

Tidal Wetlands and Climate Adaptation *Moving to Actionable “Smart” Assessment*

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 San Francisco Bay
National Estuarine
Research Reserve



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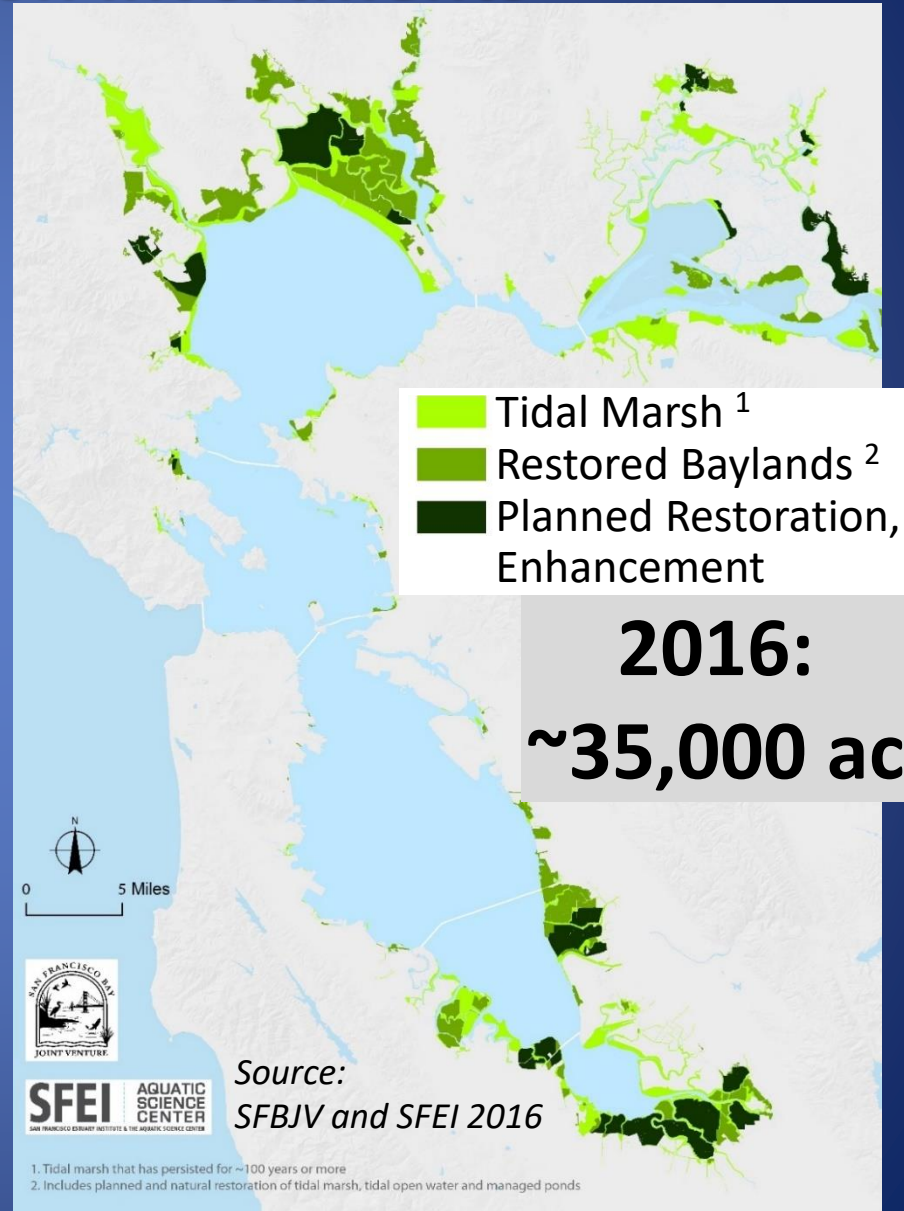
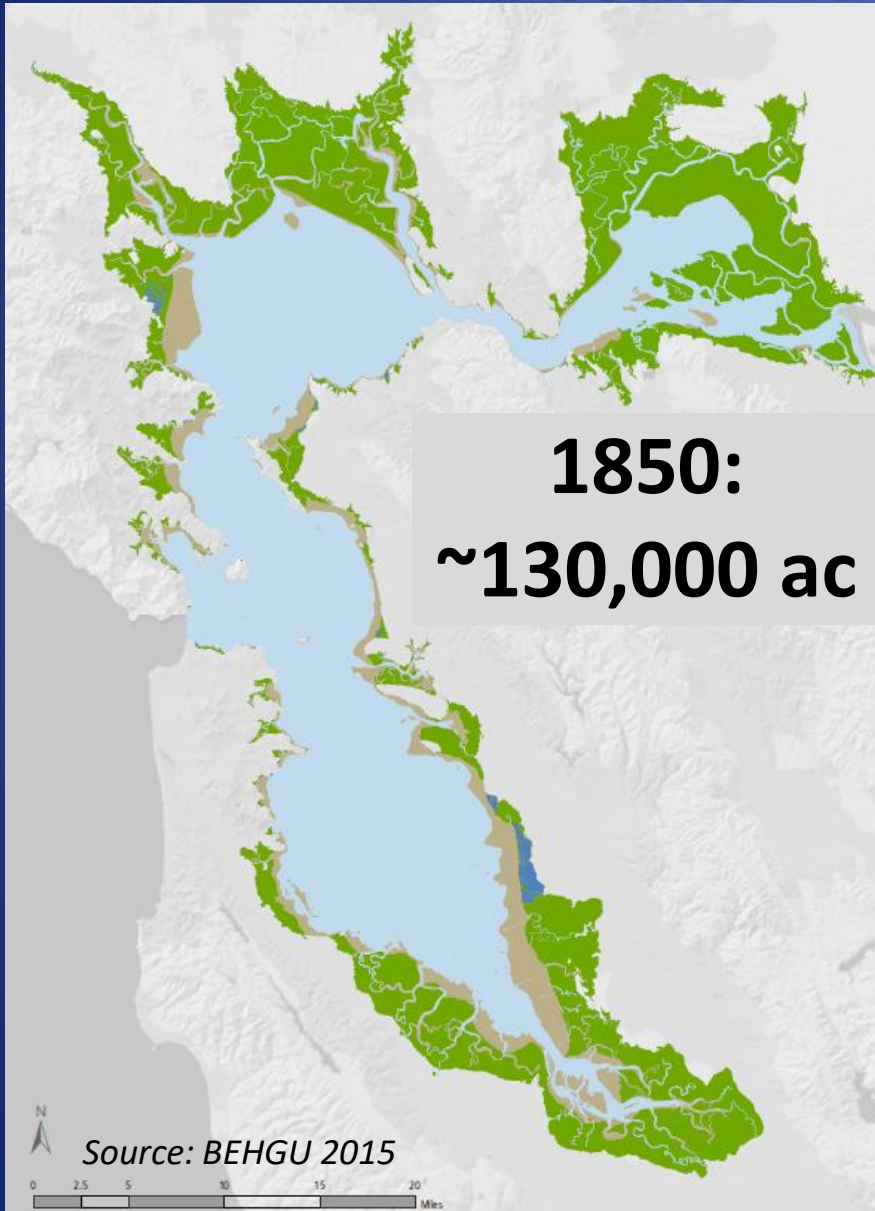
Old Model: *~Everything ~Everywhere*

New Model: *What We Need Where We Need It*



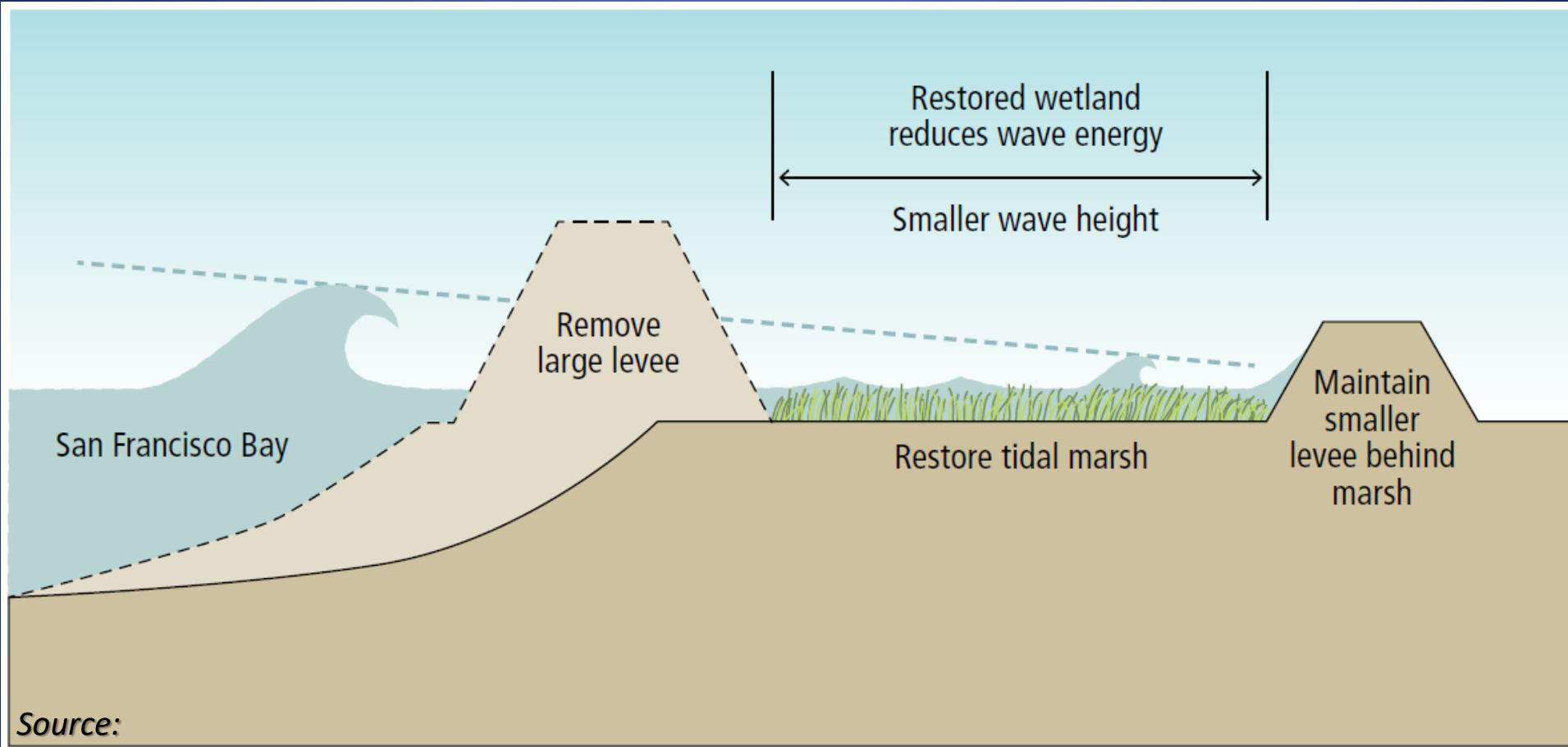
Courtesy of Susanne Moser / Point Blue

Efficacy of Past and Future Tidal Marsh Restoration and Conservation Investments



Wave Attenuation = Target

Tidal marshes are effective attenuators

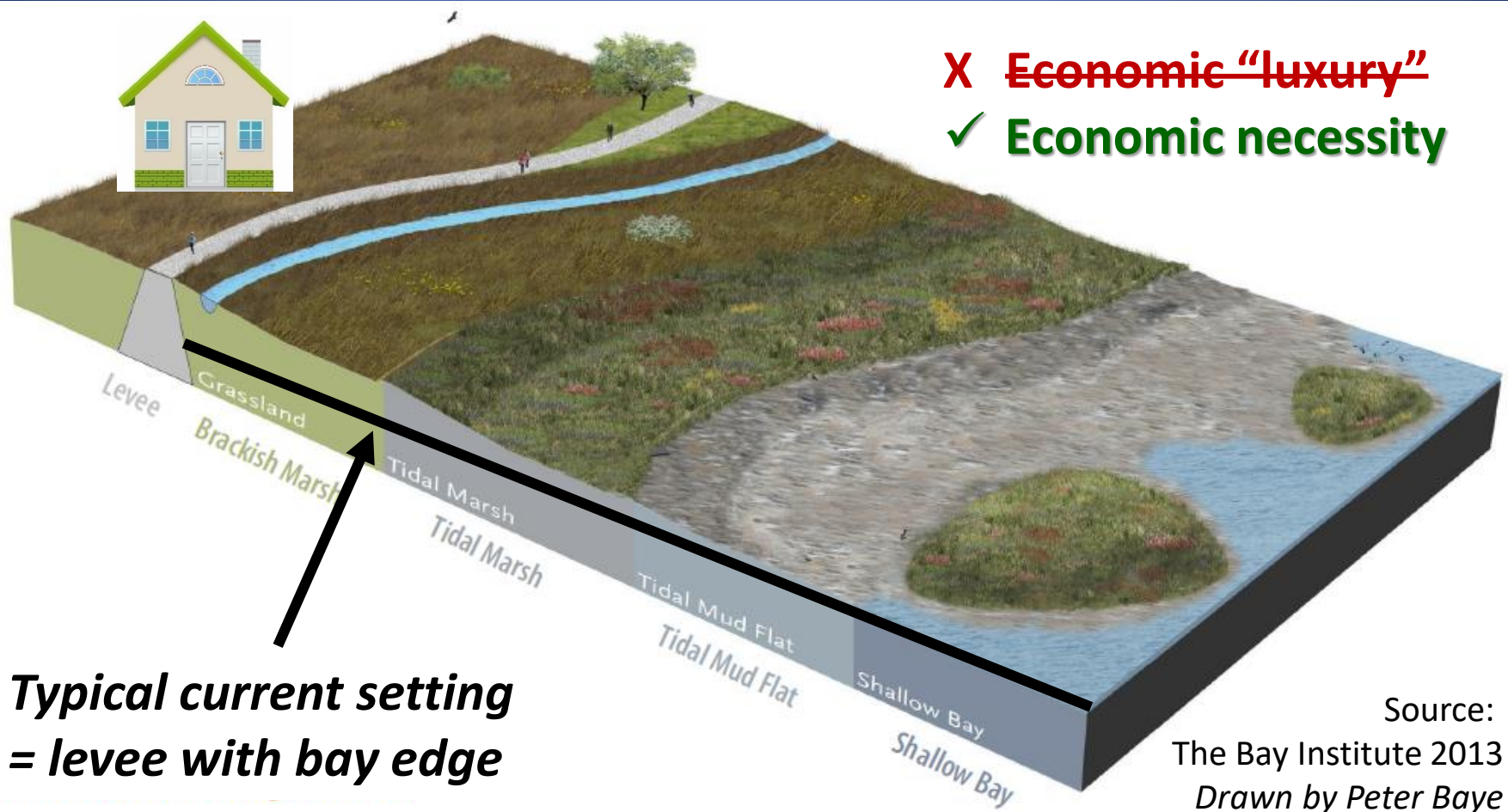


Attenuation = $f(\text{width, elevation, vegetation height and density})$

Green is the New Grey: Living Shorelines



~~X Economic "luxury"~~
✓ Economic necessity



**Typical current setting
= levee with bay edge**

Source:
The Bay Institute 2013
Drawn by Peter Baye

Moving Forward in an Adaptive World: Significant Recent Policy Advances

Flood Control 2.0
Rebuilding Habitat and Shoreline Resilience through a
New Generation of Flood Control Design and Management

Flood Control



THE *Baylands* AND *Climate Change*

WHAT WE CAN DO
BAYLANDS ECOSYSTEM HABITAT GOALS
SCIENCE UPDATE 2015

Tidal Marsh

LIVING SHORELINES
FROM BARRIERS TO OPPORTUNITIES

RESTORE AMERICA'S ESTUARIES

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Living Shoreline

THE BOARD OF DIRECTORS OF RESTORE AMERICA'S ESTUARIES HAS REVIEWED AND ENDORSED THE FINDINGS AND RECOMMENDATIONS OF THIS REPORT

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SUGGESTED CITATION:
Restore America's Estuaries. 2015. Living Shorelines: From Barriers to Opportunities. Arlington, VA.

DISCLAIMER

THE VIEWS AND OPINIONS EXPRESSED IN THIS REPORT ARE THOSE OF THE INDIVIDUAL MEMBERS OF THE COMMITTEE AND DO NOT REFLECT IN ANY WAY THE VIEWS OR OPINIONS OF THEIR EMPLOYERS OR ANY GOVERNMENT AGENCIES.

Living Shorelines Project, MD; image © Tracy Skrabal

Old Model: Myriad of Permits Require Monitoring (Almost) Everything at Every Project

State Agencies: *BCDC, RWQCB, CDFW, DSC, SLC, SHPO, CVFPB, Caltrans*

Federal Agencies: *USFWS, NMFS, USACE, USEPA, USCG*

Clean Water Act Section 401

Porter-Cologne Water Quality Control Act

Clean Water Act Section 402

Clean Water Act Section 404

Suisun Marsh Protection Act

Rivers and Harbors Act

Fish and Game Code

Clean Water Act Section 303(d)

McAteer-Petris Act

California Endangered Species Act

Magnussen-Stevens Act

Federal Navigation

Delta Reform Act

National Historic Preservation Act

Federal Endangered Species Act

California Environmental Quality Act

33 USC Section 408

State Leases and Encroachment

Title 23

National Environmental Policy Act

Migratory Bird Treaty Act

New Model: *What We Need Where We Need It*

Management Decisions Drive Information Needs

- Natural resources: maintain and increase fish and wildlife pop.
- Ecosystem services provision – adaptation

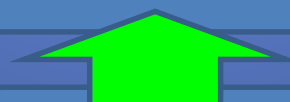
Needs evolve as climate change pressures emerge and we understand the fruits of our labor



Actionable Information = Coin of the New Realm

- All that is needed, but...
- Only what is needed (which evolves)

Everything else = optional



Site-Scale Adaptive
Management

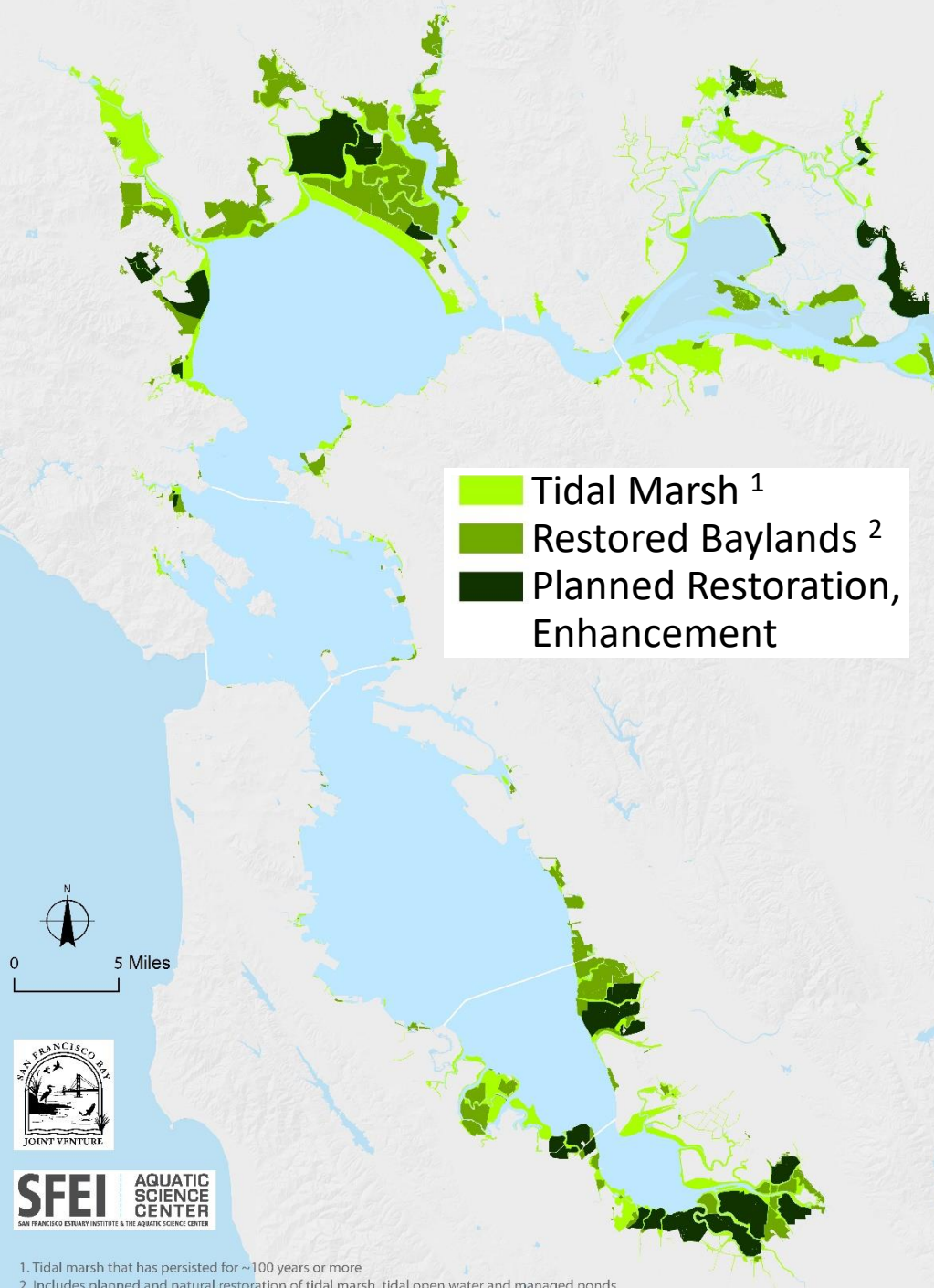
Corrective measures

Regional Scale Adaptive Management

Responsiveness to a Changing
Environment, Effects of Our Actions

New Model in Action

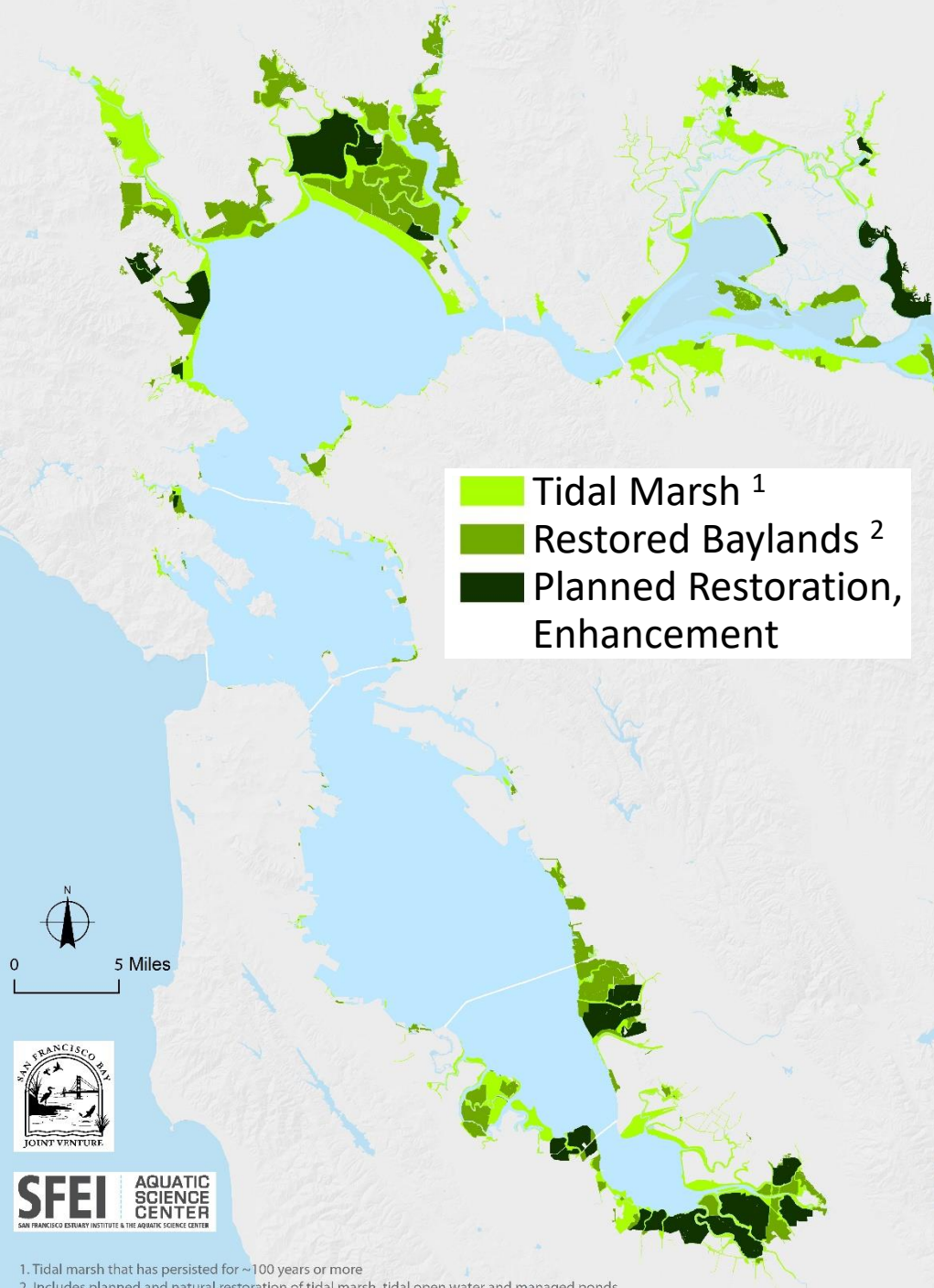
- Sample “universe” = region, not each site
- Each natural marsh and restored marsh is a *possible* sample site for one or more metrics
- Metrics:
 - Core compliance
 - Necessary site adaptive management
 - **LESSONS LEARNED**
- Citizen science as much as feasible
- **Stratify the sample universe**



Stratified Sample Universe

Stratify in Data Collection and Analysis:

- Salinity
- Sediment supply
- Vulnerabilities
- Likelihood/suitability for living shoreline projects
- Land uses
- Diked baylands restoration opportunities
- Disadvantaged communities

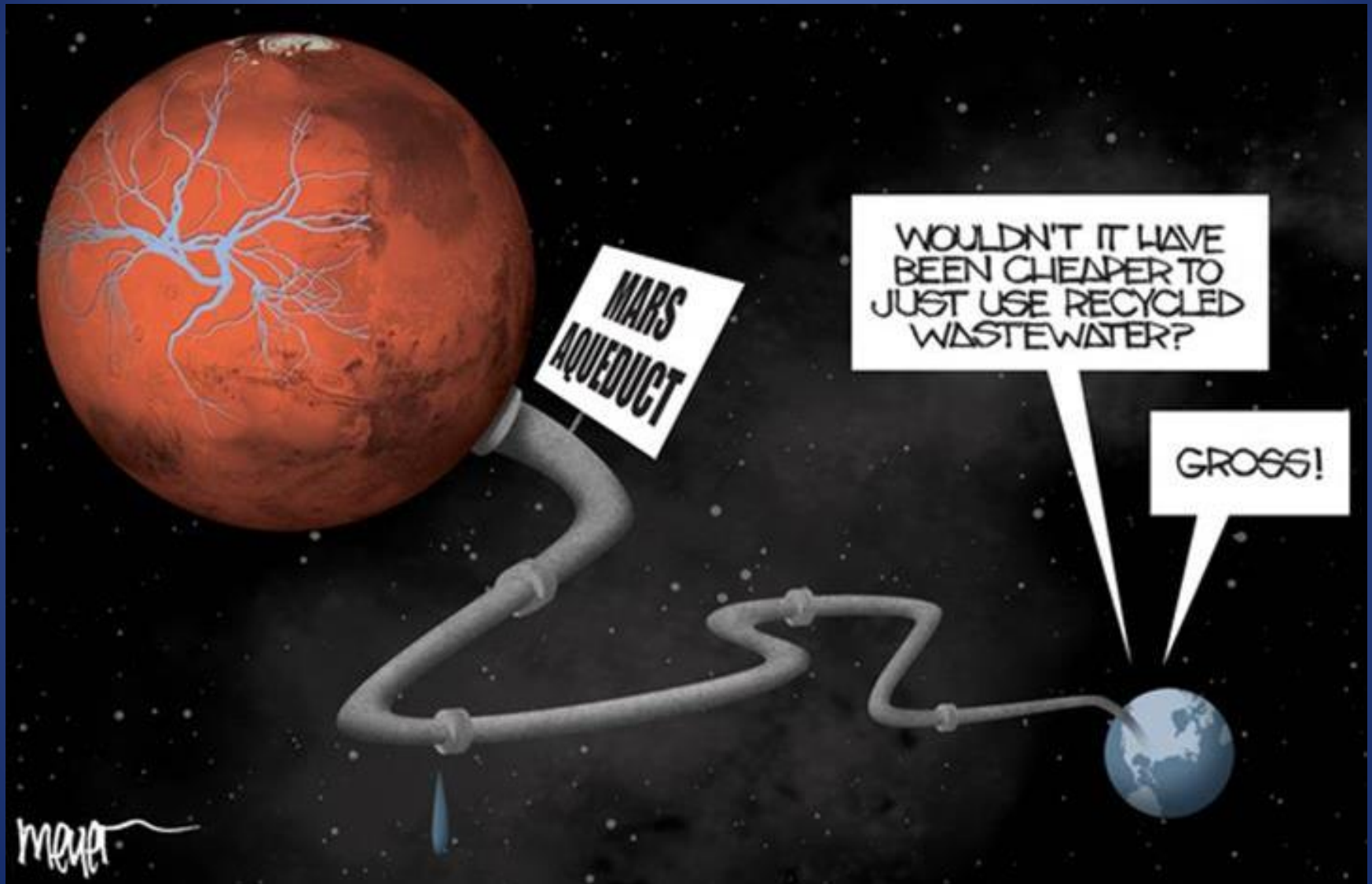


1. Tidal marsh that has persisted for ~100 years or more

2. Includes planned and natural restoration of tidal marsh, tidal open water and managed ponds

The Time to Act is Now

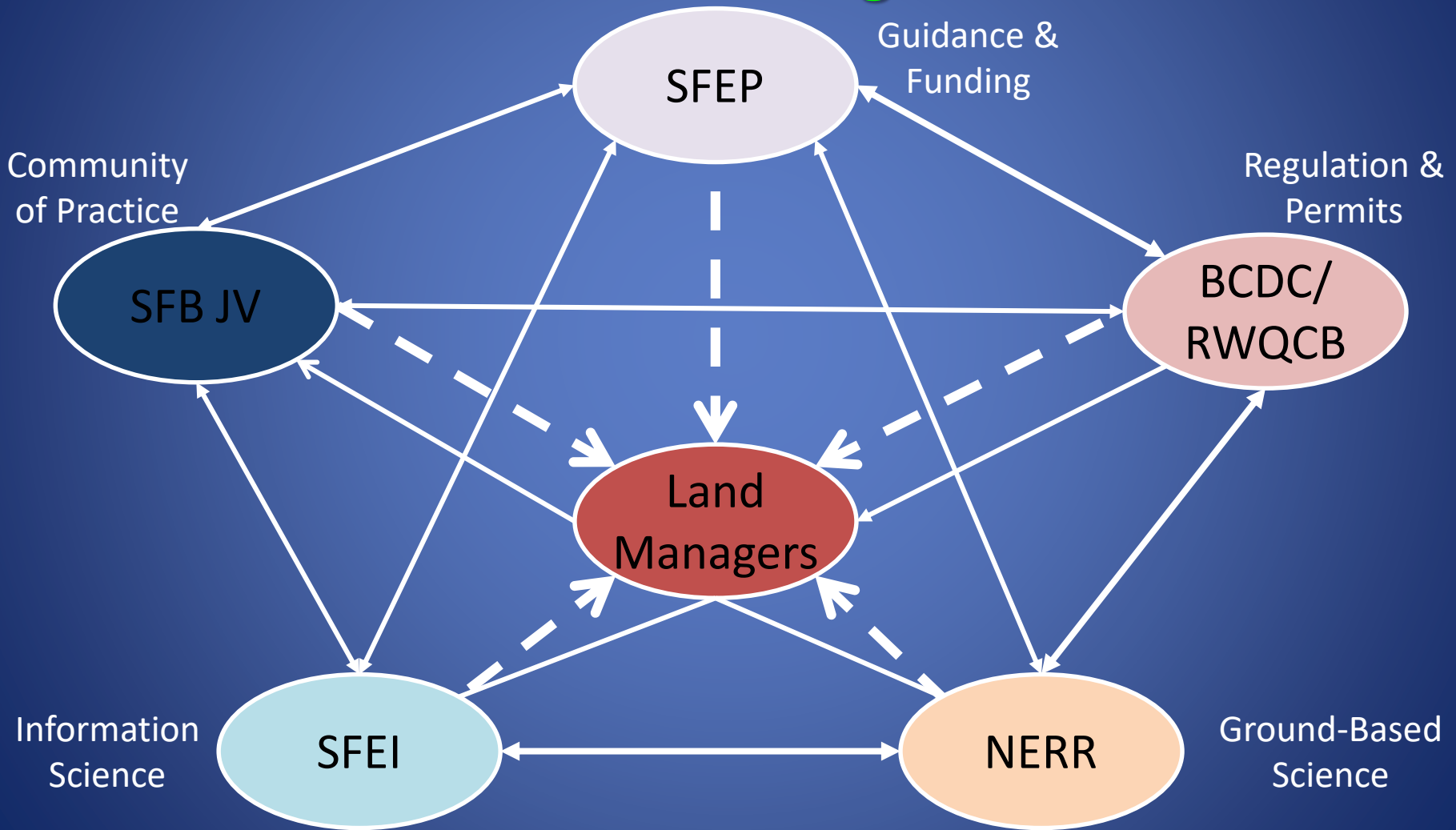
We are planning and taking action: success requires focus



Courtesy of Susanne Moser / Point Blue

Comprehensive Conservation and Management Plan

Action 2 'Owners' For Regional Tidal Wetland Monitoring



Let's Buck the Trend. Thank you!



Courtesy of Susanne Moser / Point Blue

Chattanooga Times Free Press **Bennett**