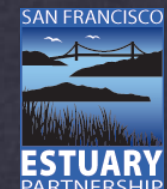


Flood Control 2.0:

Rebuilding Habitat and Shoreline Resilience through a New Generation of Flood Control Channel Design and Management



North Bay Watershed Association
November 6, 2015



WHY?

Flood Control Channels at the Bay Interface: A unique challenge and opportunity

- Increasing Economic Costs and Risk
 - Aging Infrastructure
 - Increasing Flood Risk



WHY?

Flood Control Channels at the Bay Interface: A unique challenge and opportunity

- Significance to Bay Ecosystem
 - High Ecological Diversity
 - Steelhead Migration
 - Delivery of Sediment
 - Delivery of Freshwater and Nutrients



- Sea Level Rise and Storm Events – Meeting Increasing Challenges for Flood Protection
- Sediment – Moving from Problems to Solutions
- Aging Infrastructure – Taking Advantage of Window of Opportunity

Increase Resilience
Support Multiple Benefits

How can we meet future flood control needs AND restore/improve future ecosystem functioning at the Bay interface?



Flood Control “2.0”

Goal:

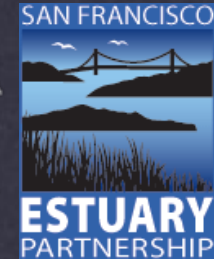
Develop *tools* and a *process* for helping integrate habitat restoration and creation elements into flood risk management at the Bay interface



Project Partners

Project Leads

- San Francisco Estuary Partnership (SFEP)
- San Francisco Estuary Institute (SFEI)
- San Francisco Bay Joint Venture (SFBJV)
- Bay Conservation and Development Commission (BCDC)



Implementation Project Partners

- San Francisquito Joint Powers Authority
- Marin County Flood Control and Water Conservation District
- Contra Costa County Flood Control and Water Conservation District



Regional Partner – BAFPPAA



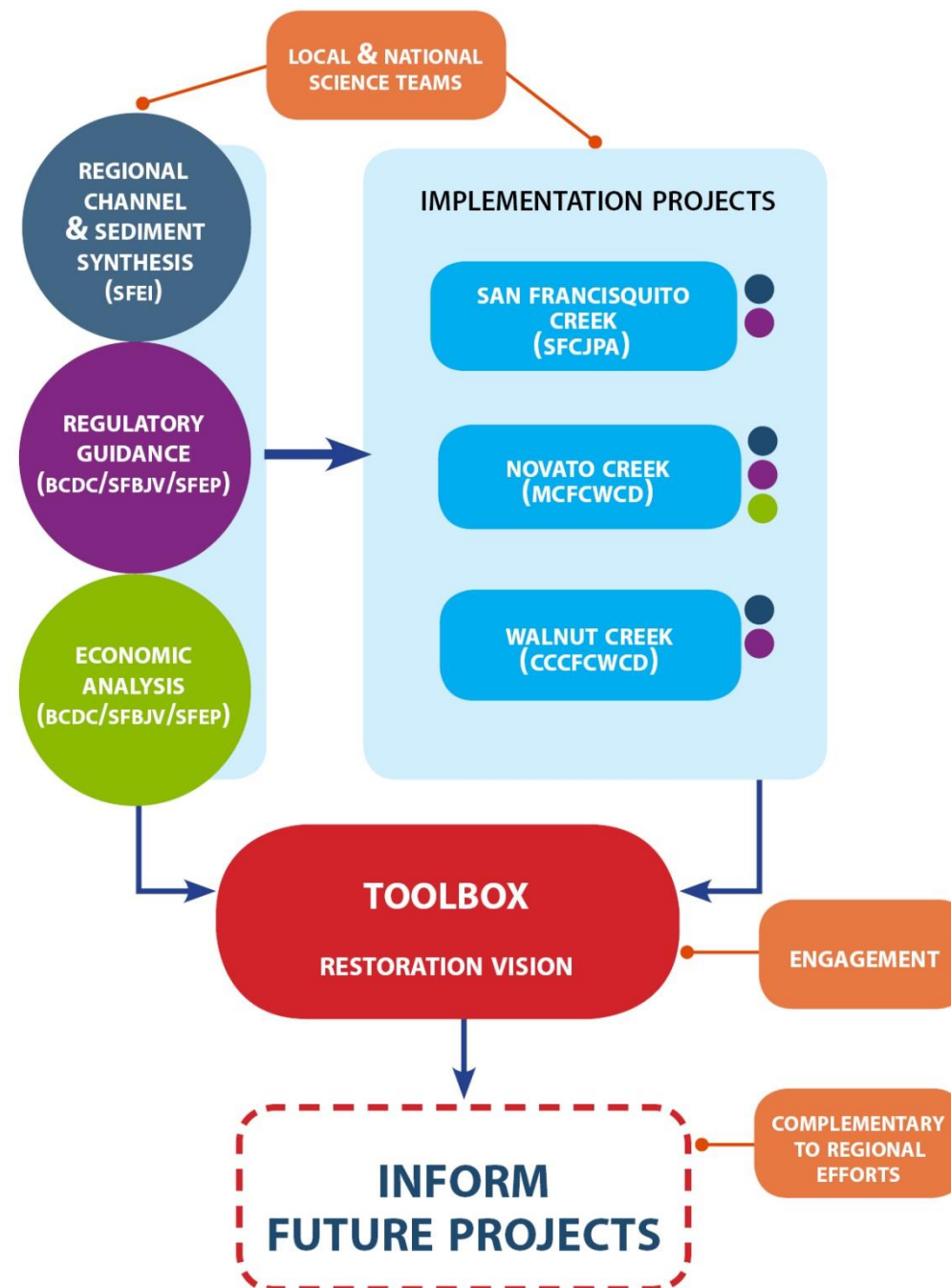
Funding from EPA SF Bay Water Quality Improvement Fund

Flood Control 2.0

Project Components

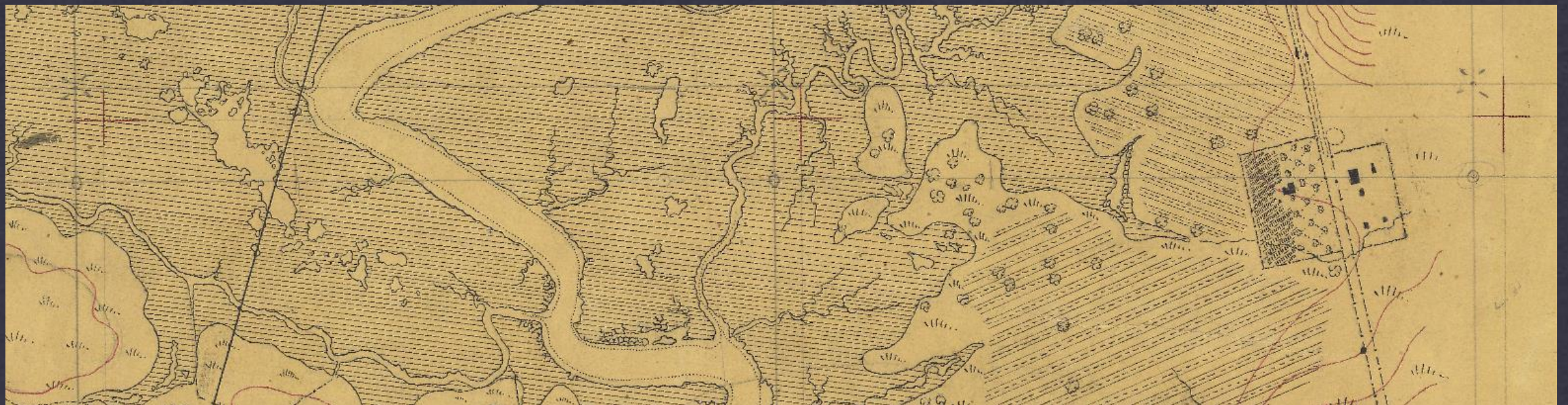
Timeline:
2012-2016

\$3,122,059 =
\$1,552,059 (grant)
+
\$1,570,000 (Match)



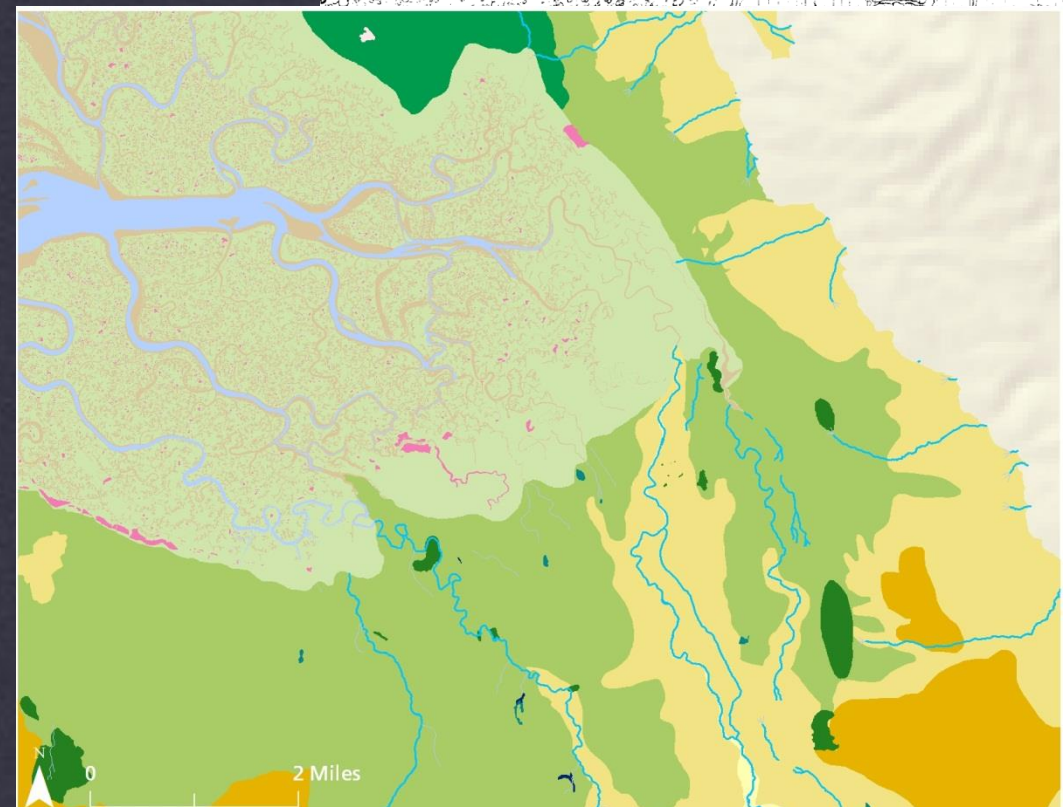
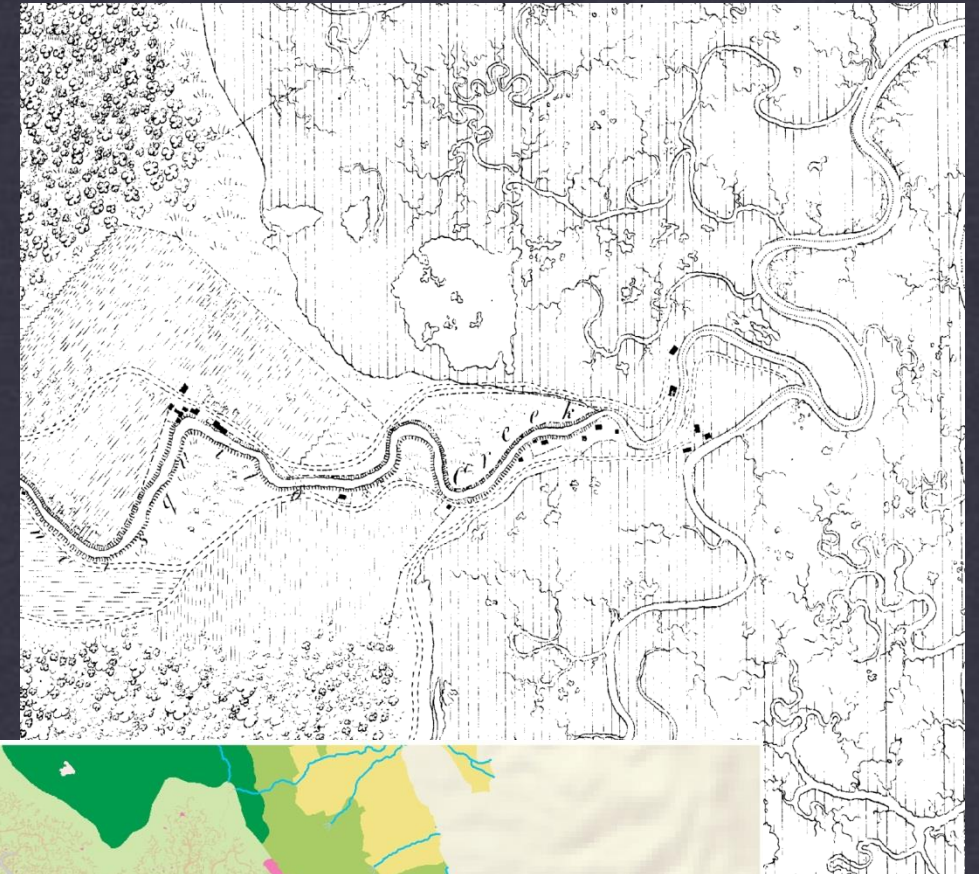
How did local streams transport sediment across the lowlands to the Bay?

What can we learn from history?

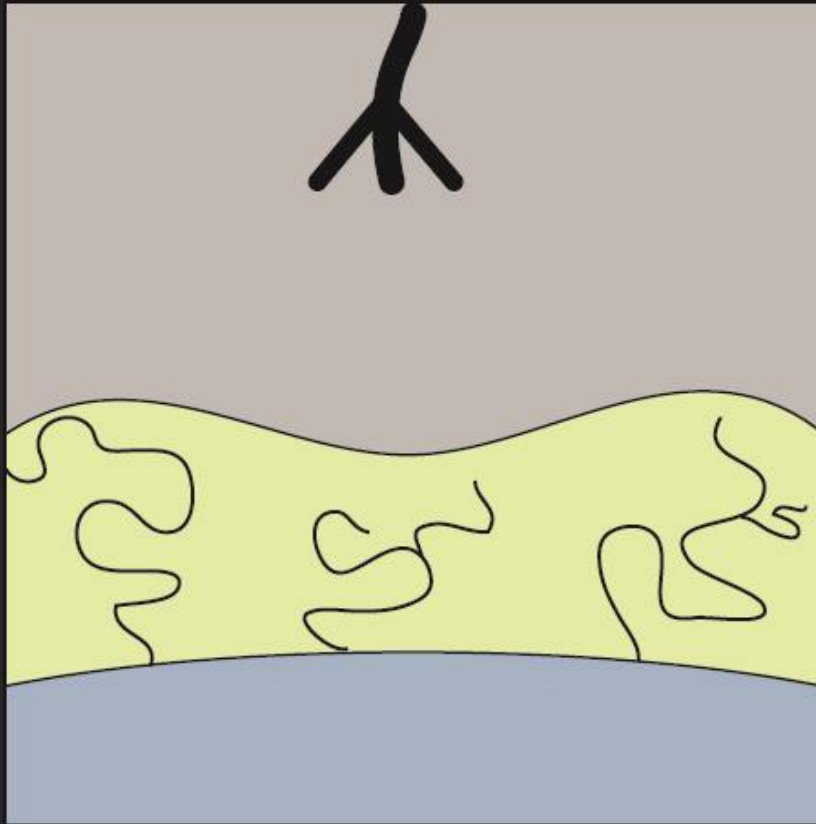


Regional Historical Ecology Synthesis

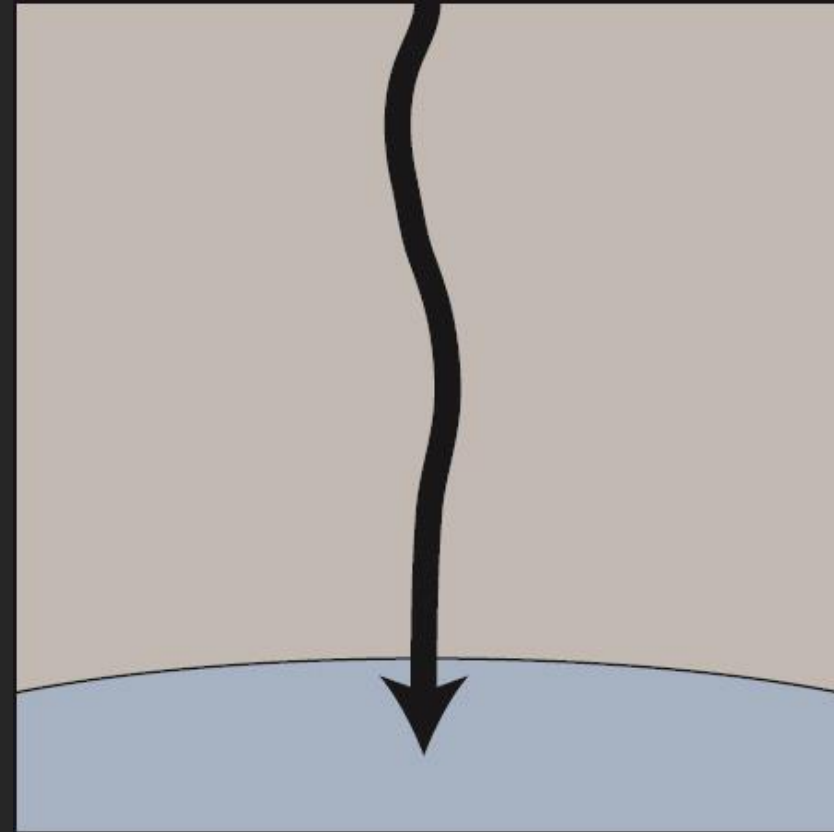
- Classify Historical Fluvial-Tidal Interface
- Build Conceptual Models to Describe Historical Function



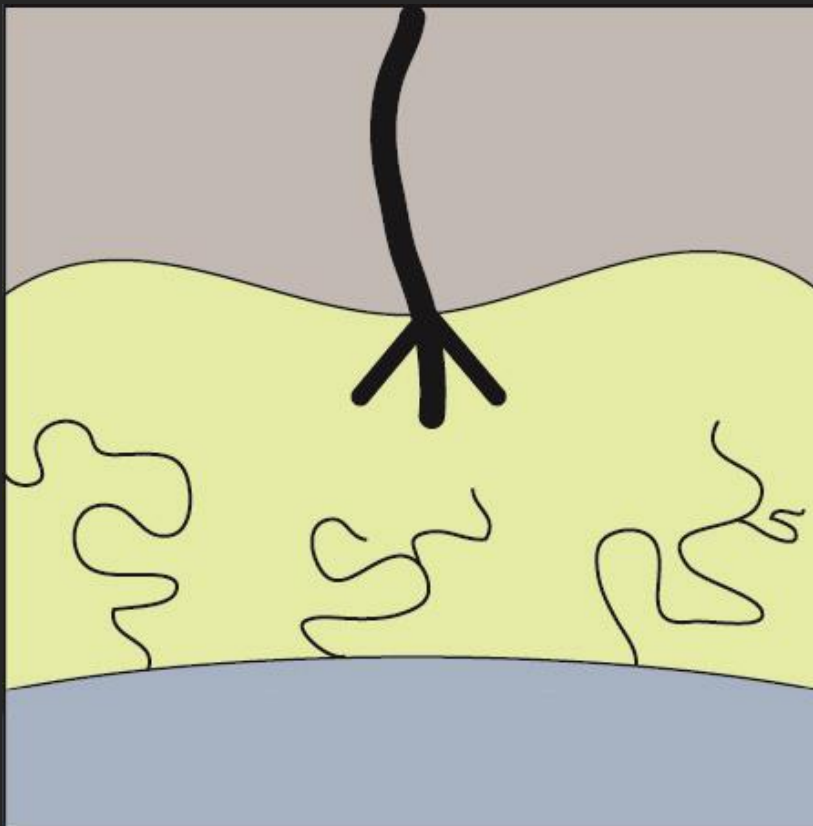
Historical Fluvial-Tidal Interface Types



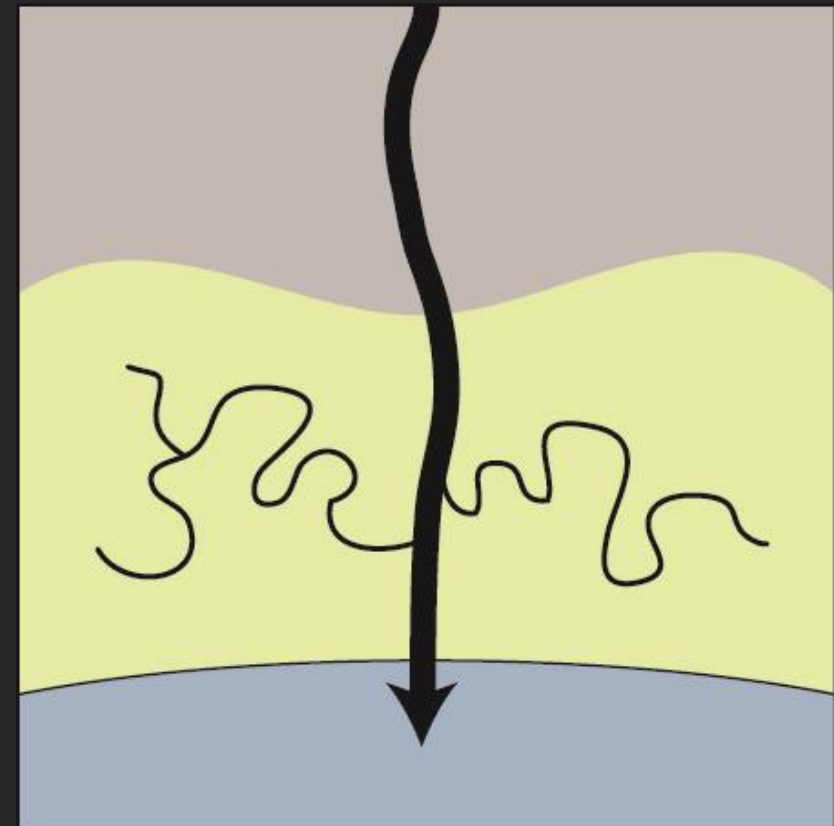
Disconnected



Connected to the Bay



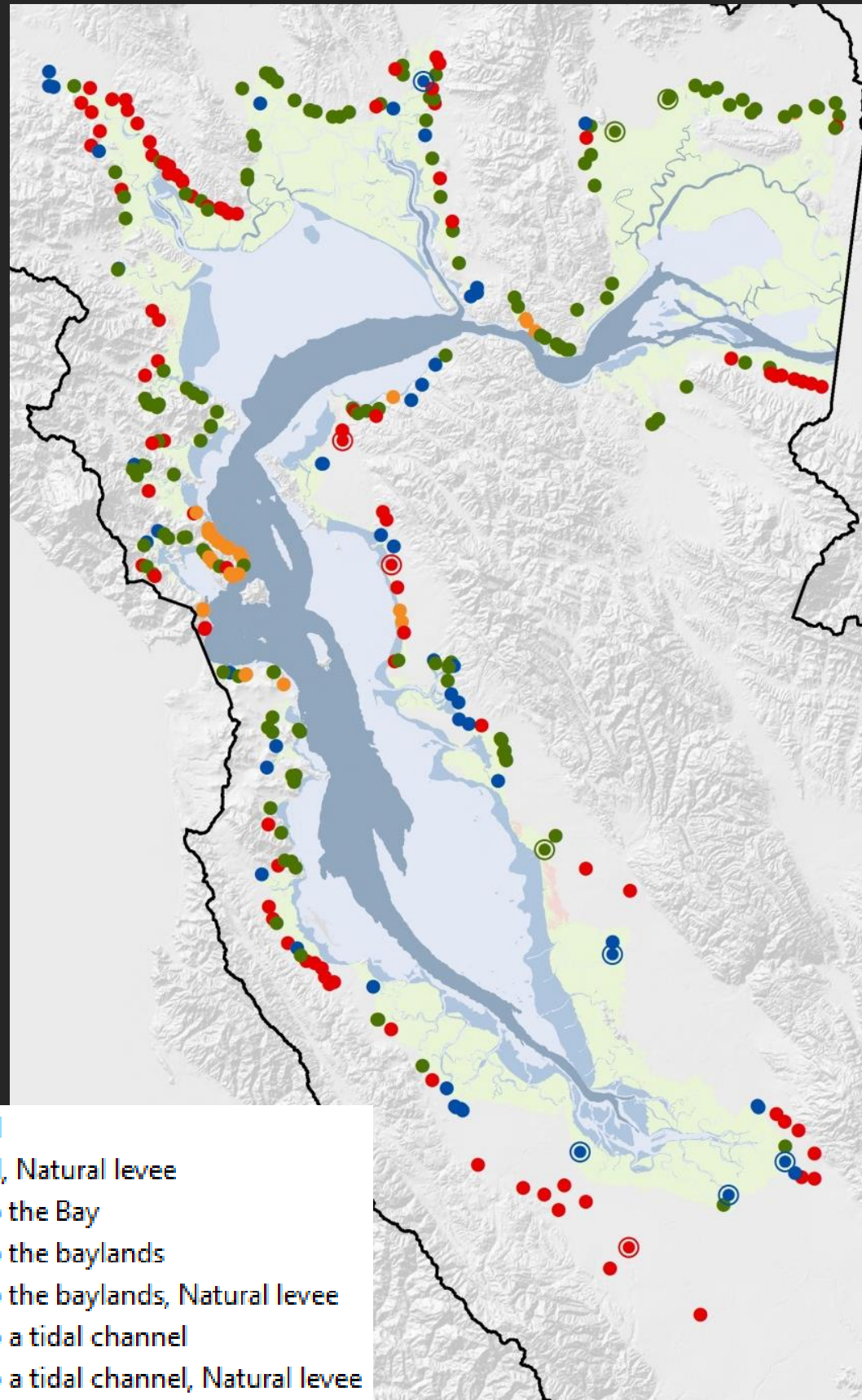
Connected to Baylands



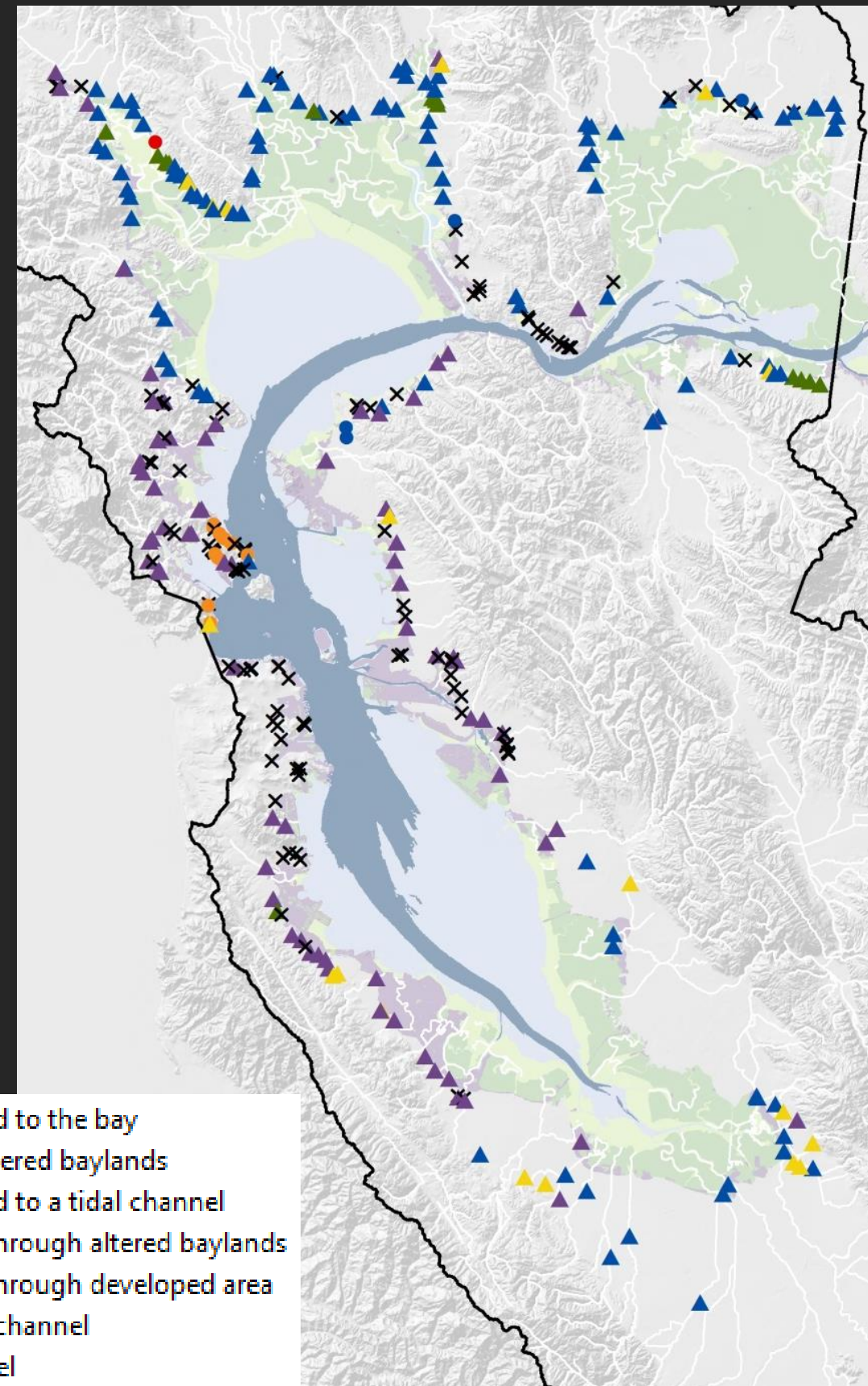
Connected to Tidal Channel

Characterizing Historic and Current F-T Interface

HISTORICAL



CURRENT



HOW CREEKS MEET THE BAY: Changing Interfaces

A Product of the Flood Control 2.0 Project

Slide the bar on the map to compare historical (mid-1800's) and contemporary (2014) fluvial-tidal interfaces around San Francisco Bay.



FLOOD CONTROL 2.0



San Francisco Bay's connections to local creeks are integral to its health. These fluvial-tidal (F-T) interfaces are the points of delivery for freshwater, sediment, contaminants, and nutrients. The ways in which the F-T interface has changed affect flooding dynamics, ecosystem functioning, and resilience to a changing climate. As the historical baylands have been altered, the majority of contemporary F-T interface types have changed leading to additional F-T interface types within the present-day landscape. Illustrations of each F-T interface type and methods for classification are available [here](#).

Legend

Historical Conditions

F-T Interface Location










-  Bay
-  Tidal marsh channel
-  Natural levee
-  Tidal marshland
-  Natural levee
-  Disconnected
-  Natural levee

Historical Baylands





-  Water
-  Tidal Flat
-  Tidal Marsh
-  Salt Pond or Panne
-  Beach or Dune

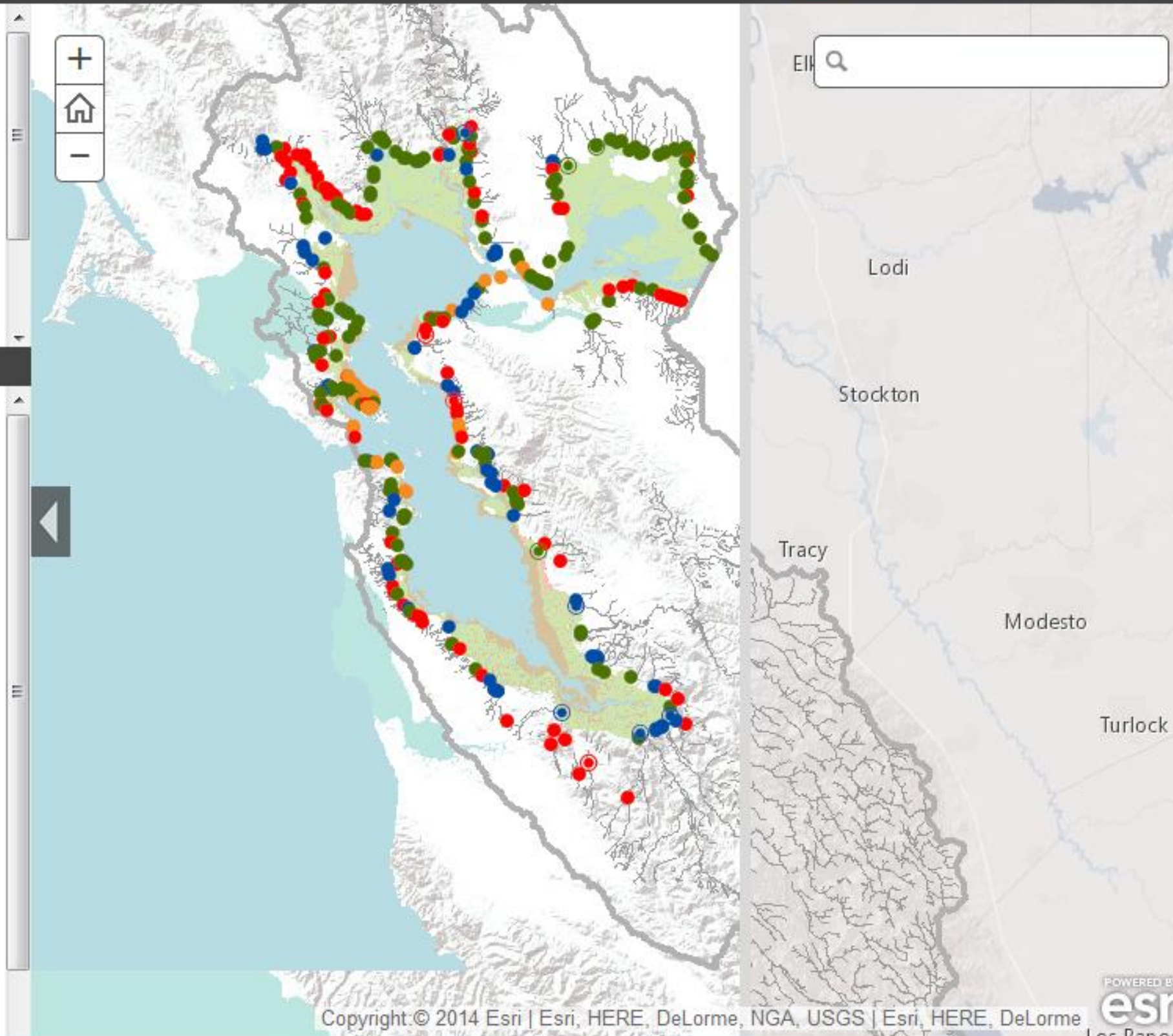
Contemporary Conditions

F-T Interface Location

-  Bay
-  Tidal marsh channel
-  Tidal channel
-  through diked baylands
-  Tidal channel through bayfill
-  Diked baylands
-  Bayfill
-  Tributary channel
-  Channel no longer present

Contemporary Baylands

-  Water
-  Tidal Flat
-  Tidal Marsh or Muted Tidal Marsh
-  Diked Baylands (Salt Ponds, Managed Marsh)



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e. Raport

HOW CREEKS MEET THE BAY: Changing Interfaces

A Product of the Flood Control 2.0 Project

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FLOOD CONTROL 2.0



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Legend

Historical Conditions

F-T Interface Location

- Bay
- Tidal marsh channel
- Natural levee
- Tidal marshland
- Natural levee
- Disconnected
- Natural levee

Historical Baylands

- Water
- Tidal Flat
- Tidal Marsh
- Salt Pond or Panne
- Beach or Dune

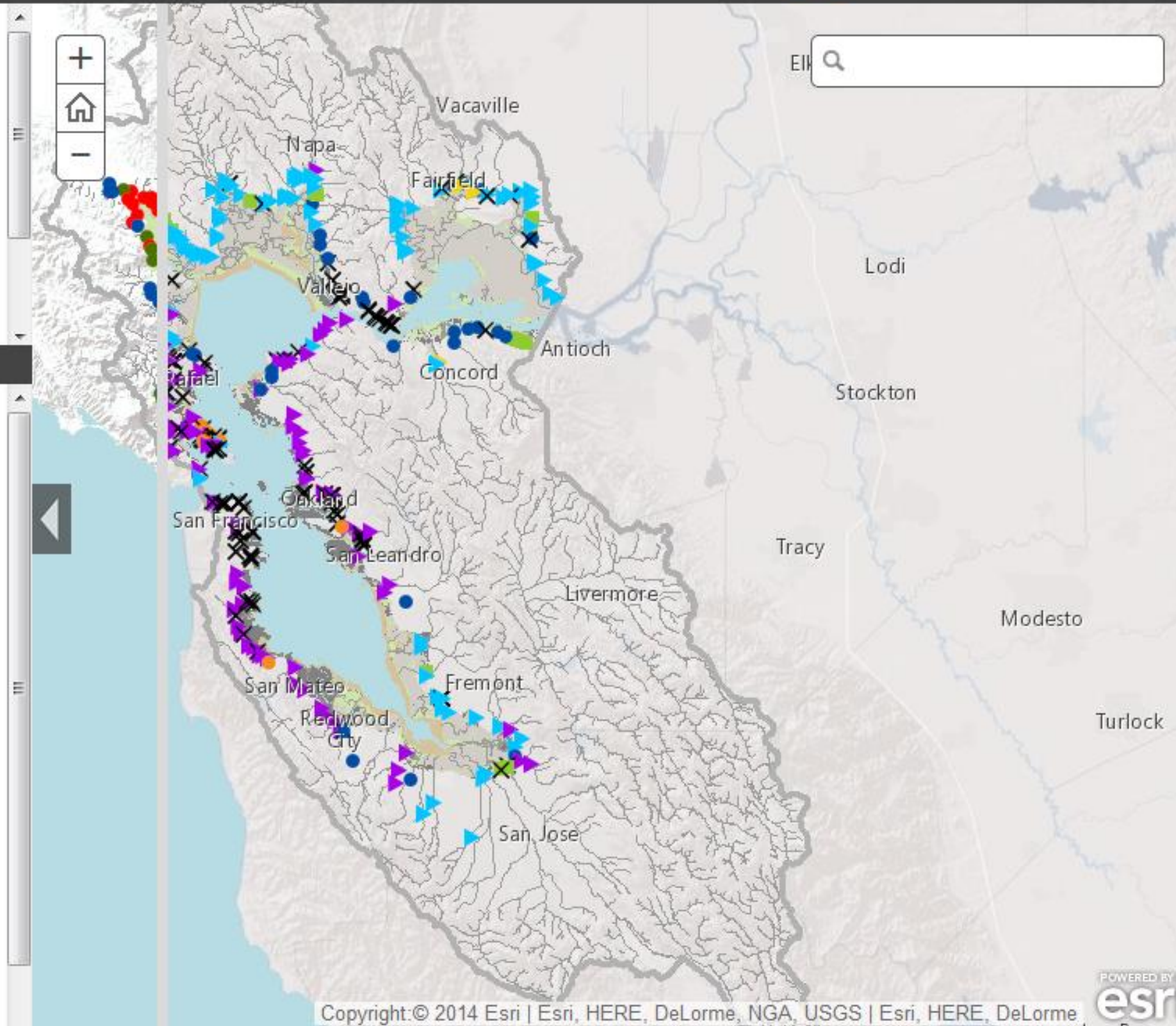
Contemporary Conditions

F-T Interface Location

- Bay
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Contemporary Baylands

- Water
- Tidal Flat
- Tidal Marsh or Muted Tidal Marsh
- Diked Baylands (Salt Ponds, Managed Marsh)



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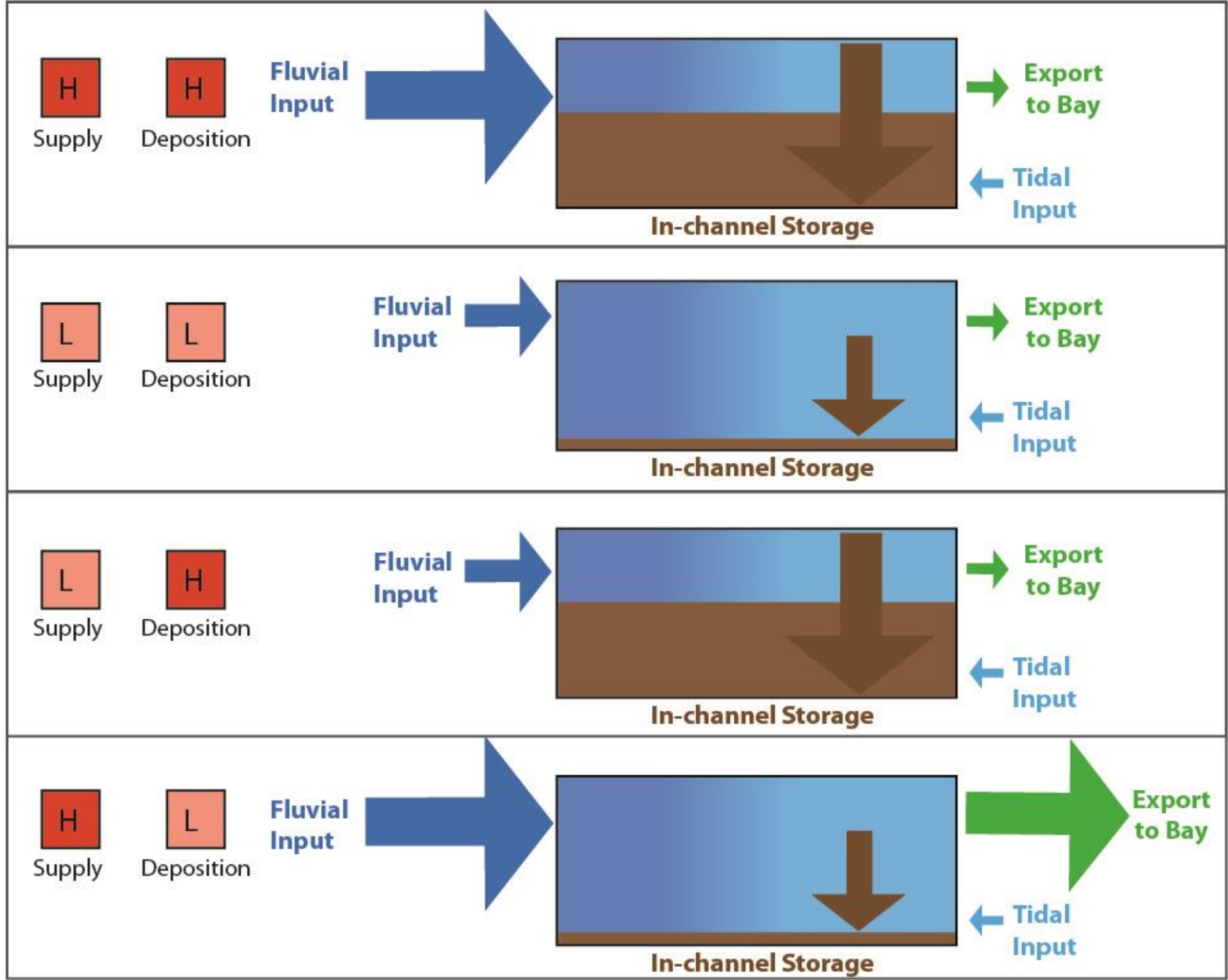
How much sediment is in flood control channels?

Where does it go?



Characterizing Current Sediment Dynamics

SEDIMENT BUDGET



**Wildcat Creek
Las Gallinas Creek**

Coyote Creek

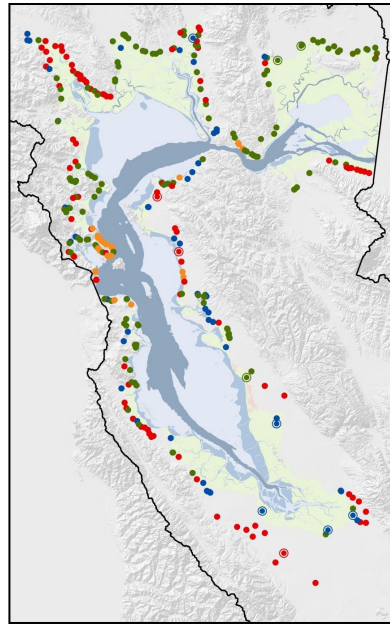
**Alameda Creek
Novato Creek**

Belmont Creek

How can we integrate historical ecology and current sediment information?

Developing Regional Channel Typology

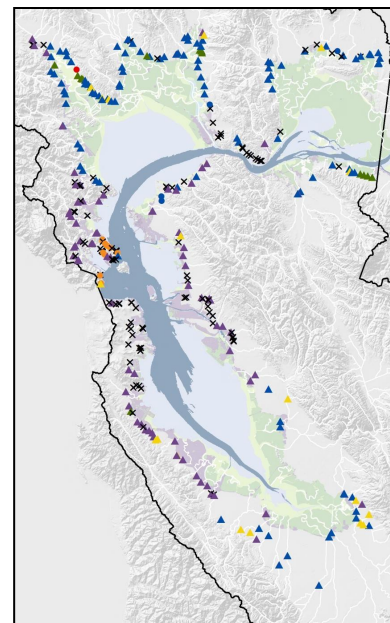
Historical (1850s)



- F-T interface type
- Relative watershed sediment yield
- Relative sediment storage



Current



- F-T interface type
- Relative watershed sediment yield
- Relative sediment storage
- *Legacy and current management actions*



Channel Type

What can we do with the sediment that we can't transport to the Bay with natural processes?

(close, cheap, high ecological value)




Dredged material placement at the Hamilton Wetlands Restoration Project

“SediMatch”

Sediment Match Up Website



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Wednesday, November 7, 2012
User - Sandra Scoggin

Project **Report** **Mapping** **Editing** **Services**

[Introduction](#) [Project](#) [Partner](#) [Super-Project](#) [Contact & User](#)

Could this project potentially use dredge materials? (Optional) ☐ Yes ☐ No

If so, how much? (Optional, up to 500 characters)

If so, what type? (Select all that apply) ☐ Gravel ☐ Sand ☐ Mud

How much will it cost?

Can it be permitted?

Regulatory and Economic Guidance

- Economic Analysis of Costs and Benefits of Traditional Flood Control Practices versus “Flood Control 2.0”
- Regulatory Analysis, Recommendations and Guidance Document

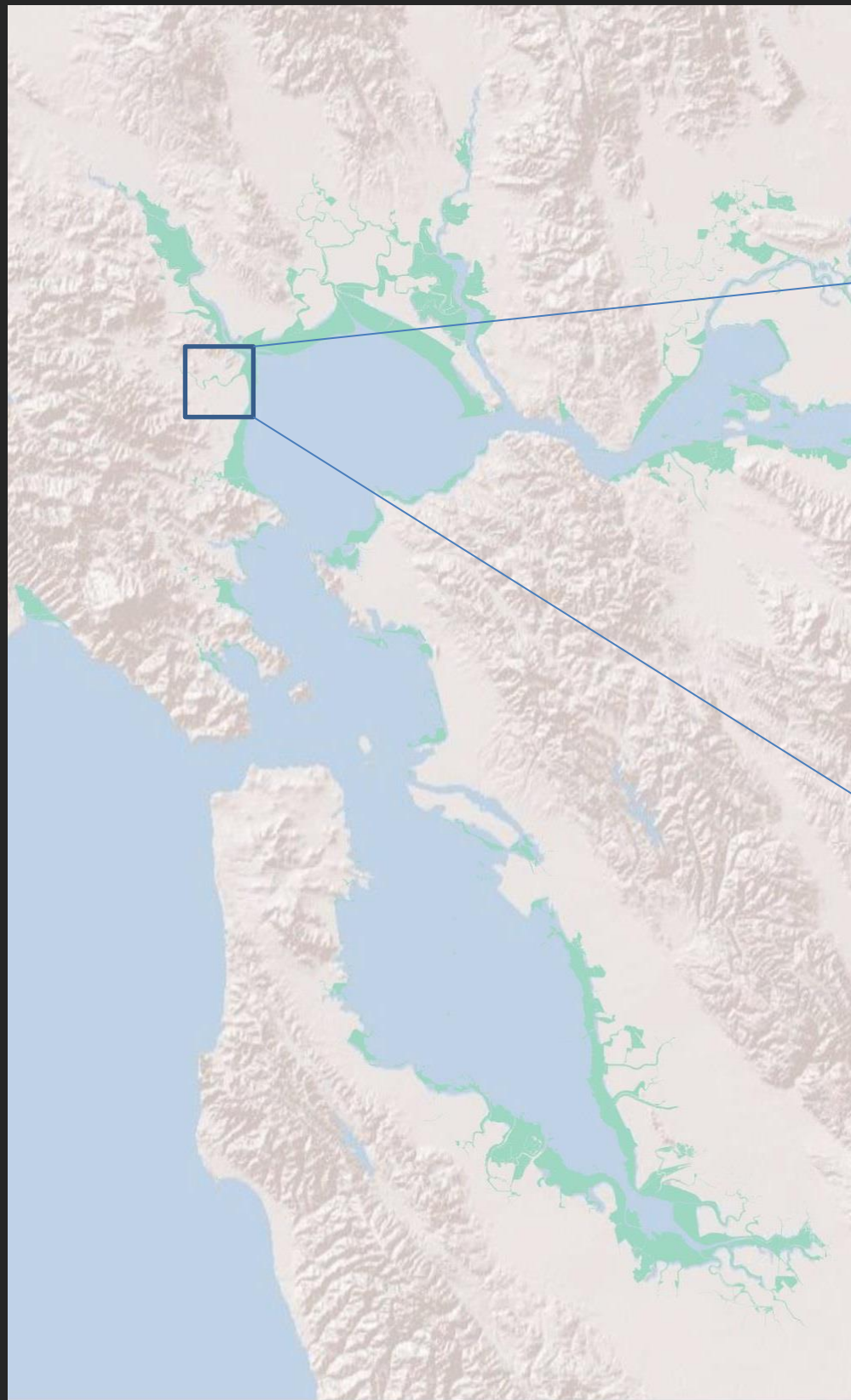


Where are these ideas being implemented?

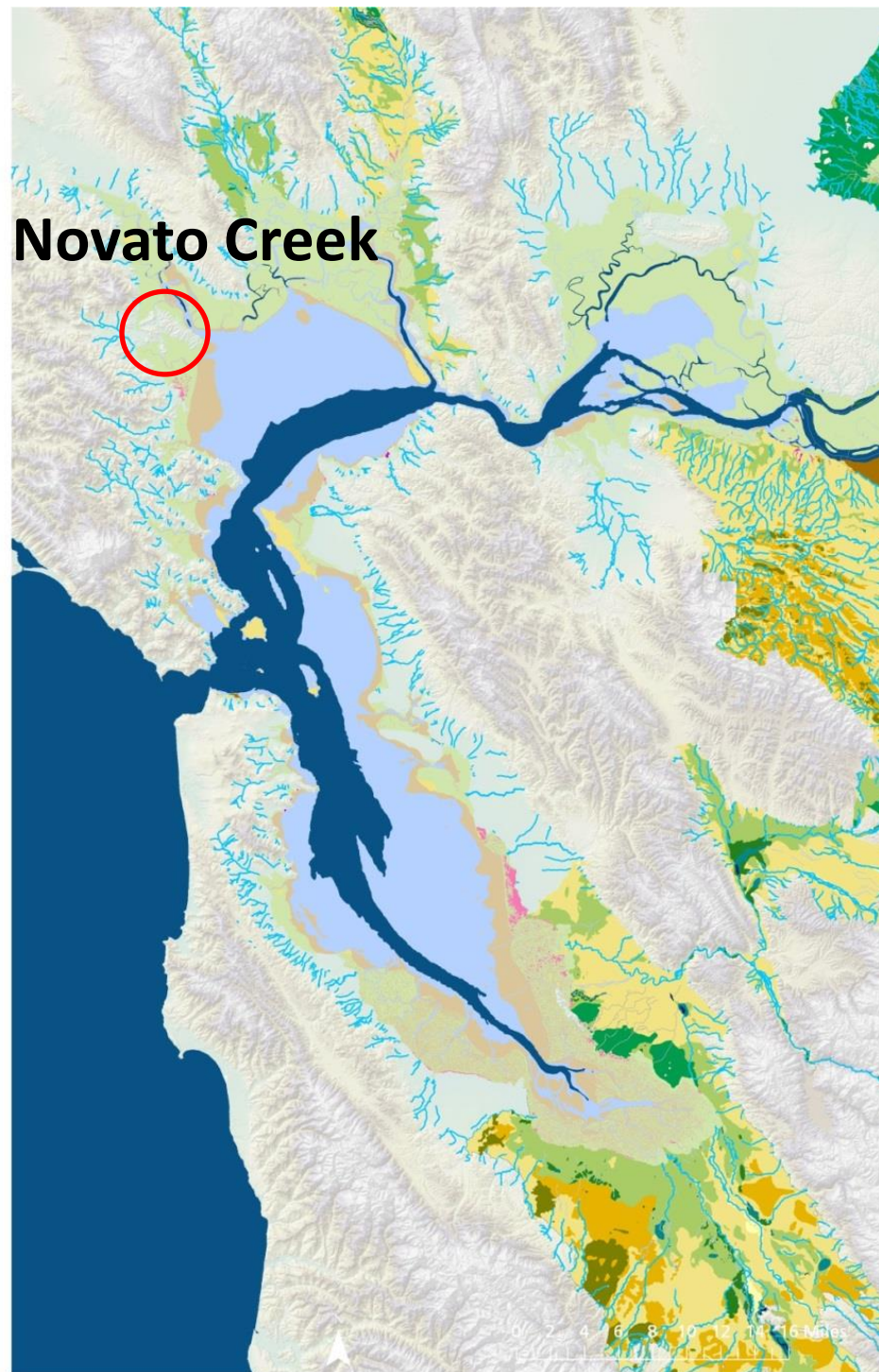
Implementation Projects



Implementation Project: Novato Creek



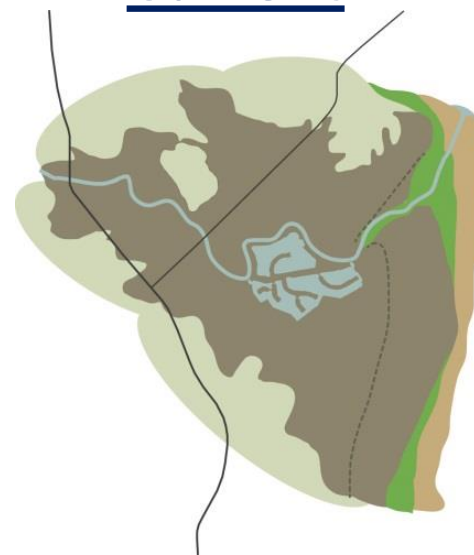
Developing a Vision



Historical (1850s)



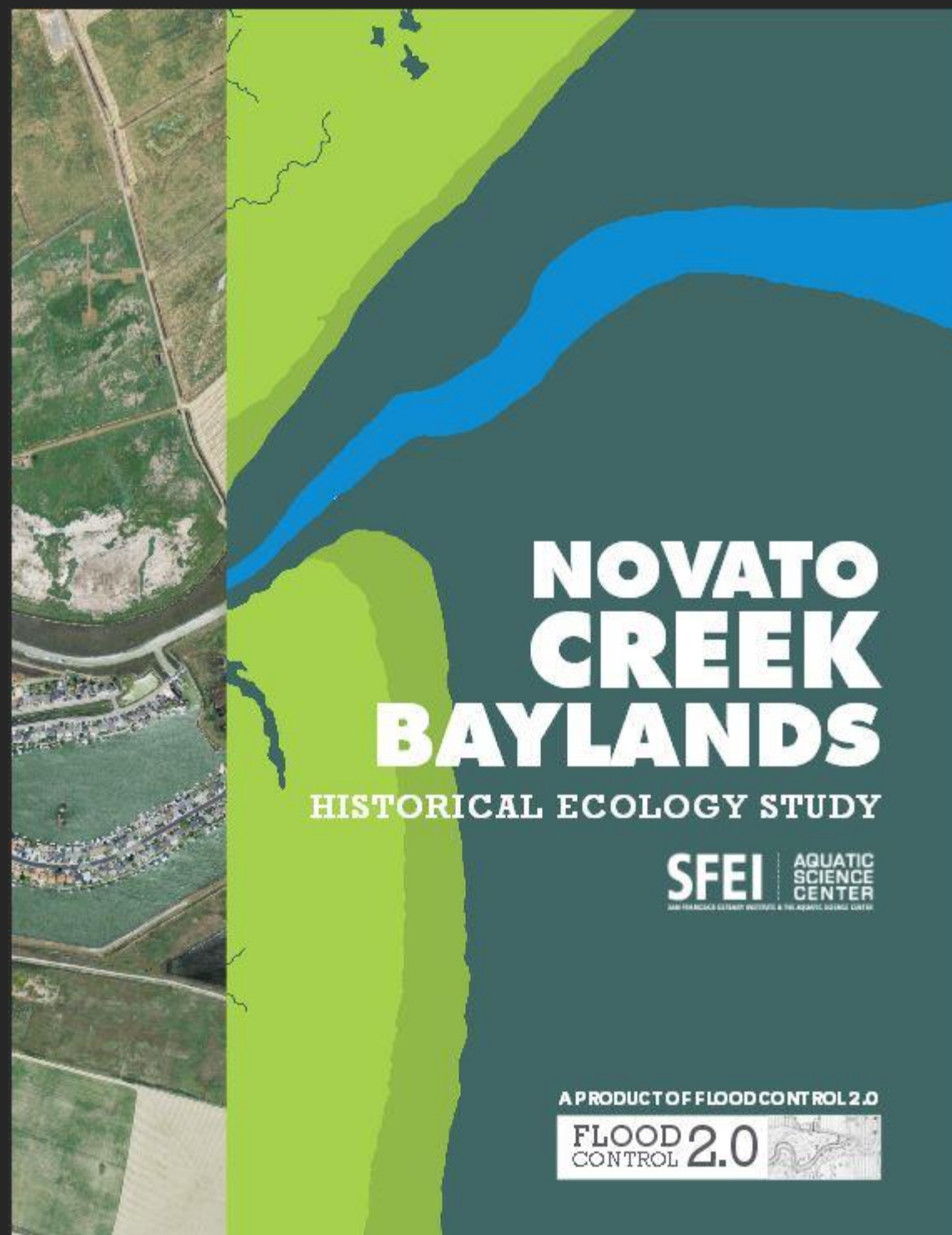
Current



- F-T interface type
 - Relative watershed sediment yield
 - Relative sediment storage
-
- F-T interface type
 - Relative watershed sediment yield
 - Relative sediment storage
 - ***Legacy and current management actions***



Long-Term Conceptual Vision



- Fluvial Channel
- Small Intertidal Channel
- Tidal Marsh
- Low Tidal Marsh
- Salt Pond / Panne
- Subtidal Channel
- Channel Flat
- Bay Flat
- Shallow Bay

Habitat Type	Historical Acreage
Tidal Marsh	4,490
Low Tidal Marsh	160
Salt Pond / Panne	240
Subtidal Channel	50
Channel Flat	320
Bay Flat (more bay flat existed south of the study area)	2,800
Total	8,060

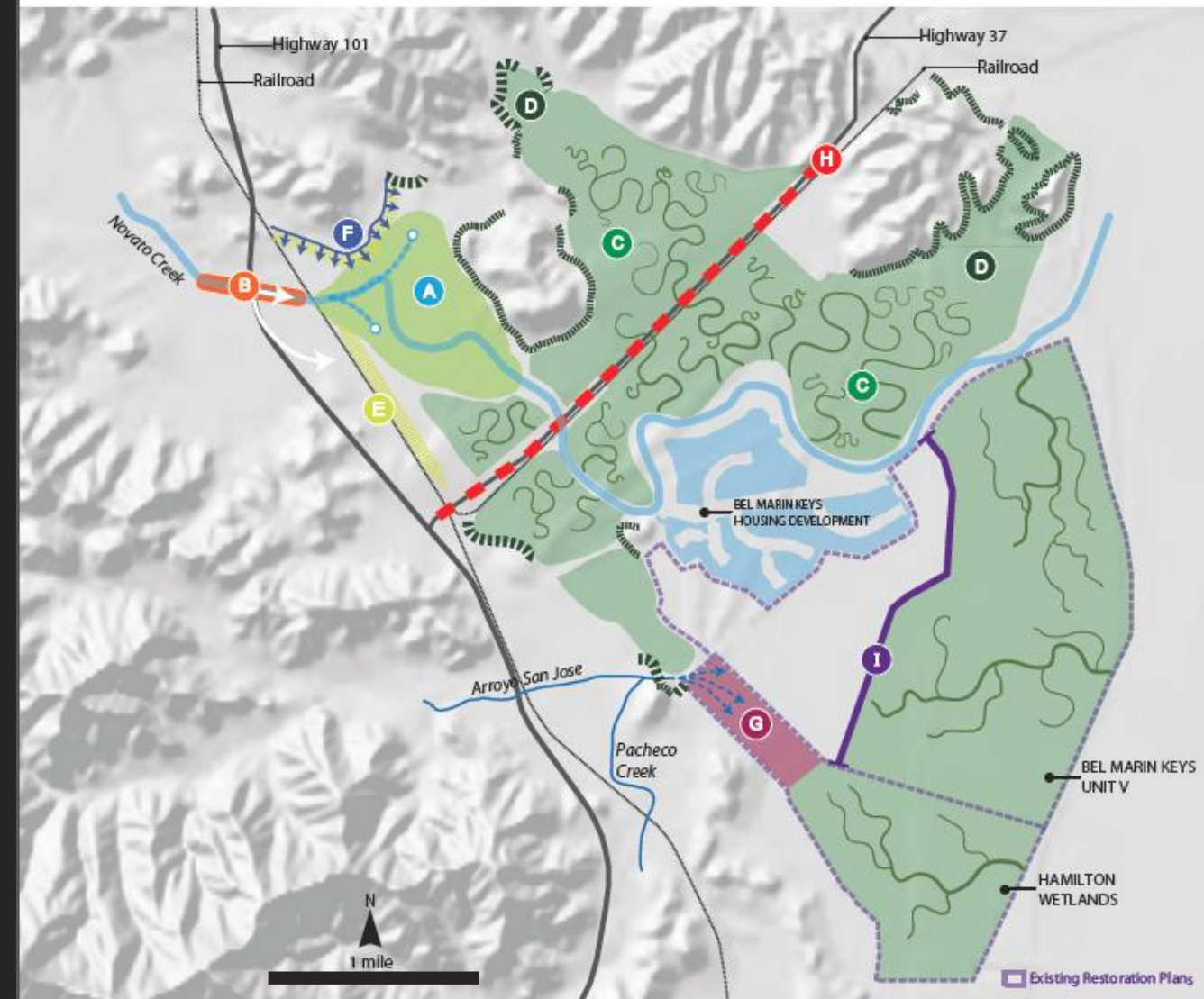
Figure 9. Historical habitats of the Novato Creek baylands, mid-1800s. An extensive tidal marsh, totaling nearly 5,000 acres, surrounded lower Novato Creek. Within the marsh plain there were over 100 miles of tidal channels and approximately 240 acres of salt pannes. A broad tidal flat, over one mile wide, separated the marsh from San Pablo Bay.

Table 3. Total area (acres) occupied by each habitat type historically.

Lower Novato Creek Vision

- Developed Vision w/ Marin Co and Science Advisors
- Focused on elements that could improve habitat and address flood risk
 - *Creek/Bayland reconnection*
 - *Removing channel constriction points*
 - *Beneficial sediment reuse*
- Elements are conceptual and based on opportunities & constraints, no feasibility assessment

NOVATO CREEK BAYLANDS LONG-TERM VISION



Please Note:

- Bel Marin Keys Unit V & Hamilton Wetlands have existing restoration plans. The anticipated restored tidal marsh shown on Bel Marin Keys Unit V & Hamilton Wetlands is illustrated from the State Coastal Conservancy's completed and proposed restoration plans. Please reference the State Coastal Conservancy's plans for additional site actions and associated habitats that are not shown.
- This visioning did not include any modifications to the Bel Marin Keys Housing Development.

How will the outcomes from this effort be transferable?

Regional Implementation Toolbox

- **Regional Management Concepts – historical function, sediment dynamics, current opps and constraints**
- **Economic Analysis Template**
- **Regulatory Guidance**
- **Sedi-Match**



What's Next for Flood Control 2.0

- Lower Walnut Creek HE and Vision (Fall 2015-Winter 2016)
- Regional Channel Management Typology (Spring 2016)
- Regulatory Guidance Document (Spring 2016)
- Web-based Toolbox (Fall 2016)

How can you find out more?

Podcasts at www.yourwetlands.org

Your Wetlands
A Project of the San Francisco Bay Joint Venture

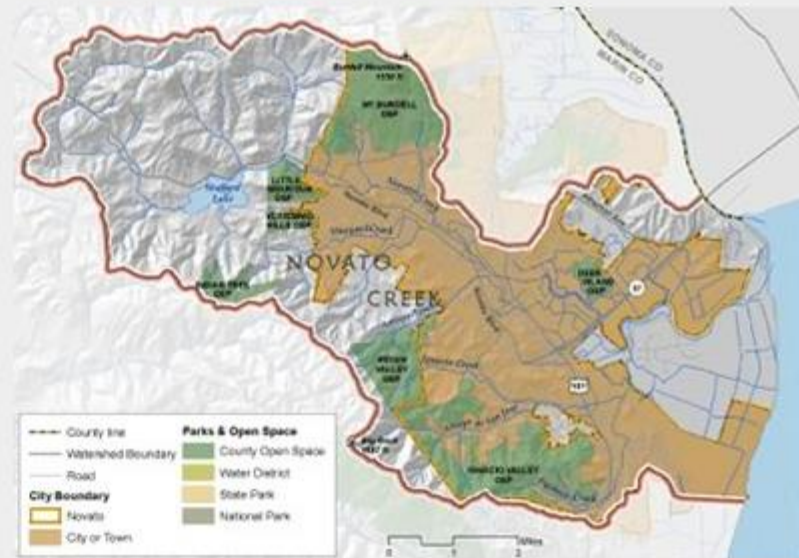


Lower Novato Creek Redesign Project



[Download mp3](#)

There are extraordinary restoration projects being designed all around SF Bay. One of them is in the North Bay and is called "the Lower Novato Creek Redesign Project". With a history of flooding during large storms in downtown Novato, the community is supportive of projects that integrate flood control and include environmental enhancements. This program looks at the thinking behind the design of this project.



What is Flood Control 2.0?



[Download mp3](#)

Join our guest Robin Grossinger, a Senior Scientist at the San Francisco Estuary Institute as he describes Flood Control 2.0 and how bay area environmental organizations are rethinking the way that flooding is controlled around San Francisco Bay. Your Wetlands is a project of the San Francisco Bay Joint Venture.

For more information:

San Francisco Bay Joint Venture - www.sfbayjv.org

San Francisco Estuary Institute - www.sfei.org

San Francisco Estuary Partnership: <http://www.sfestuary.org/our-projects/watershed-management/floodcontrol/>

San Francisco Bay Conservation and Development Commission - www.bcdc.ca.gov



Thank You



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San Francisco Estuary Partnership
Caitlin.Sweeney@waterboards.ca.gov
510-622-2362