Monitoring Plan For Evaluating The Success of The San Dieguito Lagoon Wetland Restoration Project

Monitoring Plan

Purpose:
The Monitoring Plan will provide a framework to guide the monitoring work.

Contents:
Description of the performance standards and sampling methods.

Issues not covered by CCC Monitoring Plan

- Least tern nesting sites
- Trails & public access
- Mosquito control
- Watershed management

Performance Standards

Long-term physical

- Topography
- Water quality
- Tidal prism
- Habitat areas

Biological Performance Standards

- Biological communities (fish, inverts, birds)
- Vegetation (cover, open space)
- *Spartina* canopy architecture
- Reproductive success of plants
- Food chain support (feeding activity of birds)
- Exotics (no impairment by exotics)

Topics that will be covered today

- Reference sites
- Sampling methods for post-restoration monitoring

Reference site selection

46 sites evaluated

Criteria for inclusion

- Relatively undisturbed
- Tidal
- Located in Southern California Bight
- Suite of habitats similar to restoration site (vegetated marsh, tidal creeks, main channel, basin)

Reference wetlands

Tijuana Estuary

Mugu Lagoon

Carpinteria Salt Marsh

Post-restoration monitoring

Goals

- Provide adequate information to evaluate performance standards
- Minimize damage to wetland resources
- Cost effective

Focus of Pre-restoration Monitoring

Develop sampling methods for evaluating biological performance standards.

Incorporate findings from pre-restoration monitoring into the CCC Monitoring Plan.

Biological Communities

Standard

Within 4 years of construction, total densities and number of species of fish, macro-invertebrates and birds shall be similar to densities and number of species in similar habitats in reference wetlands.

Fish

Sampling methods

No one method can be used to estimate the abundance and species number in main channels and tidal creeks.

The following methods will be used to sample fish:

- Enclosure traps
- Beach seines
- Purse seines

Enclosure traps

Arrow Goby

Shadow Goby

Enclosure traps

Sampling considerations:

- Sampling efficiency

  Highly efficient (98% recapture of marked fish)

  Do not escape sampling by hiding in burrows

- Sampling design

  Focus on replication at the scale of major habitat units

  Space replicates out within habitat unit

Status: White paper in preparation

Beach Seine

Top smelt

Sculpin

California Halibut

Beach seine

Sampling considerations:

- Sampling efficiency

  7.5 m net satisfactory

  Blocking nets needed

  Similar recapture rates in creeks and main channel (50%)

- Sampling design

  Focus on replication at the scale of major habitat units

  Space replicates out within habitat unit

Status: In progress, anticipated date of completion – Aug 2004

Purse seine

Top smelt

Spotted Bay Bass

Mullet

Purse seines

Sampling considerations:

- Sampling efficiency

  Determine size of net appropriate to sample restored and reference sites

- Sample design

  Determine appropriate sampling effort in space and time

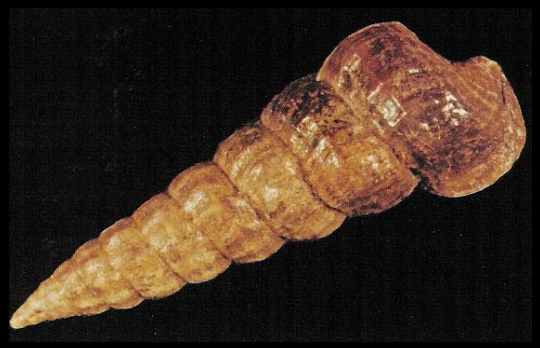
Status: In progress, anticipated date of completion – Dec 2004

Macro-invertebrates

Sampling methods

Primary

benthic cores



Macro-invertebrates

Sampling methods

Secondary

enclosure traps

beach seines

Macro-invertebrates

Sampling considerations:

- Sampling efficiency

  Small invertebrates-use 4.8 cm diameter cores taken to depth of 6 cm and 0.5 mm mesh size.

  Larger invertebrates-use 10 cm diameter cores taken to depth of 50 cm and 3 mm mesh size.

- Sampling design

  Sample several replicate habitat units (e.g. tidal creeks)

  Space sample replicates out within habitat unit

  Take samples at same time and location that fish enclosure sampling is conducted.

Status: White paper in preparation.

Birds & Food Chain Support

Sampling considerations

Allocation of sampling effort in space and time

Standardization across wetlands

Sampling method

To be determined during current work plan.

Status

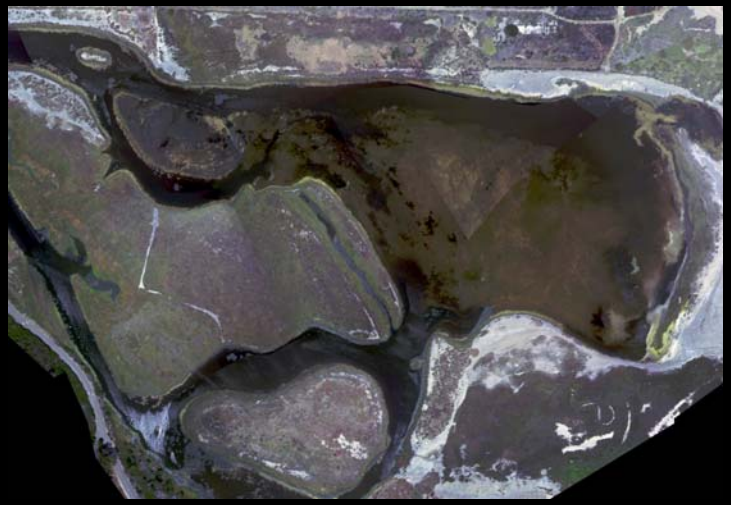
Working with bird expert. Method to be resolved by June 2004.

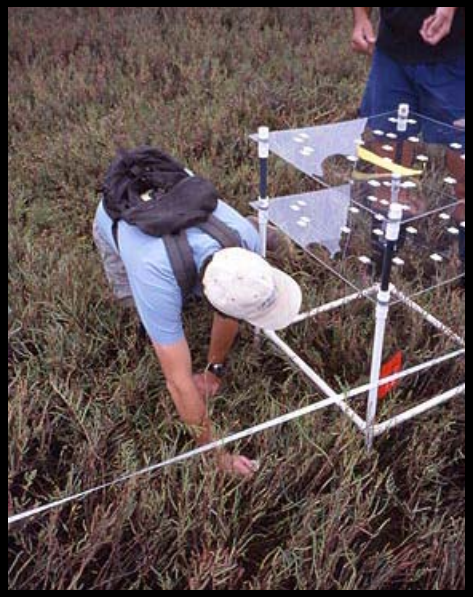
Vegetation

Standard

The proportion of total vegetation cover and open space in the marsh shall be similar to those proportions found in the reference sites.

Vegetation





Sampling methods

Aerial photos with limited ground surveys

Status

Working with Ocean Imaging on analyzing aerial photos of SDL, Carpinteria, and Tijuana Estuary. Final sampling method to be determined by April 2004

Spartina canopy

Standard

The restored wetland shall have a canopy architecture that is similar in distribution to the reference sites, with an equivalent proportion of stems over 3 ft tall.

Spartina canopy

Sampling methods

Sample sizes to be determined using data collected at Tijuana Estuary.

Status

To be completed by June 2004.

Reproductive success

Standard

Certain plant species shall have demonstrated reproduction at least once in 3 years.

Reproductive success

Sampling methods

Quantify viable seed production in prominent species for the low, mid and high marsh. Specifics and effort to be developed.

Status

To be completed by October 2004.

Exotic species

Standard

The important functions of the wetland shall not be impaired by exotic species.

Exotic species

Sampling methods

Rely on biological monitoring to estimate the relative and absolute abundance of exotics and their effects on wetland structure and function.

Augment with routine observations.

Timeline for completion of Monitoring Plan

Draft circulated for comment – Dec 2004

Final draft submitted to CCC – June 2005