Draft Outline of an Ecosystem Restoration Strategic Plan for the CALFED Bay-Delta Program

I. INTRODUCTION

A. Problem Statement

B. Purpose of Strategic Plan

For February: describe the purpose of preparing the methodology to complete the plan. Describe how plan revises Volume III and how it relates to other ERPP volumes, with references.

C. Relation to other Bay-Delta Program components

D. Definition of Terms[1]

(see Attachment 1)

II. GUIDING ECOLOGICAL PRINCIPLES

Briefly present the key ecological principles used in selecting goals and strategies to attain the goals[2]. Underpinnings of the restoration/rehabilitation plan.

III. ERPP GOALS AND OBJECTIVES

Revise existing ERPP goals and identify four to five overarching program goals.[3] Each goal should be supported by several specific, quantifiable objectives. ~~A preliminary list of primary goals with some possible supporting objectives is shown in Attachment 2.~~ This draft list should be further refined through a more complete review of existing goal statements and further stakeholder discussions. Identify key themes to convey the ERPP goals and approach in layperson's terms.

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[1] This step is necessary to address, in part, the scientific review panel's first recommendation: "In revising the ERPP, CALFED should clearly state whether the goal of the project is restoration or rehabilitation and name the document accurately . . . The decision to restore or rehabilitate need not be made on a system-wide level – it could be made for individual watersheds or ecological zones. . . .This distinction between "rehabilitation" and "restoration" is one among several examples of the need for refining the use of phrases and terms in the ERPP. . ."

[2] These principles are intended to guide both the selection of goals and implementation strategies employed to attain goals.

[3] This step is necessary to address the second recommendation of the scientific review panel: "Simplify and focus the presentation of the program and its goals on the basis of conceptual models. The goals should be explicitly, quantifiable, and attainable." This step is intended to set explicit, quantifiable goals. Section IV of this outline addresses presentation of the program and its goals through conceptual models.

*** CALFED comments are highlighted and have not been reviewed by drafters if this outline.**

IV. HYPOTHESES AND CONCEPTUAL MODELS OF THE BAY-DELTA ECOSYSTEMS

This Chapter will provide a picture of the system (past and present) and present a series of conceptual models that describe current theories on how the system functions and how various factors (including stressors) influence the system. The conceptual models combined with the guiding ecological principles described in Chapter III will form the rationale, or logic, for how specific strategies and actions are expected to help in achieving the program goals. Much of this information exists in Volumes I and II but it must be synthesized and better documented.

A. Ecosystem Descriptions

Provide a description and ecosystem classification of the Bay-delta system. Include major structural characteristics, processes, and organizational features. (see Attachment 3 for preliminary classification).

B. Historical Conditions and Human Interventions

Provide a description of the watershed and its ecosystems as they existed prior to massive human intervention; circa 1800. Discuss major human interventions over time.

C. Current Status and Trends

Describe the present system. Clearly identify the difference between existing conditions and program goals. Discuss causative factors creating and/or maintaining these differences including documented cause-effect relationships, suspected cause-effect relationships, and controllable vs. uncontrollable factors.

D. Key Attributes of the Bay-Delta System

Identify key system attributes including hydrology, geomorphology, habitat types, biological communities, and energetics/nutrients.

E. Testable Hypotheses and Conceptual Models of the Bay-Delta System

Describe conceptual models that explain the current theories regarding how the system works and how various strategies will achieve the restoration goals. Describe the hypotheses implicit in these conceptual models and cite the evidence or assumptions underlying these hypotheses. These conceptual models will describe the various relationships believed to exist and the basic logic behind implementing specific restoration actions. Testable hypotheses and conceptual models potentially developed by USGS and reviewed through technical workshops.

V. RESTORATION METHODOLOGY AND APPROACH

Provide a description of the methods used for refining specific objectives and developing strategies proposed for ecosystem rehabilitation and restoration. (see Attachment 4 for draft). Describe adaptive management feedback loop in refining the strategies.

A. Methods/Tools

Specify methodologies and tools proposed for ecosystem restoration. Restatement of the state of scientific understanding. Closely tied to ecological principles described in Chapter II.

B. Strategies for Restoration and Rehabilitation

Describe major strategies (types of actions) for achieving various goals and describe how and where these strategies will be employed in the various ecosystem types (i.e. delta vs. alluvial river) throughout the planning area. (see attachment 5 for preliminary list of strategies).. Define where restoration and rehabilitation will occur.

VI. ADAPTIVE MANAGEMENT STRATEGY

A. General Description of Adaptive Management

Define adaptive management and explain the need for adaptive management in the Bay-Delta restoration program. Identify key components (see attachment 6).

B. Assessment Criteria and Performance Indicators

Describe the designation, monitoring, and use of performance indicators to evaluate success of implementation measures in attaining program goals and objectives (see Attachment 7). Potentially developed by USGS.

C. Scientific Approach and Needs

Describe how the research component of the adaptive management program will be developed from testable hypotheses.[4] *Describe/identify numerical models necessary to evaluate and test hypotheses. Particularly flesh out the specific testable hypotheses implicit in the conceptual models described in section IV.*[5] *Identify other scientific evaluation needs and focused research needs. Describe ERPP Science Program role of the scientific approach.*

[4] This step is necessary to address the fifth recommendation of the scientific review panel: "... the adaptive management framework should be developed from testable hypotheses."

[5] This step is necessary to address the fourth recommendation of the scientific review panel: " In order to utilize science as a basis for the adaptive management system, there is a need for the development and use of models of physical and biotic ecosystem processes with links to key biotic components."

D. ERPP Science Program - Scientific Review

Describe form and function of three tiered ERPP Science Program. See accompanying outline.

- Drafting Team - *Staff-level effort to draft Strategic Plan and facilitate the input of the two tiers below.*
- Standing Science Body - *Describe the form and function of a standing scientific and technical body composed of agency scientists, stakeholder scientists, and scientists independent of the program.*[6] *Activities to be carried out by the science body would include generation and reviewing hypotheses, formulating monitoring schemes, and reviewing and interpreting data. Scientists would participate in focused technical workshops or work groups facilitated by the Drafting Team.*
- Independent Scientific Panel - *Describe how outside, independent scientific expertise will be embedded in the adaptive management process.*

VII. IMPLEMENTATION STRATEGY

A. Priority Setting and Conflict Resolution

Explain a process for prioritizing potential restoration actions.[7] *A preliminary list of prioritization criteria is included in Attachment 8, but a final list can only be developed through a stakeholder consensus process. Also discuss the recognition and resolution of conflicts. Priority plans should developed jointly with the Restoration Coordination Program and the ESA conservation strategy.*

- Actions Plans

B. Institutional Structure and Decision Making Process

Describe how decisions will be made regarding implementation of specific restoration actions, including the institutional structure that will be established to facilitate decision making. This chapter should be developed in coordination with the Assurances Workgroup and others working on potential future institutional arrangements.

- Implementation Entity(ies)
- Legal authorities
- Endangered species compliance - Multi-Species Conservation Plan

C. Feasibility Studies, Pilot Projects

[6] This step is necessary to address the sixth recommendation of the scientific review panel: Accommodate "continual interaction of agency managers, agency scientists, and independent scientists" through the "creation of a scientific and technical advisory board, composed of agency scientists , stakeholder scientists, and scientists independent of the program."

[7] Although not a specific recommendation of the scientific review panel, a finite budget dictates this step.

Attachment 1
Draft Definition of Terms

Ecosystem restoration: the return of an ecosystem to a close approximation of its condition prior to disturbance including the re-establishment of pre-disturbance aquatic functions and related physical, chemical, and biological characteristics. Restoration should emulate a natural, functioning, self-regulating system that is integrated with the ecological landscape in which it occurs. (NRC, 1992)[8]

Ecosystem rehabilitation: Landscape alteration or habitat enhancement designed to improve or increase specific species and ecosystem functions.

Protection: management of ecosystems and watersheds to maintain their natural functions and characteristics.

[8] Natural Research Council, 1992. *Restoration of Aquatic Ecosystems*

Attachment 3
Draft Ecosystem Classification

1. Focal Ecosystems (primary focus of CALFED program)

    a. Upland River-riparian systems (below major dams)
    b. Lowland river-floodplain systems (Sacramento and San Joaquin)
    c. The Delta
    d. Suisun Bay/San Pablo Bay

2. Related Ecosystems (requiring some management in program context)

    a. Upland river-riparian systems (above major dams)
    b. Central and South San Francisco Bay
    c. Nearshore Ocean

For each focal and related ecosystem describe:

1. Ecosystem Structure: Essential Physical Features
    a. Distribution and extent
    b. Composition and complexity
    c. Associated biological assemblages

2. Ecosystem Function and Integration: Essential Processes
    a. Hydrogeomorphic processes (flows, sediments)
    b. Disturbance and succession
    c. Community energetics

Attachment 4
Draft Methods

Methodology Considerations:

1. Habitat Quality
   - size, connectivity, distribution of habitat patches.
   - use of gap analysis/mapping etc.

2. Population Viability
   - minimum viable populations
   - use of PVA, etc.

3. Ecologic Process
   - ecosystem support
   - assessment tools

Attachment 5
Draft Solution Strategies

Examples of specific solution strategies oriented towards Goal B might include the following:

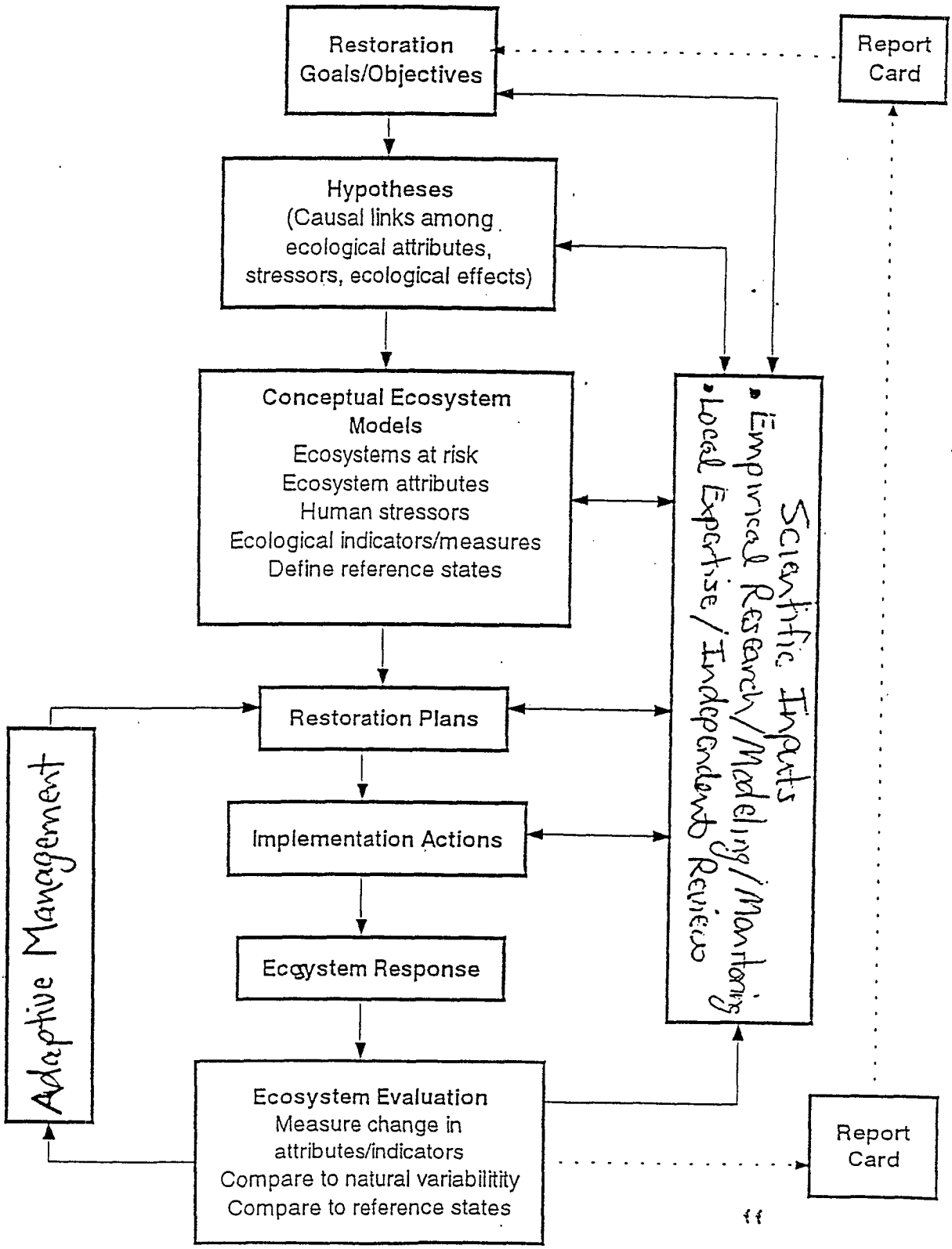
- Protect a minimum number of individuals to sustain a genetically viable population
- Protect multiple, geographically isolated populations if possible
- Expand the range of listed species if the historic range was greater
- Reduce the mortality for acute human perturbations (unscreened diversions, harvest)
- Reduce mortality from chronic, human caused perturbations (habitat degradation, toxics)
- Increase productivity in the existing range through habitat restoration or rehabilitation.

Examples of the kinds of strategies that might be employed in the Delta ecosystem type include:

- Large scale restoration of tidal marsh and shallow water habitat at lands near sea level
- Halt land subsidence by converting agricultural land on peat soils to permanent wetlands
- Rebuild subsided islands to sea level over the next 25-50 years for conversation to tidal marsh or continued agriculture
- Set back levees
- Maintain X2 in Suisun Bay
- Reduce entrainment at the pumps and Delta diversions

(1) Attachment 6 Draft

SCIENCE BASED STRATEGY FOR ECOSYSTEM RESTORATION



Attachment 7
Monitoring and Performance Indicators

Monitoring should guide management of resources in the following manner:

1) The program would propose a management action to improve the ecosystem;

2) managers would formulate alternative hypotheses that describe the outcomes of the management action;

3) the action would be conducted as an experiment, and

4) the results would be monitored by gathering data to determine which alternatives are most plausible.

Performance indicators should include:

1) landscape/regional-level indicators of habitat quality and dispersion;

2) community/ecosystem-level structural, functional, and compositional indicators, and composite indices; and

3) species-level indicators of genetic and demographic integrity.

Attachment 8
Priority Setting

Actions should be categorized and prioritized according to the level of scientific understanding, for example:

1. good understanding: undertake action
2. substantial uncertainty: conduct pilot program
3. little or no basis: begin research program

Prioritization criteria might include:

- Favor native over introduced species (e.g., manage for salmon rather than striped bass or shad)
- Favor natural processes over artificial ones (e.g.; provide smolt survival flows rather than construct hatcheries)
- Favor low maintenance solutions over high maintenance solutions (e.g., convert farmlands to habitat where diversions would require installation of fish screens)
- Favor less expensive options over more expensive options (e.g., favor capture of naturally occurring sediment to raise Delta islands over trucking dredge spoils from San Francisco Bay)
- Favor prevention over rescue (e.g., prevent species introductions from ballast water rather than dedicating large blocks of water to salinity repulsion to limit propagation up the estuary)
- Favor projects providing multiple benefits over those providing few (e.g., favor restoration of tidal marsh to restoration of diked marsh)
- Favor actions that benefit endangered species over species with stable populations.
- Favor actions that are reversible.
- Favor actions that provide benefits across a large area over actions with site specific benefits (e.g. releasing water from a dam benefits the entire river while planting cottonwood trees in one location will only benefit a small portion of the river)