

# Ecosystem Restoration Workshop Panel Report

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By

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## Introduction

CALFED has a history of supporting and using good science. It has incorporated adaptive management into its programs. The staff is capable and dedicated. During his tenure as CALFED Lead Scientist, Michael Healey edited [\*The State of Bay-Delta Science 2008\*](#). This comprehensive document, and in particular the lead article by Healey, Dettinger and Norgaard (*New Perspectives on the Delta Derived from Recent Science*), is essential reading about scientifically grounded principles to guide restoration of the Delta ecosystem.

Nevertheless, there are serious threats to the restoration program (common to ecosystem restoration programs of this size and complexity):

- changed and changing hydropatterns,
- deterioration of water quality,
- invasion of non-native and invasive species of all types,
- land use changes,
- complex ownership of the potential restoration areas,
- regional politics,
- effects of climate change and sea-level rise.

Restoration that is focused on any single one of these threats is unlikely to improve the functioning of the ecosystem in a way that is sustainable for the long term; all must be considered in comprehensive restoration efforts.

## The Social Context

Conversation between Panel Member Karen Rodriguez and a cab driver on the drive between the Sacramento and the United Airlines terminal:

Cab driver: *What meeting were you in town for?*

Rodriguez: *A CALFED science meeting about restoring the North Delta and Suisun Marsh.*

Cab driver: *Stupid fish!*

Rodriguez: *The restoration is about quantity and quality of water, not just about smelt.*

Cab driver: *The d\_\_\_ Democrats are taking all the money for the suburbs and leaving none for Sacramento.*

Rodriguez quickly departs the cab and hands the cab driver a big tip.

**Moral:** Don't underestimate the public. Like the cab driver, citizens have opinions. Management decisions may be made on those opinions that legislators hear and want to believe.

### **Recommendations**

1. The most important action is to get something(s) moving – substantially underway by the end of 2012. We believe it is essential to avoid imitating what so many project managers have done: plan endlessly and never actually do anything. It is important to start somewhere doing something now. The people associated with the restoration area have a great deal of information and understanding of the Delta ecosystem; they will have little trouble selecting suitable projects as starting places for building toward the bold program of restoration necessary to sustain integrated ecological functions in this hyper-disturbed ecosystem.

2. The projects selected for early action should be representative of what needs to be done throughout the Delta system. They should be as robust as possible to the effects of long-term climate change and natural oscillations of the climate system. They should incorporate linkages between the terrestrial and aquatic systems and should contribute to enhancing connectivity among elements over scales broader than that of the individual projects. Because of the bidirectional tidal and fluvial flows in the Delta, a restoration action in one place may foreclose subsequent actions in other places, so any localized action must be considered in the broader context of the Delta as a whole. The necessary land must be secured (through purchase and sale agreements, conservation restrictions, owner commitments) well in advance of construction start. The risks for each of the selected projects must be clearly recognized. Tidal energy and its dissipation must be considered. The cost must fit within what is possible with available funding. Consensus is not necessary or possible in all instances. The projects should be as visible to the general public as possible to build support for restoration.

3. The goal must be clear at the start: a functional ecosystem that is connected and productive and supports native biodiversity. Because the Delta ecosystem is governed by very large tidal and fluvial flows, restoration must focus on how flows can be adjusted to enhance the heterogeneity, productivity, and functional connectivity of the system. Restoration should not be focused on any particular species, especially not solely on endangered species. Endangered species are important, but the initial restorations should be broadly aimed and have minimal risk associated with any particular species. The goal should not be too specific but should encompass a range within which the goal can be accepted as being accomplished. Restoration strategies must be designed from a systems perspective that the Delta is considered as an interconnected watershed-river-marsh-

estuary-ocean landscape. Hydrology and ecology must be integrated. Expectations of each action must be clearly articulated, along with sources of uncertainty in those expectations.

An overarching theme from both local and visiting experts at the workshop was the critical importance of reconnecting land and water across the Delta landscape over a range of spatial scales, from small marsh sloughs to the Yolo Bypass floodplain.

4. Restoration projects and planning should make full use of models as well as empirical studies and data analyses. Simulation models can help to define and assess sources of uncertainty associated with different flow scenarios, evaluate ecological risks, and explore the potential consequences of threshold effects (especially those associated with climate change or sea-level rise). Modeling should be closely integrated with empirical studies throughout the life of a restoration project.

5. Success demands a hero – a single visionary project leader with authority and sufficient resources for success. Committees are a good way to prevent progress. The leader should have advisory groups with expertise in the science, sociology, politics, economics and history of the area. But these must be advisory only, without veto power. The leader should have at least a four-year term to allow progress without interruptions.

A project leader and technical advisory groups are only part of the picture, however. Landowners and other local citizens constitute another advisory group (also without veto power) who must also be involved in the planning and implementation of restoration actions and in discussions about alternative options. Stakeholder engagement, early and often, is a key element of success in restoration efforts as complex as those required in the Delta.

6. Public education about the challenges, complexity and importance of Delta restoration must be improved. One suggestion is a small book, freely available, with color illustrations. This could be adapted as a PowerPoint presentation, with scheduled presentations before community groups, environmental organizations, and local government entities. It could be focused on Delta region biodiversity and its importance both to people and the rest of the ecosystem. Another essential public piece is a clear picture of how sea level rise and climate change may affect the region. This can be accomplished, for example, through links to the Science Program-supported [CASCaDE project](#).

Who will represent the best and scientifically appropriate restoration ideas to the various segments of the CALFED region? Who will dare to have a dialog with people like the cab driver whose opinions are well formed but misinformed?

7. There must be a good monitoring and adaptive management program that is funded from the start for at least ten years and ideally fifteen years. Monitoring must be aligned to the goals of the restoration, not just measurement of things easy to measure. Monitoring results must be interpreted on a continuing basis so that the adaptive management program can really be adaptive. The philosophy of the management should use Ecological Engineering or “self design” as much as possible. This involves, among

other things, recognizing that the Delta system is highly variable and that surprises should be expected. There will be extreme events that upset expectations. In some cases, intervention may be necessary, but there will also be cases where the best approach is to avoid intervening and let nature do the work.

Because adaptive management is a learning process, there should be appropriate dissemination of the results. This should involve both publication in the peer-reviewed literature as well as publications in the mass media. It is important that the public in general and especially the stakeholders should appreciate what is being done.

Finally we suggest reading an article in *Estuaries and Coasts* 2009 32:1-17 by Margaret Palmer: [“Reforming Watershed Restoration: Science in Need of Applications and Applications in Need of Science”](#)