The Baylands and Climate Change:
WHAT WE CAN DO

SFBRA GB
3 Nov 2017
San Francisco, CA

LETITIA GRENIER
SAN FRANCISCO ESTUARY INSTITUTE

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1800

Tidal Marsh

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why do we care about

TIDAL MARSHES?

clean water

flood control

food web and wildlife

recreation and scenery

1800

Tidal Marsh

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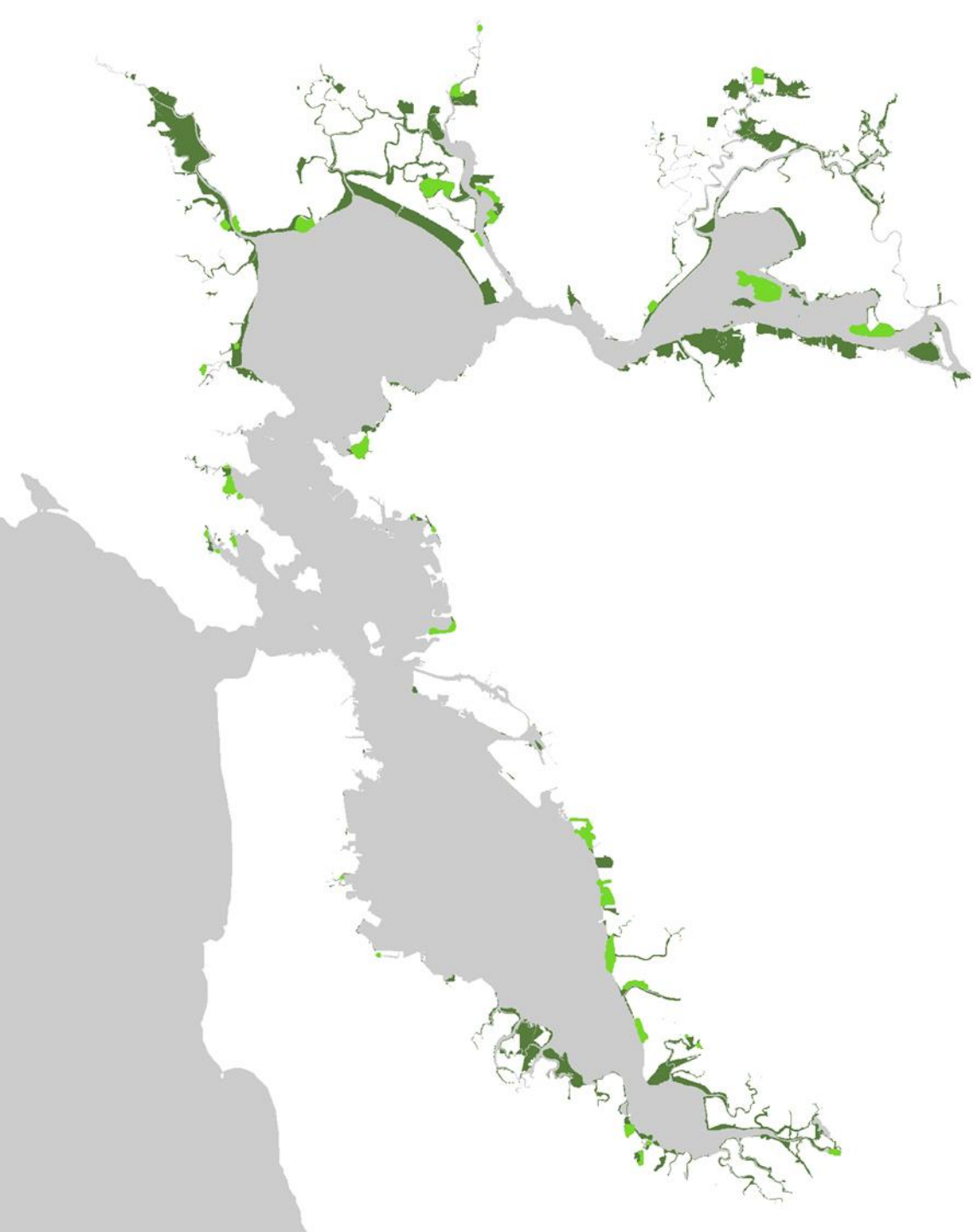

1998

Tidal Marsh

Restored Tidal Marsh

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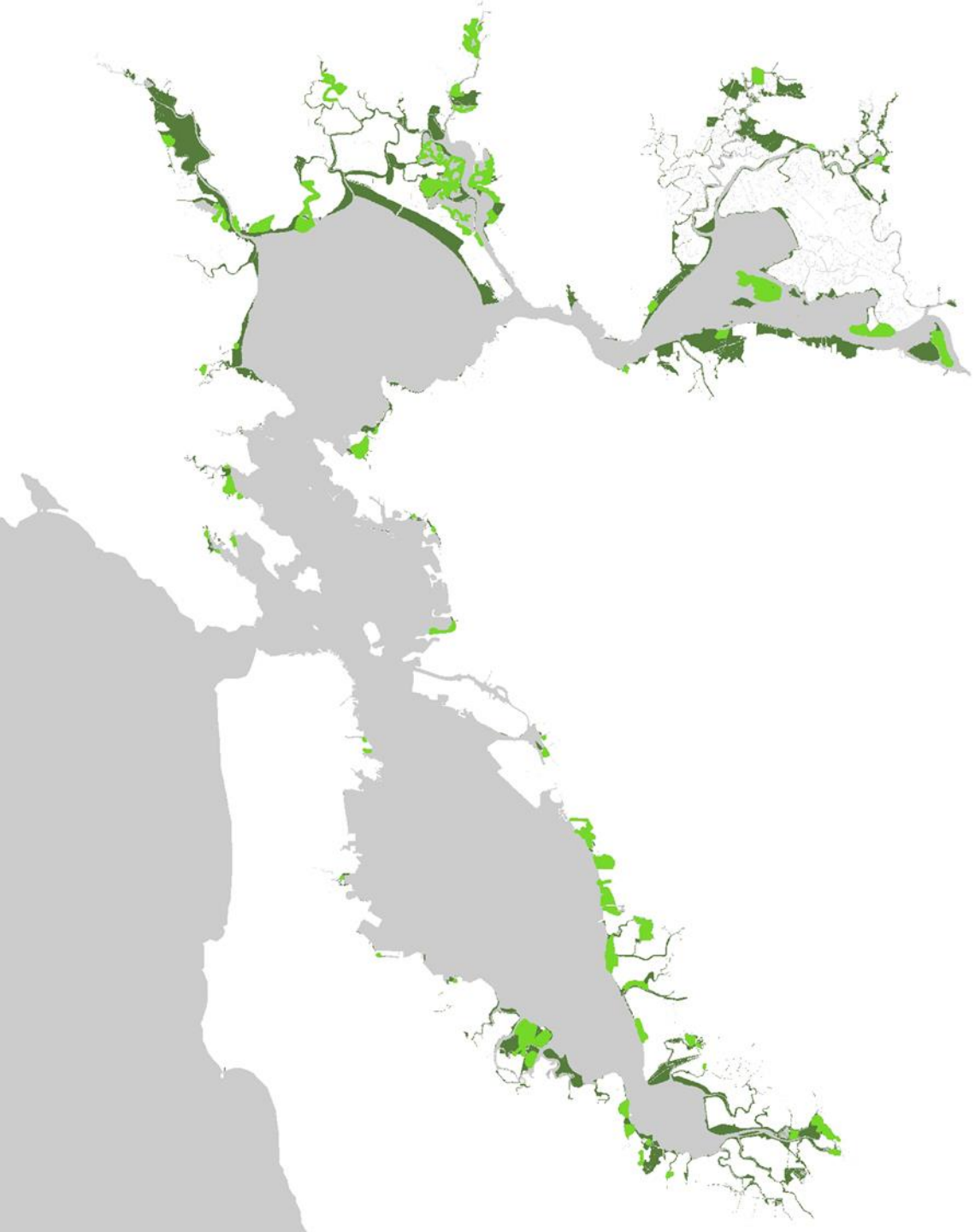

2009

Tidal Marsh

Restored Tidal Marsh

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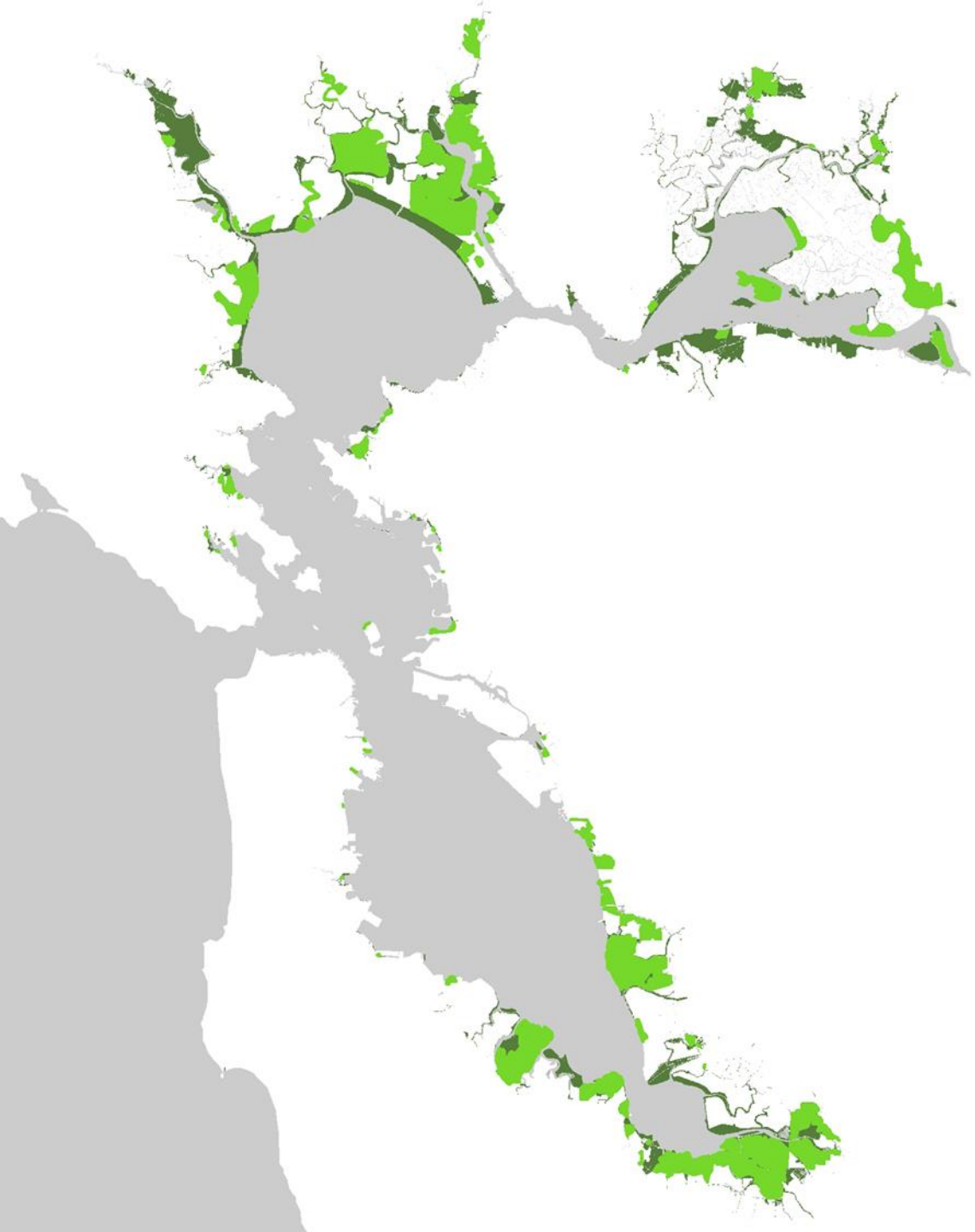

FUTURE

Tidal Marsh

Restored Tidal Marsh

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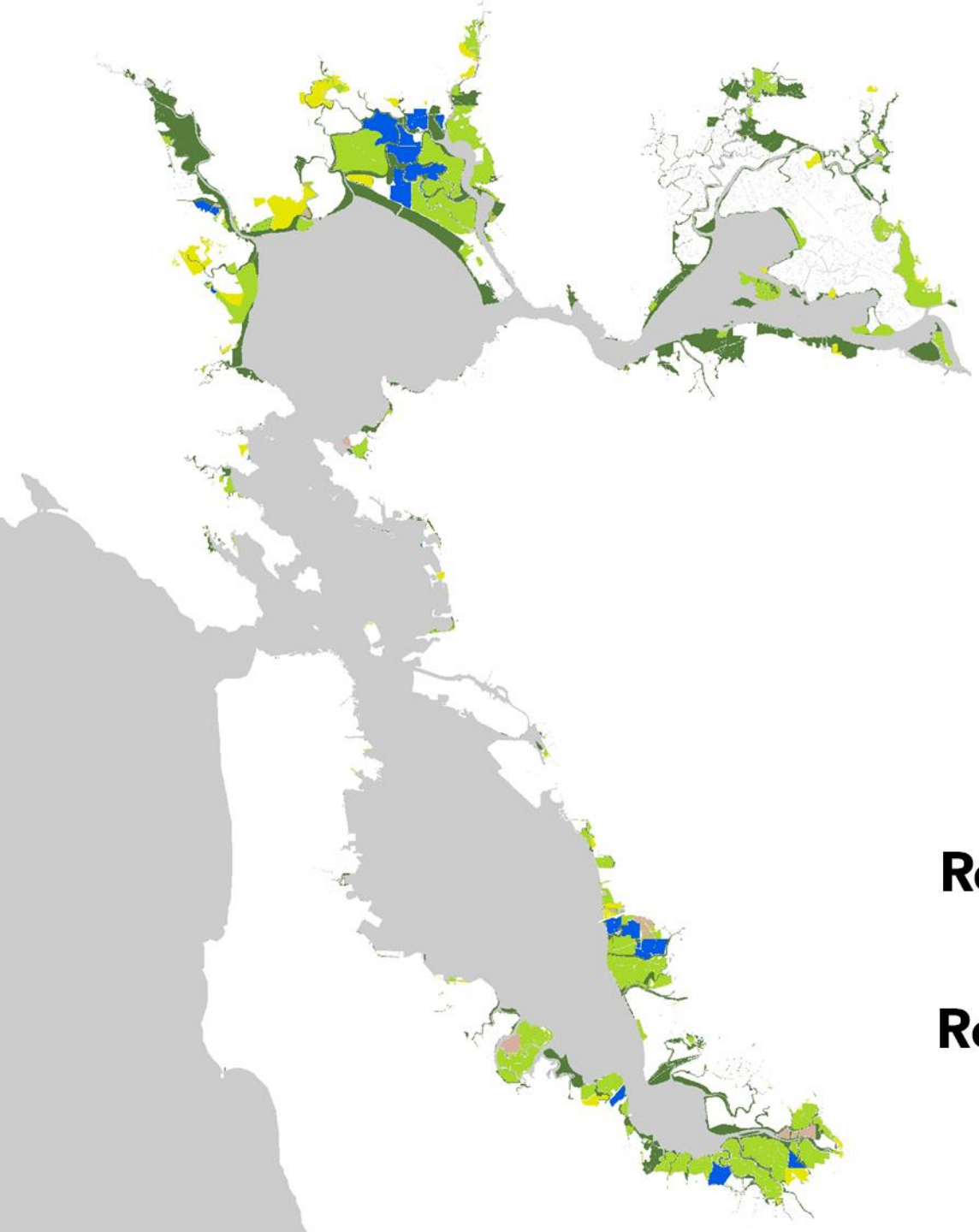

FUTURE

Existing Tidal Marsh

Restored Tidal Marsh

Restored Tidal Flat

Restored Diked Wetland

Restored Managed Pond

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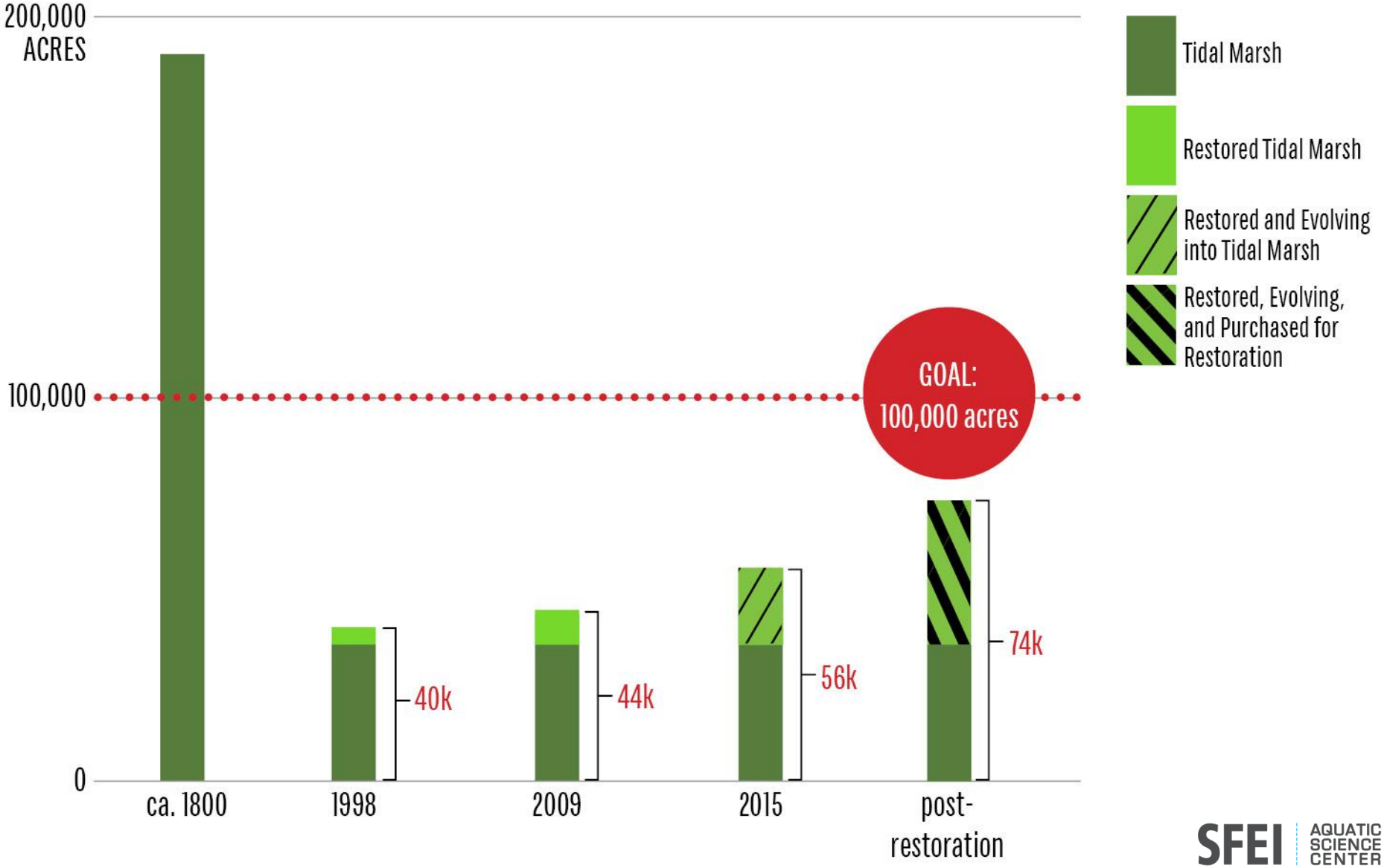
TIDAL MARSH *restoration*



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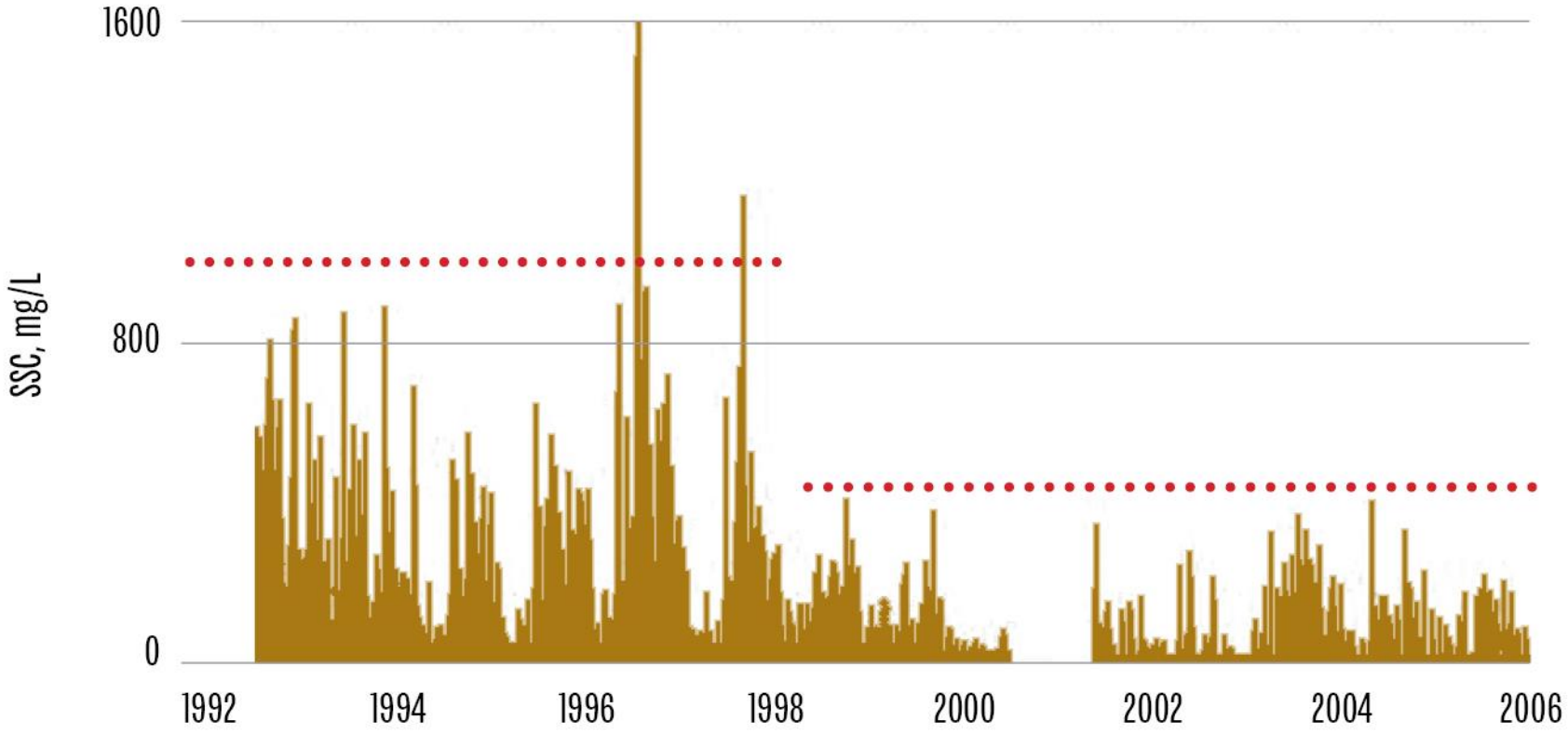
GLOBAL SEA LEVEL change SINCE 1800

Courtesy 3rd National Climate Assessment, 2014

Rising Seas 2017
4.4 ft by 2100

SEDIMENT SUPPLY *reduction*

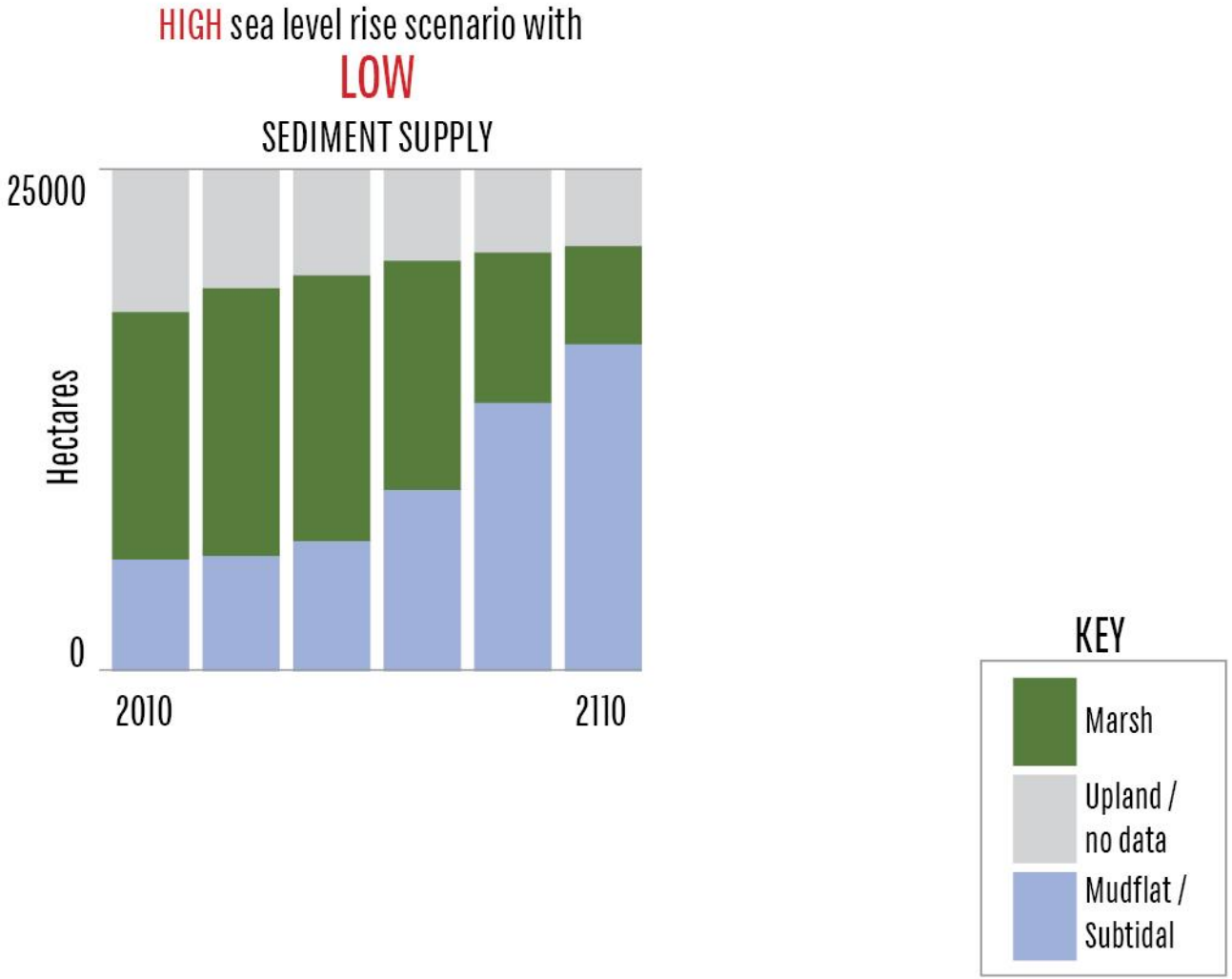
Courtesy
Dave Schoelhamer
2011



SEDIMENT SUPPLY

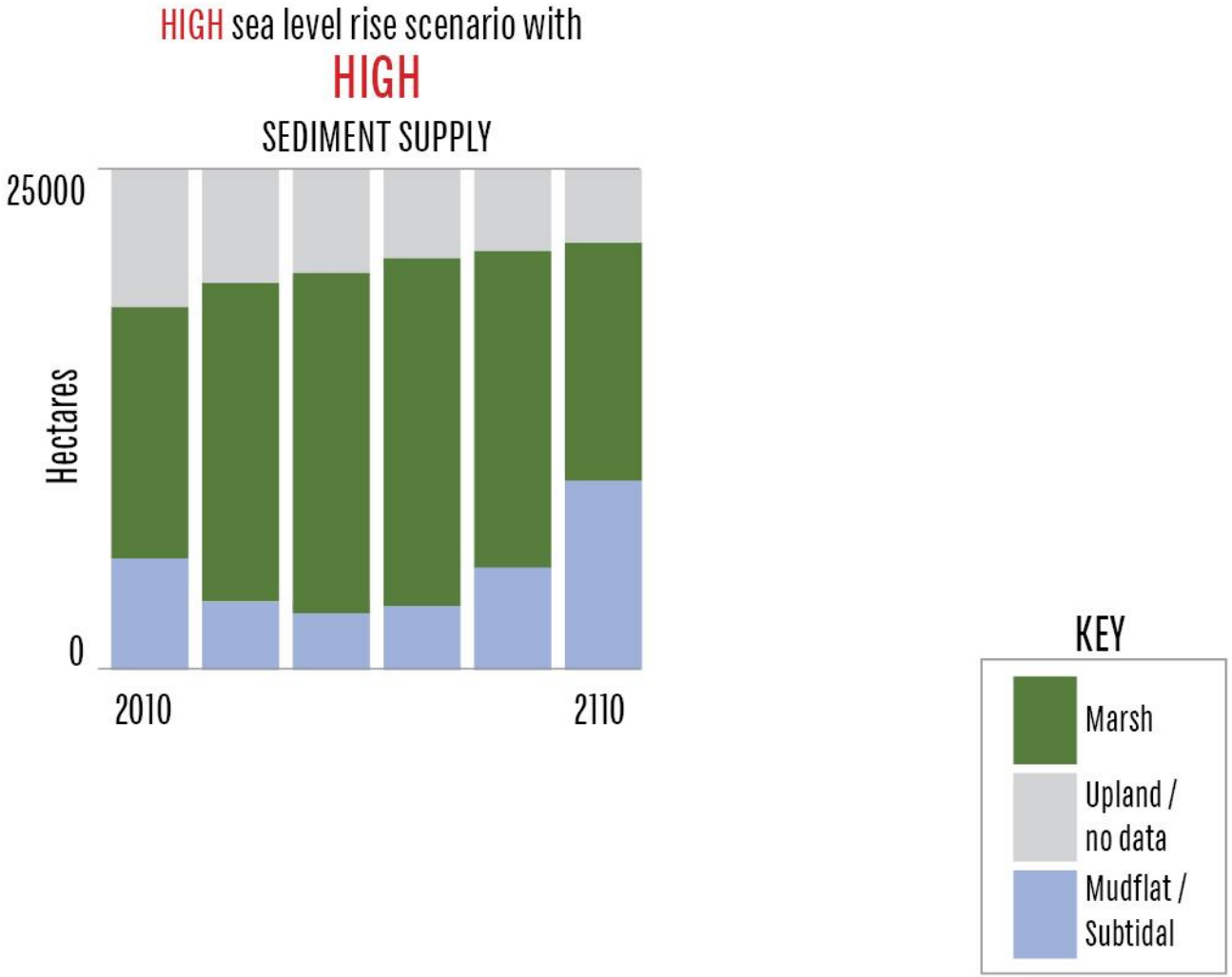
THE FUTURE OF MARSHES DEPENDS ON *sediment supply*

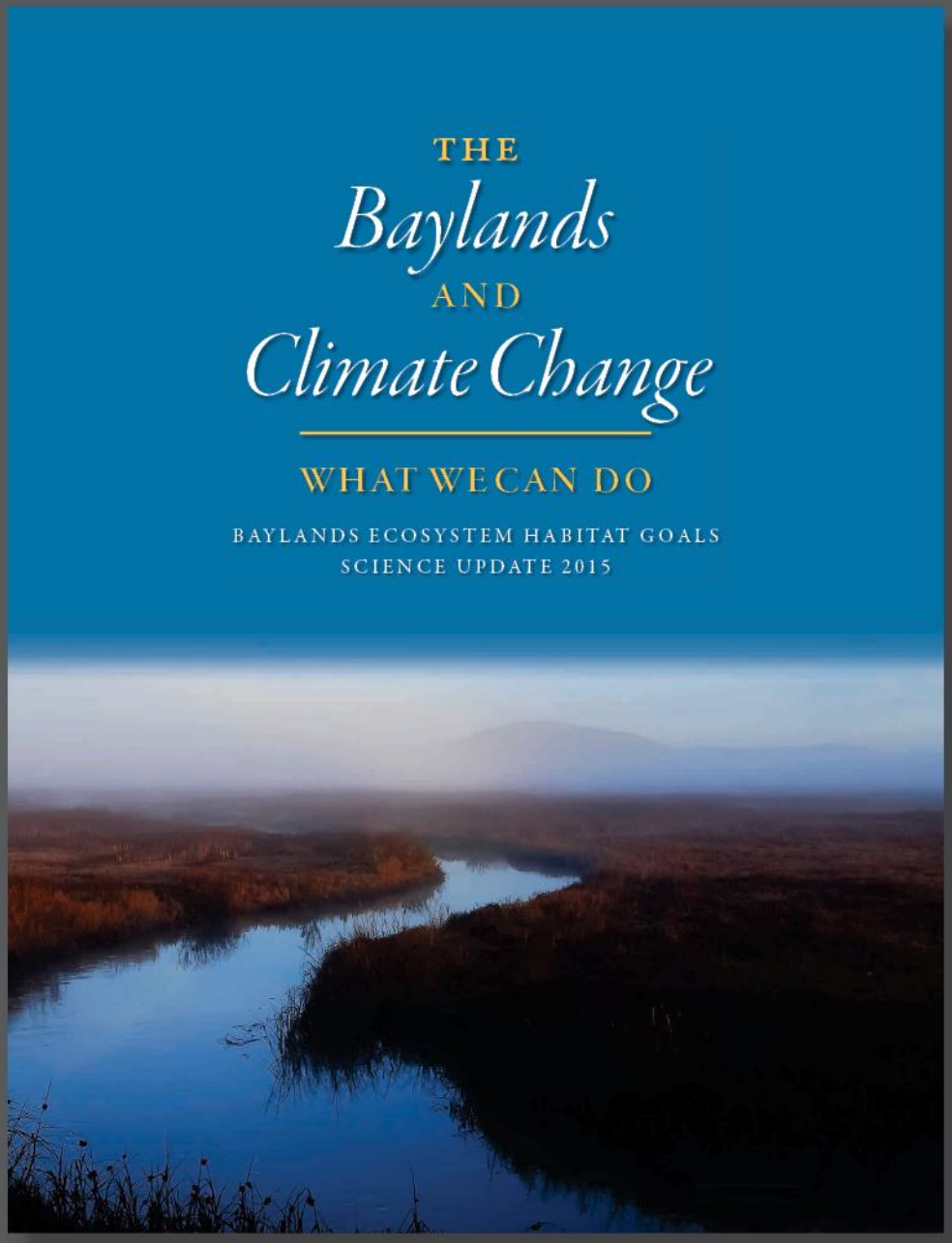
Courtesy Stralberg et al. 2011



THE FUTURE OF MARSHES DEPENDS ON *sediment supply*

Courtesy Stralberg et al. 2011





- Ecological goals
- 200+ scientists, land managers, regulators
- 26 agency steering committee

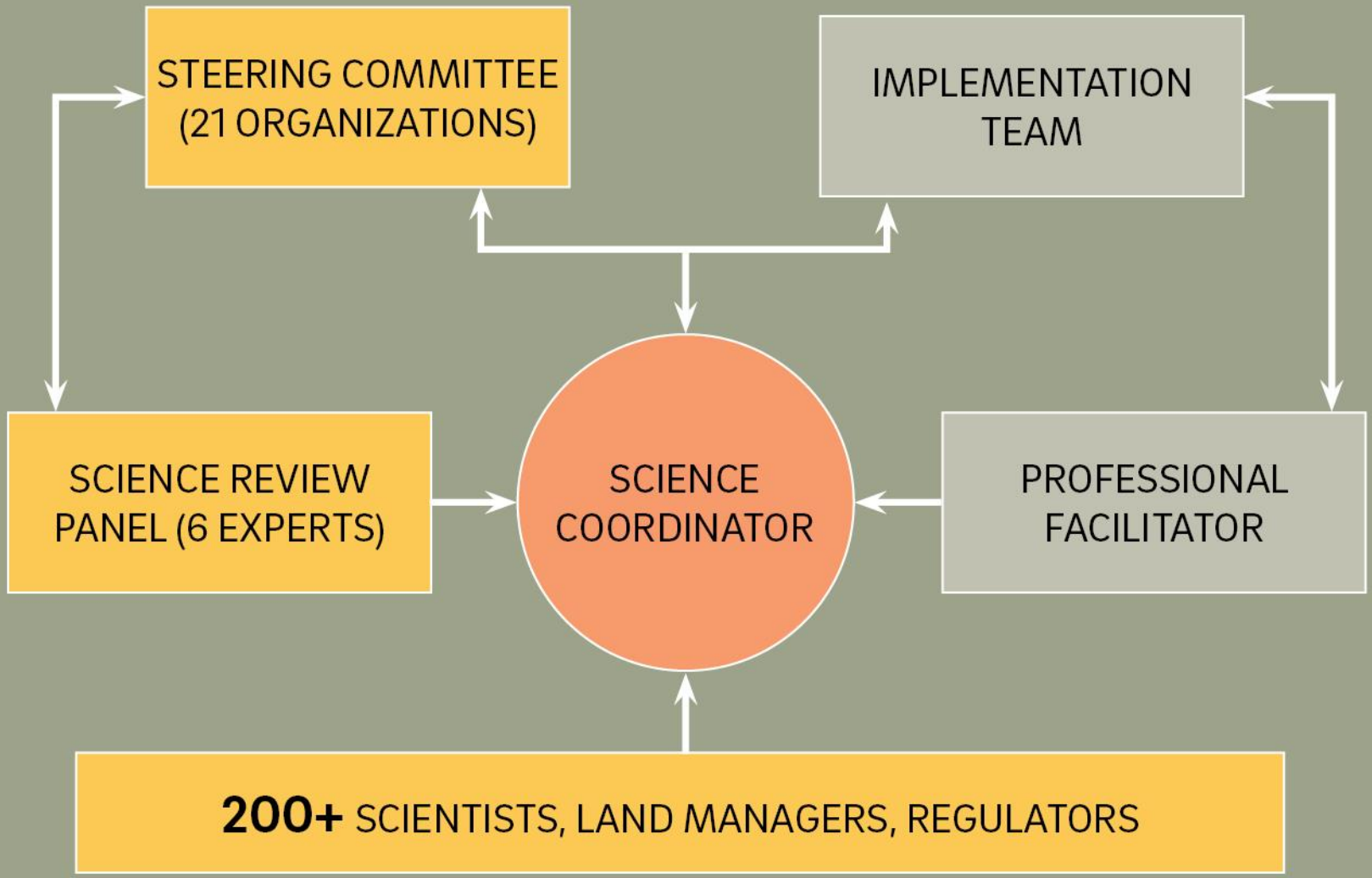
State of California
Coastal Conservancy

BAY AREA ECOSYSTEMS CLIMATE CHANGE CONSORTIUM

BAYLANDS GOALS 2015

- Science synthesis
- Effect of future change, especially climate and sediment supply, on the Baylands
- Goal is healthy ecosystem, providing a resilient shore for people and wildlife
- Recommendations and landscape visions for the next century

ROBUST COLLABORATIVE PROCESS



STEERING COMMITTEE

Resource management, regulatory, restoration organizations

Coastal Conservancy	***Sam Schuchat, Chair (Nadine Peterson)***
Delta Conservancy	*Kristal Davis-Fadtke*
Delta Stewardship Council	*Marina Brand*
EBRPD	*Brad Olson (Chris Barton)*
NOAA	*Becky Smyth (Korie Schaeffer)*
Point Blue	*Grant Ballard (Julian Wood)*
SFEI	*Robin Grossinger (Lester McKee)*
USACE	*Tom Kendall (Fari Tabatabai)*
USEPA	*Sam Ziegler (Luisa Valiela)*
BAFPAA	*Carol Mahoney (C Morrison)*
Water Board	*Andree Greenberg (N Feger)*
USFWS	*Anne Morkill*
BCDC	*Joe LaClair*
DFW	*Carl Wilcox*
DWR	*Erin Chappell*
EBDA	*Michael Connor*
NPS	*Kristen Ward*
SFBJV	*Beth Huning*
SFEP	*Judy Kelly*
Suisun RCD	*Steve Chappell*
URS	*Mike Monroe*


Shira Bezalel

WHAT WE CAN DO

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Regional Recommendations

1	Restore estuary-watershed connections that nourish the Baylands with sediment and fresh water.
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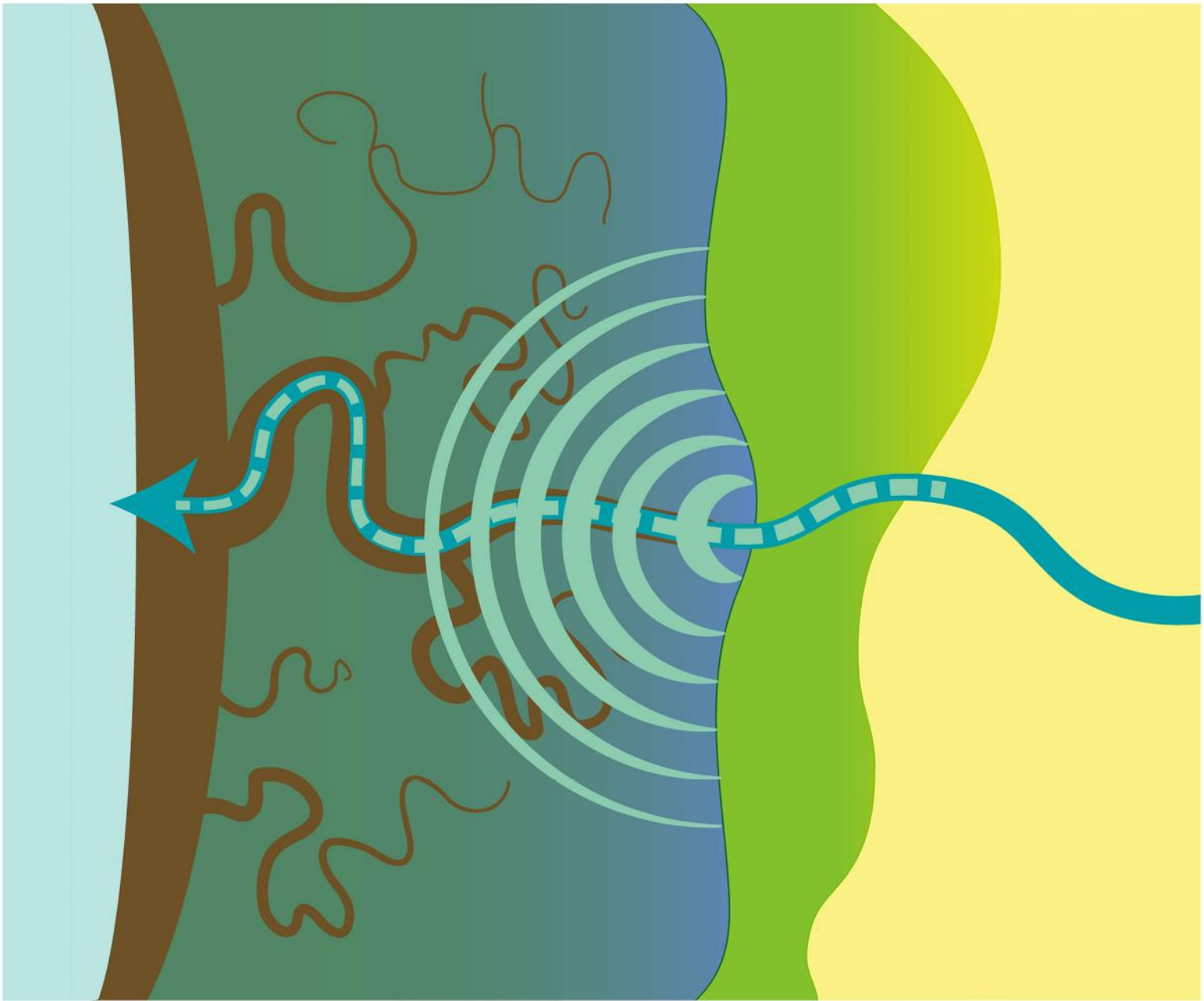
HISTORICAL



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MODERN

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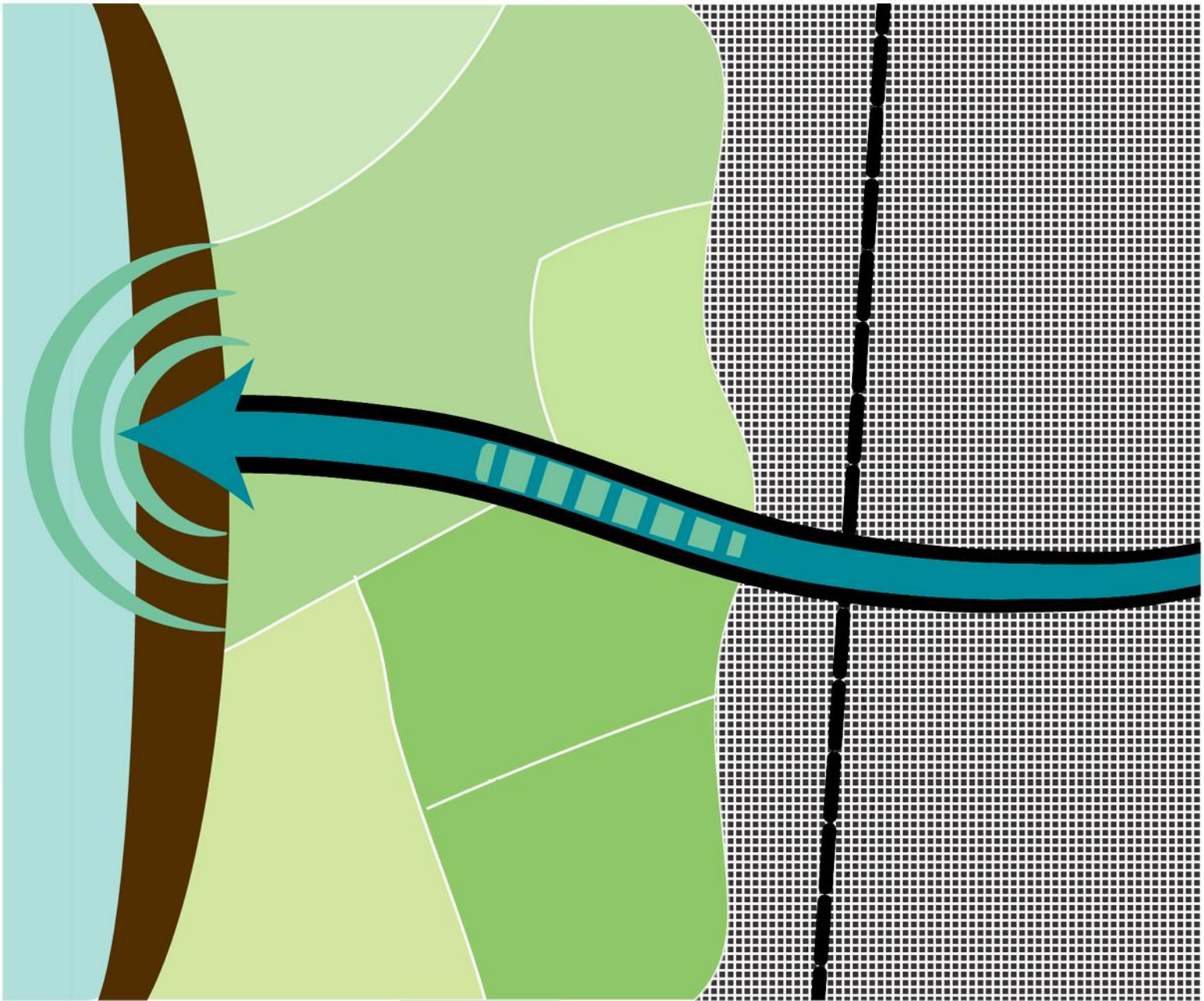

FUTURE

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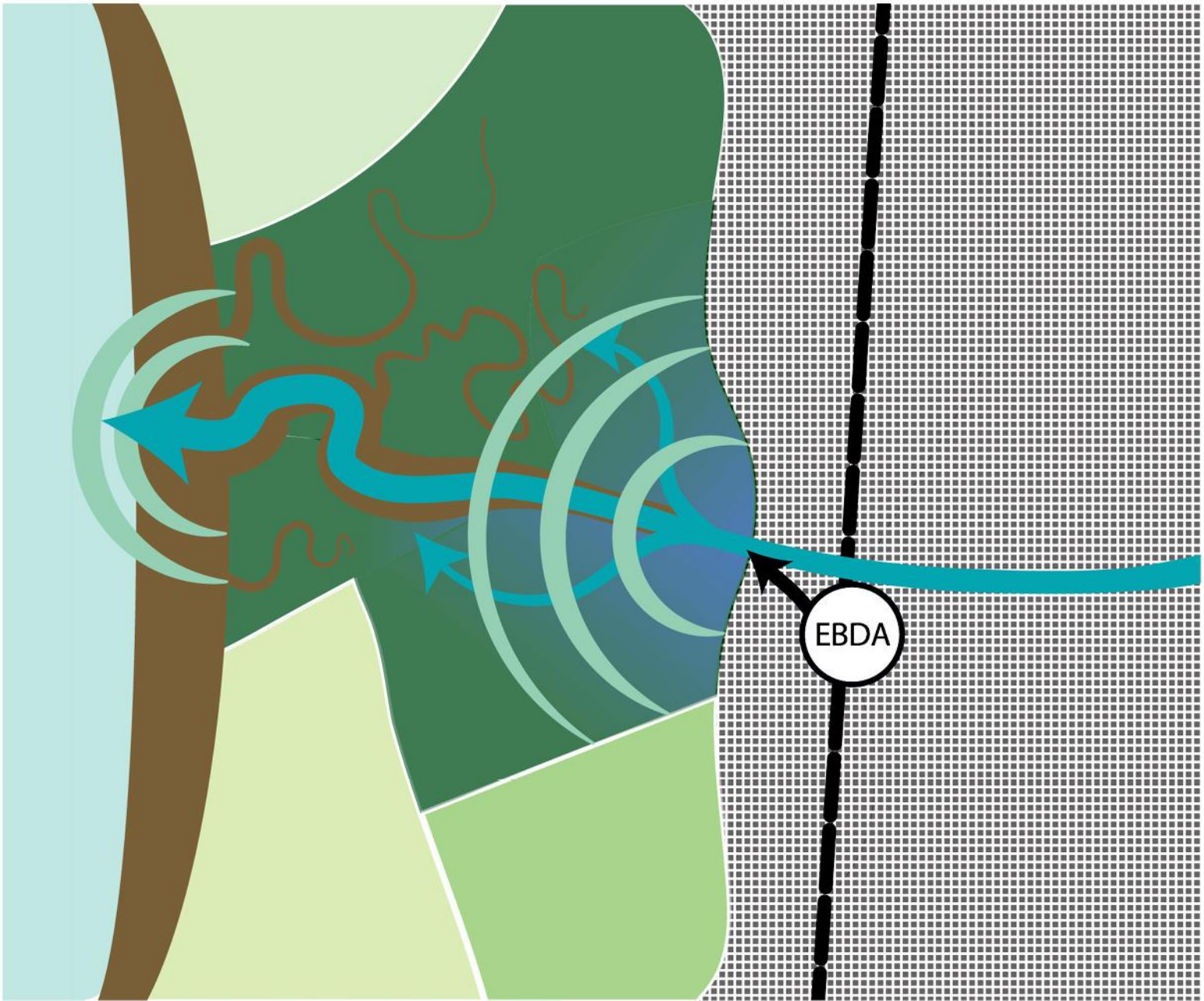
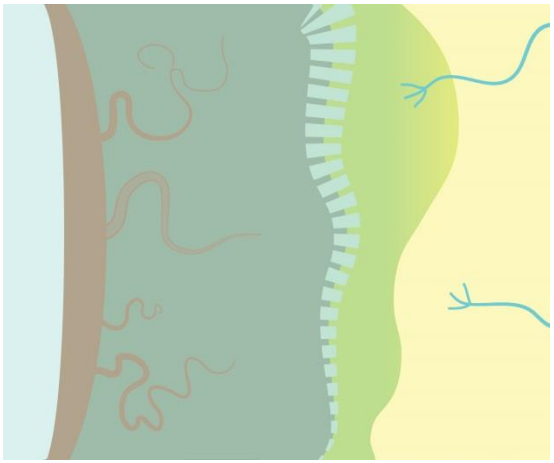
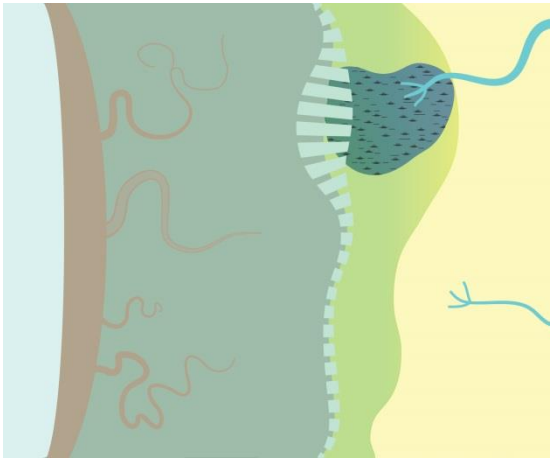
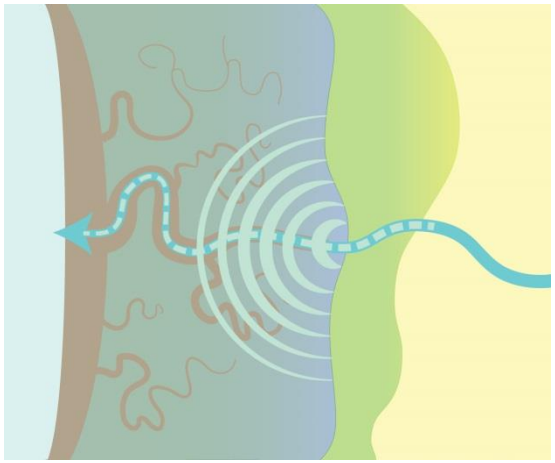




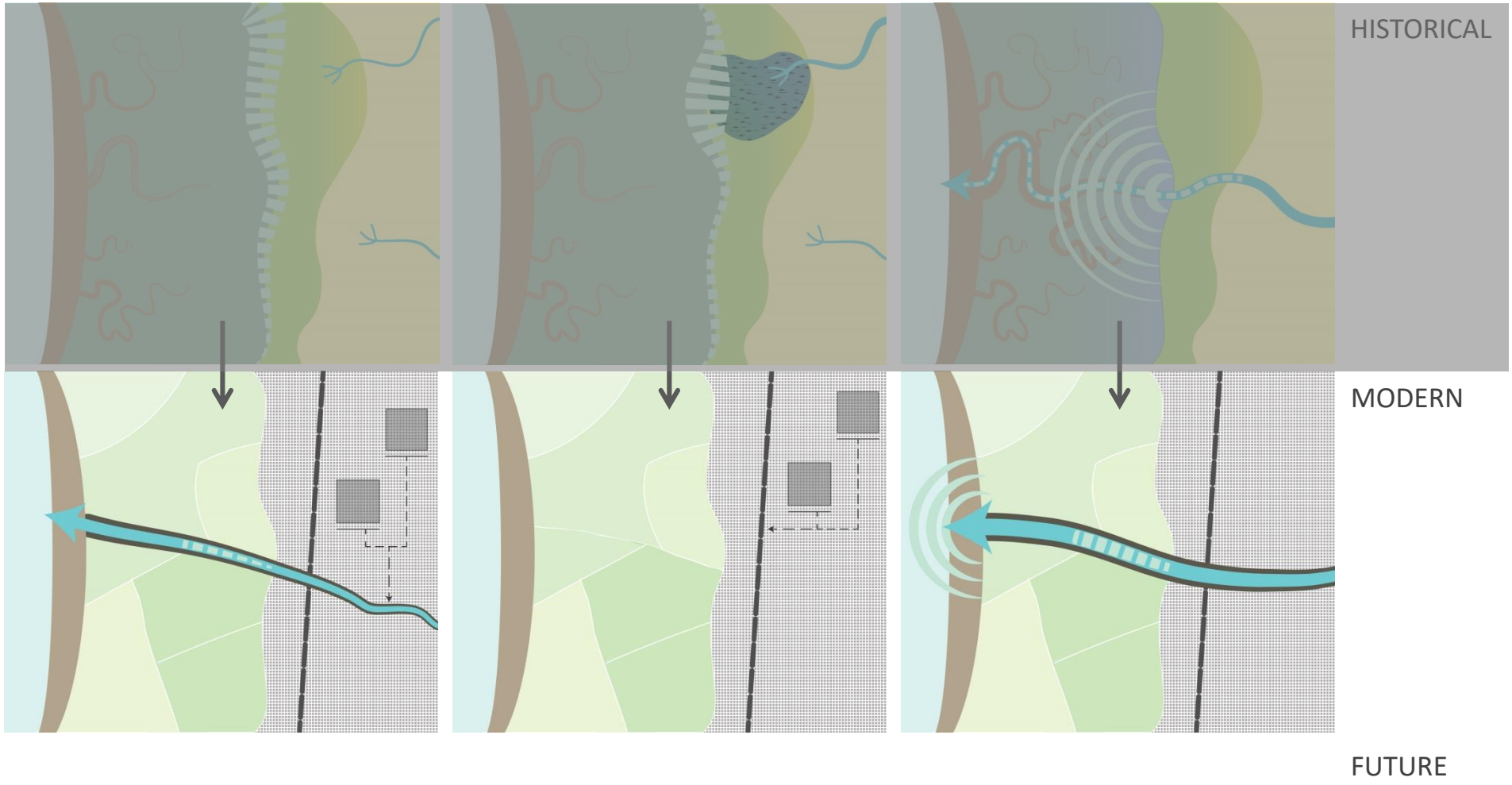




HISTORICAL

MODERN

FUTURE


HISTORICAL
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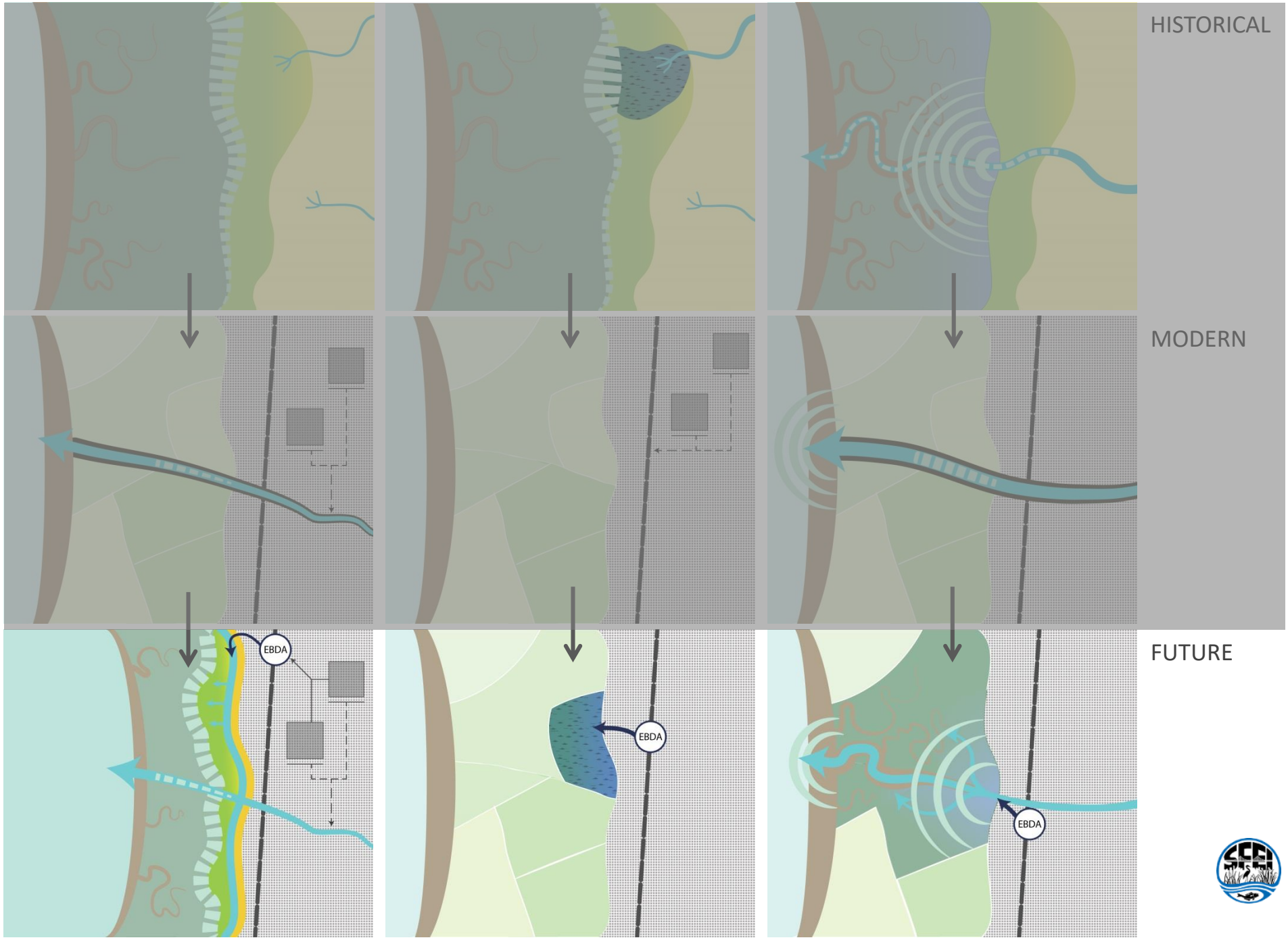
HISTORICAL
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FUTURE
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Regional Recommendations

1	Restore estuary-watershed connections.
2	Design complexity and connectivity into the Baylands landscape.
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Need for More Complex Marsh Vegetative Structure

Historical Marsh

Laumeister Marsh
(Palo Alto Baylands Nature Preserve)

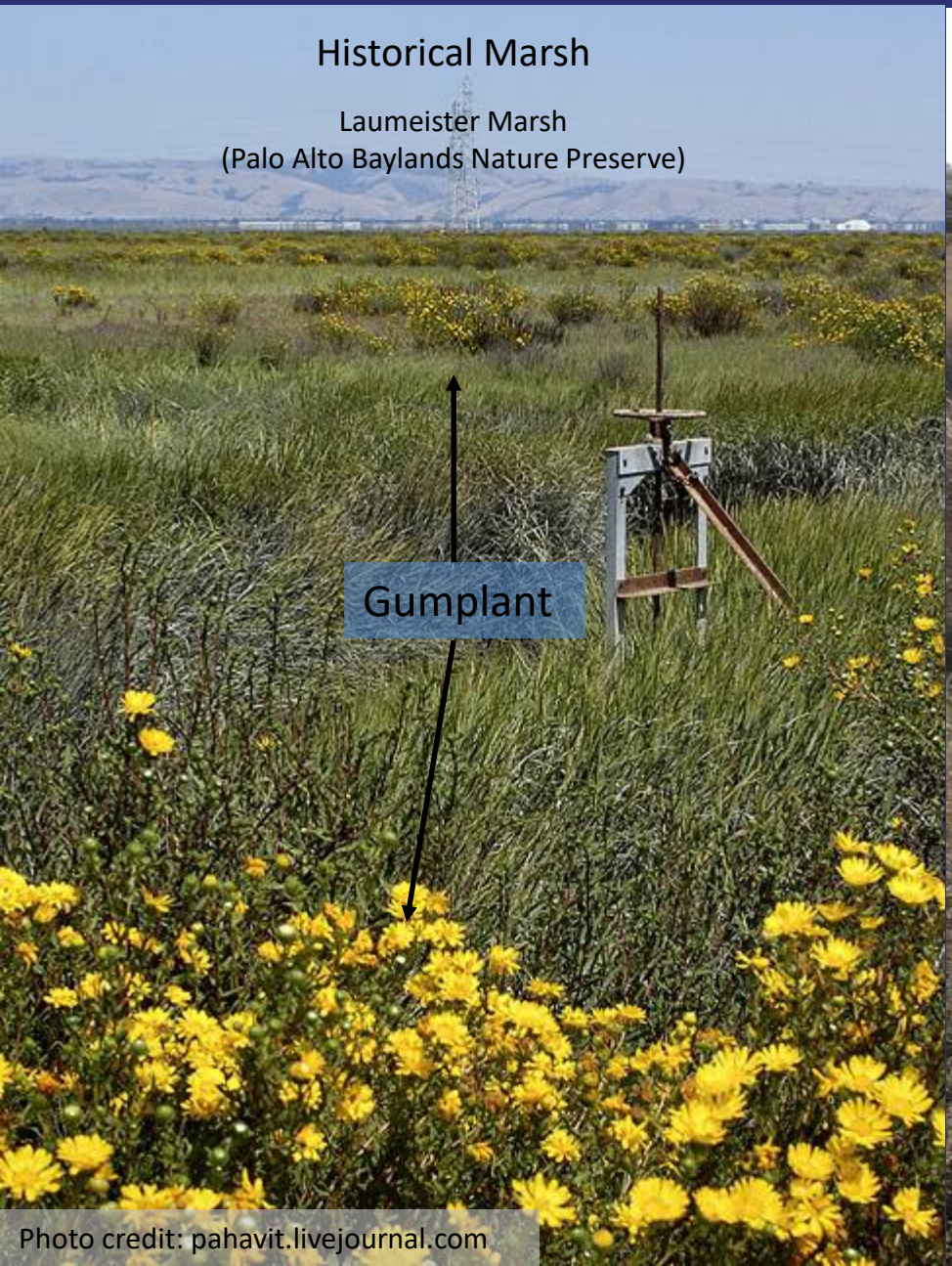


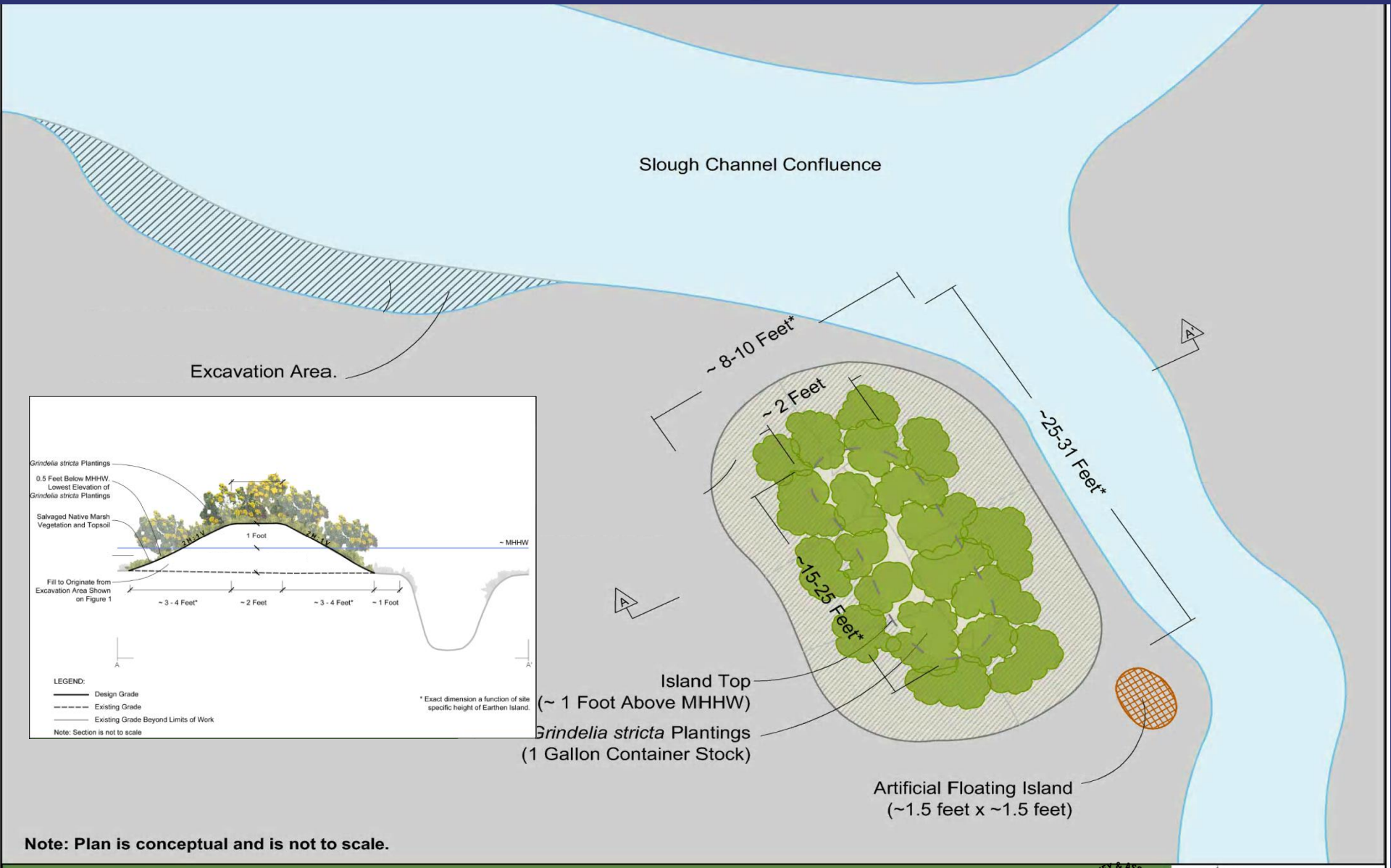
Photo credit: pahavit.livejournal.com

Restored Marsh

Cooley Landing Marsh
(Ravenswood Regional Open Space Preserve)

Coastal Conservancy

High-Tide Refuge Island



Note: Plan is conceptual and is not to scale.

Figure 1: Typical Plan View
Earthen Refugial Island Conceptual Plan

H.T. HARVEY & ASSOCIATES Ecological Consultants

SAN FRANCISCO ESTUARY INVASIVE SPARTINA PROJECT
Preserving native wetlands

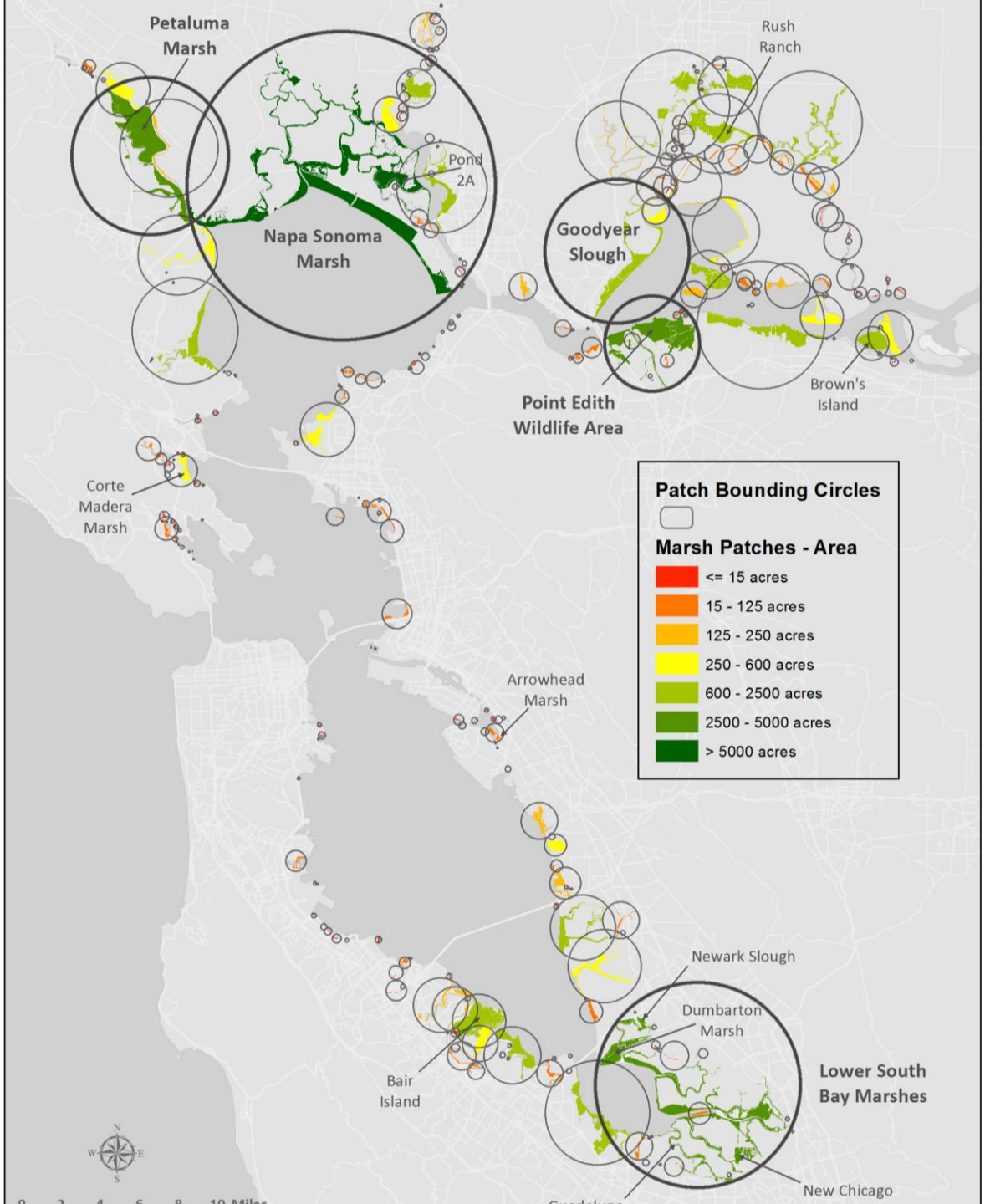
Construction

Coastal Conservancy

Vegetation Survival Monitoring

Coastal Conservancy

Design connectivity into the Baylands landscape



Regional Recommendations

1	Restore estuary-watershed connections.
2	Design complexity and connectivity into the Baylands landscape.
3	Restore and conserve complete tidal wetlands systems.
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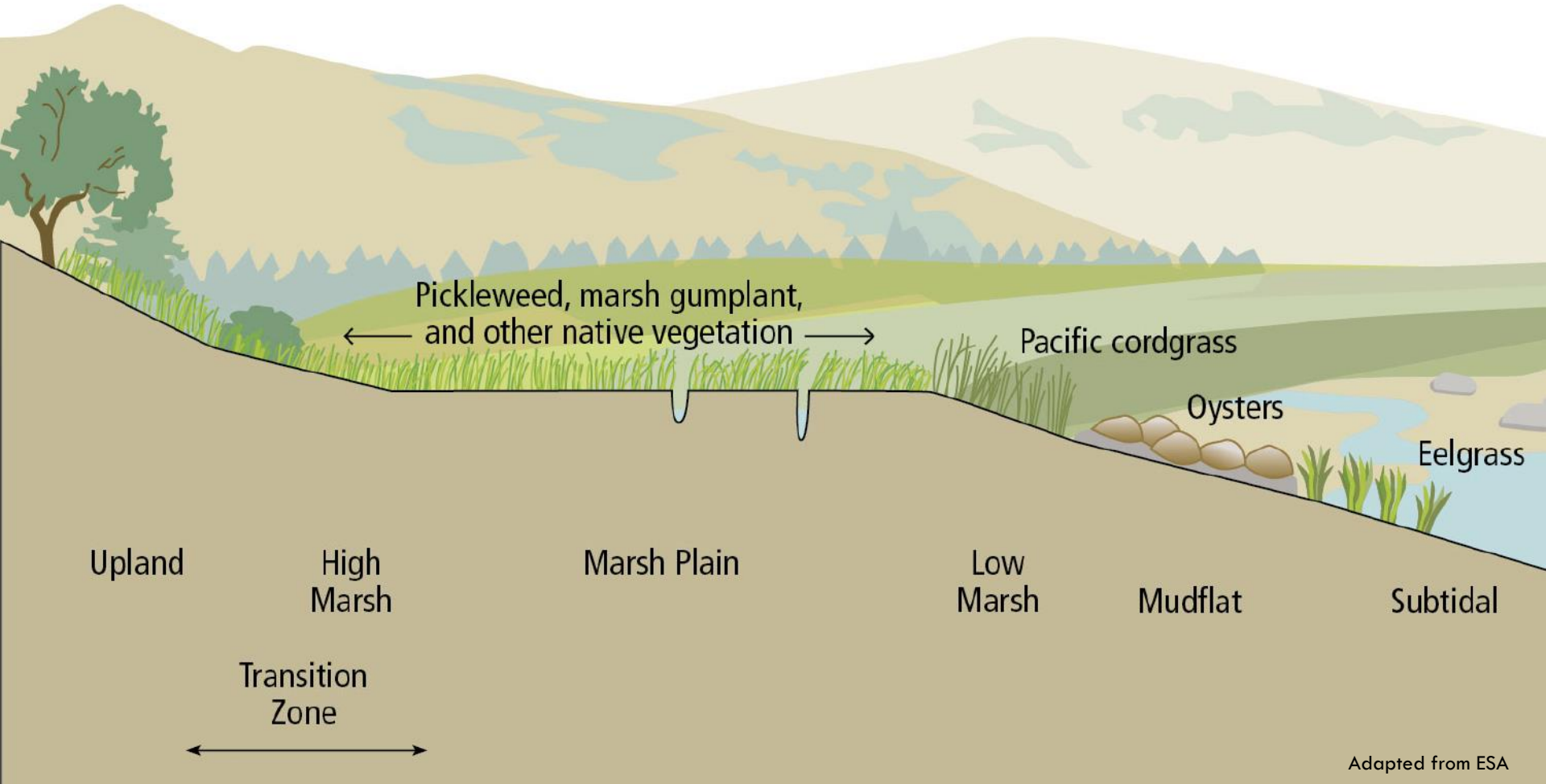
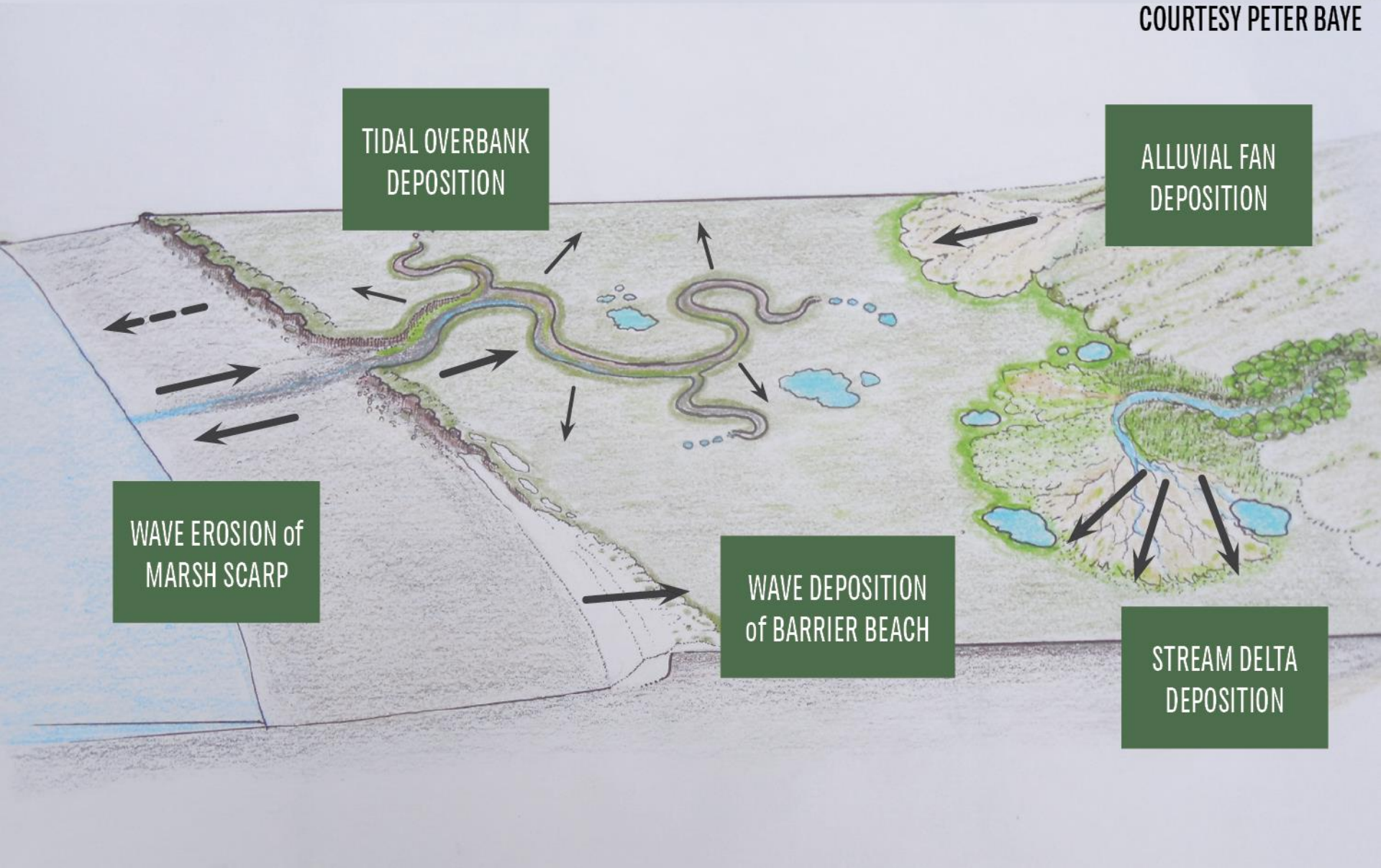
Restore COMPLETE SYSTEMS



Adapted from ESA

RESTORING PROCESSES NOT JUST PLACES

COURTESY PETER BAYE



SEDIMENT IS A *precious resource*

Dave R

SEDIMENT IS A *precious resource*

Regional Recommendations

1	Restore estuary-watershed connections.
2	Design complexity and connectivity into the Baylands landscape.
3	Restore and conserve complete tidal wetlands systems.
4	Restore Baylands to full tidal action prior to 2030.
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restore MARSHES BY 2030 IN AREAS WHERE THEY'RE LIKELY TO persist

Build up of sediment and vegetation takes time

Higher starting elevation means marshes survive sea-level rise for longer

Regional Recommendations

1	Restore estuary-watershed connections.
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3	Restore and conserve complete tidal wetlands systems.
4	Restore Baylands to full tidal action prior to 2030.
5	Plan for the Baylands to migrate.
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PLAN FOR THE BAYLANDS TO *migrate*

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PLAN FOR THE BAYLANDS TO *migrate*

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PLAN FOR THE BAYLANDS TO *migrate*

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Shira Bezalel

MIGRATION SPACE

strategies

- *Acquire and conserve*
- *Construct (horizontal levee)*
- *Planned retreat*

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3	Restore and conserve complete tidal wetlands systems.
4	Restore Baylands to full tidal action prior to 2030.
5	Plan for the Baylands to migrate.
6	Actively recover, conserve, and monitor wildlife populations to avoid bottlenecks and buffer population sizes.
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Wildlife Found Only in SF Bay Tidal Marshes

Not only endangered species……

California Vole

Salt Marsh Wandering Shrew

Western Harvest Mouse

Song Sparrow. Photo from PBCS by Tom Grey.

Savannah Sparrow

California Black Rail

Salt Marsh Common Yellowthroat

Regional Recommendations

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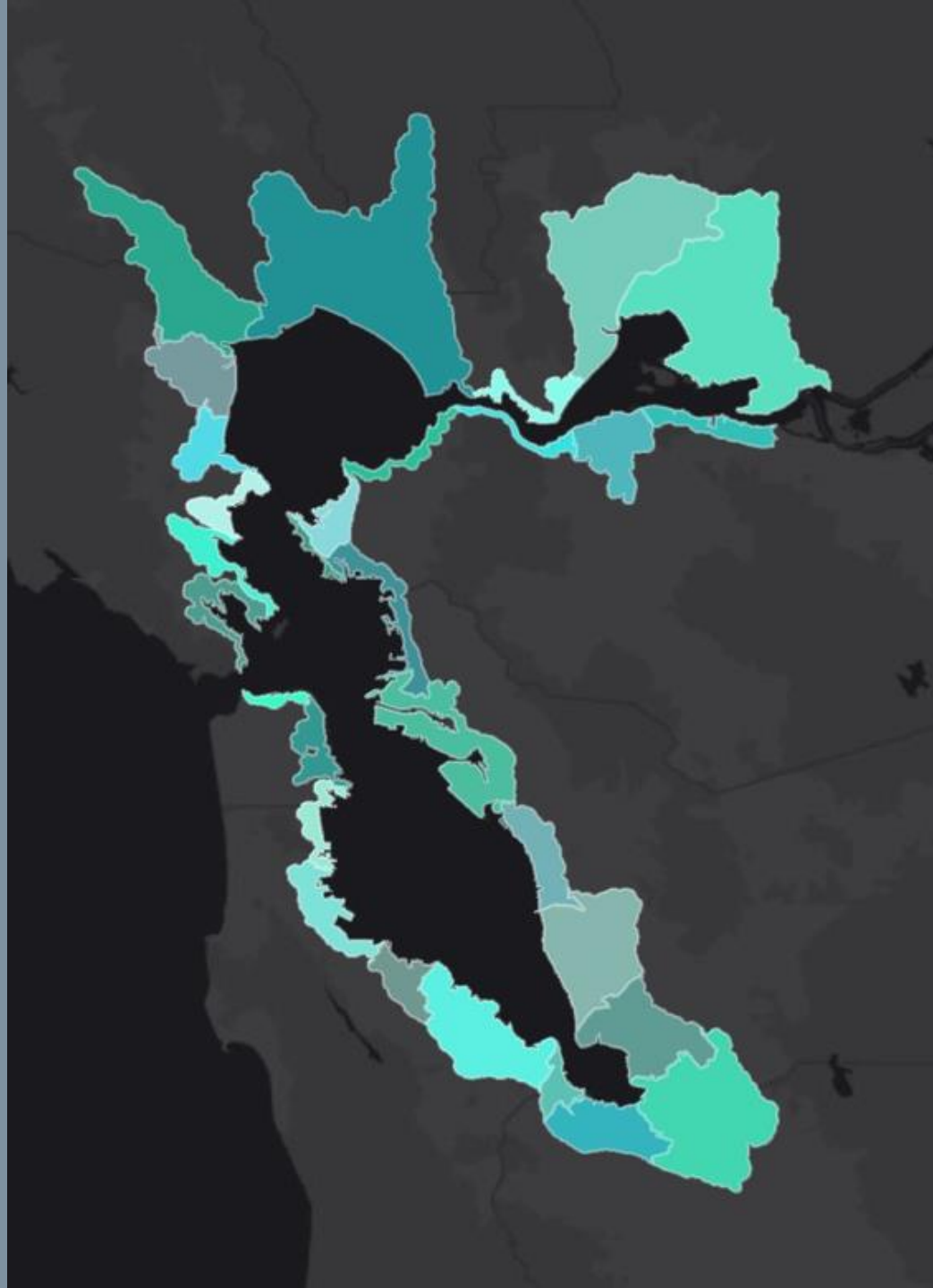
4	Restore Baylands to full tidal action prior to 2030.
5	Plan for the Baylands to migrate.
6	Actively recover, conserve, and monitor wildlife populations.
7	Develop and implement a comprehensive regional sediment management plan.
8	Invest in planning, policy, research and monitoring.
9	Develop a regional transition zone assessment program.
10	Improve carbon management to prevent further subsidence, increase organic matter accumulation, reduce GHG emissions, and sequester more carbon.

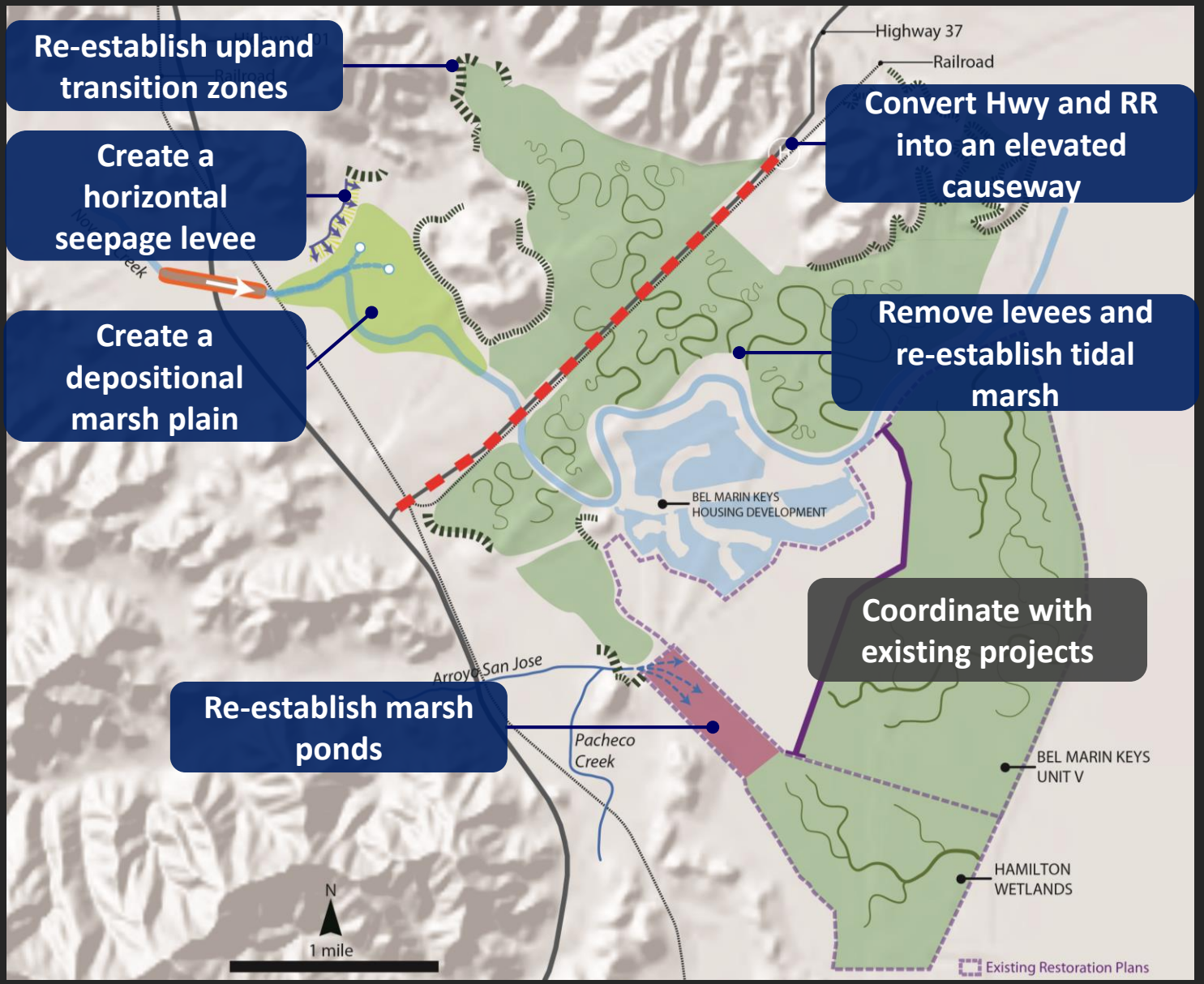
Collaborative local

VISIONS & PLANNING

- *Define practical, science-based shoreline units*
- *Pair with appropriate adaptation strategies*
- *Convene stakeholders to create long-term vision for resilience*



Novato Creek Baylands Long-term Vision



WE HAVE *choices to make*

Baylands Goals Science Update

www.BaylandsGoals.org

Nate Kauffman

FUNDERS

- *State Coastal Conservancy*
- *Gordon and Betty Moore Foundation*
- *Goals Update Steering Committee*