# Ecosystem Restoration and the U.S. Army Corps of Engineers- What does the future hold?

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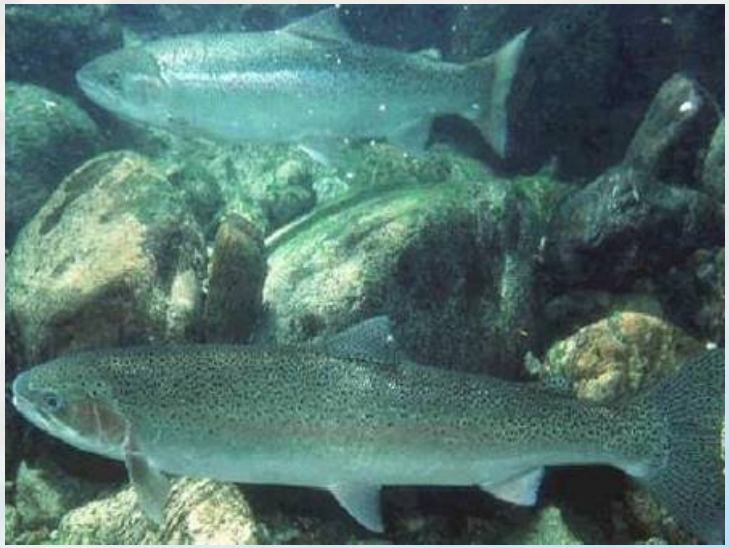
# *Goals*

- Update on USACE Eco Restoration Program and understand our role
- Current portfolio of studies and projects
- Understand how projects and programs compete for limited funding and related challenges
- Discuss future portfolio and role of the USACE
- Get FEEDBACK FROM YOU!!

# *Who am I??*

- Oversee the Corps of Engineers Ecosystem Restoration Program Nationwide (yes, I'm one of those "headquarters people")
- Portland, Oregon native now living in Washington, DC (yes, yikes!)
- Fish biology and civil engineering background (yes, it's weird!)
- Fight for money



# *Why am I here?*

- Minimal USACE presence at NCER in past years, more in 2016
- Update community on USACE ecosystem restoration activities
- Opportunity to interface with USACE staff and our partners
- Get feedback from the restoration community

# *Environmental Roles of the Corps*

## Remediating prior environmental damage

Improving environmental quality degraded by prior Federal actions

## Holding the environmental line

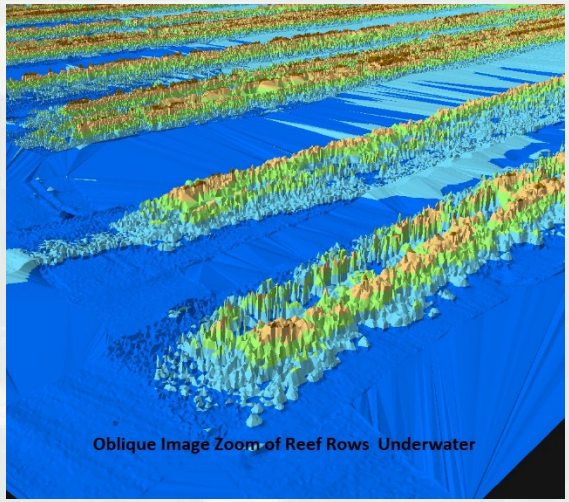
Reducing environmental impacts of actions and preserving environmental quality as the Nation continues to grow and mature

## Contributing to resiliency and sustainability

Ecosystem restoration, extensive research program, Environmental Operating Principles

# *USACE Definition of Ecosystem Restoration*

- "The objective of ecosystem restoration is to ***restore degraded ecosystem structure, function, and dynamic processes*** to a less degraded, more natural condition."



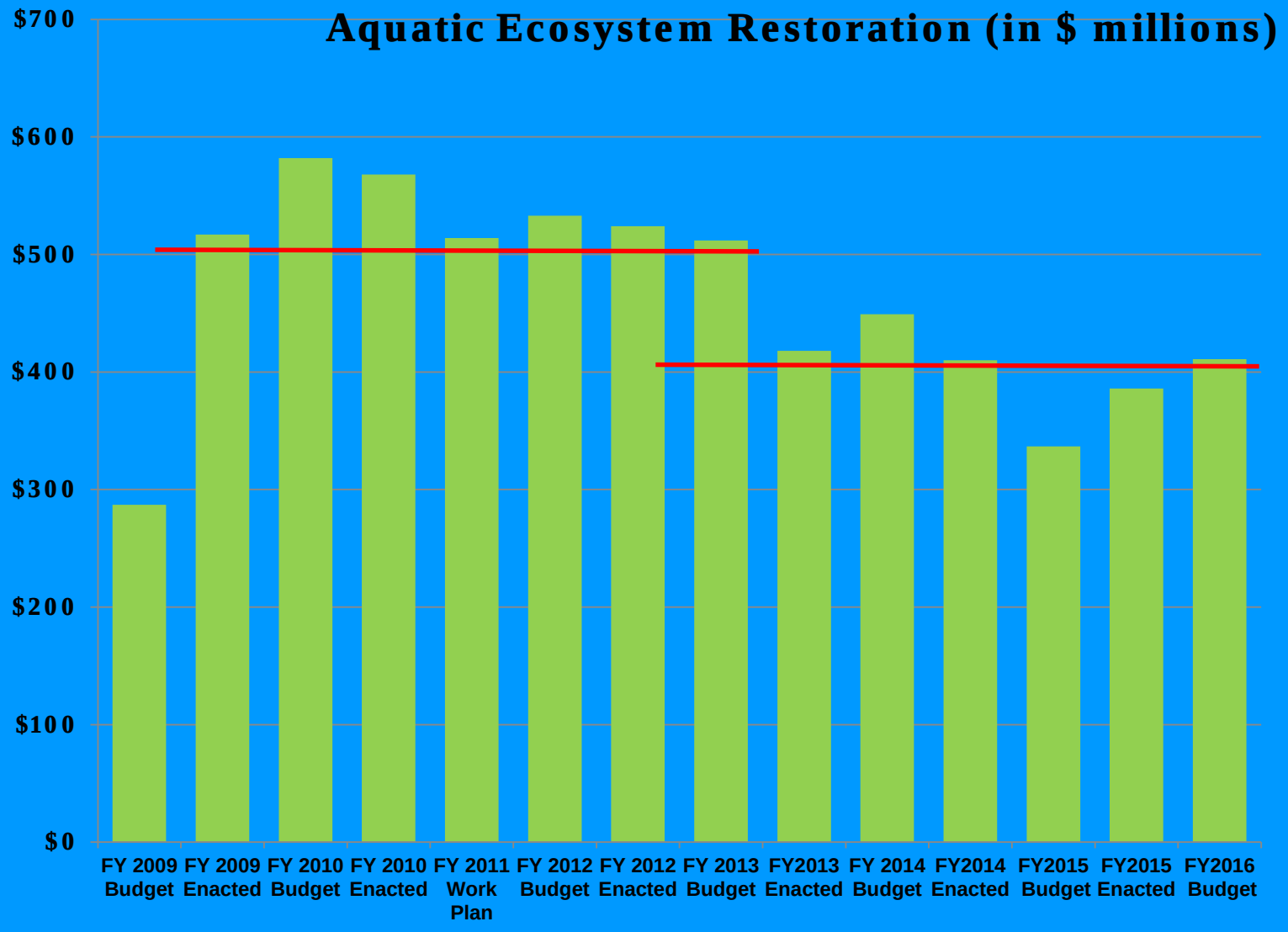
# Ecosystem Restoration

**Priority Ecosystems:**
California Bay-Delta
Chesapeake Bay
Everglades
Great Lakes
Gulf Coast

**Key Watersheds:**
Columbia River
Puget Sound
Upper Mississippi
Missouri Rivers






Aquatic Ecosystem Restoration (in $ millions)
$700
$600
$500
$400
$300
$200
$100
$0
FY 2009 Budget
FY 2009 Enacted
FY 2010 Budget
FY 2010 Enacted
FY 2011 Work Plan
FY 2012 Budget
FY 2012 Enacted
FY 2013 Budget
FY2013 Enacted
FY 2014 Budget
FY2014 Enacted
FY2015 Budget
FY2015 Enacted
FY2016 Budget

# South Florida Ecosystem Restoration Program (Everglades)

$60-$120M annual budget

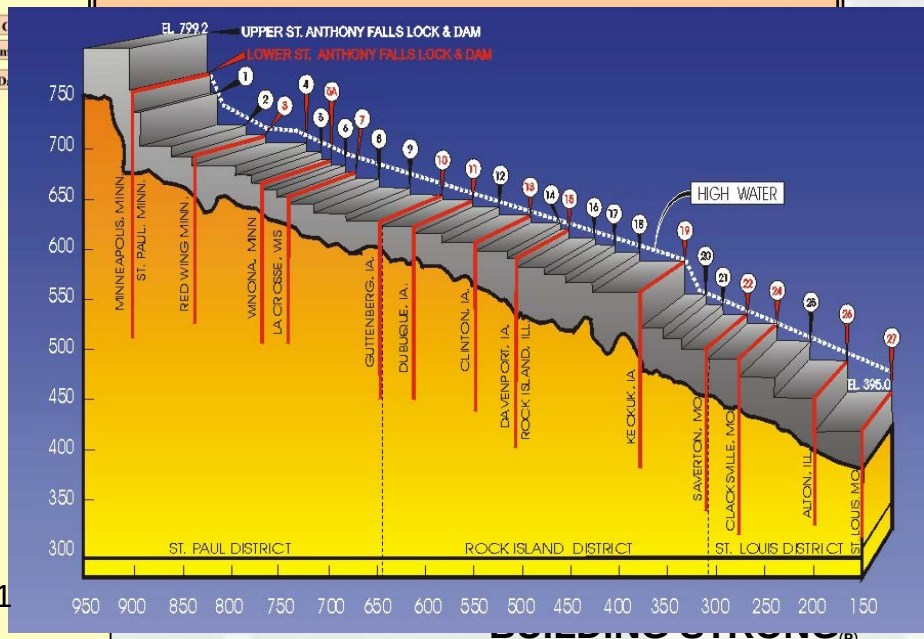
# *South Florida Ecosystem Restoration Program (Everglades)*

- Large-scale, watershed project area
  - Over 18,000 square miles
- Intense stakeholder interest
- Competing interests
- Complexity of problems
- Conflicting agency responsibilities

# Upper Miss River Navigation System

## 9-ft Channel

- Constructed 1930-45
- 37 Lock Sites
- Created system of navigation pools
- River training structures

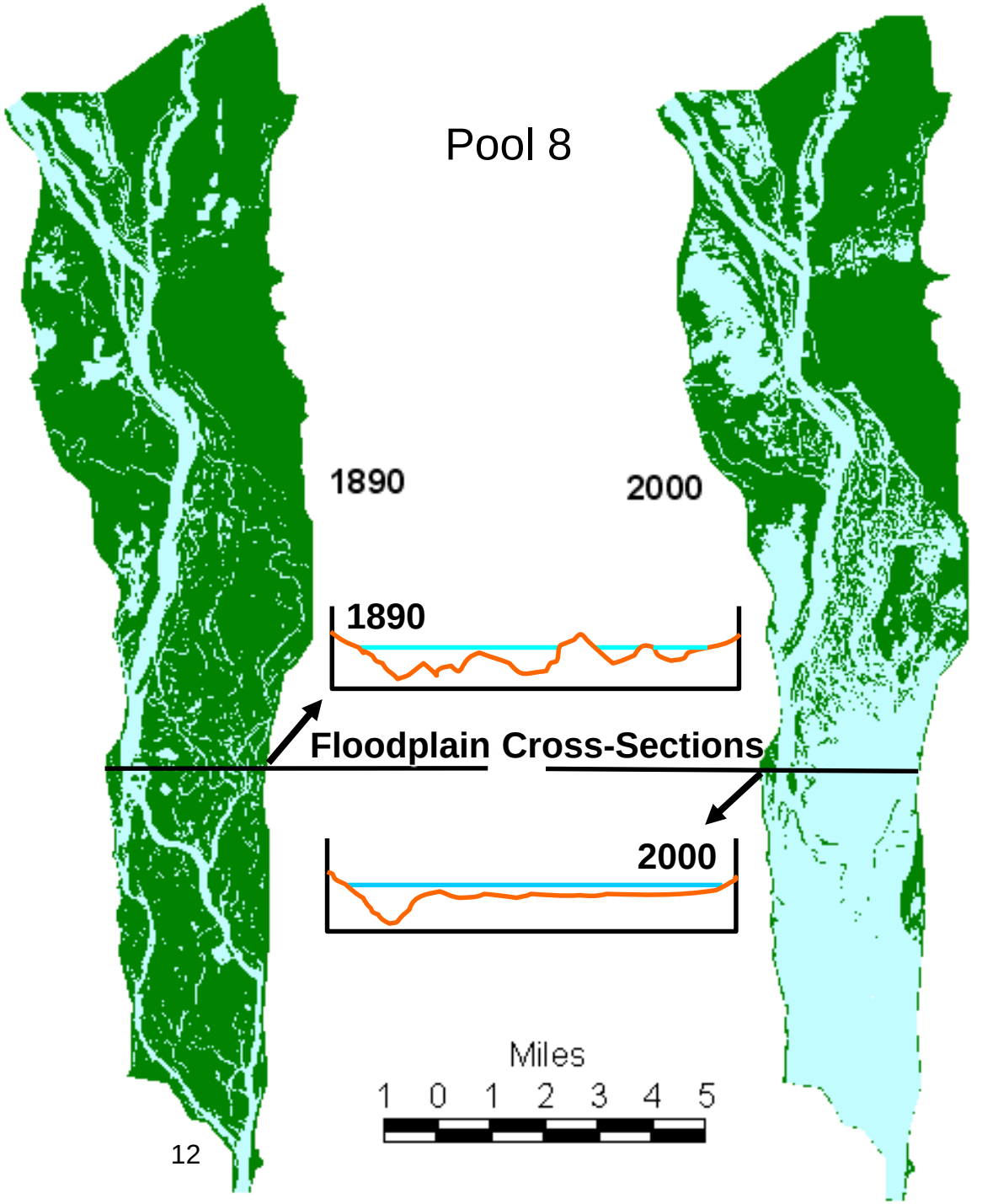
# Effects of 9-foot Nav Channel

## Problems:

- Increased base water elevation
- erosion of islands, etc.
- sedimentation of deep water

## Objective:

- Address cumulative impacts of an aging ecosystem created by navigation pools, including ongoing effects of maintaining the navigation system.



# Upper Mississippi River Restoration

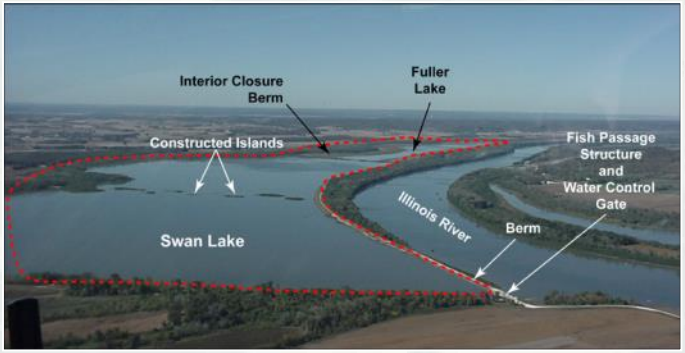
## Environmental Management Program

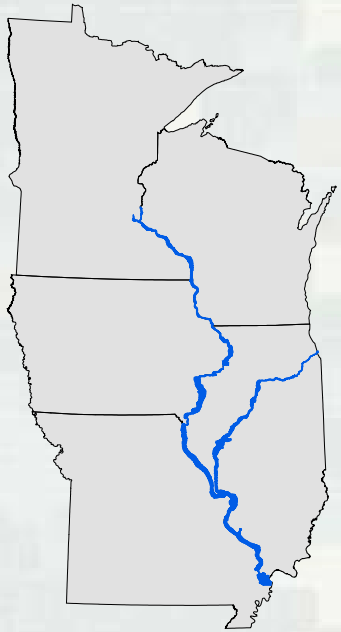

*Restoring and Monitoring*

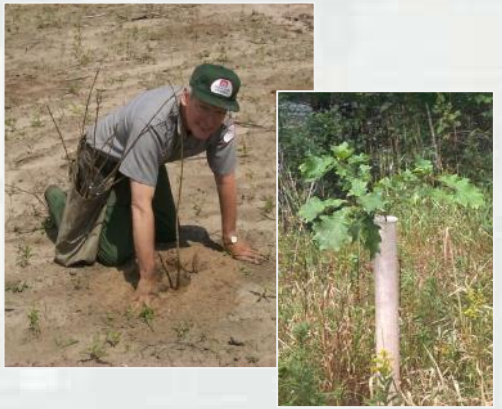
100,000 acres of aquatic habitat over 25 years

U.S. Environmental Protection Agency · Missouri Department of Conservation · USGS science for a changing world · DNR · Illinois Department of Natural Resources · Minnesota Department of Natural Resources · Wisconsin Dept. of Natural Resources · U.S. Fish & Wildlife Service · NRCS · US Army Corps of Engineers

# Many Different Restoration Tools Needed and Used





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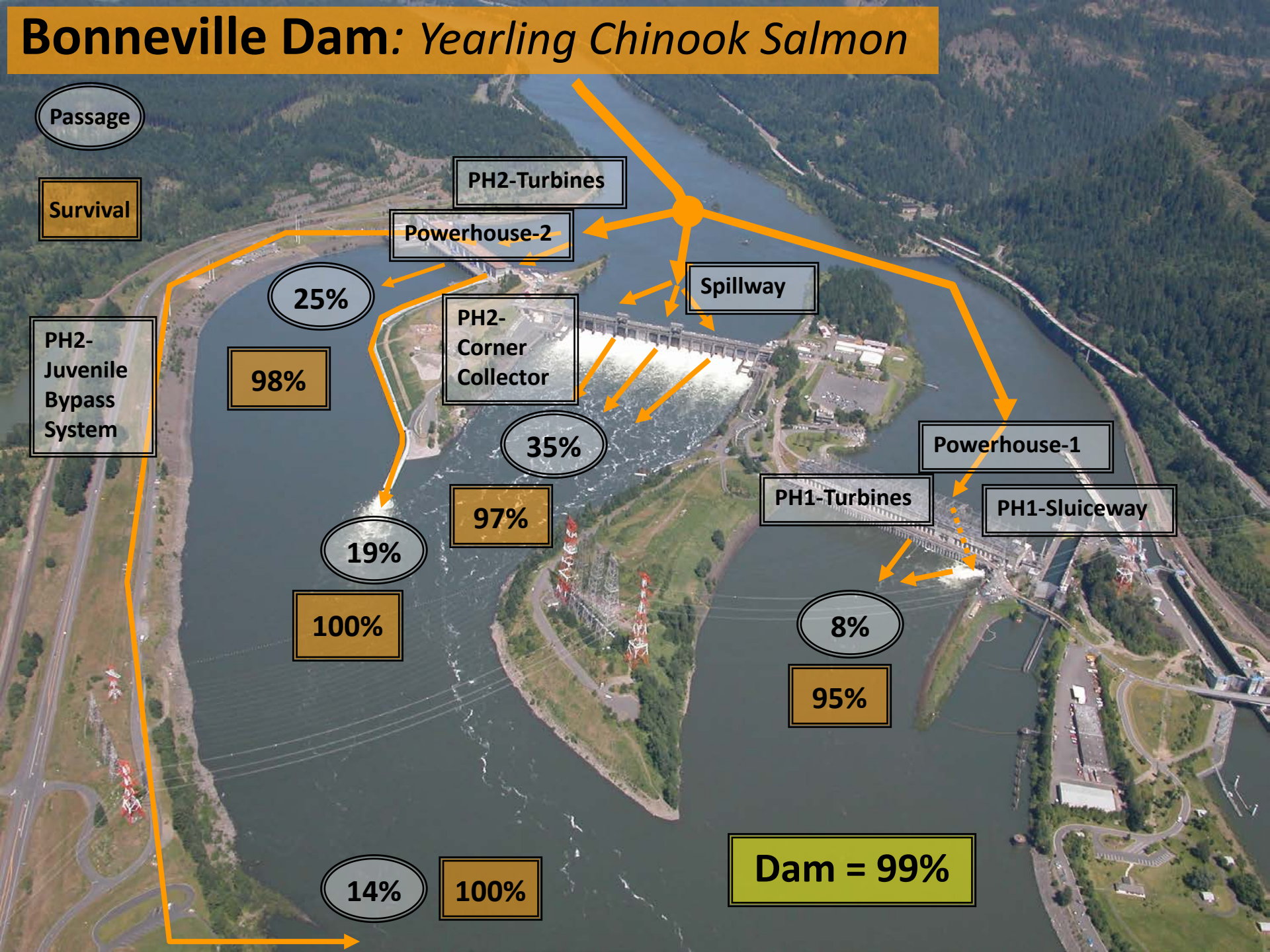
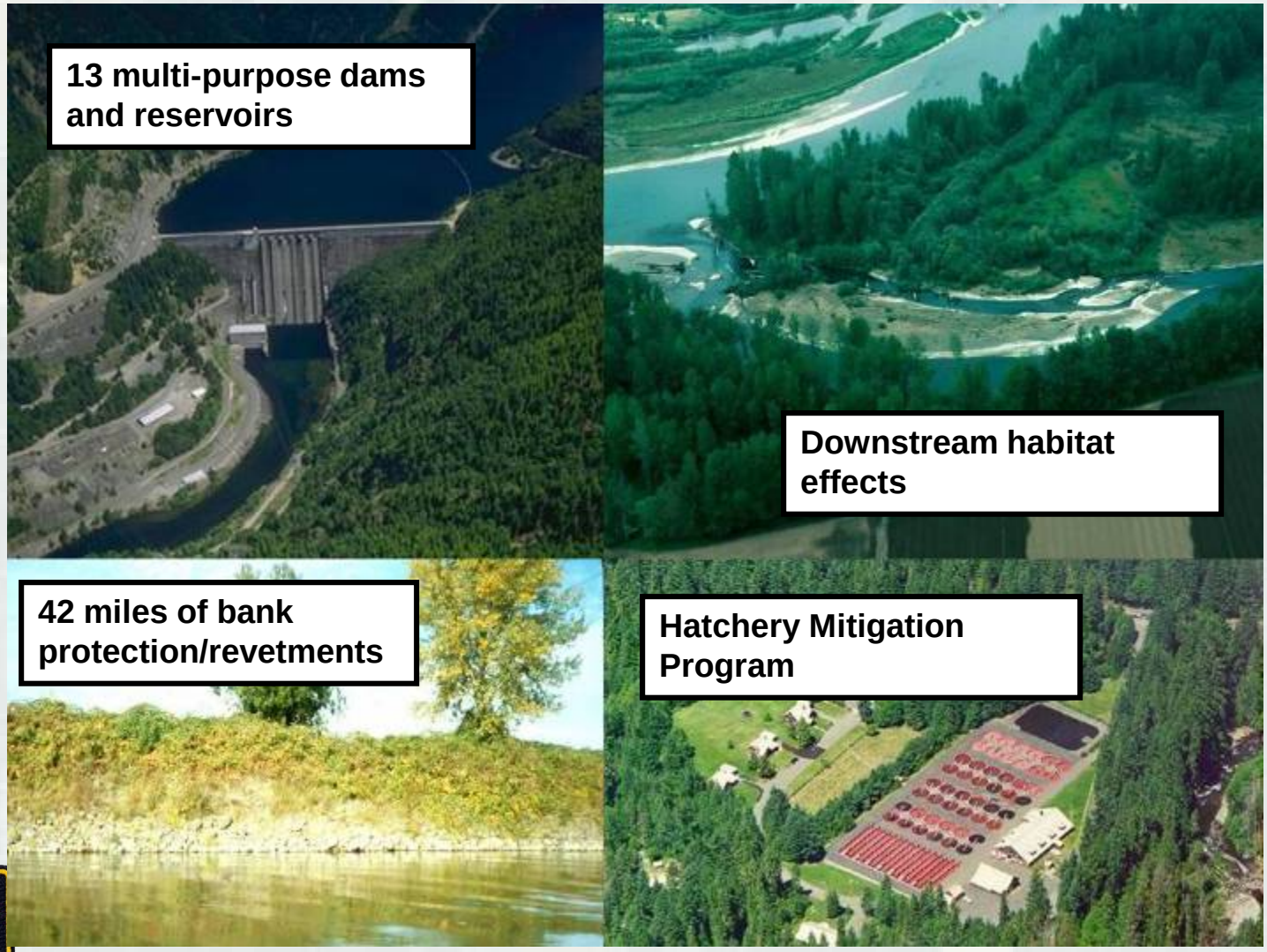
# *Columbia River Basin/Puget Sound Salmon and Lamprey*

- Mitigation for operation of multi-purpose dams (hydropower, flood risk management, navigation)
- Endangered Species Act/Biological Opinion requirements
- $70-100M annually

# **Bonneville Dam**: *Yearling Chinook Salmon*



# *Willamette Project Biological Opinions*



# *Chesapeake Bay- Poplar Island, MD*

**Poplar Island, MD**

- Winner of ASCE 2015 Innovation in Sustainable Engineering Award
- Located in upper-middle Chesapeake Bay
- Beneficial use of dredged material
- Dredged material will restore 1,715 acres of remote island habitat
- 68 million cubic yards of dredged material to restore island habitat

# *Typical Corps Project Phases*

- Study (develop a plan) with a non-Federal cost-sharing partner
  - Typically a 3-year process, since WRRDA 2014
    - cation
  - F
- Pre-construction Engineering and Design
- Construction

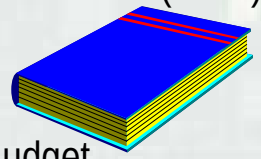
*Need funding at each step of the way- funding is appropriated ANNUALLY*

# Current AER Budget Criteria

| Performance Criteria | Maximum Score | Description |
|---|---|---|
| **Habitat Scarcity** | 25 | Regional or national scarcity of the habitat type |
| **Connectivity** | 25 | Extent to which organismal movement is improved or a critical component is added to increase biodiversity |
| **Special Species Status** | 10 | Provides significant contribution to a key life requisite in the potential range of a listed species |
| **Hydrologic Character** | 20 | Refers to the timing, magnitude, duration, frequency, and rates of change of aquatic systems |
| **Geomorphic Condition** | 20 | Establishment of suitable structure and set of physical processes for successful restoration |
| **Self-sustaining** | 20 | Applies to advanced phases, goal of project to be self-sustaining |
| **Plan Recognition** | 10 | Recognizes Corps ecosystem restoration projects that contribute to watershed or basin plans as emphasized in the “Civil Works Strategic Plan” |
| **TOTAL** | 130 | Maximum potential score |

1) OMB Provides Budget Guidance (Jan)

2) HQ Provides Program Guidance ( Mar )



3) Field Offices Develop Program Requirements ( Apr - May )

4) HQ Review & Approval ( May -Jun )

5) Program Presented to Secretary of the Army (Jul - Aug )

6) Program Submitted to OMB ( Sep )

7) OMB Passback ( Nov-Dec )

8) President's Budget to Congress ( Feb )

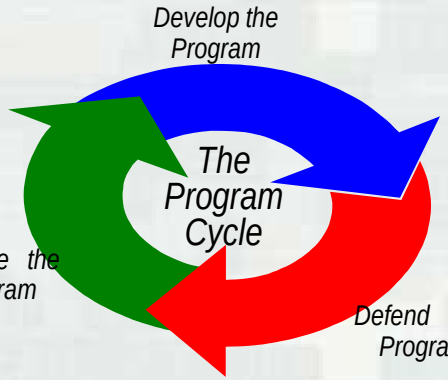
9) Congressional Hearings ( Mar - Apr )

10) Appropriations Bills ( Jul - Sep )

11) President Signs Appropriations Bill ( Sep - Oct )

12) Funding Allocations to Field Offices ( Oct - Dec )

13) Districts Execute current FY Program ( Oct - Sep )

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# *Challenges*

- Limited funding
- Compete with large, nationally significant projects that have clear, quantifiable benefits, described in a benefit-to-cost ratio (BCR)
  - Navigation benefits (tonnage, transportation rate savings)
  - Flood damage reduction/life safety

# *Challenges*

- Difficult to communicate benefits of ecosystem restoration in a way that resonates with the public and demonstrates national significance
- Potential for using Ecosystem Goods and Services, but not ripe
- Irony- USACE has unique skill set to accomplish large-scale ecosystem restoration, but these often require large investments in a time of scarce resources

# *Need Support from Administration and Congress*

- No major USACE project can move to the construction phase unless “approved” by the Administration (i.e., Office of Management and Budget/OMB)
- No clear position on their criteria
- Result
  - unconstructed projects
  - Uncertainty about future projects

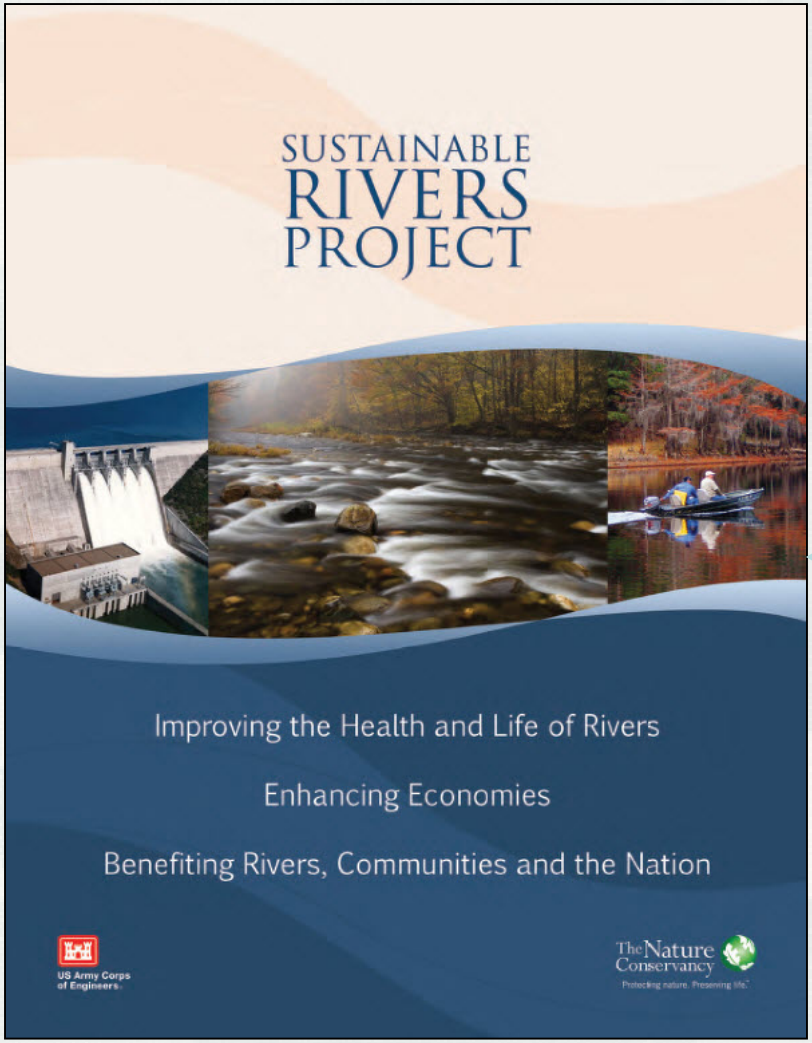
# *What is the Corps' role in Restoration?*

- No clear answer
- Recommendations from the Chief of Engineers' Environmental Advisory Board
  - Past Federal role in creating the problem
  - Use ecosystem approach
  - Focus on modification of hydrologic and geomorphic processes (i.e., unique engineering skills)
  - Create sustainable benefits

# *Future of the USACE Restoration Program- look at new studies/projects*

- Modifying existing infrastructure
  - Fish passage at USACE-owned facilities (e.g., Mud Mountain Dam)
  - Removal/alteration of structures that no longer meet authorized purpose (e.g., an old lock or navigation channel)
    - Savannah River Below Augusta

# *Environmental Flows from Corps Dams- Sustainable Rivers Project*



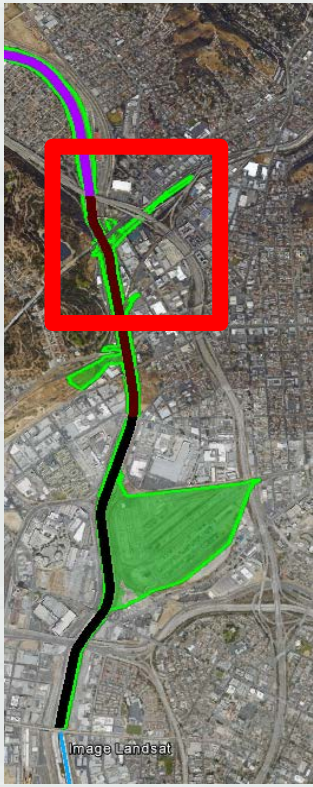

- Partnership between Corps of Engineers and The Nature Conservancy on ecosystem restoration
- More than a decade of collaboration
- Project types include:
  - adaptive reservoir management
  - stream restoration
  - wetland restoration
  - river-floodplain reconnection
  - coastal wetland restoration
  - oyster bed restoration
  - dam removal

# *Future of the USACE Restoration Program- look at new studies/projects*

- Urban Restoration??
  - Los Angeles River Ecosystem Restoration
  - Proctor Creek, GA (Atlanta)
  - Denver County, CO
  - San Antonio- Mission Reach, NM
    - Constructed by the sponsor

# L.A. River Ecosystem- Recommended Plan

Reach 7 – Arroyo Seco Tributary Confluence Restoration

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# *Future of the USACE Restoration Program- look at new studies/projects*

- Multiple Purpose??
  - Three Rivers, Arkansas (stop a headcut to preserve a navigation channel and restore bottomland hardwood forests)
  - South San Francisco Bay Shoreline (Ecosystem Restoration and Coastal Storm Damage Reduction)

# RECOMMENDED PLAN OVERVIEW

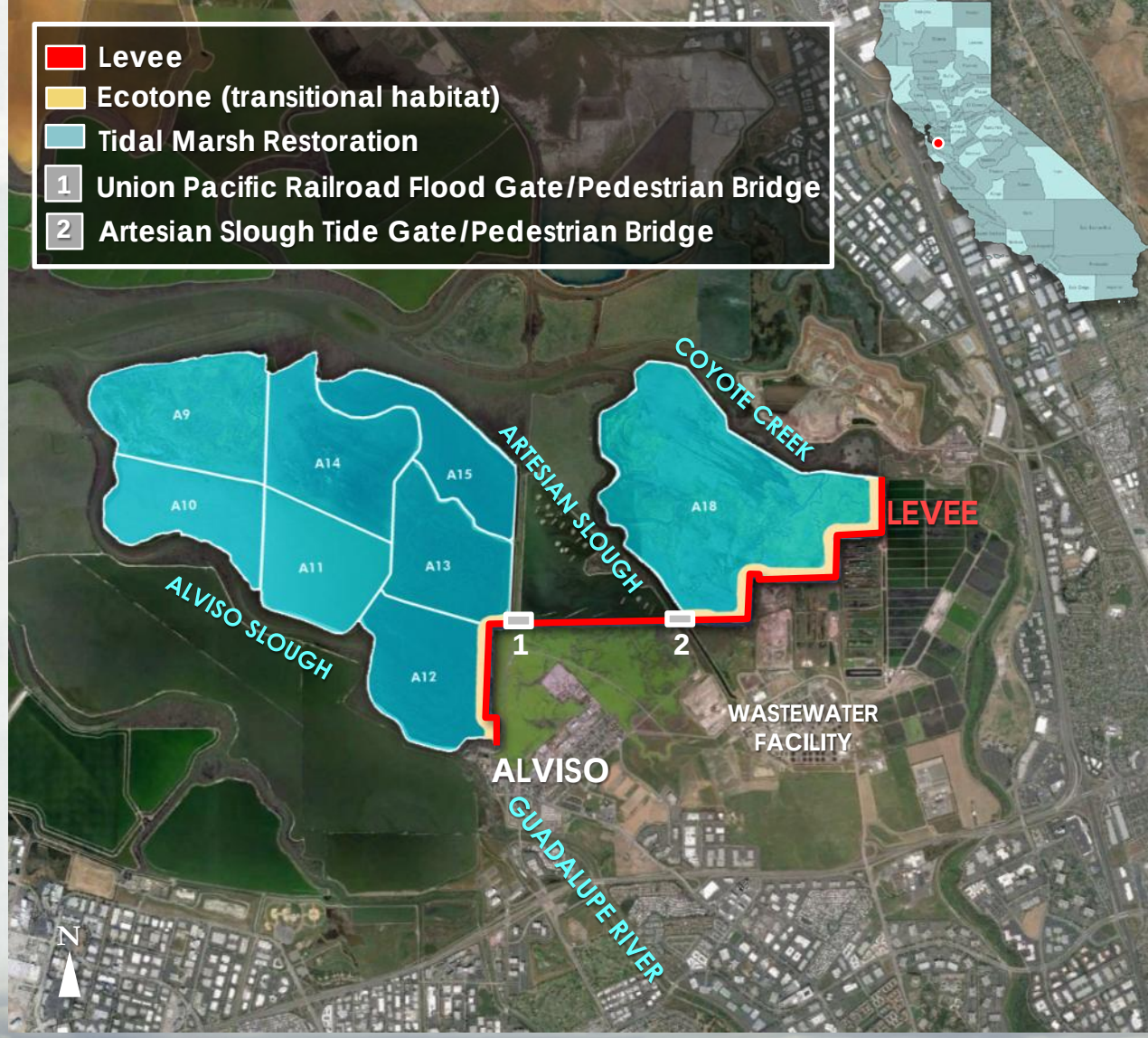
- **Flood Risk Management (FRM)**
  - 4-mile long levee, 15.2' NAVD 88 between existing FRM features
  - Manages risk for population of ~3,500, ~1,100 structures, & regional wastewater facility
- **Ecosystem Restoration**
  - 2,900 acres of former salt ponds
- **Recreation**
  - Provides key connections to San Francisco Bay Trail & viewpoints

**Total Project First Cost**
$174 million (Oct 2015 Price Level)

**FRM BCR (@3.375%)**
SLC Low: 4.2
SLC Intermediate: 5.3
SLC High: 9.4

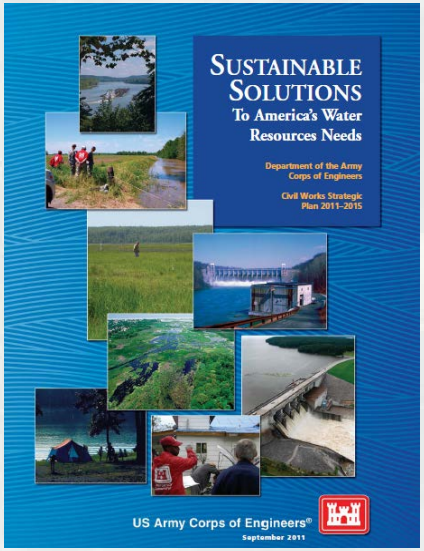
**Ecosystem Restoration**
48,308 AAHU; 2,900 acres
Monitoring/Adaptive Management

**Recreation BCR (@3.375%)** 1.1



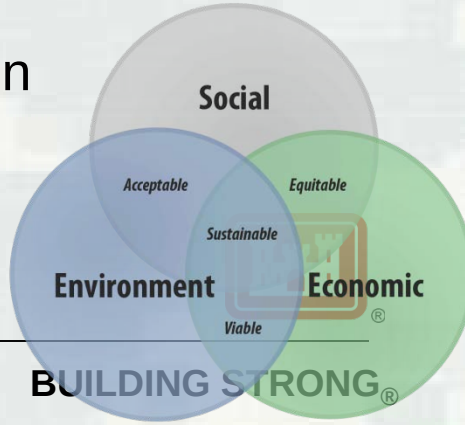

*South San Francisco Bay Shoreline Recommended Plan*

# Engineering With Nature




***…the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits through collaborative processes.***

- Science and engineering that produces operational efficiencies
- Using natural process to maximum benefit
- Expanding the benefits provided by projects
- Science-based collaboration



# Natural & Nature-Based Infrastructure

**GENERAL COASTAL RISK REDUCTION PERFORMANCE FACTORS:**
**STORM INTENSITY, TRACK, AND FORWARD SPEED; SURROUNDING LOCAL BATHYMETRY AND TOPOGRAPHY**

### Dunes and Beaches

**Benefits/Processes**

Breaking of offshore waves

Attenuation of wave energy

Slow inland water transfer

**Performance Factors**

Berm height and width

Beach slope

Sediment grain size and supply

Dune height, crest, and width

Presence of vegetation

### Vegetated Features

**Benefits/Processes**

Breaking of offshore waves

Attenuation of wave energy

Slow inland water transfer

Increased infiltration

**Performance Factors**

Marsh, wetland, or SAV elevation and continuity

Vegetation type and density

### Oyster and Coral Reefs

**Benefits/Processes**

Breaking of offshore waves

Attenuation of wave energy

Slow inland water transfer

**Performance Factors**

Reef width, elevation, and roughness

### Barrier Islands

**Benefits/Processes**

Wave attenuation and/or dissipation

Sediment stabilization

**Performance Factors**

Island elevation, length, and width

Land cover

Breach susceptibility

Proximity to mainland shore

### Maritime Forests/Shrub Communities

**Benefits/Processes**

Wave attenuation and/or dissipation

Shoreline erosion stabilization

Soil retention

**Performance Factors**

Vegetation height and density

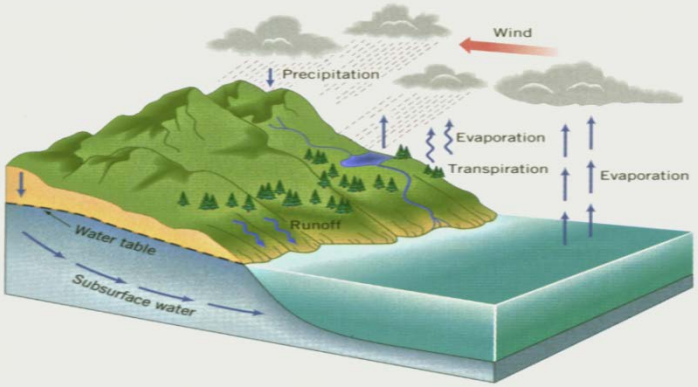
Forest dimension

Sediment composition

Platform elevation

# ECOSYSTEM RESTORATION RESEARCH

- **Maximize Value of the Corps' Aquatic Ecosystem Restoration Program**
- **Ensure Ecological Integrity and Sustainability of Restoration Projects**
- **Improve Capabilities to Design and Implement Restoration in Urban Settings**
- **Enhance Resilience and Reliability of Ecosystem Restoration**
- **Impact and Relationship of Species (T&E and Invasive) on Ecosystem Restoration**



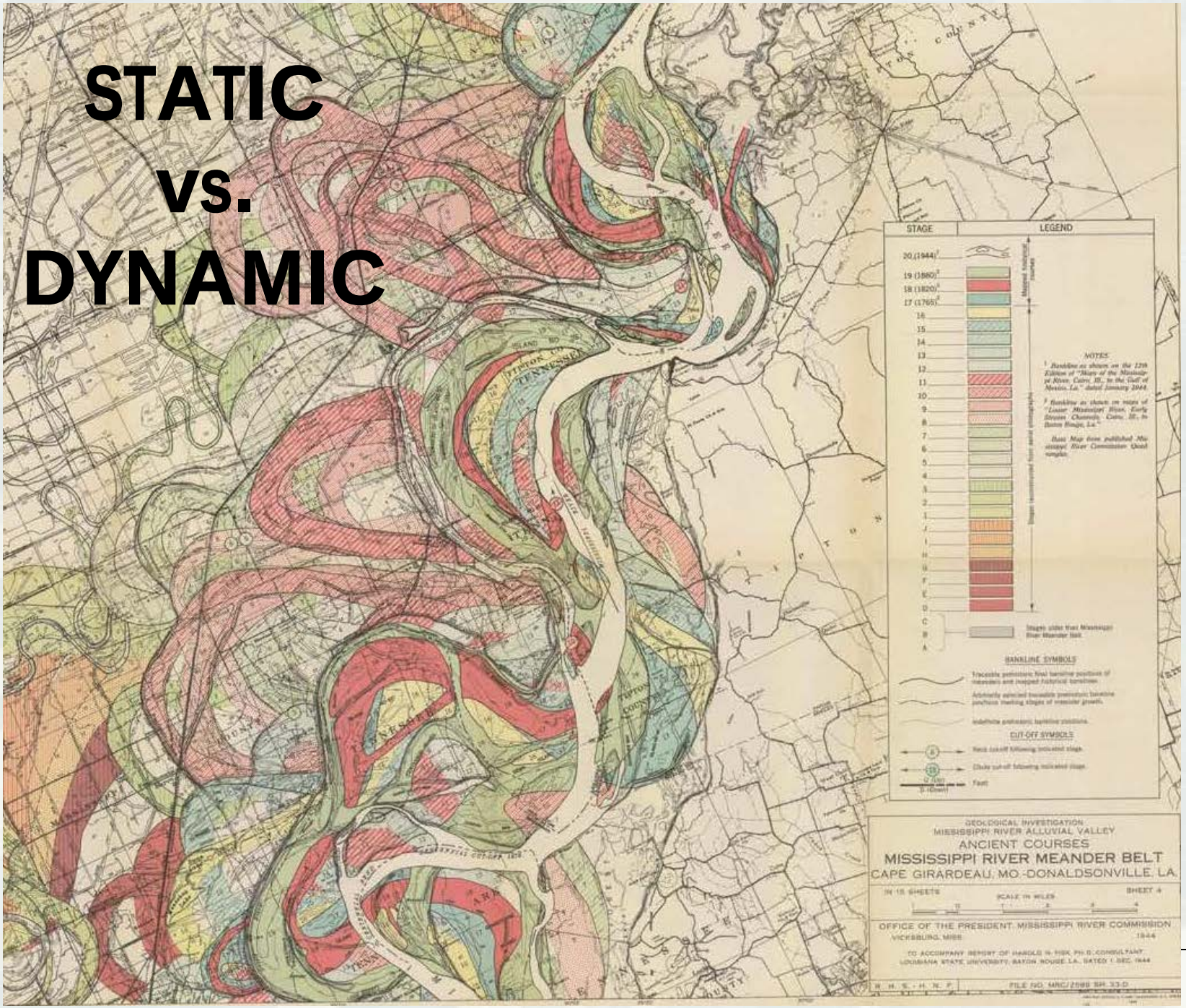

# *Integrated Water Resources Management?*

**Integrated Water Resources Management (IWRM) is the overarching strategy in the our Strategic Plan. IWRM encourages:**

- ✓ A holistic focus
- ✓ Coordinated development and management of water and related resources
- ✓ Considers economic benefits, ecosystem quality, and health and public safety


**WATERSHED ASSESSMENT**
**to Inform Actions**
**by USACE & Others**

# STATIC vs. DYNAMIC

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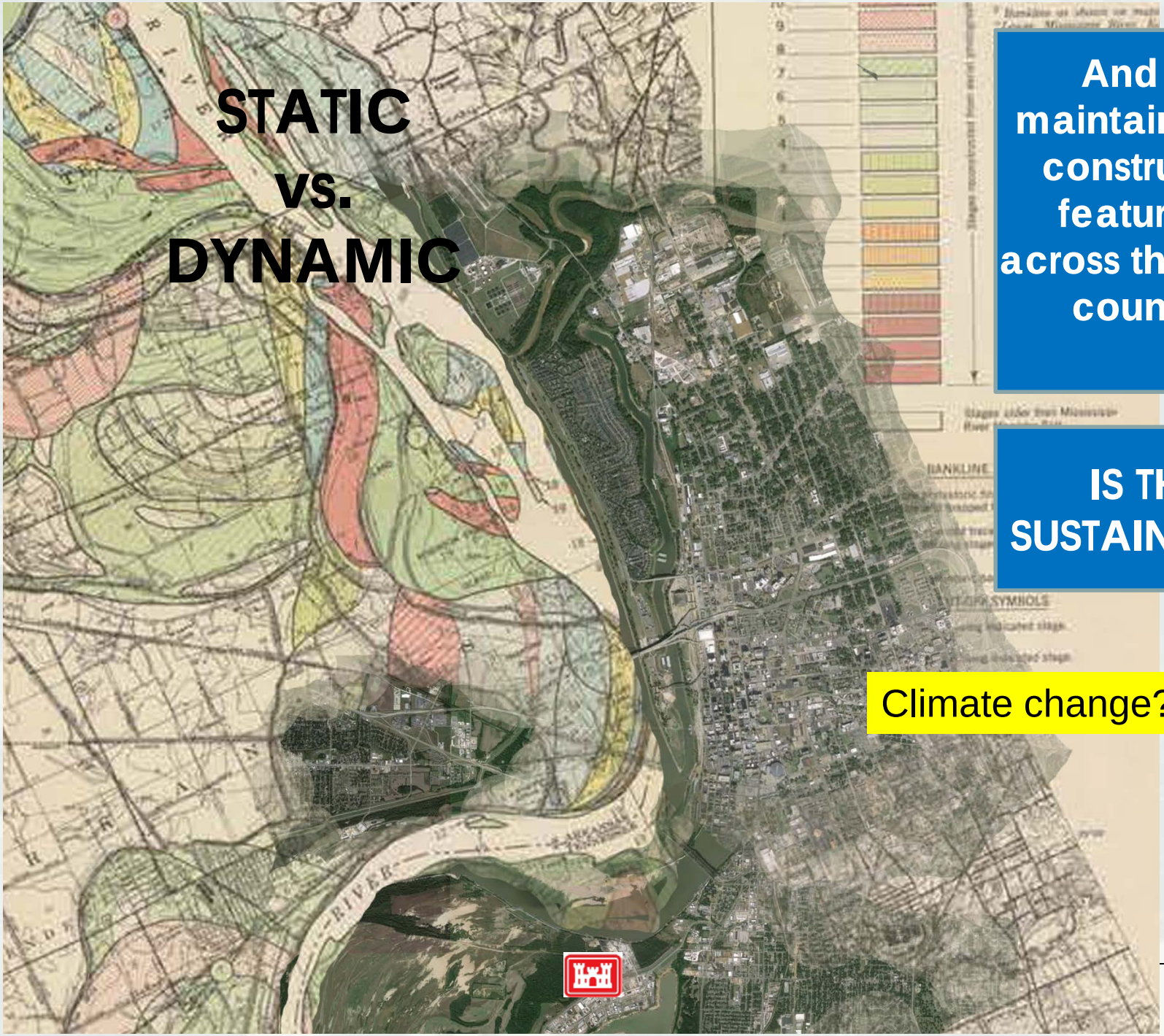
STATIC
vs.
DYNAMIC
And we maintain these constructed features… across the entire country?
IS THIS SUSTAINABLE?
Climate change??
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# *Fundamental Tenets of Sustainability*

- A systems approach is requisite, not optional.
- Intergenerational heritage is our focus.
- Society and the environment are ***"a part of,* not *apart from"*** economic outcomes.
- Sustainable systems are resilient to disturbances.
- The process for decision making influences the outcome.
- Individual choices matter.
- The only certainty is change.

# *Summary*

- Corps portfolio of projects is changing- large-scale??
- Need better methods to describe benefits of our ecosystem restoration projects AND other project benefits
- Integrated Water Resources Management
  - Collaborate with other agencies, take a more holistic approach
- Transition towards true sustainability
- We want YOUR feedback!!

# Ideas and Questions?

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# *Environmental Operating Principles*

***(per Environmental Advisory Board, 2013)***

- **Foster sustainability as a way of life throughout the organization.**
- **Proactively consider environmental consequences of all Corps activities and act accordingly.**
- **Create mutually supporting economic and environmentally sustainable solutions.**
- **Continue to meet our corporate responsibility and accountability under the law for activities undertaken by the Corps, which may impact human and natural environments.**
- **Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs.**
- **Leverage scientific, economic and social knowledge to understand the environmental context and effects of Corps actions in a collaborative manner.**
- **Employ an open, transparent process that respects views of individuals and groups interested in Corps activities.**

# *Combating Invasive Species*

**Impacts**

- **International – $1.4 Trillion** in damages (2008 – GISP/Cornell Univ.)
- **National – $138 Billion** in damages (2006 -Cornell Univ.)
- In addition to economic damages, **2nd leading cause of decline in T&E Species!**

**Cost**

- **USACE** – IN FY14, the Corps spent roughly $145 million on management of invasive species (NISC Report)


***Leader in the development and application of new techniques for managing aquatic invasive species!***