

## DRAFT MEMORANDUM

SUBJECT: Questions of the Ecosystem Restoration Plan that require outside review.

FROM: Bruce Herbold

TO: Peer review development panel members

I have based these comments on the draft vision for the Sacramento-San Joaquin Delta Ecological Zone that was distributed at the public workshop of April 8. I assume that similar questions would arise from a consideration of other vision statements. Due to time constraints I have not attempted to review other vision statements.

It is essential that we identify particular issues and questions for a panel to review. Review of the entire document would be a hopelessly iterative process; review of crucial assumptions is a suitable use of an expert review panel. The following suggestions are still too broad but may be a base upon which to do a triage.

I. General approach. A series of implementation objectives have been identified. These are general types of efforts that CalFed intends to pursue. Each of these implementation objectives concludes with a statement of the intended results. CalFed is developing indicators to keep track of the effectiveness of each implementation objective in achieving the intended results. For each indicator an intended numerical result is to be described. For each Implementation objective there is at least one target (a more exact statement of a restoration effort that CalFed will pursue) and an action that is a statement of a level of effort appropriate for each target.

1. Is this conceptual framework appropriate and adequate? How does it differ from the approach used elsewhere? Are the implementation objectives complete? Are the indicator variables appropriate? Are there scientific bases for selecting numeric values of indicators? Are the targets a complete list of the tools that might be needed to achieve the objective? How can we establish the levels of effort represented in the actions that, when combined, are likely to achieve the numeric value of the indicator?

II. The Vision. Restoration efforts aim at 'a healthy ecological system that provides for the needs of plants, animals and people using the system.'

Given that any ecosystem fits the description in the vision, it is important to identify the plants, animals, and human uses that the restoration effort is targeting. Some of these intended results are described later in the plan.

1. Are these intended results compatible with each other? Where do the needs of these ecosystem elements conflict in a way that would impede restoration? For example, predator-prey relationships represent a 'conflict' that would be expected to occur in any ecosystem, but are some restoration activities likely to expose species to excessive predation pressure or to inadequate prey densities? For which species, habitats and processes are such conflicts most likely?

2. Are the intended results compatible with the irreversible changes to the watershed? Spring run salmon spawning cannot be restored to many former streams because of the presence of insurmountable and immovable dams. CalFed is not proposing restoration of such historical spawning sites, but are there other physical constraints that are likely to prevent attainment of the vision? For example, are sediment contaminant loads likely to prevent attainment of a restored population of striped bass whose flesh is non-toxic to humans? Is the answer different for starry flounder or sturgeon?

3. The plan attempts to address environmental problems of diverse kinds. Ecological experience suggests both that processes are often limited by bottlenecks but that there are often alternative pathways or configurations that can circumvent bottlenecks. For which of the intended results are results most likely limited by a single bottleneck, such that diverse other actions may not have any effect or where attention to the bottleneck is the most effective method of restoration?

III. Focus of the Plan. The plan is based on three areas of effort:

1. restoring ecological processes that create and maintain habitats.

The principal ecosystem process addressed by CalFed within the delta is freshwater flow. Are there ecosystem processes that should be addressed separately? To what extent do irreversible changes in sediment loads, nutrient loads, temperatures, water quality or other factors affect the likelihood that manipulations of flow toward a more natural regime will achieve the intended result?

2. restoring aquatic and wetland habitats.

The principal method of restoring habitats to the delta rests on developing a more natural geomorphology, combined with the changes in flow addressed above. Given the irreversible changes in various aspects of the delta, which kinds of

habitats that formerly existed in the delta are likely to pose the greatest restoration problems? Are there alternative ways to achieve these habitat goals?

3. reducing stressors that negatively affect desirable processes, habitats or species of fish and wildlife.

Many of the stressors to be addressed by CalFed reflect the historical concerns of the regulatory agencies that are members of CalFed. Stressor reduction efforts are directed toward minimizing impacts to protect existing conditions; the ecosystem restoration efforts of CalFed are largely concerned with increasing rates of production. In which types of situation is each approach more likely to be effective? Are there areas in which the two approaches are in conflict? Are there areas in which using both approaches is likely to be necessary? What adaptive management designs or staging of implementation actions are likely to be more useful in separating these impacts?