Elkhorn Slough

1. Tidal Habitats

2. Tidal Erosion/ Marsh Loss

3. Tidal Wetland Plan
Elkhorn Slough
Tidal Habitats
• **Intertidal habitats** (2800 acres)

  - Mudflat
  - Salt marsh

• **Subtidal habitats** (600 acres)

  - Channel/Tidal Creeks
Tidal Habitats - Value

2nd largest tract of CA tidal salt marsh

CA estuaries - habitat loss 75-90%

Critical habitat
• 550 marine invertebrate
• 102 fish species
• 100 species algae and phytoplankton
• 135 water birds (Pacific Flyway)
• 5 marine mammals
Tidal Habitats - Value

The other “marine” mammals - kayakers, boaters, birdwatchers
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Marsh Loss
44% from 1931 - 2001
Channel Bank Erosion

~ 1/2 meter per year
Tidal Creek Bank Erosion

Average width increase 10 meters from 1993 - 2001
Channel Erosion
24% increase from 1993 - 2001

73,000 cubic yards (1,971,000 cubic feet) sediment lost/yr
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Tidal Wetland Plan (TWP)

What is it?

• Collaborative strategic planning process

Purpose of Plan

• Develop strategies to address hydrological management issues
• To conserve, enhance, and restore tidal habitats in the Elkhorn Slough watershed

Funding/Management

• NOAA Coastal Impact Assistance Program
• CA Department of Fish and Game
• ES National Estuarine Research Reserve
ESTWP Participants and Roles

- Working Groups
  - Large-Scale Alternatives
  - Habitat Goals
  - Hydrodynamics
  - History
  - Ecology
  - Monitoring
  - Strategies

- Strategic Planning Team
- Science Panel

- Public Review
  - Community Review
  - Agency Review

- Peer Review
- Strategic Planning Team
- Science Panel
Strategic Planning Team

**Role**
Primary decision-making body overseeing the planning process

**FEDERAL**
- NOAA Elkhorn Slough National Estuarine Research Reserve (lead)*
- NOAA Monterey Bay National Marine Sanctuary
- NOAA National Marine Protected Areas
- U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service

**LOCAL**
- Monterey County
- Moss Landing Harbor District

**NONPROFIT/ ACADEMIC**
- CA State University Monterey Bay
- Elkhorn Slough Foundation
- San Francisco Estuary Institute
- The Nature Conservancy
- The Ocean Conservancy
- University of San Francisco

**STATE**
- CA Coastal Commission
- CA Coastal Conservancy
- CA Department of Fish and Game

SCIENCE PANEL/CONSULTANTS

- Defines Project Purpose & Planning Process
- Identifies Key Habitat & Hydrological Trends and Causes
- Recommends Large to Small Scale Alternatives
- Creates Draft Strategies
- Identifies Adaptive Management & Monitoring Actions

STRATEGIC PLANNING TEAM

- Selects Criteria for Goals and Strategies
- Creates Draft Habitat Goals
- Prioritizes Strategies Using Criteria

OUTCOMES/REVIEW*

- Summary of Data and Trends, Literature Review/Case Studies
- Draft List/Map of Habitat Goals and Alternatives
- Draft Strategies and Recommendations
- Draft Tidal Wetland Plan Produced
- Begin Preliminary Management Designs

*Review and Input by All Groups
“We envision a mosaic of estuarine communities of historic precedence that are sustained by natural tidal, fluvial, sedimentary, and biological processes in the Elkhorn Slough Watershed as a legacy for future generations.”
GOALS

1. CONSERVE TIDAL HABITATS
   - reduce tidal erosion and marsh loss

2. RESTORE AND ENHANCE TIDAL HABITATS
   - increase salt marsh/tidal creek, tidal brackish, and quality of mudflat/subtidal habitats

3. RESTORE AND ENHANCE NATURAL PROCESSES
   - more stable system - reduce the tidal prism, restore tidal exchange, re-establish/augment suitable supply of sediments
Strategic Planning Principles (7/17)

- Consider the broadest range of possible approaches to achieve the goals and objectives.
- Accommodate boating, farming, transportation, recreation, and other human uses necessary to support people in the region.
- Incorporate the needs of estuarine-dependent species, state- and federally-listed species, migratory species, and formerly dominant species.
- Give priority to actions that focus on protecting estuarine habitats most rapidly being lost.
- Mitigate or avoid the negative impacts and consider the positive impacts of management strategies to neighboring landowners.
- Take into account present natural and cultural constraints and future geomorphological and climatic conditions in selecting restoration strategies.
- To the extent possible, find solutions that minimize the long-term cost of on-going maintenance.
ESTWP Participants and Roles

- Strategic Planning Team
- Science Panel

Working Groups

- Ecology
- Habitat Goals
- Hydrodynamics
- Large-Scale Alternatives
- History

Review Processes

- Public Review
  - Community Review
  - Agency Review
- Peer Review
- Agency Review
- Community Review
- Public Review

Strategic Planning

- Monitoring
- Strategies
Science Panel and working groups

Role
- Provide and review scientific information for the Strategic Planning Team to make management decisions

Who
- Biology, hydrology, geology, tidal restoration, water chemistry

Over 40 members
- U.S. Geological Survey
- Stanford University
- The Nature Conservancy
- Moss Landing Marine Laboratories
- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- University of California Santa Cruz
- California Coastal Commission
- Monterey Bay Aquarium Research Institute
- California State University Monterey Bay
- Resource Conservation District
- Monterey Bay National Marine Sanctuary
- Point Reyes Bird Observatory
- ES National Estuarine Research Reserve
- San Francisco State University
## Characterize Key Tidal Habitats, Trends, and Causes

| Past Conditions | 1 | Evolution of Elkhorn Slough and Associated Wetlands 17,000 years before present (ypb) to 1880 A.D. |
| Past and Present Conditions | 2 | 150 Years of Human Alterations and Tidal Habitat Change (1870-Present) |
| | 3 | A Review of the Geology, Geomorphology, and Hydrodynamics |
| Present Conditions | 4 | Tidal Habitat Descriptions |
| | 5 | Groundwater Information |
| | 6 | Key Physical Processes Causing Tidal Erosion |
Tidal Erosion/ Marsh Loss

Causes

Decrease in sediment supply (Salinas River diversion), dike/levee failure and removal, Monterey Canyon, sea level rise, flooding due to subsidence and increased tidal range, biogeochemical processes
50-YEAR TRENDS

The relationship between the cross-sectional area and tidal prism in the Elkhorn Slough system is not at equilibrium. Therefore...

- Channel and tidal creek erosion will continue causing significant marsh and mudflat loss
- Sediments in soft-bottom areas will erode
- Salt marsh will continue to significantly decrease
Community, Agency, and Peer Review

- **Community** – Representatives of key stakeholder groups and interested public

- **Agency** – Entities with jurisdictional or regulatory authority of tidal wetlands in the Elkhorn Slough watershed

- **Peer Review** – Scientists with tidal wetland expertise

- **Role** – Provide input to the Strategic Planning Team
“In our profession, a plan that everyone dislikes for different reasons is a success. A plan everyone dislikes for the same reason is a failure. And a plan that everyone likes for the same reason is an act of God.”

Richard Carson, Pacific Northwest planner and writer
Elkhorn Slough Tidal Wetland Plan

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www.elkhornslough.org/tidalwetlandplan.htm