# Shoreline Assets At-Risk by SLR & Lowland Flooding

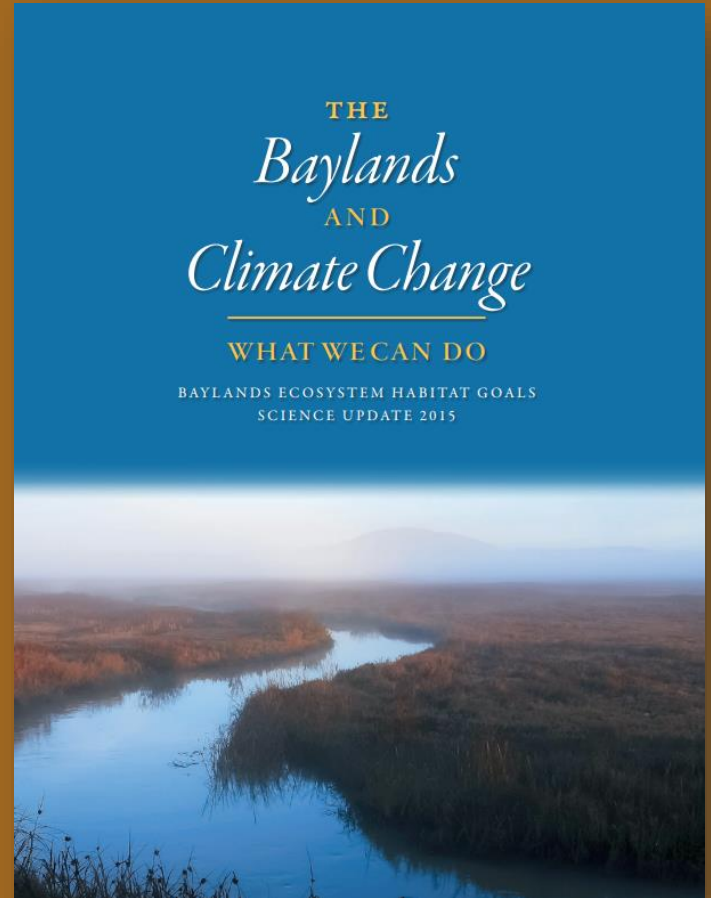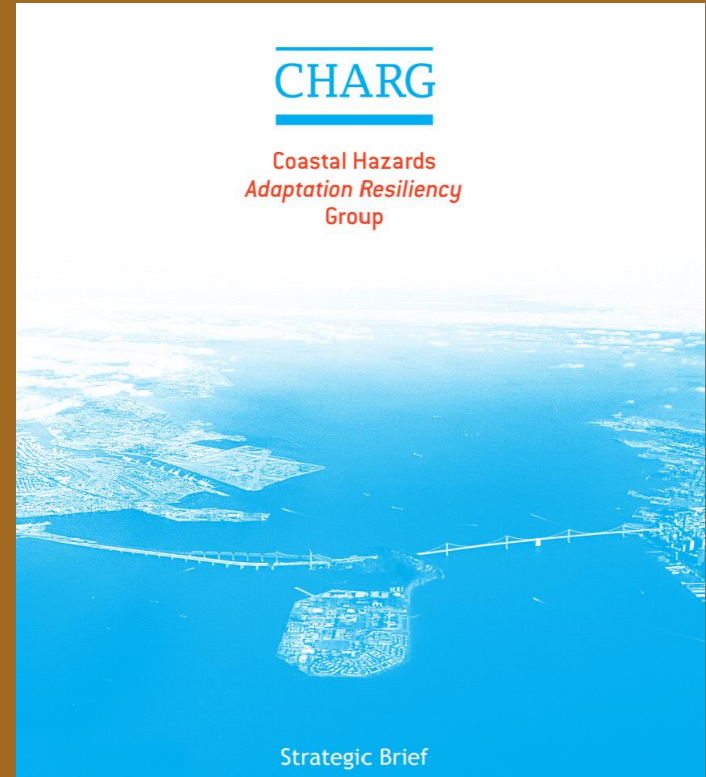| | |
|---|---|
| **S. F. Bay Shoreline** | **$100 Billion** |
| **CA (Pacific Coast)** | **$50 Billion** |

**Case Study**

# S.F. Bay Adaptation Planning

- **Baylands Goals Report**

- **Restoration Authority**

- **Adapting to Rising Tides**

- **Plan Bay Area 2040**

- **Resilient by Design Challenge**



THE
*Baylands*
AND
*Climate Change*

WHAT WE CAN DO

BAYLANDS ECOSYSTEM HABITAT GOALS
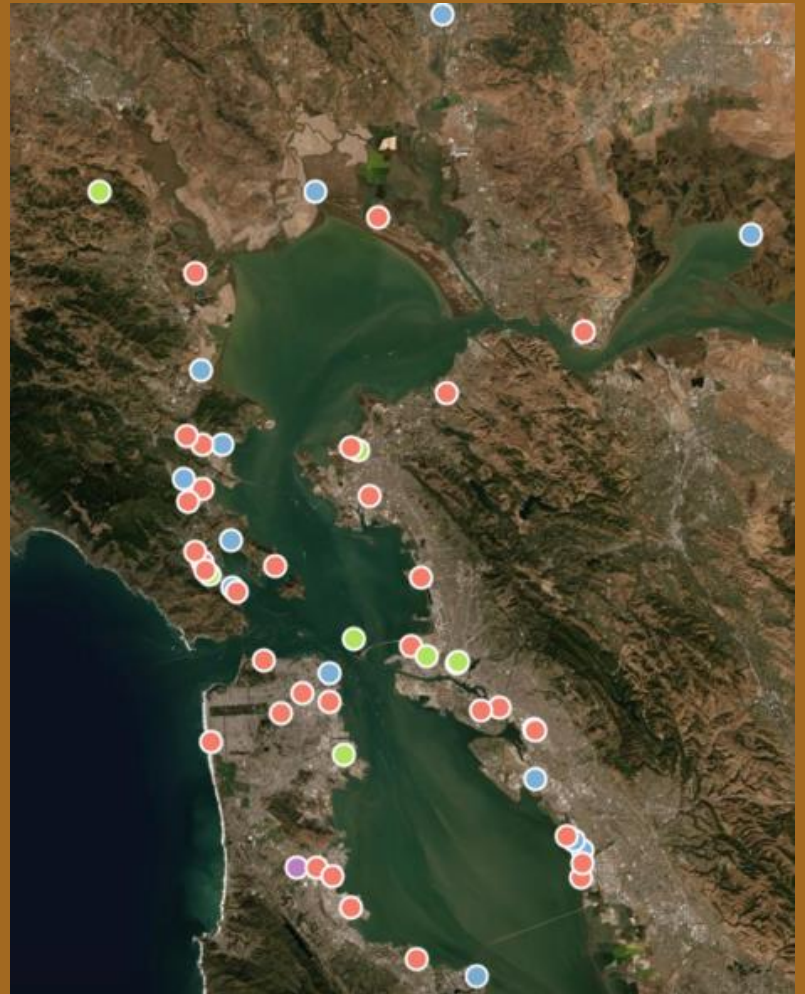SCIENCE UPDATE 2015

BayCAN

CHARG

# Local Adaptation Planning



Legend

**Adaptation Around the Region**

- 🔴 Vulnerability Assessment and Planning
- 🔵 Physical Adaptation
- 🟢 Community-based Organization
- 🟣 Education initiatives

# Adaptation Atlas

- A place-specific framework

- Nature-based and hybrid options

- Less expensive, more effective options

- Spans jurisdictions.



SAN FRANCISCO BAY SHORELINE
**Adaptation Atlas**
Working with Nature to Plan for Sea Level Rise
Using Operational Landscape Units

**SFEI** | San Francisco Estuary Institute

SPUR
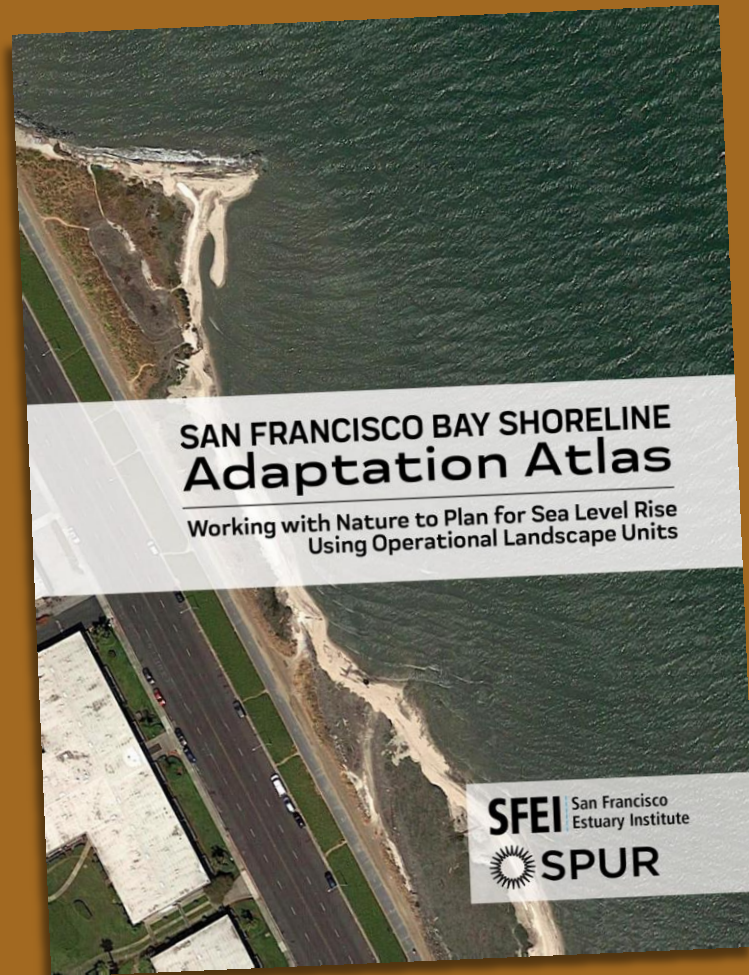
# Operational Landscape Units

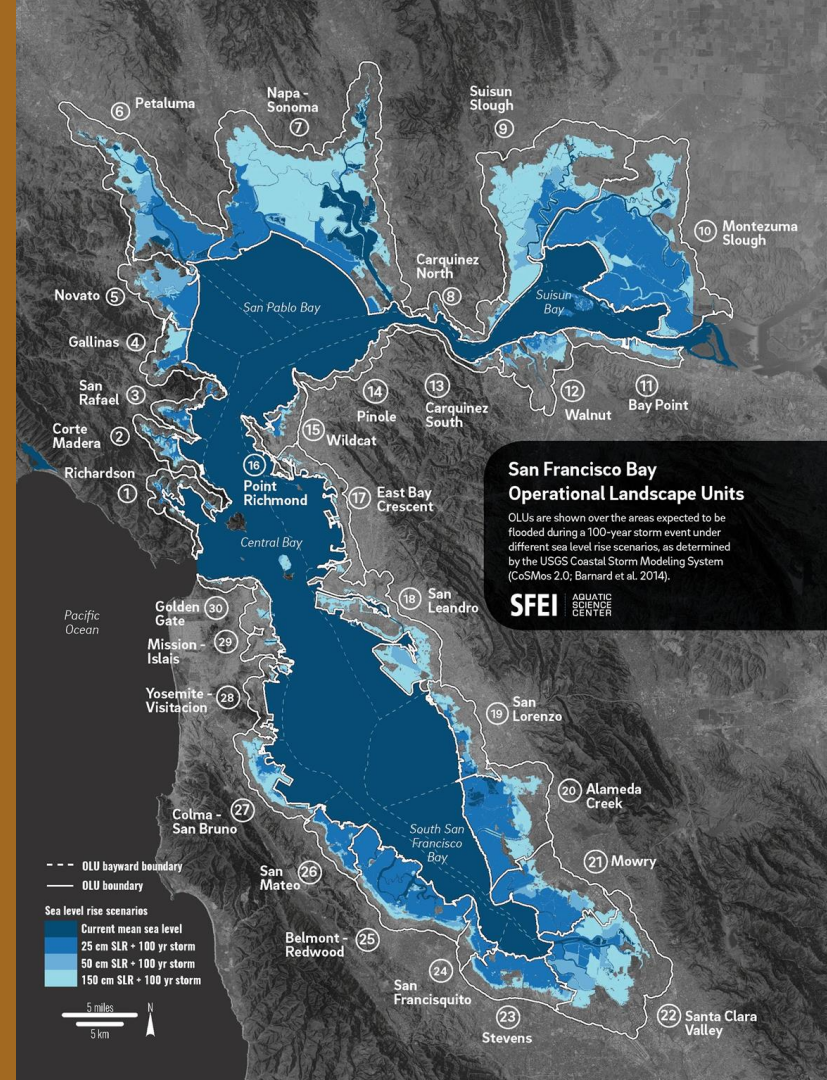*Areas with shared geophysical and land use characteristics suited for a particular suite of nature-based measures*

San Francisco Bay Operational Landscape Units

OLUs are shown over the areas expected to be flooded during a 100-year storm event under different sea level rise scenarios, as determined by the USGS Coastal Storm Modeling System (CoSMos 2.0; Barnard et al. 2014).

**SFEI** AQUATIC SCIENCE CENTER

OLU bayward boundary
OLU boundary

**Sea level rise scenarios**
Current mean sea level
25 cm SLR + 100 yr storm
50 cm SLR + 100 yr storm
150 cm SLR + 100 yr storm

5 miles
5 km

SFEI

# Tidal Marsh Restoration Options
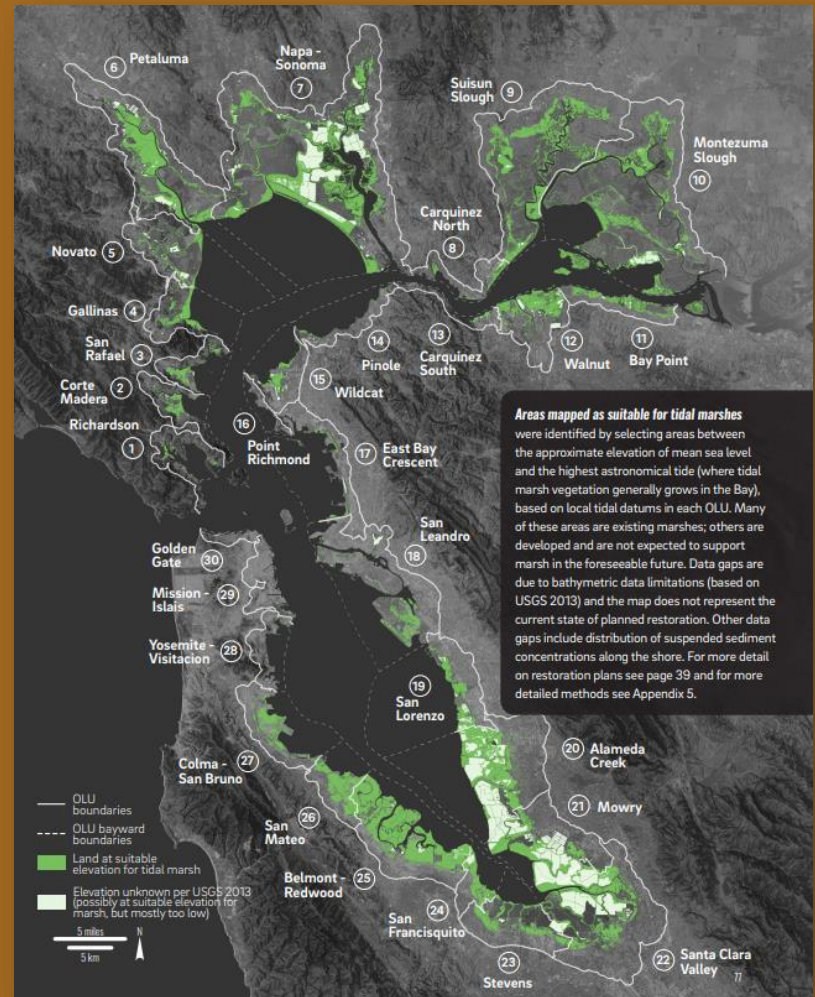
# Adaptation measures

## Nature-based measures

- **Nearshore reefs**

- **Beaches**

- **Tidal marshes**

- **Ecotone levees**

- **Migration space preparation**

- **Creek-to-bayland reconnections**

- **Green stormwater infrastructure**

## Regulatory & policy tools

- **Zoning**

- **Setbacks, buffers,**

- **Building codes**

- **Rebuilding restrictions**

- **Conservation easements**

- **Tax incentives**

- **Geologic Hazard Districts**

- **Buyouts**

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# Suitability

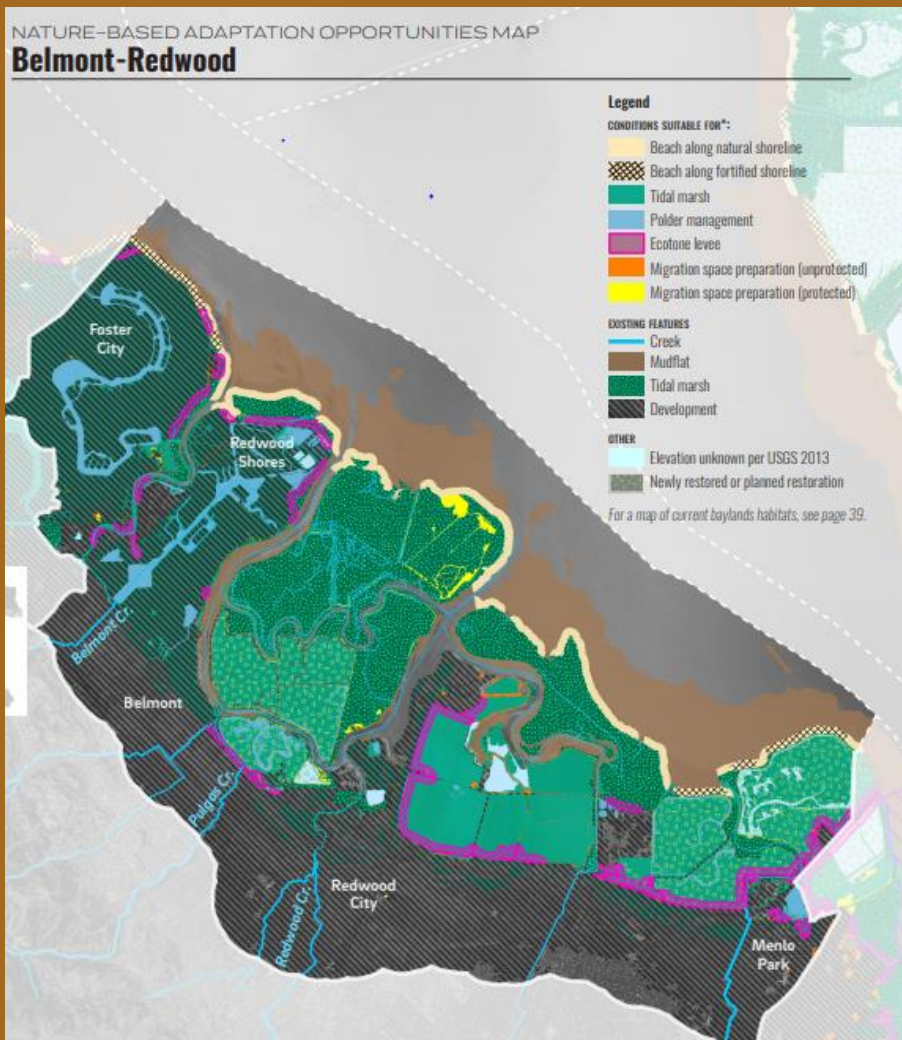## of nature-based measures

**Suitability Rating**

- ◯ Limited suitability
- ◓ Some suitability
- ● High suitability

| | Nearshore reefs (p. 66) | Submerged aquatic vegetation (eelgrass) (p. 68) | Beaches (p. 72) | Tidal marshes (p. 76) | Polder management (p. 80) | Ecotone levees (p. 84) | Migration space preparation (p. 88) |
|---|---|---|---|---|---|---|---|
| 1. Richardson | ● | ● | ● | ◓ | ◯ | ◓ | ◯ |
| 2. Corte Madera | ● | ● | ● | ◓ | ◓ | ◓ | ◓ |
| 3. San Rafael | ● | ● | ● | ◓ | ◓ | ◓ | ◯ |
| 4. Gallinas | ◓ | ● | ◯ | ● | ● | ◓ | ● |
| 5. Novato | ◯ | ◯ | ◯ | ● | ● | ◓ | ● |
| 6. Petaluma | ◯ | ◯ | ◯ | ● | ● | ◯ | ● |
| 7. Napa - Sonoma | ◯ | ◯ | ◯ | ● | ● | ◓ | ● |
| 8. Carquinez North | ◯ | ◯ | ◯ | ● | ◯ | ◓ | ● |
| 9. Suisun Slough | ◯ | ◯ | ◯ | ● | ● | ◓ | ● |
| 10. Montezuma Slough | ◯ | ◯ | ◯ | ● | ● | ◯ | ● |
| 11. Bay Point | ◯ | ◯ | ◯ | ● | ● | ◓ | ● |
| 12. Walnut | ◯ | ◯ | ◯ | ● | ● | ● | ● |
| 13. Carquinez South | ◯ | ◯ | ◯ | ◓ | ◯ | ● | ● |
| 14. Pinole | ● | ◯ | ● | ◓ | ◯ | ◓ | ◯ |
| 15. Wildcat | ● | ● | ● | ● | ◓ | ● | ● |
| 16. Point Richmond | ● | ● | ● | ◯ | ◯ | ◯ | ◯ |
| 17. East Bay Crescent | ● | ● | ● | ◓ | ◯ | ● | ◓ |
| 18. San Leandro | ◯ | ● | ● | ◓ | ◓ | ◯ | ◯ |
| 19. San Lorenzo | ◯ | ● | ● | ● | ◓ | ● | ◓ |
| 20. Alameda Creek | ◯ | ◯ | ● | ● | ● | ● | ● |
| 21. Mowry | ◯ | ◯ | ◯ | ● | ● | ● | ● |
| 22. Santa Clara Valley | ◯ | ◯ | ◯ | ● | ● | ● | ● |
| 23. Stevens | ◓ | ◯ | ◯ | ● | ● | ◓ | ◓ |
| 24. San Francisquito | ● | ◯ | ◯ | ● | ◓ | ● | ◓ |
| 25. Belmont - Redwood | ◯ | ◯ | ● | ● | ◓ | ● | ◯ |
| 26. San Mateo | ◯ | ● | ● | ◓ | ◓ | ◓ | ◯ |
| 27. Colma - San Bruno | ◯ | ● | ● | ◓ | ◯ | ◓ | ◯ |
| 28. Yosemite - Visitacion | ● | ● | ● | ◯ | ◓ | ◯ | ◯ |
| 29. Mission - Islais | ◯ | ● | ● | ◯ | ◯ | ◯ | ◯ |
| 30. Golden Gate | ◯ | ◯ | ● | ◯ | ◯ | ◯ | ◯ |

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NATURE–BASED ADAPTATION OPPORTUNITIES MAP

**Belmont-Redwood**

**Legend**

**CONDITIONS SUITABLE FOR*:**

- Beach along natural shoreline
- Beach along fortified shoreline
- Tidal marsh
- Polder management
- Ecotone levee
- Migration space preparation (unprotected)
- Migration space preparation (protected)

**EXISTING FEATURES**

- Creek
- Mudflat
- Tidal marsh
- Development

**OTHER**

- Elevation unknown per USGS 2013
- Newly restored or planned restoration

*For a map of current baylands habitats, see page 39.*

Foster City

Redwood Shores

Belmont Cr.

Belmont

Pulgas Cr.

Redwood Cr.

Redwood City

Menlo Park

# Adaptation Atlas Download:

## adaptationatlas.sfei.org