INTEGRATED REGIONAL WETLANDS MONITORING (IRWM) PILOT PROJECT

Introduction to IRWM Part 2: Site Selection

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CALIFORNIA BAY-DELTA AUTHORITY

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INTRODUCTION

This poster describes the process used to select the six IRWM research sites. It also briefly explains the overall experimental design of IRWM at the site scale.

STUDY DESIGN AND SITE SELECTION

The conceptual model presented on the adjacent poster, "Introduction to IRWM Part 1: Overview and Conceptual Model" provides the framework for the IRWM overall study design. Namely, it defines regional variations in estuarine salinity, inundation, and sediment supply combined with differing landscape contexts as the driving forces behind variability in ecological process effects of tidal marsh restoration. Site selection, then, aimed to provide sites from the freshwater to saline ends of the system, with an emphasis on the high-variability "middle".

SITE SELECTION CRITERIA

The primary and secondary criteria listed here represent those considerations identified as being of greatest importance in selecting restored and natural wetland sites with characteristics that allow each research team to collect and analyze field-based ecological data effectively to accomplish the goals of the IRWM Pilot Project. The primary criteria are the most important for the site to meet; the secondary criteria should be met if possible.

Primary

- Pairing restored and natural marshes by similarity of abiotic and biotic conditions and landscape context to the extent possible
- Size of site
- Age of natural sites (Holocene or Centennial)
- Stage of evolution (restored sites)
- Sites that are "typical" of restoration opportunities within each region
- Presence of slough channel network
- Availability of previous/future data
- Access to site (both physical and legal)
- Potential for reduced data return in face of sampling challenges

Secondary

- Pre-restoration condition and initial heterogeneity
- Ability to endure impacts of researchers
- Proximity between natural and restored sites
- Site security
- Extent of local watershed influence

It was impossible to find six sites that satisfied all these criteria and fit into an ideal experimental design. Our search was made especially difficult by the lack of adequately revegetated restored tidal freshwater marshes in the Sacramento-San Joaquin Delta. However, after considering more than 30 sites throughout San Pablo Bay, Suisun Marsh, and the Delta (see Figures 1 to 3 depicting potential study sites), the IRWM team narrowed their search down to the nine sites listed below. A variety of configurations utilizing these sites were eventually considered in the table below.

- Option 1 (3-basin, 3 pairs of 1:1 restored-natural marshes) presented perhaps the best suite of sites, but was disqualified by the San Souci Duck Club's last-minute decision not to allow access.
- Option 2 (2-basin, 3 pairs of 1:1 restored-natural; Suisun excluded) was eliminated due to an over-emphasis on Petaluma River sites, and
- Option 3 (2-basin, 2 pairs of 2:1 restored-natural; Suisun excluded) was eliminated due to physical access limitations from both land and water at Big Break.
- Option 4 (2-basin, 1 pair of 1:1 restored-natural, 1 pair of 2:1 restored-natural, 1 stand-alone restored; Suisun excluded) was eventually chosen as the most viable site configuration. It encompasses sites along two different salinity gradients:
  - along the primary estuarine salinity gradient from the Golden Gate to the Sacramento-San Joaquin Delta, and
  - along the secondary estuarine gradient of the Napa River flowing into San Pablo Bay.

This configuration (see Figure 4) places a greater emphasis on restored marshes, with four restored sites of different evolutionary trajectories and representative land use histories (i.e., agriculture and salt production). It captures areas that support a variety of species of interest in the San Francisco Bay estuary, such as certain birds and fish. Overall, this configuration fits the conceptual model well and allows for an effective experimental design.

EXPERIMENTAL DESIGN AT THE SITE SCALE

The integrated Physical Processes/Landscape Ecology conceptual model integrates both abiotic and biotic factors in an attempt to address the underlying management question of interest to CALFED, how are ecosystem restoration efforts throughout the region affecting ecosystem processes at different scales? These different scales, both spatial and temporal, were taken into consideration by the IRWM teams when choosing sampling locations at each site. Also critical was the Plant Team's conceptual model concerning channel influence on vegetation structure, which directed sampling stations placed with respect to channel proximity (both along channels and laterally away from channels onto the marsh plain). Finally, the Teams used the preliminary vegetation maps (derived via remote sensing) to stratify sites for sampling purposes. Figures 5 to 10 show the sampling locations at each of the six IRWM sites.

	Regions and Sites Indicating Restored (Year) or Natur al								
	Petaluma River		Napa River			Suisun		We st Delta	
Option	Ca rr's	Green Point Cent	2A	Coon	Bull	San Souci	Brown's	Big Break	Sherman
	1994	Na t	1995	Nat	1954	1998	Na t	1930	1930
Op tion 1	X		X	X		X	X	X	
Op tion 2	X	X	X	X			X	<-- 1 site -->	
Op tion 3			X	X	X		X	X	X
Op tion 4	X		X	X	X		X		X

Notes:
1) Br own's Island consi dered east Suisun and west Delta

Potential Natural and Restored Tidal Marsh Study Sites

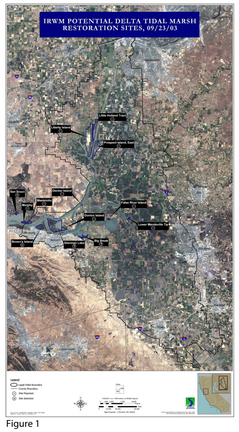

Figure 1

Figure 2

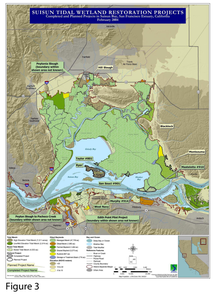

Figure 3

Sampling Location Maps

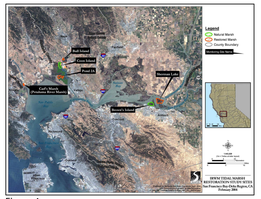
Figure 4

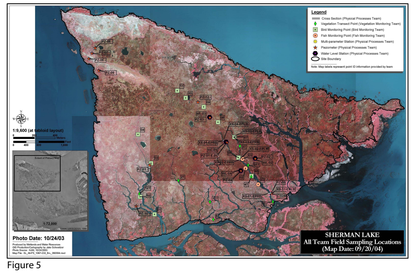

Figure 5

Figure 6

Figure 7

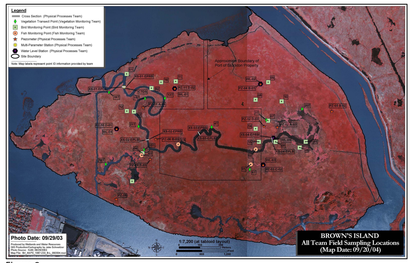

Figure 8

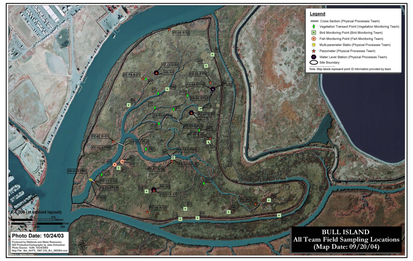

Figure 9

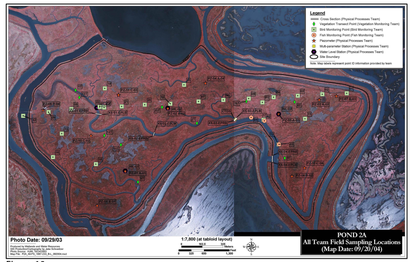

Figure 10

For more information visit: www.irwm.org