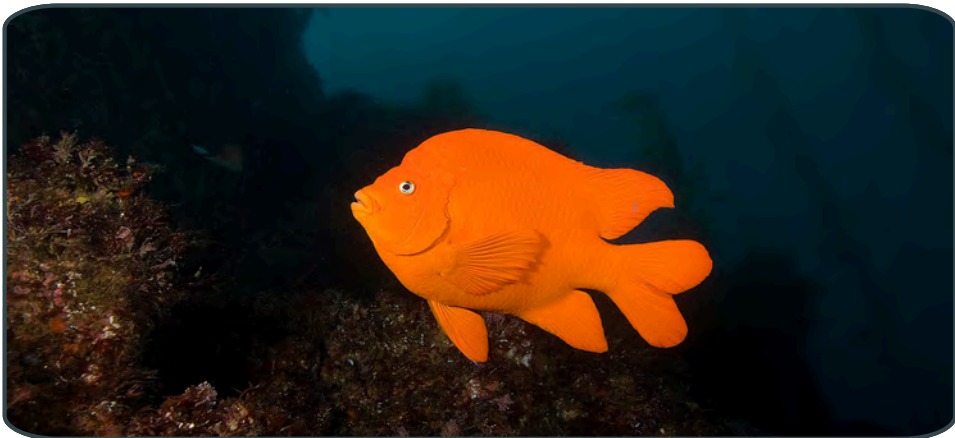




Photo Credit: BEACSMART Program

## **BEACHSMART**

Currently, BEACON is partnering with Santa Barbara County on its BeachSMART project, providing technical and scientific support contributing to project identification, necessary data collection and analysis, and recommendations for project monitoring and project adaptation within a regional sediment management approach encompassing the south Coast of Santa Barbara County within the Santa Barbara Littoral Cell

BEACON will work to identify preferred placement methods and capacities to receiver sediments, focused on developing criteria for deposition within sensitive beach and nearshore marine environments, and requirements for deposition methods and practices will be developed to enable BEACON to implement selected demonstration projects. An analysis of placement protocols will be conducted to provide up-to-date information on the impacts from historic beach and ocean deposition placement, and to develop updated sediment placement protocols and project requirements.

This research has been focused on assessing the transport and fate of sediment fines. BEACON staff are currently pursuing opportunities to extend this research to a fuller range of sediments-particularly cobbles, which represent a critical knowledge gap in understanding beach-nourishment impacts on sensitive coastal resources. The team will continue intensive data collection and modeling of sediment sources, transport pathways, and ultimate fate to inform coastal-adaptation planning. An analysis of historic placement protocols will be updated with these new insights, producing revised sediment-placement standards and project requirements. Between 2025-2028, BeachSMART and BEACON will pursue additional research and analysis to support sustainable, resilient beach-nourishment while refining project protocols, approvals, and ecological-protection goals.

The initial science research agenda identified gaps and voids in regional monitoring needed to support coastal sediment management, coastal access and recreation, coastal restoration and coastal climate and SLR adaptation. Since 2021 BEACON staff have been working with local agencies to identify opportunities for funding to support advancing regional monitoring programs addressing the multiple topic areas of physical, environmental, ecological, and social and human use. Several examples of current BEACON efforts are included in the Update and described briefly below.

**Physical Data:** BEACON supports on-going Physical Shoreline Data Collection currently being undertaken as part of a long-term science partnership with the USGS.



**Regional Coastal Adaptation Monitoring Plan (RCAMP):** BEACON is developing the Regional Coastal Adaptation Monitoring Plan (RCAMP) that encompasses Santa Barbara and Ventura Counties. As an objective of the program, the RCAMP provides local management agencies with the information needed to assess whether changed conditions warrant new adaptation approaches and implementation actions resulting in regional resilience benefits or impacts. The RCAMP contains monitoring topics including sandy beach shoreline change, storm events, damage, and emergency response, and combined coastal and fluvial flooding. Monitoring plan components are suggested for each of the topics, laid out by current and suggested data and monitoring, analysis, and products. (BEACON, 2025). The current pilot projects include partnership with USGS to analyze recent shoreline change combining shore transects with satellite imagery and develop recommended methods for future shoreline monitoring.

BEACON is collaborating with USGS and CSUCI to develop the Shoreline Change Hazard Tool (Shore Chat) that will synthesize coastal change measurements and provide actionable coastal change information. The proposed project addresses the absence and need of shoreline change information to support sea-level rise planning in California. New technologies, including satellite-derived shorelines and airborne and drone remote sensing, are able to fill these data gaps and provide decades of shoreline change information. These data provide essential input for forecasts of future shoreline change under sea-level rise, leading the development of use of these new data to discover patterns, trends, processes, and projections of coastal change along the California coast.

**Ecological Data:**

**OPC Prop 68 Coastal Resilience Project:** The project report included a recommended ecological monitoring and recovery framework for sandy beaches, identifying several complementary

key activities, including completing baseline and reference site assessments, developing 'Key Ecological Indicators', and undertaking long-term monitoring. The framework includes specific monitoring of ecological impacts of sediment placement, encompassing a range of species, including invertebrate species diversity and population density, shorebird and fish community monitoring and coastal vegetation.



The framework identified habitat protection and resilience protocols, research and monitoring priority actions, focusing on two important habitats and coastal natural resources, eelgrass and kelp beds in the nearshore ocean environment and dunes onshore. Both of these important and sensitive habitats require additional research and long-term monitoring on a regional and place-specific level. Beacon supports additional research on these sensitive coastal and ocean habitats, region-wide as both are critical coastal natural resources. The suggested additional research efforts can be integrated with on-going regional monitoring efforts in Santa Barbara County and in Ventura County within the Santa Barbara Littoral Cell.

The framework includes a suggested set of performance criteria to evaluate the success of sediment placement and beach nourishment activities, including importantly, habitat protection and nature-based coastal resources adaptation.

### **Coastal Access and Beach Use Data:**

In the past decade, BEACON's social science data assembly and analysis efforts have included social cultural as well as socioeconomic monitoring and survey data. The BEACON Science Research Agenda has recognized the limits to, the expense of, and the lack of funding to support, traditional beach access data. BEACON has been pioneering the use and applicability of new geo-located cell-phone location-derived beach use data. BEACON, and its project partners, have completed a pilot project involving this use of mobile device location-derived data. In its initial phase, BEACON, and its project partners, organized and conducted a Beach Count/Survey project in 2024, for a select number of SoCal beaches, in Ventura, Santa Barbara and Los Angeles counties. These coordinated beach use research efforts contribute to regional beach use and beach monitoring programs, incorporating data collection, data management, and development of decision-support tools.



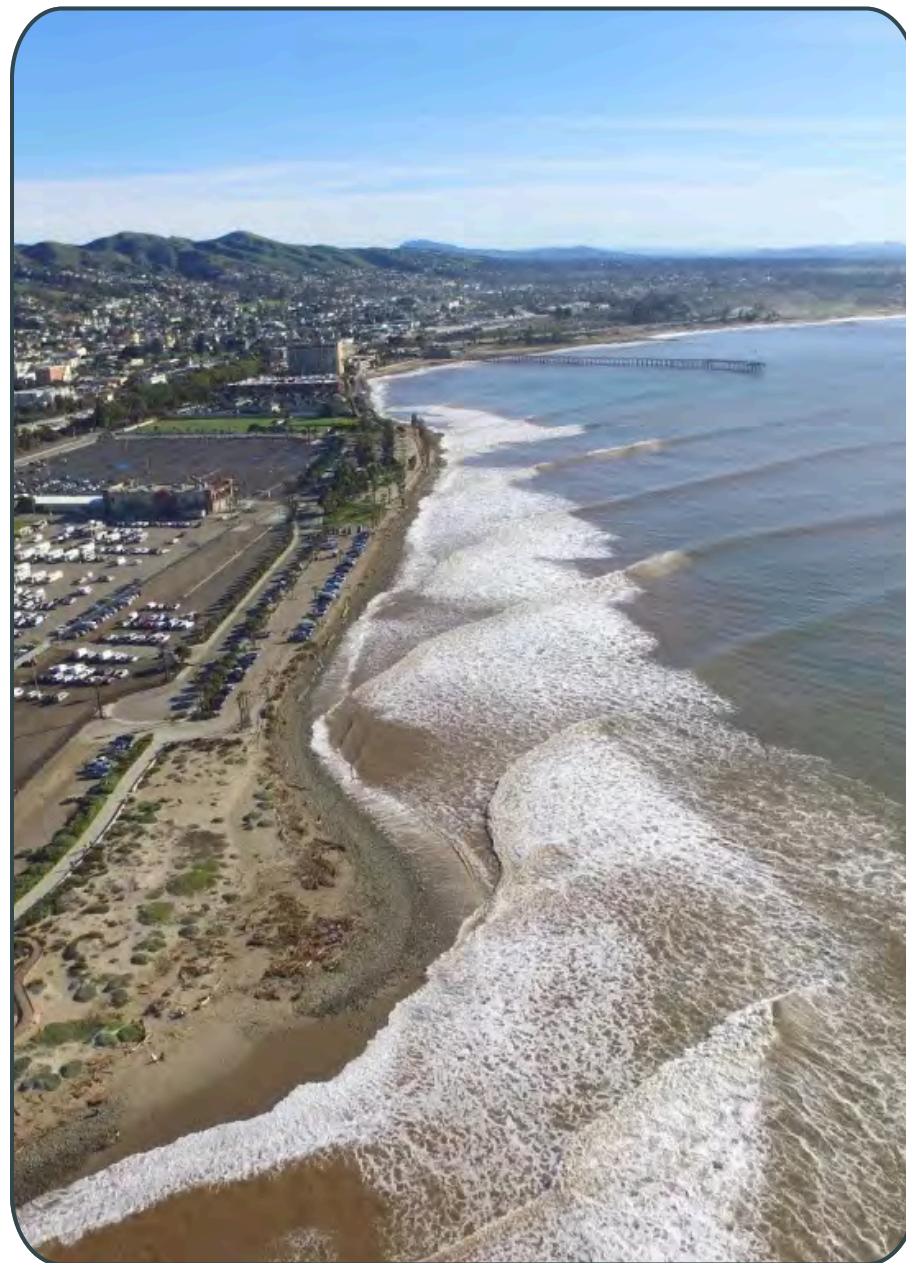
BEACON' Science Research Agenda, and BEACON's staff efforts have both emphasized the need to consider interdisciplinary approaches to research topics and efforts. Several of BEACON's research initiatives seek to address topics of physical, ecological and social science from multiple disciplines including continued monitoring of demonstration projects at Surfers point, collaboration with the California Dunes Science Network, and the Prop 68 grant).

Applying ecosystem planning tools and assessment frameworks is an important element of incorporating interdisciplinary science into decision support. One important way in which ecosystem approaches can be used, including ecosystem services analysis, is to contribute to improved cost benefit assessment (CBA) addressing both market and non-market ecosystem services.

### **Surfers Point Regional Sentinel Monitoring Site Monitoring:**

Organized in 2020, with monitoring conducted in 2021, 2023, and 2024, BEACON coordinated monitoring of the SP Living Shoreline and Managed Retreat Project. This monitoring pilot project built on the project monitoring conducted from 2013-2017 for the Phase 1 project. The most recent BEACON Monitoring expanded monitoring, incorporating 3-D aerial data and imagery.

The lessons learned from Surfers' Point's expanded long-term monitoring program illustrate the need for a consistent monitoring framework that can be applied across multiple sites within the SBLC. Additionally, the project demonstrates the benefits of interdisciplinary collaboration in addressing coastal management challenges. This project will be used to seed additional projects and research on regional sediment and coastal management.



BEACON seeks to identify issues and topics that can benefit from the application of computer modeling. BEACON collaborated with USGS to undertake sediment modeling of transport and fate at select beach locations at Goleta County Beach and Carpinteria City Beach to expand our knowledge of the shoreline extent and character from beach nourishment deposition projects. This research has been focused on assessing the transport and fate of sediment fines.

BEACON staff are currently pursuing opportunities to extend this research to a fuller range of sediments, including fines and cobbles. The focus on fines and cobble has been identified as a gap in our knowledge of impacts of beach nourishment activities on coastal sensitive resources. BEACON staff will continue to emphasize data collection and modeling of sediment source, transport, and fate to help inform regional sediment management and coastal adaptation activities.

BEACON has continued to support innovative prototyping efforts, including evaluation of 'soft' nature-based stabilization and retention structures such as hybrid dune restoration elements in its long-standing demonstration pilot project at Surfers Point at the Ventura River mouth. Current monitoring efforts support assessing project performance. Results of the monitoring efforts provide technical and scientific data and information to support outreach and education regarding project success metrics and successful prototyping.



Photo: Dave Hubbard

## **Surfers Point Regional Sentinel Monitoring Site Monitoring:**

Efforts have broadened to include 3-D aerial video and photographic imagery. Additional monitoring data collection is being investigated including additional imagery and remote sensing monitoring. BEACON has coordinated and collaborated in project planning, design, and construction and monitoring with the City of Ventura, the Ventura County Fairgrounds (property owner), and through its participation on the Surfers' Point Working Group. In addition, BEACON has coordinated on-going project regional monitoring. Beacon has coordinated preparation of technical reports on the project to share project results to a wider audience of practitioners and project developers.

The project is an important model of a living shoreline, nature-based project on the high-energy southern California coast. The first phase of the project was constructed in 2010-2012. The City conducted physical monitoring of the site from 2011 through 2017, for which several monitoring reports were prepared. BEACON coordinated funding for final planning and construction of the second phase of the project, initiated in 2024, with the living shoreline and retreat elements completed in 2025 (Battalio, et.al., 2025).



## **Regional Dune Science Network (CDSN):**

The California Dune Science Network (CDSN) coordinates partner-based coastal dune restoration efforts statewide, identifies science-based indicators of coastal resilience, and synthesizes best management practices. BEACON will continue its partnership with the CDSN, reporting on restoration methods and performance results of BEACON living shoreline projects, and the participation in sharing methods, practices, and project performance, providing actionable research and guidance for the usage of hybrid living shoreline beach and dunes as nature-based solutions. BEACON will work to co-develop restoration and site selection frameworks by providing feedback on restoration goals and framework priorities.

# Information, Data Management, and Decision-Support Tools

There is an array of monitoring programs focused on coastal resilience throughout the BEACON region; however, availability and accessibility of this data has been identified as a major constraint to coastal resilience collaboration. BEACON is examining integrated data management system options for a demonstration pilot project, a Regional Data Information Station (RDIS), in order to further develop information infrastructure. Such a system would address accessibility to multiple users including technical and scientific staff, agency coastal management and resource staff, interested stakeholders, and the public. This hub can serve to support improved and expanded data accessibility, transparency and usability allowing for better sharing of data and information.



BEACON has been developing additional social cultural data and information focused on beach use and beach user attendance and practices in order to inform improved and expanded coastal and beach access. Managing complex data and information has required BEACON to partner with government and university expertise to investigate and develop accessible data management alternatives. One component of any RDIS would involve managing this type of data and information for users. Socio-cultural data would be a component added to the information station. This would involve a complete and publicly accessible database of socio-cultural data for the BEACON region including beach user data, public access data, and transportation.



## 1. Expand Outreach and Engagement

BEACON is developing additional communication and engagement activities that increase transparency and encourage input from the community. Specifically, these projects will focus on providing transparency of BEACON's plans and projects to community members, and the incorporation of more public voice in project processes. Currently, BEACON is partnering with SB County in outreach and consultation efforts through the BeachSMART project.

## 2. Extend Shoreline Change Analysis

There is a documented need for more locally-specific, or down-scaled models on sea level rise to assess community vulnerability. BEACON seeks to expand research and understanding of local Shoreline Change and Hazards. BEACON is collaborating with USGS and CSUCI to develop the Shoreline Change Hazard Tool (Shore Chat) that will synthesize coastal change measurements and provide actionable coastal change information.



The proposed project addresses the absence and need of shoreline change information to support sea-level rise planning in California. New technologies, including satellite-derived shorelines and airborne and drone remote sensing, are able to fill these data gaps and provide decades of shoreline change information. These data provide essential input for forecasts of future shoreline change under SLR, leading the development of use of these new data to discover patterns, trends, processes, and projections of coastal change along the California coast.

## 3. SBLC Sediment Budget Analysis

BEACON is partnering with CSU Channel Islands on an 18-month effort to produce an updated, synthesis-based sediment budget for the SBLC. The project integrates existing datasets from the USGS, CSU Channel Islands, and regional partners, emphasizing careful synthesis, professional judgment, and transparent documentation. The new budget will capture temporal dynamics often missed in regional planning, such as lag times between watershed delivery and beach response, seasonal versus long-term shoreline change, episodic sediment pulses from drought-wildfire-flood events. The resulting budget will directly inform BEACON's ongoing regional sediment management, coastal adaptation planning, and future CRSMP updates and regional adaptation strategies.

## 4. Sandy Beach Habitat and Species Ecology

BEACON will continue to expand its monitoring of beaches across the region, including regional typology analysis, targeted habitat-restoration and ecological-function improvements relating to climate change and sea level rise adaptation. The effort will also identify preferred placement methods and capacities to receiver sediments, focused on developing criteria for deposition within sensitive beach and nearshore marine environments, and requirements for deposition methods and practices.

Ongoing monitoring of the Surfers Point demonstration, in partnership with the Coastal Data Services Network (CDSN), will be supported by BEACON funding while additional resources are pursued to sustain long-term monitoring of the Ventura River–Seaside Wilderness coastal corridor, extending from Emma Wood and Seaside Wilderness Park in the west to the Surfers Point area in the east. This integrated approach builds on existing regional monitoring initiatives such as the Southern California Beach Processes Study and the Coastal Data Information Program, which have demonstrated the value of high-resolution aerial, LiDAR and wave-measurement data for assessing beach dynamics and informing adaptive management

## 5. Prototyping and Demonstration Projects

Sandy Beach and Dune Living Shorelines (see above): Beacon will continue to support nature-based solutions, especially those addressing sandy beach and dune ecosystems. The experience with the Surfers point project demonstrates the important role for BEACON; is to develop a proof of concept, pilot and demonstration projects to inform larger coastal adaptation planning and project design analysis.

## 6. Shoreline Retention and Stabilization Projects

BEACON is expanding its evaluation of sand-retention structures by supporting research and analysis of both reef and groin projects as potential model or demonstration efforts, although dedicated funding for these proposals has not yet been secured. The Resilient Reef-Oil Piers Demo Project will produce an updated assessment of a reef structure, exploring multiple design options for installation at oil-pier locations. The Green Groins initiative will identify suitable demonstration sites, compare various groin designs, and develop feasibility studies that incorporate environmental-impact considerations for near-shore marine and coastal ecosystems. BEACON will investigate how existing groins affect sand resources in

Santa Barbara and Ventura counties, examine alternative designs to mitigate adverse environmental effects, and design one or more pilot “green-groin” projects within the Santa Barbara Littoral Cell.



## 7. Socio-Cultural

BEACON will continue to invest in additional data focused on the social cultural topics including both social and economic data on beach use and beach users, including both traditional and nontraditional sources of data. BEACON is developing additional social science data sources, methods, and preparing a regional beach use and beach user regional monitoring program, integrating traditional on-the-ground data methods, with new sources of georeferenced, mobile device origin and destination data.

One important component missing from coastal access and beach use data research is the lack of a transparent and accessible data ‘dashboard’ and the identification of a management agency to house such a data access portal (see above-Information Hub). BEACON is working with Dr. Nathaniel Merrill to further develop the integrated coast access data project to support an updated economic assessment of recreational beach use.

# Governance, Organization, and Funding

Since 2021, BEACON's executive and program staff have continued to develop program elements addressing governance, organization, and funding. A recent analysis –examined options for better integrating regional sediment management with climate- and sea-level-rise (SLR) adaptation in California.

The study reviewed regional sediment management plans (RSMPs), local adaptation plans, BEACON member agencies' climate-vulnerability assessments, and completed a statewide practitioner survey, uncovering gaps, barriers, and coordination opportunities.

Key findings highlight: integration of sediment-adaptation planning; governance and permitting obstacles; need to account for sediment variability in plans; funding and public-outreach challenges.

BEACON is aiding the federal-state Coastal Sediment Management Workgroup (CSMW) in implementing the California Sediment Master Plan, supporting regional sediment management within the Santa Barbara Littoral Cell. BEACON has also joined with three other regional sediment efforts to form the Southern California Sand Collaborative (SCSC).



BEACON is a very small public agency with very limited financial resources. BEACON supports the activities of the SAC with a small amount of annual operational funding.

BEACON'S research and applied science activities are supported primarily through extramural grants and contracts from other state and federal agencies.

In the past five years, BEACON staff have successfully secured multiple grants from a range of partner organizations including the California Coastal Commission, the California State Coastal Conservancy, the California State Coastal Conservancy, and The Bay Foundation.

BEACON currently supports funding for science support staff and contractors, providing GIS and data science services to the agency.

Future implementation of research and science activities will require Beacon to continue to leverage its limited program funding with external funding from partner organizations.

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Dr. Jenifer E. Dugan

Dr. Lesley Ewing, P.E.

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Dr. Charles Lester

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Dr. Sean Vitousek

## **Manager Liaisons**

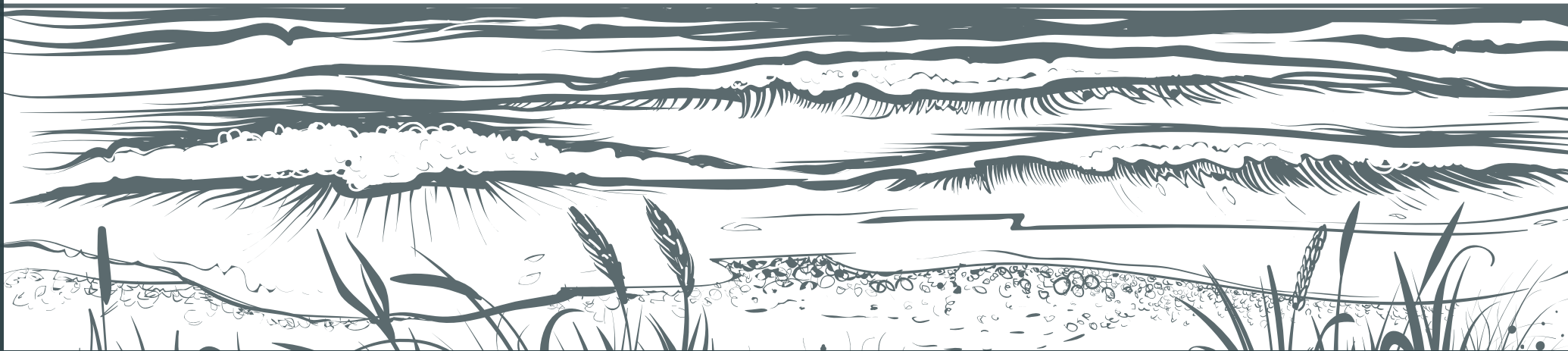
Mr. Aaron Engstrom

County of Ventura

Mr. Michael Wells

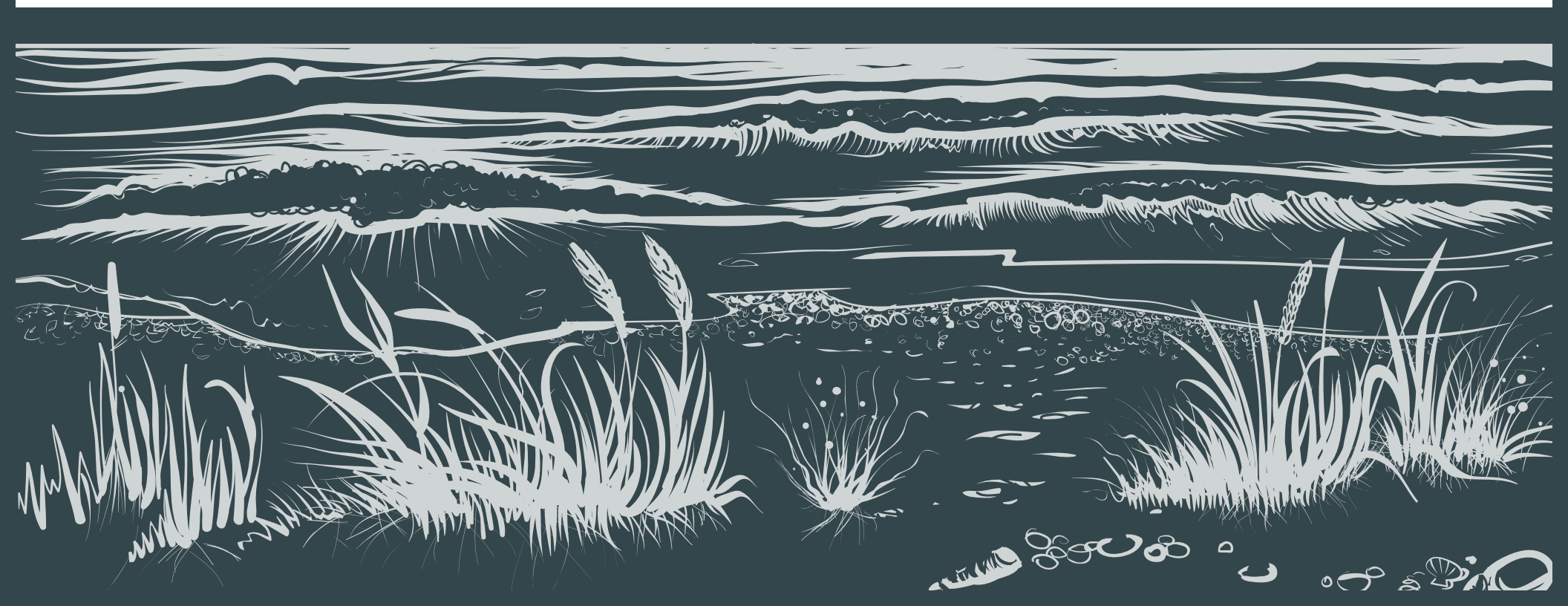
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Bibliography: 2020-2026 Update

Coastal Adaptation Planning Dashboard: Ocean and Coastal  
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## **STAFF REPORT**

**Meeting Date: April 14, 2026**  
**Agenda Item: 5**

**To: Science Advisory Committee**  
**From: BEACON Science Support Staff**

**Date: April 7, 2026**

**Subject: BEACON SAC Research Roundtable**

### **RECOMMENDED ACTION:**

BEACON SAC Co-Chairs will moderate round-robin presentations from SAC members regarding their latest research projects and initiatives

### **DISCUSSION:**

BEACON SAC Co-Chairs will moderate round-robin presentations from SAC members regarding relevant latest research projects and initiatives. SAC members will be asked to share brief descriptions of recently completed and/or on-going data collection and science research initiatives relevant to Beacon's research efforts.

SAC members have provided a range of technical reports and professional peer-reviewed publications for inclusion in an updated bibliography of initiatives and research activities undertaken in the past five years focused on the SBLC and on related topics that will help inform implementation of the SRA Update. This bibliographic reference has been included in the 2026 Update to the SRA. Any additional sources and references and relevant research initiatives will be included in a revised listing.



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## **STAFF REPORT**

**Meeting Date: April 14, 2026**  
**Agenda Item: 6**

**To: Science Advisory Committee**  
**From: BEACON Science Support Staff**

**Date: April 7, 2026**

**Subject: 2026-2027 SAC Schedule**

### **RECOMMENDED ACTION:**

BEACON Staff present schedule of SAC activities for Fiscal Year 2026-2027.