The Ballona Wetlands Ecological Reserve Monitoring Program

Karina Johnston
Director of Watershed Programs
The Bay Foundation
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
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):

- 0 (approximately mean sea level)
- 1 - 5
- 5 - 10
- 10 - 15
- 15 - 20
- 20 - 50
- 50 - 100
- 100 - 150
- > 150 feet above mean sea level

Ballona Wetlands Project Area Boundary
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 delineations based on vegetation alliances, tidal influence, and soil type.
Change in acres by habitat type (2007 – 2013)

Habitat Categories

- Tidal Wetland
- Non-tidal Salt Marsh
- Brackish Marsh
- Brackish Scrub
- Riparian Scrub and Woodland
- Iceplant Wetland
- Pampas Grass
- Dune
- Non-native Dune
- Disturbed Hard-pack
- Non-native "Tall" Herbaceous
- Iceplant Stand
- Upland Scrub
- Eucalyptus Grove
- Non-native Tree

Change in Acres

-14.2
-14.0
-10.0
-5.0
0.0
5.0
10.0
15.0

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

Reference Wetlands

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

LOS CERRITOS

Hellman – muted tide channels
59

Steamshovel – few impacts
71

www.cramwetlands.org
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

Maintaining the Land
- Weeding invasive plants
- Community groups / activists
- CDFW management

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

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

Permitting
- Flood control permits
- Army Corps
- Coastal Commission
NEXT STEPS

- Finalize assessments / complete analyses
- Publish additional reports & memos
- Apply science to restoration process
  - Issues and impacts that need to be further assessed
  - Adaptive management
- Compare BWER data to regional monitoring sites
THANKS INTERNS!