

Adaptive Management in the Delta Plan

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The Delta Reform Act of 2009 requires the use of adaptive management and defines adaptive management as “a framework and flexible decision making process for ongoing knowledge acquisition, monitoring, and evaluation leading to continuous improvements in management planning and implementation of a project to achieve specified objectives” (Water code section 85052). Inconsistent use of adaptive management for water supply management and ecosystem restoration in the Delta leads to unintended consequences such as reduced likelihood of project, plan or program success and increased likelihood of adverse environmental impact. Adaptive management provides flexibility and feedback to the management of natural resources in the face of considerable uncertainty. The Delta Stewardship Council must include in its Delta Plan “a science-based, transparent, and formal adaptive management strategy for ongoing ecosystem restoration and water management decisions” (Water code section 85308(f)). The Delta Plan puts forth a three-phase (“Plan”, “Do”, and “Evaluate and Respond”) and nine-step adaptive management approach for ongoing ecosystem restoration and water management decisions. The Council is applying this science-based adaptive management framework to the Delta Plan and requiring its use by proponents of ecosystem restoration and water management actions seeking consistency with the Delta Plan. Intended outcomes of this approach include broader and more consistent use of adaptive management, the application and development of best scientific information, and an increased likelihood of success for water and environmental decision making under conditions of uncertainty. Proper development and application of adaptive management plans for programs and projects in the Delta will lead to an improved state of knowledge of the system and ultimately inform policy-makers and managers about California’s progress toward achieving its coequal goals of “a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem” (Water code section 85054).

Keywords: adaptive management, Delta, water management, ecosystem restoration, plan, policy

Thursday, October 18, 2012: Room 307, Adaptive Management– Order 1

The Necessary Action to Ensure the Ecological Recovery of the San Joaquin Delta

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The Sacramento San Joaquin Delta is a rare inverted river delta, so the Delta is actually deltas and the ecological effects from water export operations in each delta are separate. The Sacramento Delta ecology is relatively unaffected by present water export operations. In stark contrast, the San Joaquin Delta ecology has been profoundly degraded by current and historical water export operations. Large population declines of Chinook salmon, steelhead, delta smelt, longfin smelt, threadfin shad and young-of-the-year striped bass are direct adverse effects of present water export operations. All of these declines can be reversed, with improvement of other ecological conditions if the following action is taken: Allow no flow reversals to occur in the San Joaquin River.

In addition to water supply and delta ecological improvement, controlling salt intrusion during the flood tide cycle is an important political and economic consideration. The San Joaquin River is better at resisting salt intrusion than the Sacramento River, so except for in-Delta diversions, allow all San Joaquin River flow to “waste” to the sea.

Benefits from this single action include: return of emigration cues for salmonid smolts, return of attraction flows for returning anadromous adults, return of backwater habitats for delta and longfin smelts, return of longer residence time of San Joaquin River water that will facilitate an increase in abundance and diversity of planktonic communities needed by threadfin shad and young-of-the-year striped bass, and an almost complete cessation of salt importation into the San Joaquin Valley, along with a decrease in water treatment costs.

Keywords: ecological recovery reverse flows POD

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Can Adaptive Management for the Sacramento-San Joaquin Delta be More Than Words?

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“Adaptive management” is an almost unavoidable term in contemporary environmental planning, management, and policy. It is almost impossible to have a major environmental planning or policy effort which does not refer to or require it. Although rhetorical consensus on the desirability of adaptive management seems frequently achieved, implementation experience has been more varied and faces important impediments. This has spawned numerous learned papers and reports on the success, prospects, and pitfalls of adaptive management. Adaptive management seems to have taken on many practical meanings which differ from the original approach suggested by C.S. Holling (1978). The various schools of adaptive management thought seem to include Model, manage, monitor, and revise (Holling 1978); Experimental management (Lee); Real-time management (e.g., VAMP); Manage and revise reactively (trial and error); Manage and promise to fix later; and Just keep saying adaptive management.

The Delta’s ecosystem includes a growing list of threatened and endangered species under federal and state legislation, as well as a growing number of invasive species and growing controversies over water and land management. Hundreds of federal, state, and local agencies are involved, as well as numerous non-governmental organizations and private stakeholders. Several planning processes are ongoing; all are controversial. Many invoke “adaptive management”. The development of an ecologically effective adaptive management program is technically, scientifically, institutionally, and politically difficult under these circumstances. But, there seems little alternative except to try.

Some ideas are suggested for developing an effective adaptive management program under these challenging conditions. Perfection is unlikely. The rapid learning needed for adaptive management will challenge both bureaucratic and scientific cultures; mistakes from both perspectives will be made. Mistakes are important for learning.

Keywords: adaptive management

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Managing Freshwater Inflows to the San Francisco Estuary to Reverse "Chronic Drought" Conditions

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The amounts and variability of freshwater inflows to the San Francisco Estuary—key physical and ecological drivers that create estuarine habitat, promote productivity and influence abundance, movement and life cycles of fish and wildlife—have been highly altered by dams and water diversions. Addressing the estuary’s altered hydrograph, one of the principal stressors on the ecosystem and its fish resources, is one of the most challenging issues for development of plans to meet the state-mandated co-equal goals of ecosystem restoration and water supply reliability. In this presentation, I discuss application of quantitative indicators of freshwater inflow conditions developed for the San Francisco Estuary Partnership’s State of the San Francisco Bay report for exploration of alternative flow management strategies for the estuary. For the past 30 years (1982-2011), annual freshwater inflows to the estuary have been reduced by 45%, on average, compared to estimated unimpaired inflows. Proportional flow reductions are greatest in drier years, averaging 60% in the driest 40% of years. Reduced annual inflows have doubled the frequency of years in which the estuary receives inflows comparable to what it would have received in the driest 20% of years under unimpaired conditions, effectively driving the estuary into anthropogenic “chronic drought” conditions. Directed management of inflows as a percentage of unimpaired flows, a strategy under investigation by the State Water Resources Control Board, could improve conditions. For example, annual inflows at 75% of unimpaired flows restore inter-annual variability to a more natural pattern. By comparison, flows at 65% of unimpaired increase the frequency of “very dry” inflow conditions by 56%, from 9 to 14 years during the 1982-2011. These results reinforce the importance of evaluating outcomes of various proposed flow management regimens in terms of inter-annual variability as well as in terms of flow amounts.

Keywords: Estuary, freshwater inflows, flow management, indicators, water supply

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Unifying the Science, Regulation and Operation of the Delta Water-Works System: A Practical Path Forward

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Biological Opinions designed to protect listed fish populations in the Sacramento-San Joaquin catchment are poorly integrated with each other and with the coordinated operation of the Central Valley Project and State Water Project (CVP/SWP). This lack of unity stems in part from the single-species focus of the Endangered Species Act (ESA) and from the lack of unity in the science that is supposed to inform the ESA consultation process. Each Biological Opinion hinges on hundreds of hypotheses that require research and monitoring programs to test them all. Delta science is thus anchored to the regulatory process rather than the other way around. This lack of regulatory and scientific integration makes it impossible to achieve the co-equilibrium of environmentally and economically responsible water supply management mandated by federal and state law. This talk will present a practical strategy for unifying and aligning the science, regulation and operation of the CVP/SWP to help achieve this new co-equilibrium.

Keywords: unity, integration, Endangered Species Act, co-equal goals, water operations, regulations

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