

The Ballona Wetlands Ecological Reserve Monitoring Program



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Subset of Major Technical Reports

- Historical Ecology
- Hydrology of the Watershed
- Existing Conditions
- Baseline Monitoring (5 years)
- Regional Monitoring (2 years)
- Proceedings from Four Symposia
- Climate Change / Sea Level Rise





Technical Reviewers & Collaborators



- SMBRC Technical Advisory Committee
- Southern CA Coastal Water Research Project
- California Department of Fish and Wildlife
- California State Coastal Conservancy
- US Environmental Protection Agency
- California Wetland Monitoring Workgroup
- University of California, Los Angeles
- Loyola Marymount University
- Center for Urban Resilience
- California State University, Channel Islands
- California State University, Long Beach
- California State University, Northridge
- University of California, Santa Barbara
- Friends of Ballona Wetlands
- Tijuana National Estuarine Research Reserve
- San Francisco Estuary Institute
- Regional Waterboards
- US Environmental Protection Agency
- City of Los Angeles, Bureau of Sanitation
- Cooper Ecological Monitoring, Inc.
- E. Read and Associates
- Tidal Influence
- Heal the Bay
- LA Waterkeeper
- Southern California Edison
- Professional biologists, hydrologists, and water quality experts... (ESA, WRA, ICF, etc)



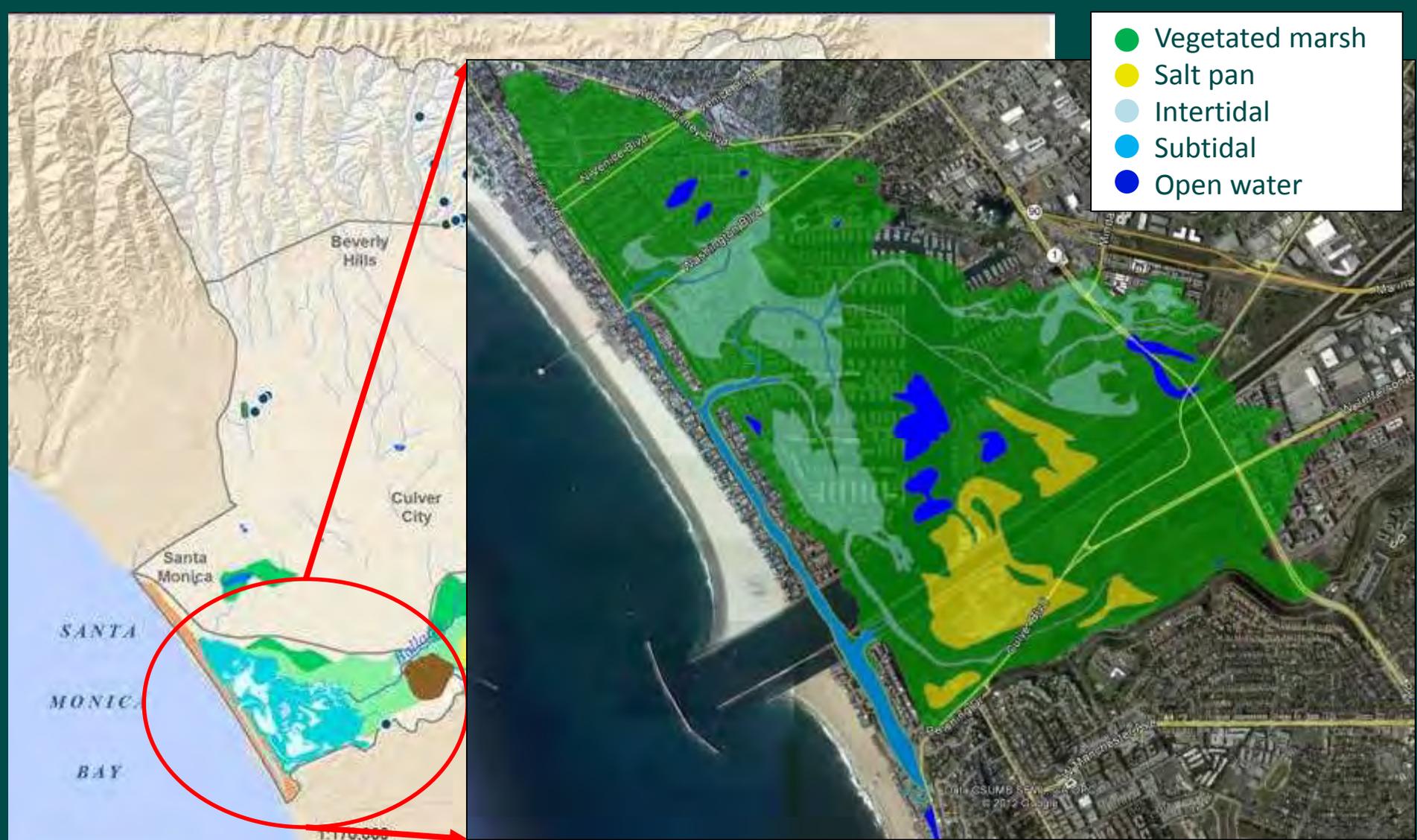
Estimates of Wetland Loss

- > 50% in the United States in the last 200 years
- > 90% in California
- > **95% in Los Angeles County**

Sources:

- State of the States Wetlands Report
- National Wetland Inventory
- Stein et al. 2014

- Vegetated marsh
- Salt pan
- Intertidal
- Subtidal
- Open water



- | | | |
|------------------|------------------------------------|---------------------------|
| ● Springs | Beach | Wet Meadow |
| — Major Channels | Dune | Valley Freshwater Marsh |
| — Minor Channels | Salt Flat/Tidal Flat | Perennial Freshwater Pond |
| □ Regions | Brackish to Salt Marsh/Tidal Marsh | Vernal Pool |
| | Alkali Flat | Willow Thicket |
| | Alkali Meadow | Open Water |

Dark et al. 2011

Ballona Wetlands Ecological Reserve



- ~ 600 acres
- Largest wetland restoration project in Los Angeles County
- Owned by the state of California; managed by CDFW and CSLC as an ecological reserve
- CCC & EPA funded monitoring



BWER Stressors

- **Modified hydrology**

- Dredging & fill dump
- Levees, culverts , & channelization
- Paving & roads
- Draining



- **Water quality**

- Non-point source discharges
- Trash
- Heavy metal impairments
- Bacteria and pathogen impairments
- Other impairments



- **Habitat destruction**

- Fragmentation
- Invasive & introduced species
- Introduced predators
- Noise and light pollution



- **Additional stressors**

- Vector control
- Physical modifications
- Misuse of the site
- Sea level rise & climate change

Ballona Wetlands Today - Topography

Topography

Elevation (in feet above mean sea level)



Ballona Wetlands Project Area Boundary



Elevation surface created by GreenInfo Network based on digitized contours and spot elevations provided by R.J. Lung & Associates, April 1991, and USGS 10-m Digital Elevation Model (DEM). Elevation values based on NAVD83.

Map created by GreenInfo Network, November 2006.



Monitoring Report: Chapter Info

- 5 years of monitoring
- Part of EPA regional monitoring program

- **Ch. 1 Water Quality**
 - (bacteria, nutrients, trace metals, turbidity, Chlorophyll, general/continuous monitoring)
- **Ch. 2 Marine Sediment**
 - (trace metals, pesticides, PCBs, pyrethroids, etc)
- **Ch. 3 Terrestrial Soils**
 - (trace metals, organic content)
- **Ch. 4 Vegetation**
 - (stratified random transect sampling – all habitats; seed bank; site-wide vegetation alliance and association mapping)
- **Ch. 5 Fish**
 - (beach seines w/blocking nets, shrimp trawl, minnow traps)
- **Ch. 6 Herpetofauna**
 - (pitfall traps, coverboard arrays)
- **Ch. 7 Mammals**
 - (Sherman live traps, motion cameras)
- **Ch. 8 Birds**
 - (site-wide surveys, breeding, waterbird, targeted species)
- **Ch. 9 Benthic Invertebrates**
 - (shallow & deep cores)
- **Ch. 10 Terrestrial Invertebrates**
 - (productivity metric & pitfall traps)
- **Ch. 11 Physical Characteristics**
 - (elevations, cross-sections, velocity, inundation mapping)

Habitat Units by Type

Category 1

- Subtidal
- Intertidal Channels

Category 2

- Tidal Wetland
- Non-tidal Salt Marsh
- Salt Pan
- Ruderal Marsh
- Brackish Marsh
- Brackish Scrub
- Riparian Scrub and Woodland

Category 3

- Iceplant Wetland
- Pampas Grass Stand
- Dune
- Non-native Dune
- Disturbed Hard-pack

Category 4

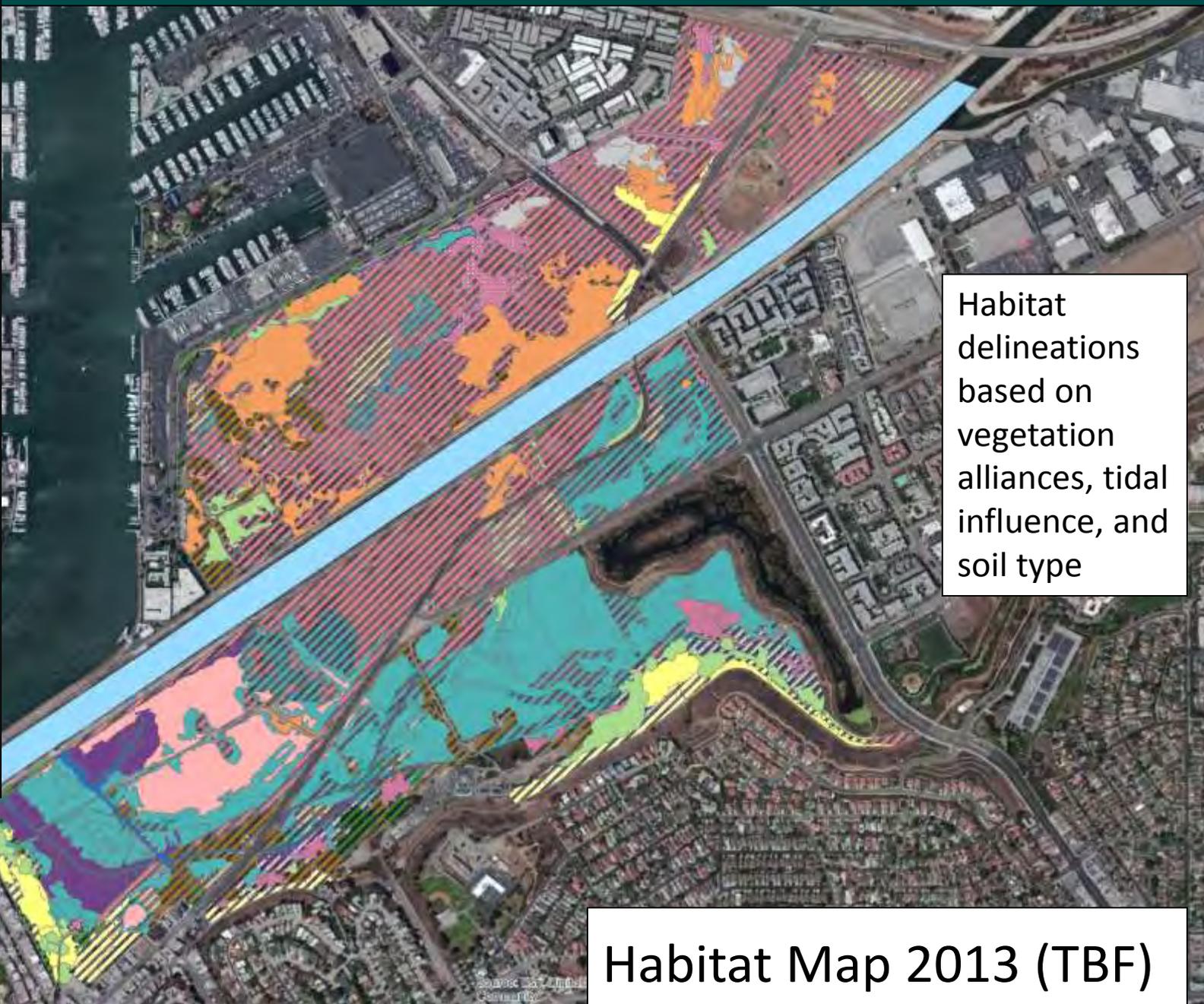
- Annual / Ruderal Grassland
- Non-native "Tall" Herbaceous
- Iceplant Stand
- Upland Scrub
- Eucalyptus Grove
- Non-native Tree

Category 5

- Developed

N
0 250 500 Meters

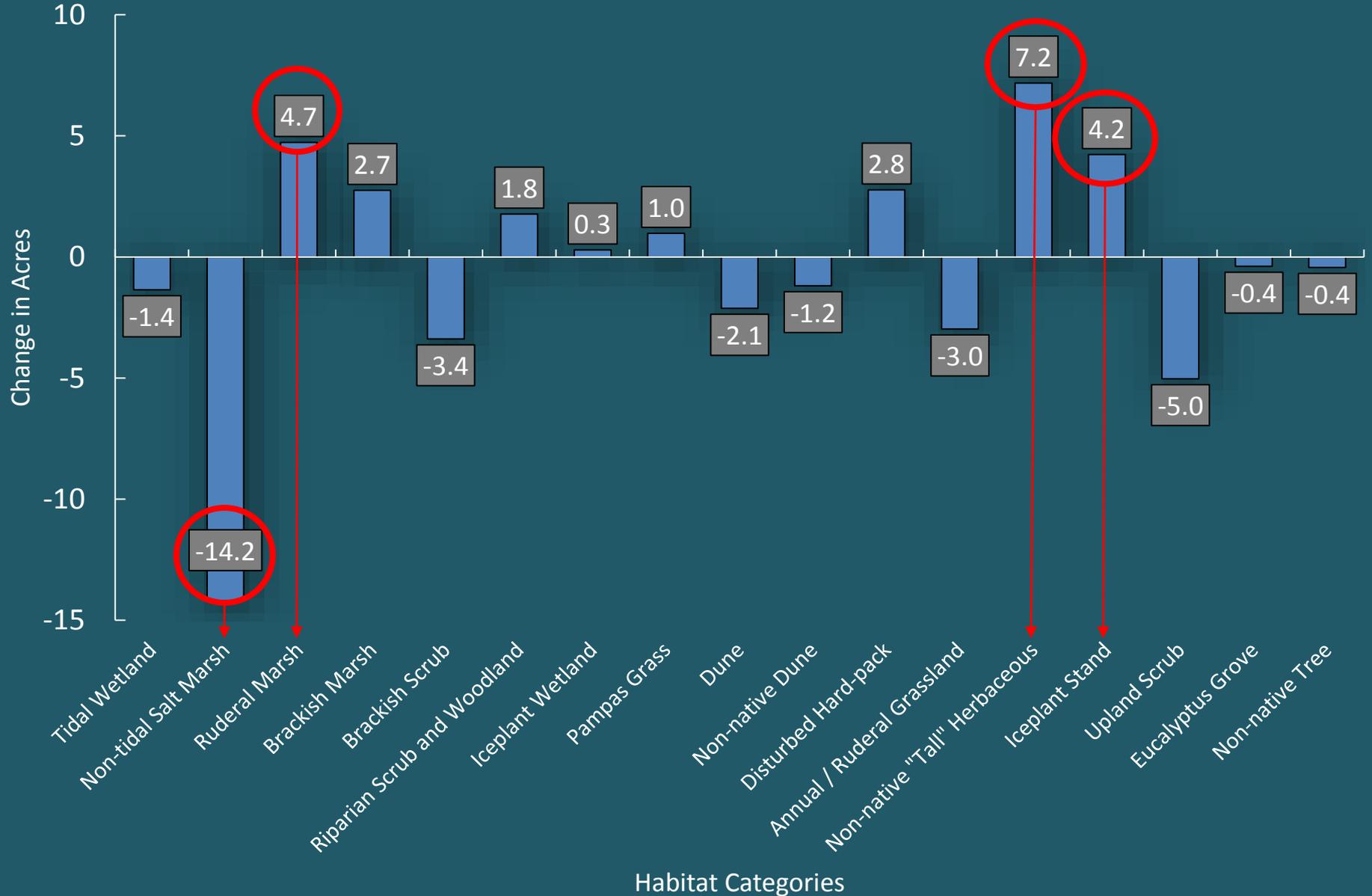
Existing habitat units map was based on survey findings conducted by Ivan Mendi of The Bay Foundation, May - October 2013.
Map created by Ivan Mendi.



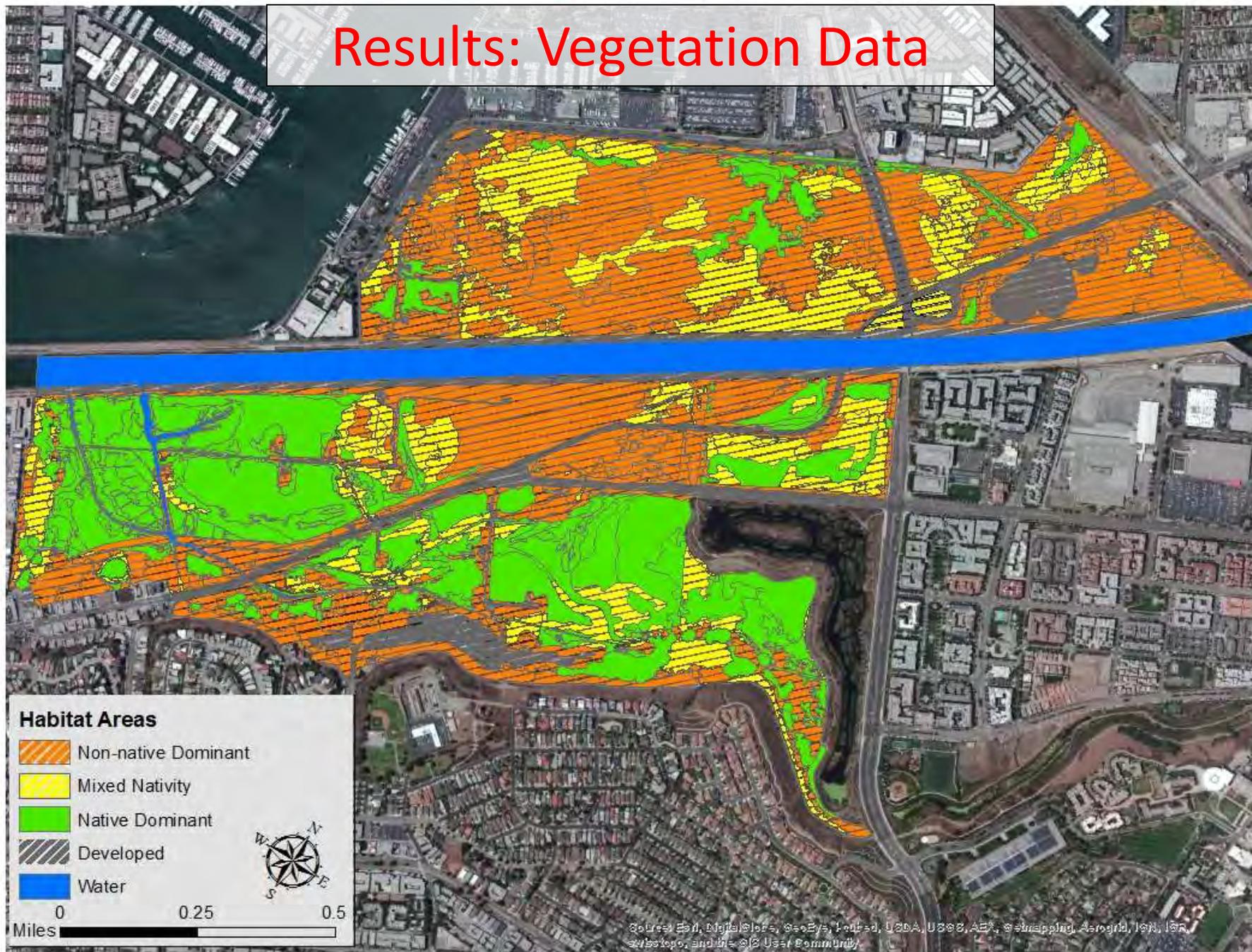
Habitat delineations based on vegetation alliances, tidal influence, and soil type

Habitat Map 2013 (TBF)

Change in acres by habitat type (2007 – 2013)



Results: Vegetation Data



Results Summary – Vegetation

- **Marsh Habitats** are typical of disturbed wetlands – high presence of invasive grasses in areas of higher elevation
 - lower species richness than some reference locations, but mostly native species in areas with estuarine tidal influence
 - some rare species present
- **Upland Habitats** are dominated by non-native species
 - many non-native invaders have begun to take over some of the upland habitats in recent years, including *Euphorbia*, mustard, and crown daisy
 - some rare species present, mostly in the dune habitats



Results Summary – Presence Data

Avifauna: > 160 species of birds

26 special-status species present on site (e.g. Belding's savannah sparrow, California gnatcatcher, Cooper's hawk, Double-crested Cormorant, Merlin, Vesper Sparrow, Western Meadowlark)

Herpetofauna & Mammals: 9 & 14 species

counted species presence by Area data, not total population estimates;
some rare species such as the legless lizard & South Coast Marsh Vole



CRAM Comparison (averages)

BALLONA WETLANDS

Area A – highly impacted

44



Area B – seasonal wetlands;
hydrological impacts

55



Area B – tide channels; muted
hydrology, fewer impacts

64



LOS CERRITOS

Hellman – muted tide channels

59

Steamshovel – few impacts

71

Reference Wetlands

| | |
|------------------------|-------|
| Mugu Lagoon | 75-85 |
| Upper Newport Bay | 91 |
| Mission Bay-Rose Creek | 78 |



Monitoring Program: Summary Results

- Tidal wetland habitats provided some water quality filtration functions (especially for fecal indicator bacteria)
- Non-native species predominant in upland habitats, native species dominant in salt marsh habitats; though many functions are lost and conditions are “degraded” and monocultures of non-native species in some areas
- Fish & benthic invertebrates are fairly representative of so-Cal salt marshes, though the tidal area is small and the nursery habitat is limited; some “disturbance” species
- Significant bird use of the site (>160 species), including BSS
- Significantly lower condition scores of the estuarine habitats as compared to regional, ‘reference’ sites

What the data from Ballona tell us:

- High level of impacts over long period of time
- Degraded compared to reference /more “natural” sites
 - Lower condition scores (e.g. CRAM) and species richness, though still some native vegetation
- Some limited functions persist (e.g. water filtration, carbon sequestration) and some completely absent from specific areas of the site
- Disproportionately high amount of vertebrate mortality along bisecting roads (e.g. Culver/Jefferson)



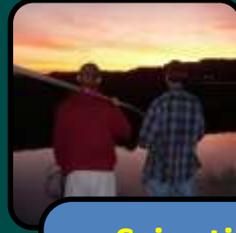
Saving the Land

- Community groups / activists
- Playa Vista sold to the state
- CDFW management



Designing the Future

- Scientists, community groups, agencies
- Dozens of workshops & meetings
- Developed potential plans and goals



Scientific Studies

- Historical ecology
- Baseline monitoring
- Research
- Mapping
- Future climate change scenarios



Environmental Planning

- Environmental impact reports
- Hydrology studies
- Geo tech studies
- Modelling studies
- Cultural resources
- Special status species



CEQA / NEPA

- Draft reports & documents
- Public comments
- Final reports & documents



Permitting

- Flood control permits
- Army Corps
- Coastal Commission



Construction / Restoration

- May require heavy equipment
- Reconfiguring the area based on the restoration goals and final plan
- Native species
- Public access



Long-Term Monitoring

- Determine project successes
- Feed into adaptive site management
- Ecological functions
- Citizen science



Maintaining the Land

- Weeding invasive plants
- Community groups / activists
- CDFW management

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NEXT STEPS

Science &
research
components

- Finalize assessments / complete analyses
- Publish additional reports & memos
- Apply science to restoration process
 - Issues and impacts that need to be further assessed
 - Adaptive management

Regional
monitoring
program

- Compare BWER data to regional monitoring sites

THANKS INTERNS!



QUESTIONS?

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