

Sediment in the Sanctuaries



Coastal Resilience Sediment Plan

Joint GFNMS / MBNMS Advisory Council Meeting
Half Moon Bay, August 15, 2019

Sara Hutto and Wendy Kordesch

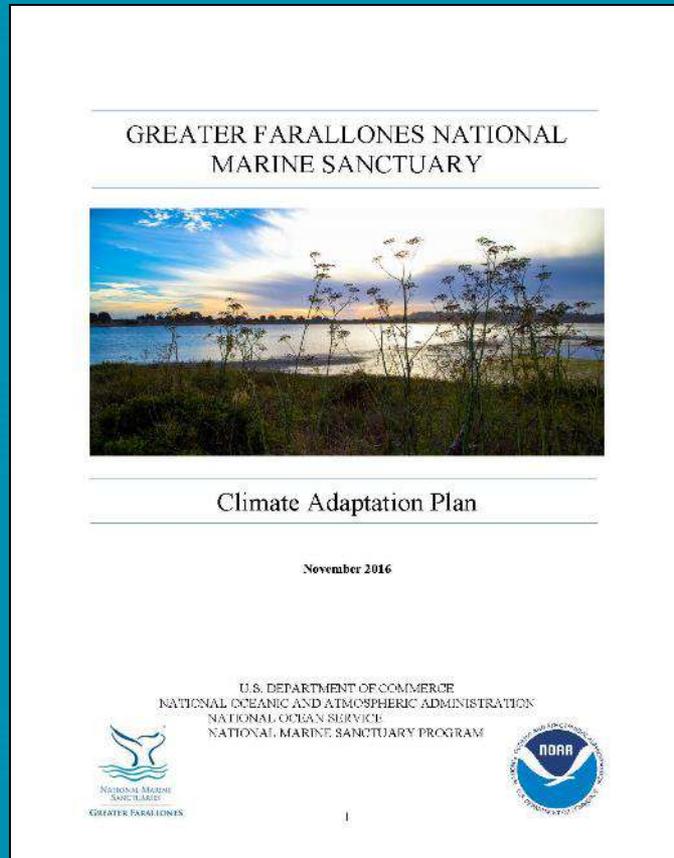
Greater Farallones Association

Max Delaney

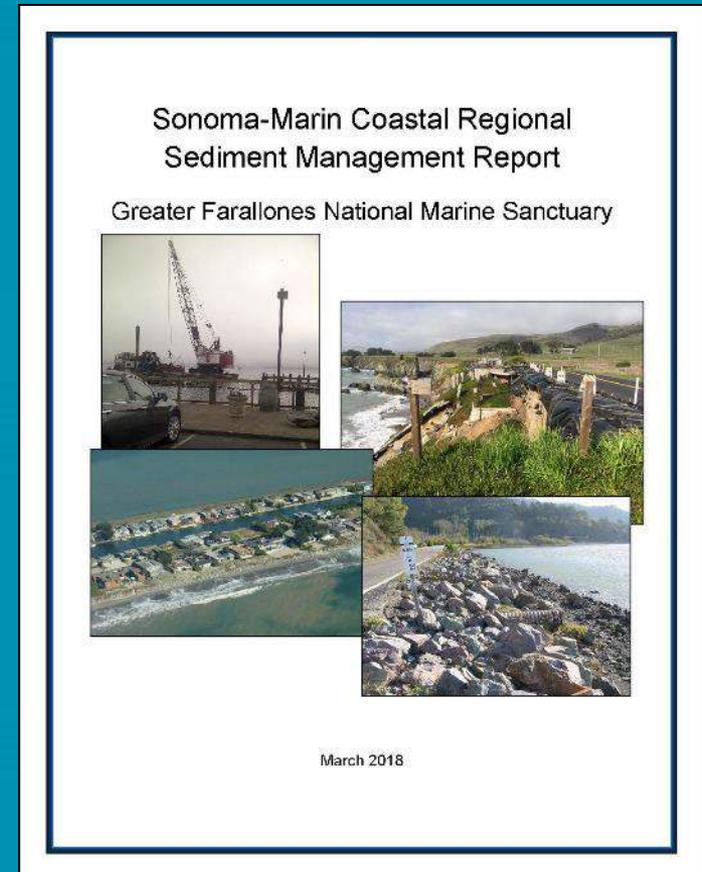
Greater Farallones National Marine Sanctuary



History of Sanctuary's Sediment Work



7 strategies call for enhanced sediment management, use, and science



Recommendations for sediment management at 29 sites across Sonoma/Marin

Four Coastal Regional Sediment Management Plans:



Gualala

Plan Area

San Francisco Central Bay

San Francisco Littoral Cell

Santa Cruz Littoral Cell

Point Año Nuevo

Coastal Resilience Sediment Plan

GOAL:

Identify and guide Sanctuary-focused approaches to sediment management for coastal resiliency

OUTCOMES:

- 6 common regional themes for sediment management across the North-central Coast
- 28 site-specific recommendations at 15 locations in the Sanctuary
- 3 Case studies
- A new multi-agency Sediment Coordination Committee



What are Sediment Management Strategies?

HARDSCAPING

- “Hold the Line”
- Groins/Jetties
- Cliff Stabilization
- Artificial Reefs
- Perched Beach

SOFTSCAPING

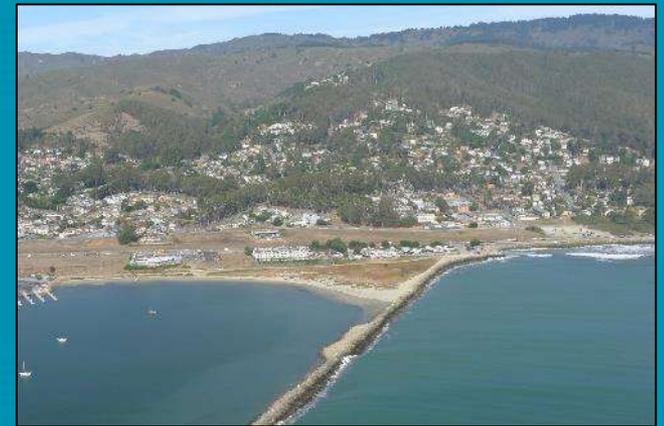
- Beach Nourishment/Restoration
- Living Shorelines
- Restoration of Dune/Upland/Marsh
- Dredging

OTHER

- Indirect Sediment Management
- Research
- Education
- Managed Retreat



MBNIMS



GFNMS



NPS

Regional Recommendations for the North-central Coast

- The four CRMSP/Rs list 39 recommendations
- GFNMS condensed these into 6 overarching themes



6 Regional Themes for the North-central Coast

1. Leverage Partnerships and Agency Coordination and Promote Information Sharing
2. Engage Communities and Stakeholders through Education and Outreach
3. Maintain and Expand Sediment Research and Monitoring Activities

6 Regional Themes for the North-central Coast

4. Restore Natural Habitats and/or Sediment Dynamics and Pursue Nature-Based Solutions to Avoid Hardening the Shoreline
5. Beneficial Reuse of Sediment
6. Watershed Approach

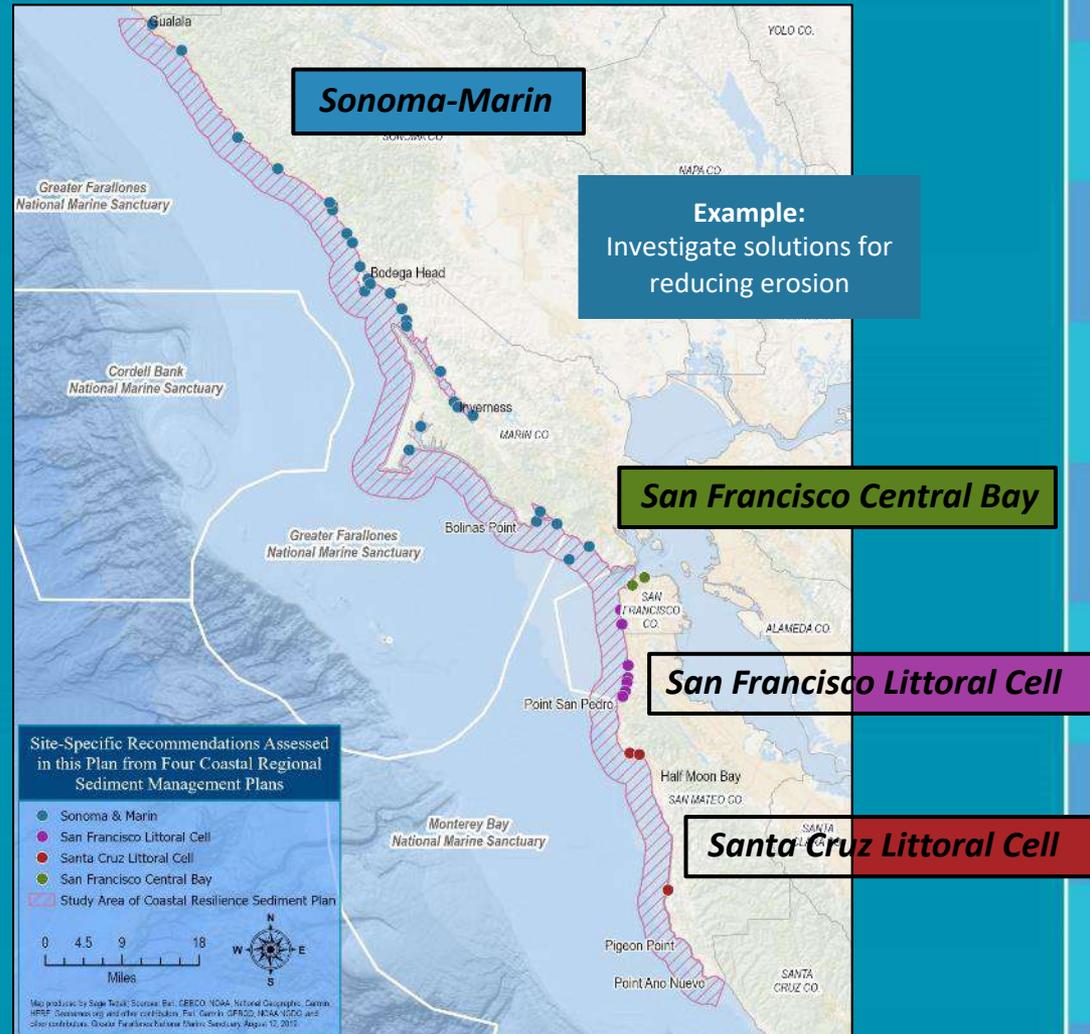


Site Level Recommendations

1

Compile recommendations from 4 plans

113 recommended strategies at 41 site locations from 4 plans in study area



Site Level Recommendations

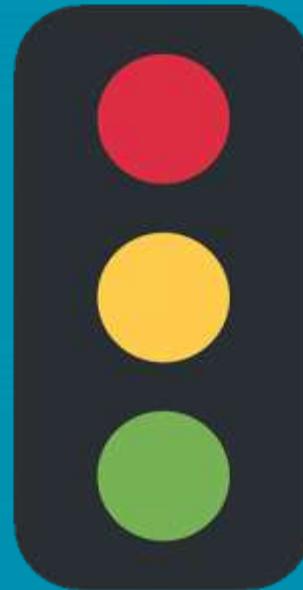
1

Compile
recommendations
from 4 plans

2

Assess:
Feasibility & Fit

Does strategy support Sanctuary
goals and objectives?



Not a Fit

**Forward to
Agency Partner**

Implement

All Site Level Recommendations

1

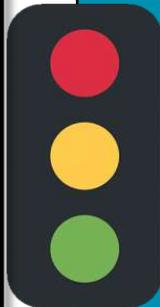
Compile recommendations from 4 plans

2

Assess: Feasibility & Fit

Site Location	13 STRATEGIES												
	Managed Network	Restoration of Dunes/Island and Marsh Ecosystems	Beach Nourishment/Restoration*	Artificial Reef	Grass	Clay	Clay	Clay	Clay	Clay	Clay	Clay	Clay
State Parks	Fwd												Fwd
Gualala River													Fwd
Sea Ranch	Fwd												Fwd
Salt Point State Park												Fwd	
Fort Ross Historic Park	Fwd												
Russian River - Driftwood Beach													Fwd
Russian River - Jenner to Estuary	Fwd											Fwd	Fwd
Russian River - Goat Rock	Fwd												Fwd
Wrights Beach	Fwd	Fwd											Fwd
Gleason Beach	Fwd	Fwd											Fwd
Salmon Creek Beach		Fwd										MSSL	MSSL
Bodega Head	Fwd											Fwd	
Bodega Harbor	Fwd											Fwd	
Doran Park	Fwd	Fwd	SLL										
Estero Americano		SLLL										SLSL	MSSL
Estero de San Antonio												SLSL	MSSL
Dillon Beach (N)	Fwd											Fwd	
Dillon Beach (S)	Fwd												
Marshall													SSLH
Chicken Ranch		SLLL											SSLH
Inverness	Fwd											SLSL	Fwd
Pt Reyes State Park		Fwd											SSSL
PRNS - Drakes Beach													Fwd
PRNS - Schooner Bay		Fwd											
Duxbury Reef and Offshore Area													SLSH
Bolinas Cliffs	Fwd	SSSL										Fwd	
Bolinas Lagoon		SSLH										SSLH	SSLH
Stinson Beach	Fwd	Fwd	SLLH									SSLH	SSLH
Muir Beach	Fwd												MLLL
San Francisco State Park Beach													Fwd
Baker Beach			Fwd										
Middle Ocean Beach	Fwd	Fwd		Fwd									Not Fit
South Ocean Beach	Fwd	Fwd		Fwd									Not Fit
Manor	Fwd	Fwd		Fwd									Not Fit
Beach Blvd	Fwd	Fwd		Fwd									Not Fit
Sharp Park	Fwd	Fwd		Fwd									Not Fit
Rookaway Beach (Cove)	Fwd	Fwd		Fwd									Not Fit
Linda Mar	Fwd	Fwd		Fwd									Not Fit
Princeton - Pillar Point Harbor			Not Fit	Not Fit									Not Fit
El Granada County (Surfer's) Beach	Fwd		SSLH										Not Fit
Pescadero Lagoon - Butano Creek		Fwd											Fwd
Total	23	13	12	1	8	1	3	7	5	18	8	10	3

* The Sanctuary could consider allowing beach nourishment or dredging only for restoration purposes.
 **Bodega Harbor is not within Sanctuary Boundaries, however the Sanctuary would be involved in helping the beneficial reuse of material for restoration of beach/marsh habitat at sites that could be in the Sanctuary.



All Site Level Recommendations

1

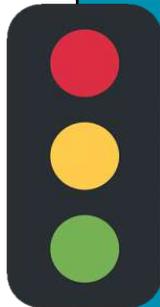
Compile recommendations from 4 plans

2

Assess: Feasibility & Fit

CSGMP	Location	13 STRATEGIES												
		Managed Wetland	Restoration of Dunes/Upland	Beach Nourishment/Restoration*	Perched Sand	Multiple Beaches	Grains	Cliff Stabilization	Hold the Line	Living Shorelines	Recreation	Education	Inland Sediment Management	Dredging**
	State Parks	Fwd										Fwd		
	Guadalupe River												Fwd	
	Sea Ranch	Fwd										Fwd		
	Salt Point State Park										Fwd			
	Fort Ross Historic Park	Fwd												
	Russian River - Driftwood Beach												Fwd	
	Russian River - Jenner to Estuary	Fwd									Fwd	Fwd	Fwd	
	Russian River - Goat Rock	Fwd											Fwd	
	Wrights Beach	Fwd	Fwd										Fwd	
	Gleason Beach	Fwd	Fwd										Fwd	
	Salmon Creek Beach		Fwd								MSSL	RSSL		
	Bodega Head	Fwd									Fwd		Fwd	
	Bodega Harbor	Fwd								Fwd	Fwd	SSSL		
	Doran Park	Fwd	Fwd	SLLL						SLSL				
	Estero Americano		SLLL							SLSL	RSSL	Fwd	SLSL	
	Estero de San Antonio									SLSL	RSSL			
	Dillon Beach (N)	Fwd						Not Fit			Fwd		Fwd	
	Dillon Beach (S)	Fwd												
	Marshall									SLLH	SSLH			
	Chicken Ranch		SLLL								SLLL			
	Inverness	Fwd								SLSL			Fwd	
	Pt Reyes Station		Fwd								SSSL			
	PRNS - Drakes Beach										Fwd			
	PRNS - Schooner Bay		Fwd											
	Duxbury Reef and Offshore Area										SLSH			
	Bolinas Cliffs	Fwd	SSSL					Fwd						
	Bolinas Lagoon		SSLH							SSLH	SLLH	SSLH		
	Stinson Beach	Fwd	Fwd	SLLH							SSLH	SSLH		
	Muir Beach	Fwd	Fwd								MLLL			
	San Francisco Gate North Beach										Fwd			
	Baker Beach			Fwd										
	Middle Ocean Beach	Fwd	Fwd		Fwd								Not Fit	
	South Ocean Beach	Fwd	Fwd		Fwd								Not Fit	
	Manor	Fwd	Fwd		Fwd								Not Fit	
	Beach Blvd	Fwd	Fwd		Fwd								Not Fit	
	Sharp Park	Fwd	Fwd		Fwd								Not Fit	
	Rookaway Beach (Cove)	Fwd	Fwd		Fwd								Not Fit	
	Linda Mar	Fwd	Fwd		Fwd								Not Fit	
	Princeton - Pillar Point Harbor		Not Fit	Not Fit	Not Fit	Not Fit	Not Fit	Not Fit						
	El Granada County (Surfer's) Beach	Fwd	SSLH											
	Pescadero Lagoon - Butano Creek		Fwd										Fwd	
	Total	23	13	12	1	8	1	3	7	5	18	8	10	3

4 Site Locations



Not a fit:

- Hardscape

* The Sanctuary could consider allowing beach nourishment or dredging only for restoration purposes.
 **Bodega Harbor is not within Sanctuary boundaries, however the Sanctuary would be involved in helping the beneficial reuse of material for restoration of beach/marsh habitat at sites that could be in the Sanctuary.

All Site Level Recommendations

1

Compile recommendations from 4 plans

2

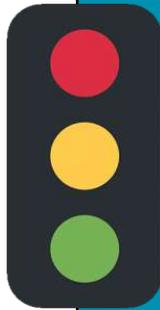
Assess: Feasibility & Fit

1 Recommendation in Sonoma-Marine Plan is not consistent with Sanctuary policies

CSMP	Location	13 STRATEGIES												
		Managed Retreat	Restoration of Dunes/Upland	900 Marsh Ecosystems	Beach Nourishment/Restoration*	Perched Beaches	Multiple Artificial Reefs	Grains & Berms	Cliff Stabilization by Seawall	Hold the Line	Living Shorelines	Revetment	Education	Inland Sediment Management
	State Parks	Fwd											Fwd	
	Gualala River													Fwd
	Sea Ranch	Fwd											Fwd	
	Salt Point State Park											Fwd		
	Fort Ross Historic Park	Fwd												
	Russian River - Driftwood Beach													Fwd
	Russian River - Jenner to Estuary	Fwd										Fwd	Fwd	Fwd
	Russian River - Goat Rock	Fwd												Fwd
	Wrights Beach	Fwd	Fwd											Fwd
	Gleason Beach	Fwd	Fwd											Fwd
	Salmon Creek Beach		Fwd									MSSL	RSSL	
	Bodega Head	Fwd												Fwd
	Bodega Harbor	Fwd									Fwd	Fwd	SSSL	
	Doran Park	Fwd	Fwd	SLLL							SLSL			
	Estero Americano		SLLL								SLSL	MSSL	Fwd	SLSL
	Estero de San Antonio											SLSL	MSSL	
	Dillon Beach (N)	Fwd						Not Fit				Fwd		Fwd
	Dillon Beach (S)		Fwd											
	Marshall										SLLH	SSLH		
	Chicken Ranch		SLLL									SSSL		
	Inverness	Fwd									SLSL			Fwd
	Pt Reyes Station		Fwd									SSSL		
	PRNS - Drakes Beach													
	PRNS - Schooner Bay		Fwd											
	Duxbury Reef and Off-shore Area													
	Bolinas Cliffs	Fwd	SSSL											
	Bolinas Lagoon		SSLH											
	Stinson Beach	Fwd	Fwd	SLLH										
	Muir Beach	Fwd												
	San Francisco Gate North Reach													
	Baker Beach			Fwd										
	Middle Ocean Beach	Fwd	Fwd		Fwd									
	South Ocean Beach	Fwd	Fwd		Fwd							Not Fit		
	Manor	Fwd	Fwd		Fwd							Not Fit		
	Beach Blvd	Fwd	Fwd		Fwd							Not Fit		
	Sharp Park	Fwd	Fwd		Fwd							Not Fit		
	Rookaway Beach (Cove)	Fwd	Fwd		Fwd							Not Fit		
	Linda Mar	Fwd	Fwd		Fwd							Not Fit		
	Princeton - Pillar Point Harbor		Not Fit	Not Fit				Not Fit	Not Fit					
	El Granada County (Surfer's) Beach	Fwd		SSLH			Not Fit							
	Pescadero Lagoon - Butano Creek		Fwd											Fwd
	Total	23	13	12	1	8	1	3	7	5	18	8	10	3

4 Site Locations

Not a fit: Dillon Beach Seawall



* The Sanctuary could consider allowing beach nourishment or dredging only for restoration purposes.
 **Bodega Harbor is not within Sanctuary Boundaries, however the Sanctuary would be involved in helping the beneficial reuse of material for restoration of beach/marsh habitat at sites that could be in the Sanctuary.

Sanctuary Site Level Recommendations

1

Compile recommendations from 4 plans

2

Assess: Feasibility & Fit

3

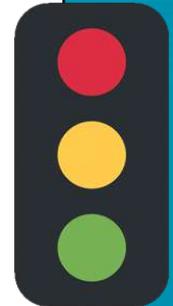
Compile Sanctuary strategies

STRATEGIES

CRRIP Site Number	Location	STRATEGIES						
		Restoration of Diverse Upland and Marsh Environments	Beach Nourishment for Restoration*	Living Shorelines	Research	Education	Dredging*	
1	Salmon Creek Beach				MSSL	MSSL		
2	Bodega Harbor**				SLL			
3	Doran Park		SLL	SLSL				
4	Estero Americano	SLL			SLSL	MSSL	SLSL	
5	Estero de San Antonio				SLSL	MSSL		
6	Marshall			SLH	SSLH			
7	Chicken Ranch Beach	SLL			SSL			
8	Inverness			SLSL				
9	Pt Reyes Station – Bivalve				SSL			
10	Duxbury Reef and Off-shore Area				SLSH			
11	Bolinas Cliffs	SSSL						
12	Bolinas Lagoon	SSLH		SSLH	SLLH	SSLH		
13	Stinson Beach		SLLH		SSLH	SSLH		
14	Muir Beach				MLL			
15	El Granada County (Surfer's) Beach		SSLH					
Total		4	3	4	11	5	1	

15 Site Locations

* The Sanctuary could consider allowing beach nourishment or dredging only for restoration purposes.
 **Bodega Harbor is not... would be involved in the beach/marsh habitat...



Implement:

- 28 Sanctuary-focused strategies
- Green shading: Implementation Feasibility (benefit/required resources/support/urgency)

Sanctuary Site Level Recommendations

1

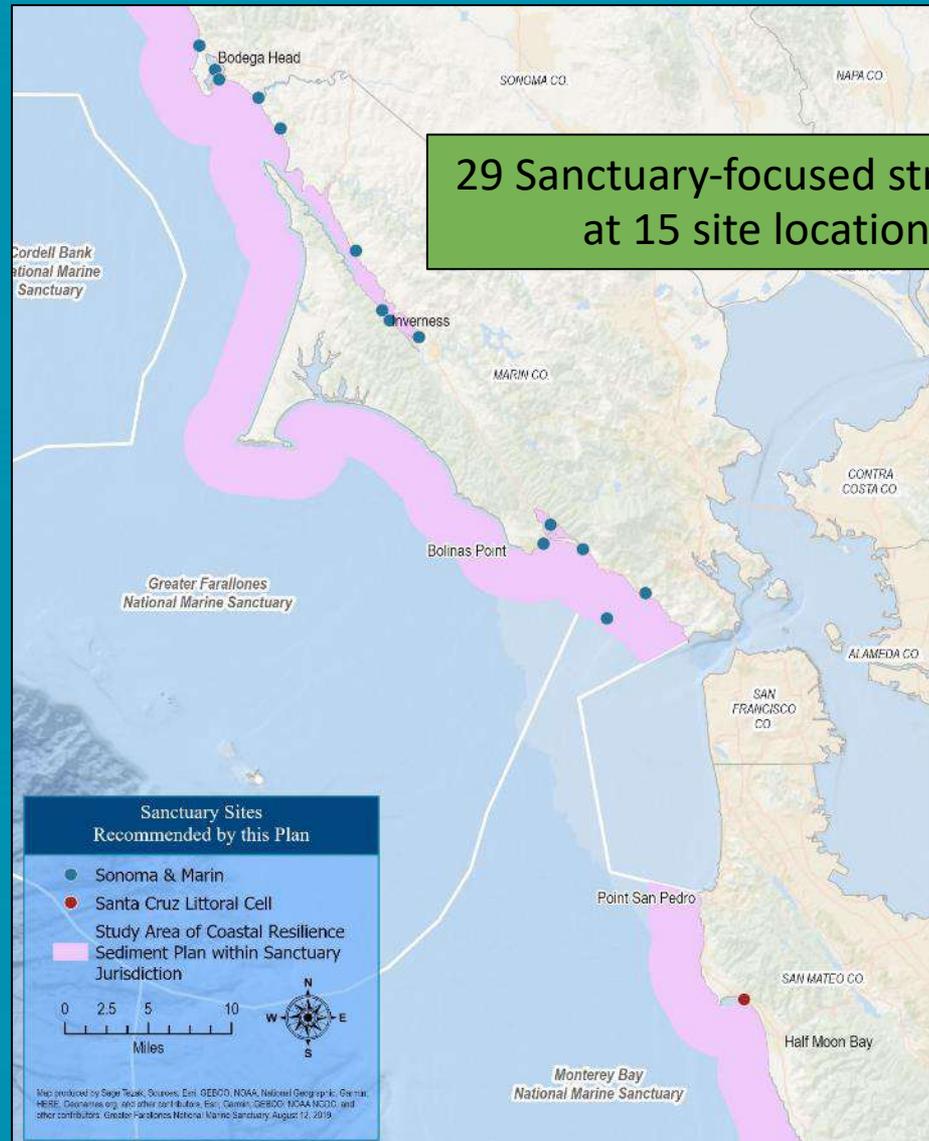
Compile recommendations from 4 plans

2

Assess:
Feasibility & Fit

3

Compile Sanctuary strategies



Sanctuary Site Level Recommendations

6. Marshall, Marin County

<i>Shoreline Characterization</i>	
General Setting	Geology: Qt, fsr Shoreline: Tidal Marsh, Beaches, Coastal Marsh, Hardened Shores
Shoreline Change	No data available
Primary Landowners	Audubon Canyon Ranch, National Park Service (GGNRA)
Critical Habitats	N/A
Public Access and Trails	1 Access Points: 1 City/Town No trails
Infrastructure	Roads: <1 km local roads Culverts: 8 Armor: none



Recommended Strategy(ies) from Table 3.7:

<i>Sanctuary Strategies</i>		
Location	Marshall	
Concerns	Scouring of mudflats and increased erosion - losing habitat (mudflats) and their protective capacity	
Goal	Erosion reduction, habitat preservation	
Management Strategy	Living Shorelines	Research
Implementation Feasibility	May be most easily implemented (SSLH)	May be most easily implemented (SSLH)
Timeframe	Near-term	Near-term <input type="checkbox"/>
Strategy Detail	Explore pilot project for living shoreline using native oyster shells to reduce wave impacts	Investigate additional solutions for reducing erosion
Potential Agency Partners	USACE; EPA; NPS; CCC; SLC; Water Board; Resource Agencies	USACE; EPA; CCC; Water Board; SLC; State Parks; County
Notes	See C-SMART Marshall Conceptual Adaptation Options from Marin County	

How will this plan be used?

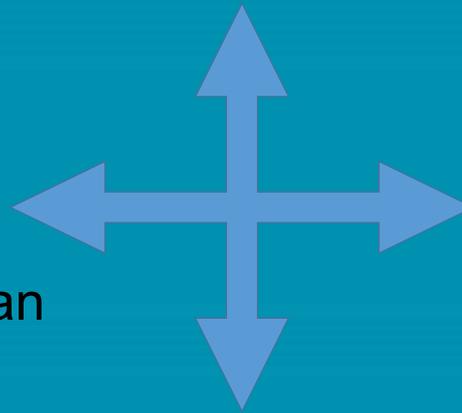


Roadmap:

GFNMS to plan and/or coordinate future projects

Resource:

Product for CSMW (CNRA) to further Sediment Master Plan



Resource:

Project development by partner Agencies

Resource:

Model for newly formed Sediment Coordination Committee planning

Next Steps



- Final Plan (Fall 2019)
- Present to North-central California Coastal Sediment Coordination Committee (Sept. 2019)
- Copies of final plan to be circulated to GFNMS and MBNMS SAC
- Online
 - GFA website
 - GFNMS Ocean Climate Storymap

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