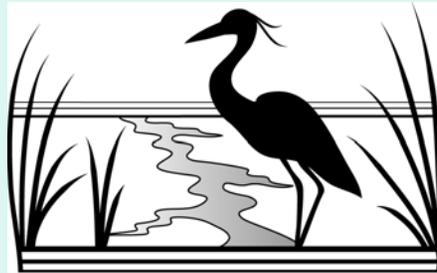


Southwest Wetlands Interpretive Association



The Southwest Wetlands Interpretive Association (SWIA), founded in 1979, is a 501(c)(3), non-profit organization dedicated to the education in and preservation, restoration and acquisition of wetlands.

**Southwest Wetlands Interpretive Association • P.O. Box 575 • Imperial Beach, CA 91932
Tel. (619)575-0550 • swiaprojects@aol.com**

**WHO WE ARE & WHAT WE DO:
PAST, PRESENT & FUTURE**



There has to be an incentive!!

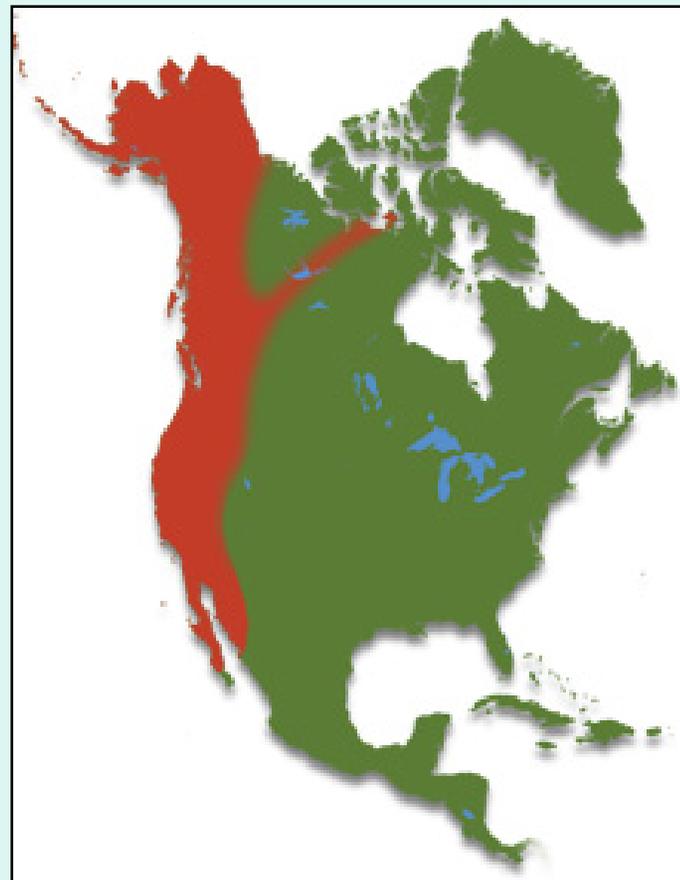


Over 90% of the Estuaries in Southern California have been destroyed
Tijuana Estuary is one of the most intact estuarine systems left



Pacific Flyway

370 species of birds utilize this area. Many are migratory wading and shorebirds and migratory waterfowl, some neotropical birds in addition to resident species.



Tijuana River Watershed

1750 Square Miles – $\frac{3}{4}$ in Mexico, $\frac{1}{4}$ in the United States









Major turning point April 15, 1974





TIJUANA RIVER VALLEY, BORDER HIGHLANDS AND
TIJUANA ESTUARY 1970'S



Many people fought the battle to protect the Tijuana Estuary from development



**Tijuana Slough NWR – Established Dec. 24, 1980 – 1,056 Acres
Deed transferred from Helix Land Corporation to the USFWS**



**Part of the 2,800-acre
Tijuana River National Estuarine Research Reserve**

SWIA AND THE USFWS WORKED TOGETHER GETTING THE REFUGE STARTED





National Estuarine Reserve Research System



Tijuana River National Estuarine Research Reserve Visitor Center
Construction started in 1988 and dedicated in 1990

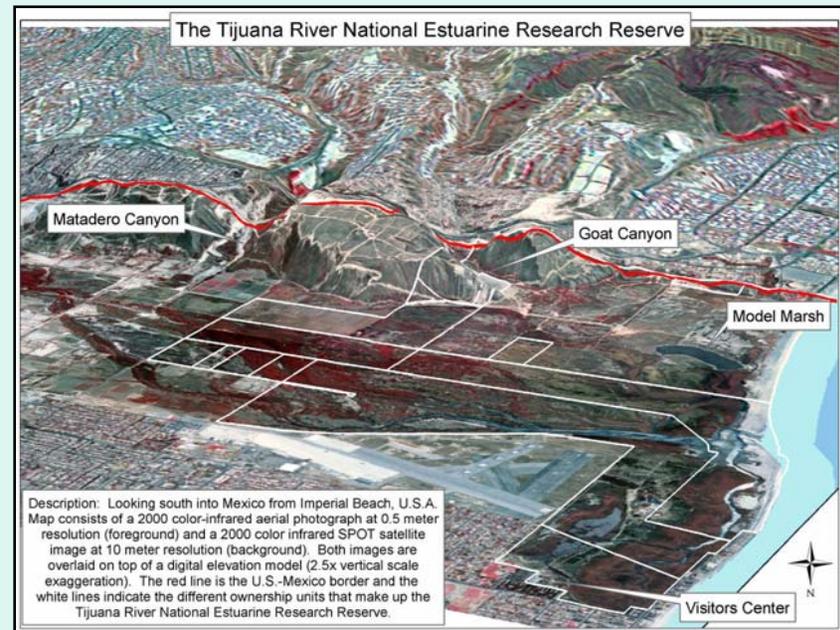


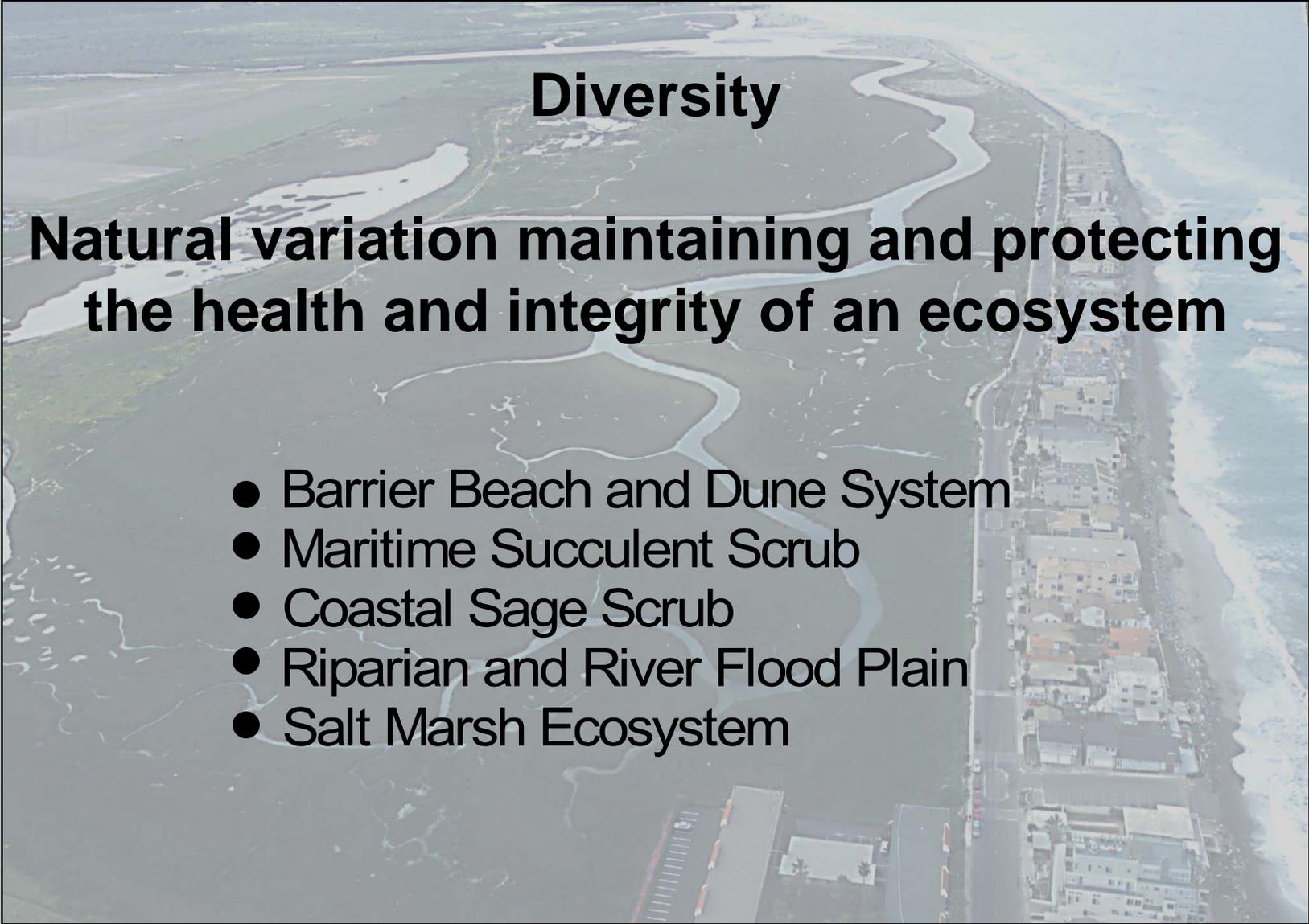
In 1985 we investigated the possibility of becoming a Ramsar site or a wetland of international importance. We applied and were accepted.

In February of 2005 the Tijuana Estuary became the 22nd designated Ramsar wetland of international Importance in the United States and the only site on an international border in the United States.

We held a formal dedication at the reserve April 22,
2005

Overview of Barrier Beach, Estuary & Highlands



An aerial photograph of a coastal ecosystem. A river flows from the top left towards the bottom right, branching into smaller channels. The river is surrounded by green marshland. To the right of the marshes is a residential area with several buildings and a parking lot. The ocean is visible on the far right, with waves breaking on a sandy beach. The word "Diversity" is written in bold black text in the upper center of the image.

Diversity

Natural variation maintaining and protecting the health and integrity of an ecosystem

- Barrier Beach and Dune System
- Maritime Succulent Scrub
- Coastal Sage Scrub
- Riparian and River Flood Plain
- Salt Marsh Ecosystem

Barrier Beaches and Dune System

Maintain and Protect Function and Structure
of Salt Marsh Ecosystem



Coastal Dune



Sand Verbena

Least Terns



Western Snowy Plover

Maritime Succulent Scrub Community



Shaw's Agave



Velvet Cactus



Dudleya

Coastal Sage Scrub Community



California Gnatcatcher



California White Sage



San Diego Sunflower



Coastal Sage Scrub Community

Riparian Community



Willow



Least Bell's Vireo



Riparian Habitat



**Willow
Flycatcher**

Salt Marsh Community

Intertidal Mudflat



Horn snail



Marble Godwit



Intertidal Mudflat



Striped Shore Crab

Salt Marsh Community

Tidal Creeks and Channels



Dunlin

Tidal Creeks, Channels & Interconnections



Salt Marsh Community

Salt Marsh



Clapper Rail Eggs



Clapper Rail Nest



Clapper Rail Adult



Salt Marsh Bird's Beak

Salt Marsh Community

Salt Panne



Salt Marsh Community

Brackish Marsh



Freshwater Seepage

Wetland/Upland Transition



Sea Lavender



Harvest Mouse



California Saltbrush



California King Snake



Upland Vegetation

Natural and Anthropogenic Impacts Barrier Beaches



Storm Impacts



Destruction of Dune Vegetation by ORV



Destruction of Dune Profile



River Mouth Closure

Natural and Anthropogenic Impacts

Coastal Sage Scrub & Maritime Succulent Communities



Water Pollution from Mexico



US Border Patrol Roads



US Border Fence Project Expansion



**Los Laureles Canyon Solid Waste
Pollution & Sediment**

Border Fence Between US & Mexico



West end of a 14-mile border barrier between Tijuana and San Diego

MIGRATION BARRIER AND HABITAT FRAGMENTAION





CONSTRUCTION (SMUGGLERS GULCH)



YOGURT CANYON / LAS SALSAS CANYON



Playas de Tijuana



GOAT CANYON / LOS LAURELES CANYON



SMUGGLERS GULCH / MATADERO CANYON



Smugglers gulch



HOMELAND SECURITY / BORDER MONUMENT



Los Laureles Canyon



Unplanned squatter community primarily made up of undocumented immigrants from Central and South America.

Natural and Anthropogenic Impacts Riparian



Rodriguez Dam



**Urban
Runoff**



**Invasive
Plants:
Arundo**



Cow Bird – Recreation Related

Natural and Anthropogenic Impacts Salt Marsh

**Sedimentation
and Solid
Waste
Problems
from both US
and Mexico at
South end of
Tijuana
Estuary**



Research

Forty Years of Research led to a better understanding of structure and function of a complex saltmarsh ecosystem

- Interdependent Variables
- Substrate
- Adaptation of Plant & Animal Associations
- Hydrology
- Climatological Variability
- Outside Stressors: Natural and Anthropogenic

Outcomes of Research

- Management
- Adaptive Management
- Additional Research
- Education
- Compatible Use
- Habitat Protection
- Restoration
- Monitoring

Research Leads to Restoration



Water Monitoring



Mesocosms



Cord Grass Mesocosm Study Area

Restoration Ecology

- **Concept**
- **Funding**
- **Project Coordination**
- **Feasibility & Design**
- **Permits**
- **Biology**
- **Hydrology**
- **Geology**
- **Archaeology**
- **Engineering**
- **Construction**
- **Monitoring**
- **Research**
- **Adaptive Management**

Restoration Projects

Barrier Dune



Dredging tidal channel



**Restoration Dune
Vegetation**



**Restoration Dune
Profile**

Oneonta Tidal Linkage

\$700,000 Project to Enhance Circulation and Increase Tidal Prism



Start of Excavation



Excavation Process



Completed Excavation



Revegetation of Site

TETRP

Model Marsh Restoration Project



Old Agricultural Fill



Dredging and Design



Breaching of Tidal Channel



Marsh after Revegetation

Goat Canyon Quarry Restoration



Spoils from Model Marsh were used to restore an old quarry site.

TETRP

Goat Canyon Sedimentation Basins Project



FATE AND TRANSPORT

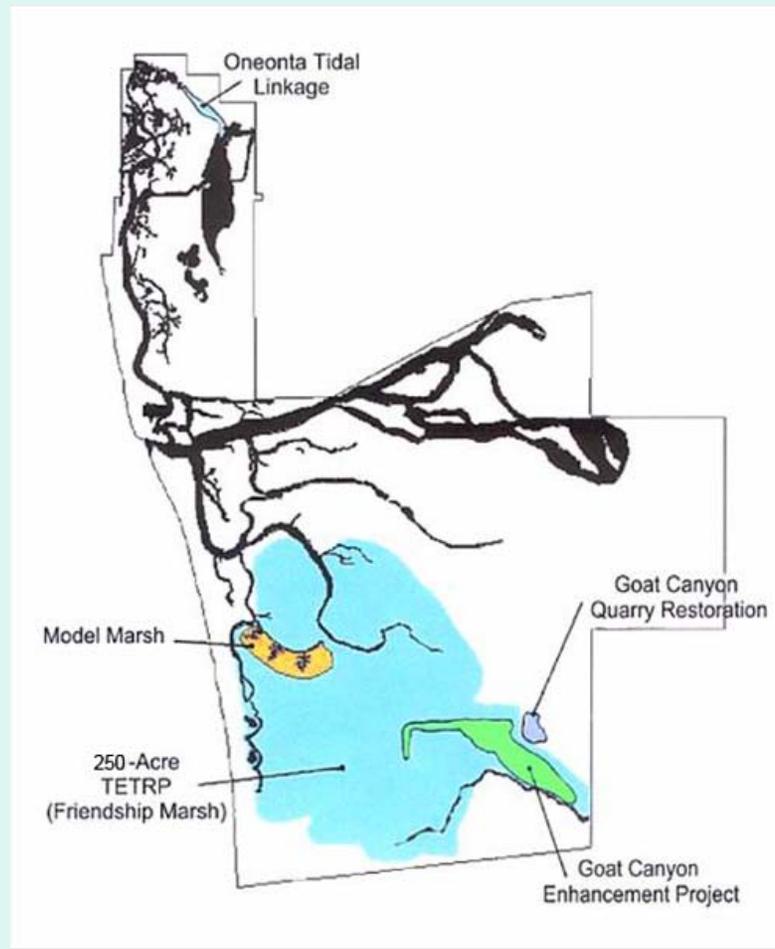
Partners
CCC, USGS, SWIA, BOATING AND WATER
WAYS, EPA, OCEAN PROTECTION
COUNCIL





TETRP

Future Plan for 250 Acre Marsh Restoration Project



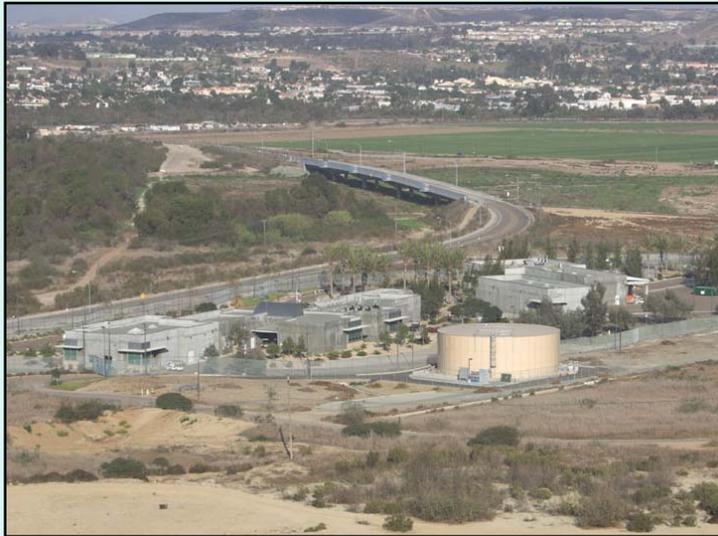
Los Laureles Canyon



Photo on left is basin before it was graded. On the right is a new subdivision following a new sub-basin plan installed by the Tijuana City Council in July 2006.

Tijuana River Valley

Resolution of Impacts



IBWC Sewage Treatment Plant and Arundo Removal

Decentralized sewage treatment system (1983 – 1985)



Otay Watershed Reference Map



Otay Watershed Features

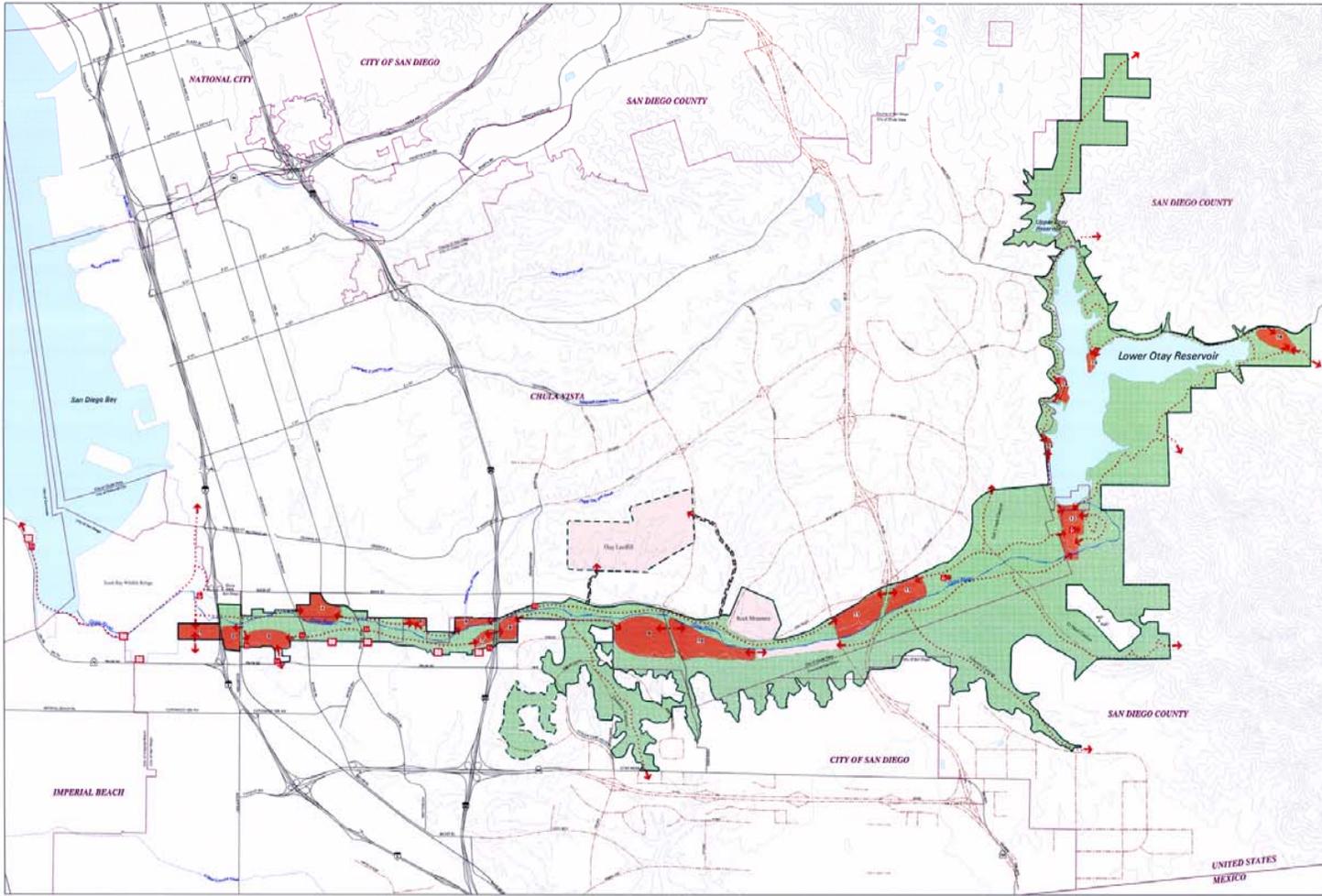
★	Water Monitoring Site		Lakes
	Streams		Otay Watershed
	Major Roads		Other Watersheds

The Otay River watershed encompasses approximately 160 square miles in southwest San Diego County and is one of the three hydrologic units that discharge to San Diego Bay. The watershed consists largely of unincorporated area, but also includes portions of the cities of Chula Vista, Imperial Beach, Coronado, National City, and San Diego. The predominant land uses in the watershed are open space (67%) and urban/residential (20%). Approximately 36 square miles of the watershed is part of the Multiple Species Conservation Plan effort that provides habitat for a wide range of endangered plant and animal species.

Background map data provided by SanDAG

Map created by Doug Mengers for San Diego Coastkeeper, 2009

OTAY VALLEY REGIONAL PARK



Concept Plan

Legend

- Plan Elements**
- Boundary
 - Alternative Boundary
 - Trail Corridor
 - Open Space / Preserve Area
 - Recreation Area
 - Park Study Area
 - Staging Area
 - Viewpoint/Overlook
 - Interpretive Center
 - Interpretive Center - Alternative Sites
- Existing Roads
 Future Roads
 Trolley Lines
 20' Contours
 Rivers
 Municipal Boundary
 Lakes/Ponds



April 19, 1999
 City of San Diego
 Planning Department GIS

Participating Jurisdictions:
 City of Chula Vista
 City of San Diego
 County of San Diego



Vicinity Map



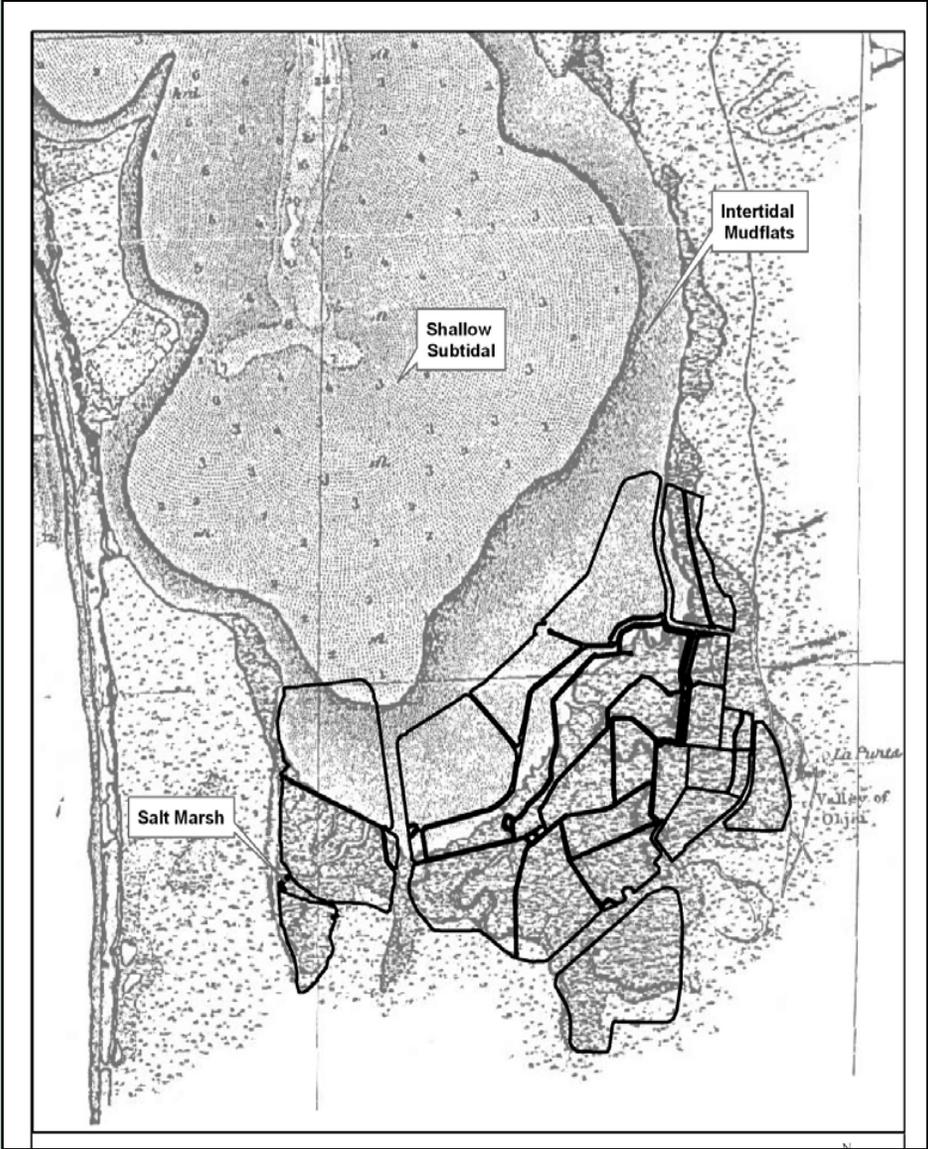
UNION COUNTY
 SAN DIEGO COUNTY
 SAN JUAN COUNTY
 SAN PABLO COUNTY
 SAN RAFAEL COUNTY
 SANTA CRUZ COUNTY
 SANTA CLARA COUNTY
 SANTA FE COUNTY
 SANTA TERESA COUNTY
 SUTTER COUNTY
 YUBA COUNTY

Otay Valley Regional Park



South San Diego Bay

**Historic (1859) vs.
Current Conditions**



SOUTH SAN DIEGO BAY UNIT SAN DIEGO BAY NATIONAL WILDLIFE REFUGE



San Diego Bay National Wildlife Refuge

Sweetwater Marsh Unit
Established 1988
316 acres

South San Diego Bay Unit
Established 1999
2,300 acres



Tide Gate on Pond 12
Maintaining the salinity
gradient as the foot print
For the salt making
Operation decreases



South San Diego Bay Coastal Wetland Restoration and Enhancement Project

Proposal to restore and enhance 300 acres of coastal habitat, including 233 acres in the western salt ponds of the San Diego Bay NWR

Project Partners:
Coastal Conservancy, SWIA, USFWS, NOAA, Port of San Diego, EPA



Preliminary Restoration Plan for the Western Salt Ponds

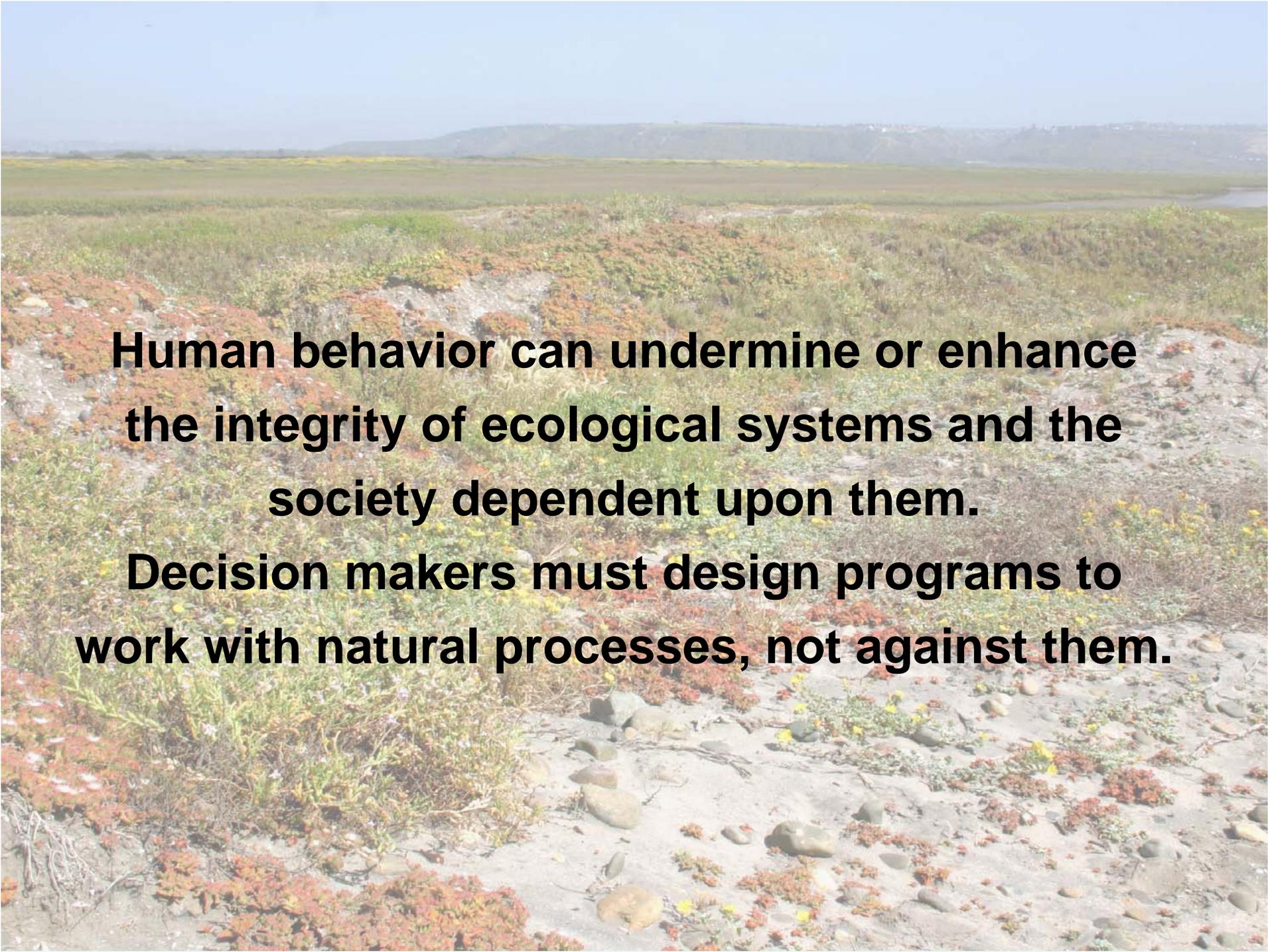
Habitat to be Restored:
 subtidal, intertidal mudflats, cordgrass-dominated salt marsh habitat, and pickleweed-dominated salt marsh



Partnerships

The Key to Wetlands Restoration

- Elected Officials
- Agencies at all levels of government
- Research Institutions
- Non-governmental organizations
- Private/Public Partnerships



Human behavior can undermine or enhance the integrity of ecological systems and the society dependent upon them.

Decision makers must design programs to work with natural processes, not against them.