

Integrating Regional Sediment Management and Sea Level Rise Adaptation in California

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THE PROBLEM

Sediment: Nature’s Adaptation Resource

Regional Sediment Management Plans (RSMPs) operate at the scale of littoral cells, while climate adaptation planning is normally conducted at the local jurisdictional level. Although both depend on the same sediment system, they are often developed by different disciplines and agencies with different vocabularies and competing objectives. Sediment is the focus of flood control, and ports and harbors with adaptation is the focus of long range planners. This results in limited coordination, implementation detail, or alignment of funding and permitting pathways.

FINDING #1

Sediment delivery is episodic and contains mixed grain sizes, not only sand.

Many RSMPs rely on average annual sediment budgets and remain strongly sand-focused. In reality, sediment delivery is highly episodic from floods, debris flows, landslides, dredging, and other events. These sediments are more than just sand, they include muds, silts, sand, cobbles, and boulder, important for maintaining beach, wetland, and marine habitats.



Different grain sizes provide different adaptation functions—and extreme events can create short-lived opportunities for beneficial reuse.

Challenges and Opportunities

Category	Challenge	Opportunity
Governance & Staffing	Sediment managers, planners, harbor districts, and public works often operate separately.	Create shared regional governance linking sediment and adaptation planning.
Grain Size & Sources	RSMPs remain sand-focused and average annual budgets miss episodic sediment pulses.	Plan for muds, silts, cobbles, debris flows, landslides, and dredged sediment.
Financing & Coastal Economics	Local funding and conventional benefit-cost analyses undervalue coastal resilience benefits.	Treat beaches, dunes, and wetlands as natural infrastructure.
Projects & SLR Integration	Transport, storage, permitting, and long-term SLR integration remain weak.	Link RSMP updates and pilot projects directly to adaptation pathways.

THE APPROACH

We reviewed BEACON region adaptation plans, scored all 11 California RSMPs across eight sediment management themes using a standardized 0 to 3 rubric, and surveyed coastal practitioners to identify integration gaps, implementation barriers, and opportunities to better align sediment management with climate adaptation.

8 BEACON JURISDICTIONS STUDIED 11 RSMPs 124 PLANNING DOCUMENTS REVIEWED

FINDING #2

Integrating sediment projects into adaptation planning is the main gap.

All 11 RSMPs identify sediment sources. The gap is implementation: governance, financing, staffing, sea-level-rise (SLR) integration, grain-size considerations, and pathways from planning to implementation vary widely.

Extent of Treatment	Sediment Sources	Financing	Projects	Economics	SLR	Governance	Staffing	Grain Size
Southern Monterey Bay 2008	3	3	0	3	2	1	2	0
Santa Barbara Littoral Cell 2009	3	3	3	3	0	3	1	0
San Diego County 2009	3	3	0	3	1	1	0	2
Orange County 2013	3	1	2	2	2	1	3	3
Santa Cruz 2015	3	3	3	1	1	2	3	0
San Luis Obispo 2016	3	3	3	1	3	2	0	0
Los Angeles County 2017	3	1	0	1	0	3	2	2
Eureka Littoral Cell 2017	3	1	3	0	1	3	0	3
San Francisco Open Coast 2017	3	3	1	3	3	2	1	1
Sonoma and Marin 2018	3	3	3	1	3	3	3	1
San Francisco Central Bay 2017	3	0	1	3	0	1	2	3

0 Not addressed 1 Limited 2 Moderate 3 Well developed

Sources are consistently addressed, while implementation capacity is much less developed.

11 California RSMPs reviewed across eight themes:



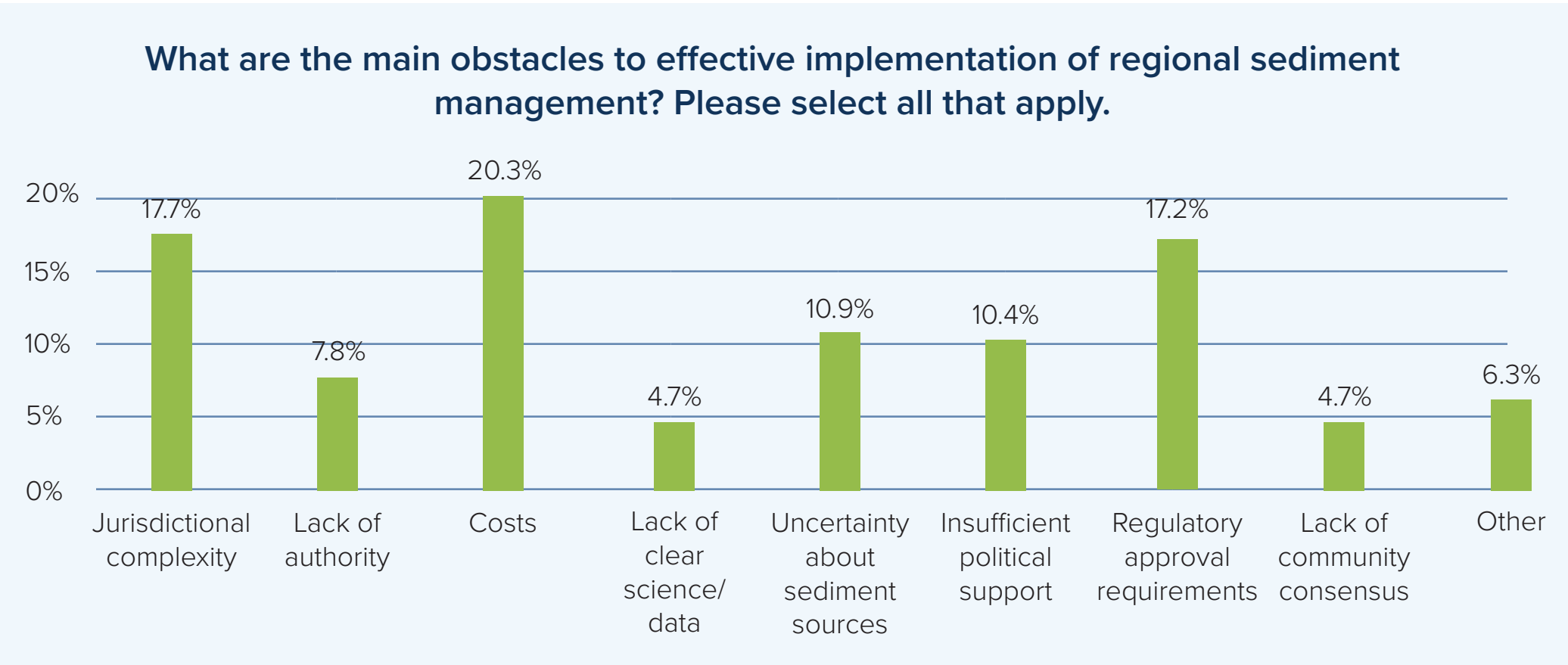
Statewide practitioner survey distributed to 252 practitioners, with 87 responses.

FINDING #3

Costs, regulatory, and jurisdictional complexities pose the largest barriers.

Practitioners identified their top three biggest barriers: 20.3%—Costs 17.7%—Jurisdictional complexity 17.2%—Regulatory approval requirements

Together, these results show a fundamental mismatch: sediment moves across jurisdictional boundaries, while funding, permitting, and management remain fragmented.



Survey results from 87 coastal practitioners.

Recommendations

- Align RSMP projects with climate adaptation planning, including Local Coastal Plans, General Plans, Local Hazard Mitigation Plans, and Capital Improvement Plans.
- Plan for sediment of all sizes and sources, from muds and silts to sand, cobbles, and boulders.
- Build regional governance across disciplines and jurisdictions—including planners, public works, harbor districts, tribes, and underserved communities.
- Streamline permitting and create implementation-ready sediment inventories and pathways.
- Treat beaches, dunes, wetlands, and living shorelines as natural infrastructure and quantify their multibenefit value.
- Use pilot projects, monitoring, and adaptive management to turn planning into implementation.

KEY TAKEAWAY

Beaches, dunes, wetlands, and living shorelines cannot provide long-term climate resilience without sediment. Sediment supply, transport, placement, and reuse therefore need to be planned as part of the adaptation system.

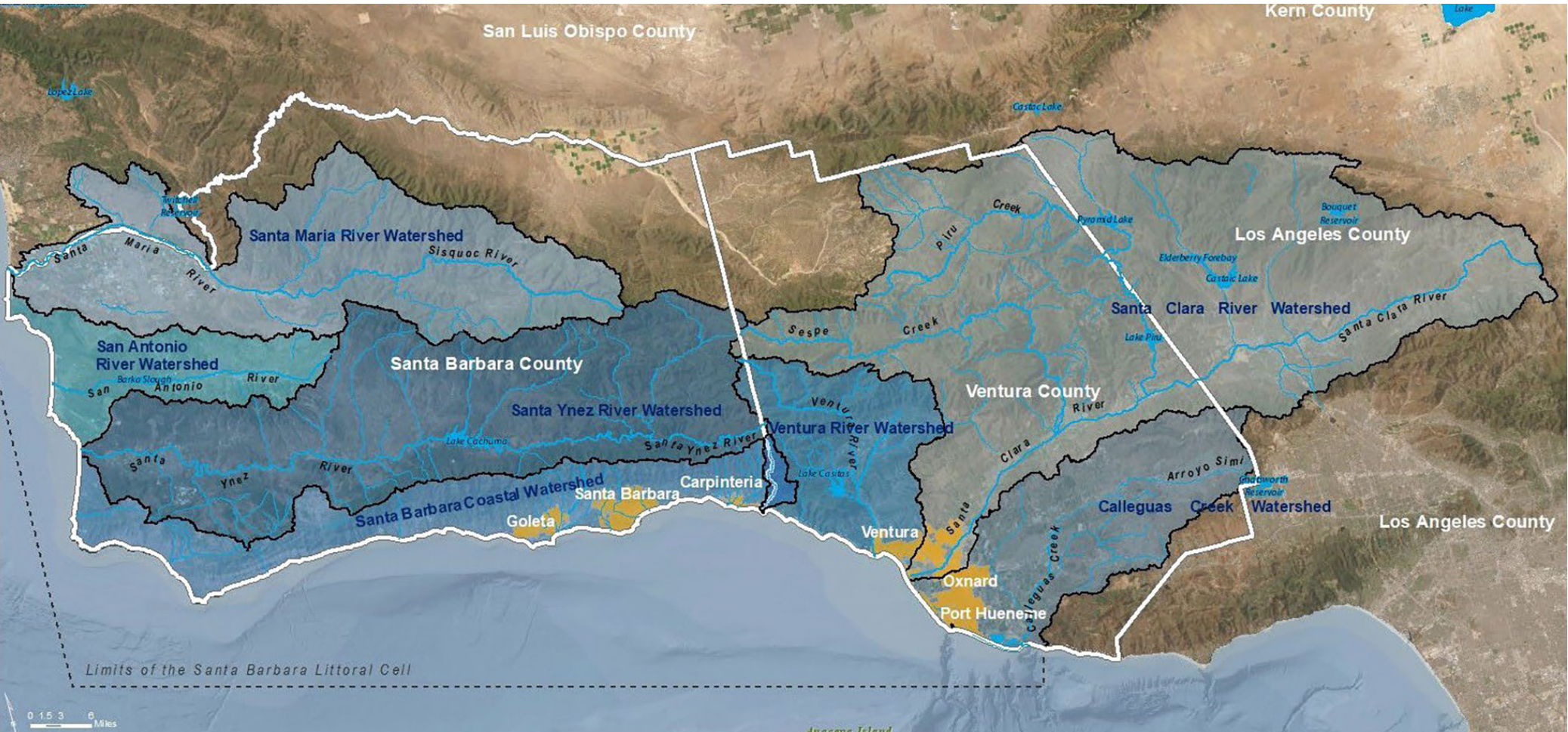


Integrating Regional Sediment Management and Sea Level Rise — Scan for full report

FINDING #4

One littoral cell, multiple jurisdictions and even more plans.

BEACON-region adaptation plans vary widely in how sediment is incorporated. Most prioritize living shorelines and while some explicitly consider dredging, nourishment, grain size compatibility, and flood-control sediments, others barely recognize sediment as an adaptation resource. Adaptation depends on sediment sources, transport, and governance that extends beyond jurisdictional boundaries, highlighting the need for regional collaboration.



BEACON littoral cell-adaptation decisions are local, but sediment sources, transport, and governance are regional.

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