Executive Summary
Adaptive Management Working Group Meeting
December 18, 2003

Linking Marsh Creek and Dutch Slough

The AMWG unanimously concurred that restoration of Marsh Creek should be integrated into the eventual design for Dutch Slough. All design alternatives should consider Marsh Creek except for the no-action alternative.

Recommended Revision of Objectives

Greater Emphasis on Waterfowl Restoration

There was strong consensus among AMWG members that Dutch Slough was a good place to restore waterfowl habitat and that restoration of waterfowl should be elevated to a higher priority objective. Benefits to waterfowl should be, and is currently not, a main objective of the Dutch Slough restoration project. Wetlands in Suisun Bay are almost entirely focused on seasonal, freshwater, non-tidal wetlands to maintain duck clubs in an area that has brackish water and is not ideally suited for waterfowl. The freshwater marshes at Dutch Slough would make a more logical location for freshwater wetlands for waterfowl. Dutch Slough may be an opportunity to compensate for loss of duck habitat associated with management changes in Suisun marsh and South Bay Salt Ponds. Several AMWG members suggested involving bird or waterfowl experts earlier in the planning process.

Native Submerged AquaticVegetation

Peter Baye argued that goal of minimizing all submerged aquatic vegetation (SAV) may be misguided. He pointed out that there are about 7-8 species of native SAV that can provide numerous ecological benefits, particularly for waterfow. These should be treated differently than non-native invasive SAV such as egeria densa. Native SAV have higher salinity tolerances than exotic SAV.

Focus on Communities and Habitats Rather than Species

Some AMWG members suggested less focus on specific species and more emphasis on restoration of communities and habitats. Peter Baye cautioned that it was probably not feasible to restore sustainable populations of Antioch Dune Evening Primrose or Contra Costa Wallflower since they require frequent disturbance, which cannot be achieved at Dutch Slough without active management. Baye suggested that restoration of the larger Antioch Dune scrub community was a more realistic and appropriate objective. Baye also recommended restoration of the willow-lady fern community that was once common on natural delta levees, and restoration of shallow, large ponds along the terrestrial edges of the site, where spring high tides and runoff may form brackish seasonal or perennial ponds with native submerged aquatic vegetation (especially pondweeds, *Potamogeton* spp.) This habitat would be valuable to numerous waterfowl species.

Trade-Offs Between Active Experimental Management and Long-Term Sustainability

The AMWG discussed the trade-offs between sustainable restoration strategies vs. more mechanical, management dependent strategies. Sustainability is generally preferable, but management dependent strategies have the benefit of facilitating experimental learning though observation of the effects of various management strategies. For example, tide gates could allow for manipulation of salinity levels to control invasive species and test hypotheses regarding the optimum environment for native species. There was general agreement, however, that if management or mechanical intensive strategies were initially employed for experimental management and learning, the project design should still strive for long-term sustainability in recognition that it is not feasible or prudent to expect that active management or experimental regimes will be permanent.

Salinity Management and Habitat Design for Control of Invasive Species

The AMWG suggested a range of strategies for minimizing invasion and dominance of the restored site by undesirable exotic species. Bruce Herbold suggested managing salinity with tide gates or some other structure to increase salinity in the summer and fall for the purpose of discouraging non-native plant and fish species. Peter Baye suggested that it might be possible to achieve seasonal salinity spikes by creating shallow large ponds or pannes along the terrestrial edges of the site, where spring high tides and run-off may form brackish seasonal or permanent ponds. Such a natural partitioning of habitats would create more sub-habitats with a greater variation in salinity levels. In order to be effective, these strategies must increase salinities in late summer and fall to between at least 2ppt and 5ppt.

In addition to managing invasive species with salinity spikes, it may be possible to minimize non-native submerged aquatic vegetation by altering depth, turbidity, and substrate. Peter Baye suggested establishing tules on site before tidal inundation to maximize the area of subtidal emergent marsh and thereby reduce the amount of open water subject to invasion by non-native SAVs. Even if the tules do not persist at subtidal elevations after tidal flooding, they may still be able to block egeria densa establishment for several years. mentioned that many of the issues regarding strategies to control invasive species were addressed in the design of the Montezuma project 12 years ago.

Infeasibility of Dense Tidal Channel Network

Creation of a highly sinuous, dense tidal channel network as graphically depicted in the Opportunities and Constraints Draft Report may not be realistic. Peter Baye cautioned against untested assumptions (for hypotheses or restoration designs) of tidal channel density and complexity in freshwater tidal marshes dominated by tule/cattail stands. In the delta, tules develop loose, peaty muck soils, rather than saltgrass-rush-jaumea-silverweed soils with fibrous peats conducive to relatively stable vertical channel banks. The typically high channel density of salt and brackish marsh is generally not a feature of tule marshes, including freshwater tidal marshes of the Atlantic coast with very similar species composition to our delta marshes. Tule marshes tend to develop few, large channels, and can colonize small channels with coarse, strong rhizomes rather easily.

Conflicts and Synergies
The AMWG suggested developing a list of potential conflicts and synergies. The most obvious conflict was between the implementation commitment to minimize degradation of delta drinking water sources (DOC) and the stated objective of increasing nutrient export to delta waters. These two desired outcomes are not necessarily, mutually exclusive, but more evaluation is necessary to understand whether it is possible to do both. One potential synergy that the AMWG identified is the possibility of locally increasing salinity to control invasive species while also creating waterfowl pond habitat on the margins of the restored marsh.

Sequence of Parcel Restoration and Adaptive Management Experimental Design
The current thinking of the project management team is that the three parcels on the site will be restored sequentially in phases. They assume that phased implementation is easier to finance and manage. Currently they anticipate phasing the project so that the Gilbert parcel is flooded first because it is simplest, the Emerson parcel is flooded second after making the decision about how to integrate Marsh Creek, and the Burroughs parcel is restored last after constructing a new levee along Jersey Island Road. Bruce Herbold commented that phasing restoration would limit the types of experimentation that are possible and make it more difficult to set-up three replicates for comparison over time.

Additional Expertise
The AMWG suggested that additional expertise would be useful in the planning process. They recommended inviting a mercury expert to be a part of the AMWG or at least be brought on as a consultant. They also suggested that the management team retain expertise in bird habitat restoration and management of mosquitoes.

Data Needs

The AMWG suggested collecting data on several parameters. These suggestions are included in the minutes. The easiest and most pressing data collection need is measuring the existing levels of dissolved organic carbon, nitrates, and mercury in drainage water from the site.