Overview of the CALFED Bay-Delta Program Assessment Process

INTRODUCTION TO THE ASSESSMENT PROCESS

The CALFED Bay-Delta Program (CALFED) is in the process of developing and refining alternative solutions to problems in the Bay-Delta system. The environmental changes associated with each alternative will be analyzed in a Programmatic Environmental Impact Report/Environmental Impact Statement (Programmatic EIR/EIS) during Phase II of the CALFED process. The work conducted in Phase I will contribute to the Phase II Programmatic EIR/EIS (Figure 1).

The primary purpose of the Programmatic EIR/EIS will be to inform decision makers about the interrelated and cumulative environmental consequences of the alternatives and to identify a preferred alternative for implementation. The Programmatic EIR/EIS will evaluate foreseeable direct, indirect, and cumulative impacts of the alternatives on various resources. Both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) direct agencies to prepare a Programmatic EIR/EIS for an agency program or series of actions that can be characterized as one large project (CEQA Guidelines Sections 15165, 15168, and 40 C.F.R. 1502.4).

The assessment process for CALFED's Programmatic EIR/EIS will be used to determine regionwide impacts and impacts at a more general level than what would be used in a project-level EIR/EIS (Figure 2). Assessment methods used for the programmatic analysis also may be applicable at the project level, but would likely be applied at a finer level of detail. For example, the assessment methods for evaluating flows through the Delta may use a monthly time scale for the programmatic assessment, whereas the project-level analysis may require a daily time scale to capture the site-specific effects of a proposed project.

The geographic scope for the CALFED program includes the "problem scope" and the "solution scope" (Figure 3). The geographic problem scope is the legally defined Delta, Suisun Bay extending to Carquinez Strait, and Suisun marsh. The geographic scope for solutions would expand to include at least the Central Valley watershed, the Southern California water system, and the Pacific Ocean. The assessment process would need to evaluate impacts and benefits caused by CALFED actions within both the problem scope and the solution scope of the program.

Figure 1. Overview of CALFED Programmatic EIR/EIS Assessment Process

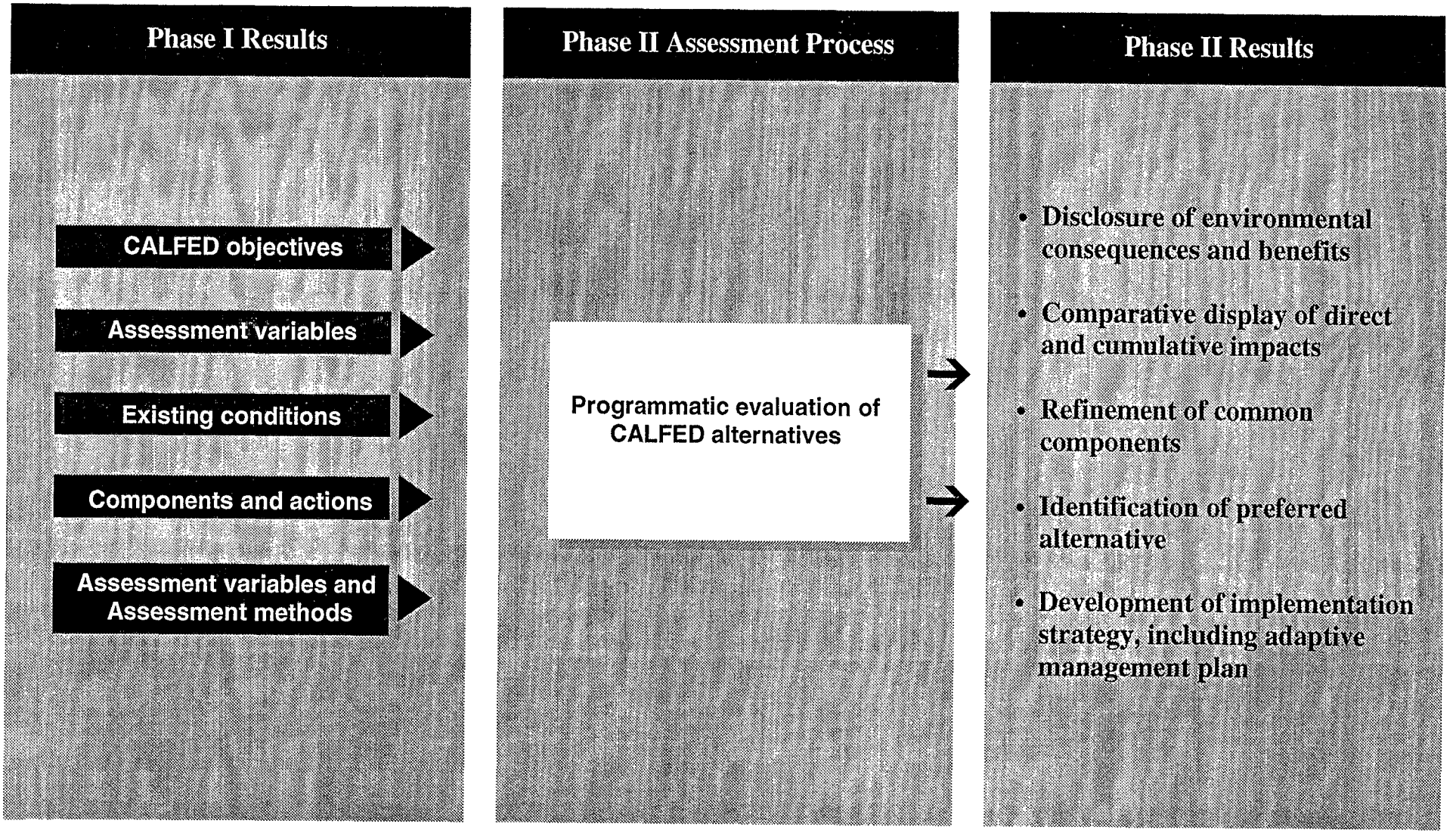


Figure 2. Comparision of Programmatic and Project-Specific Documents

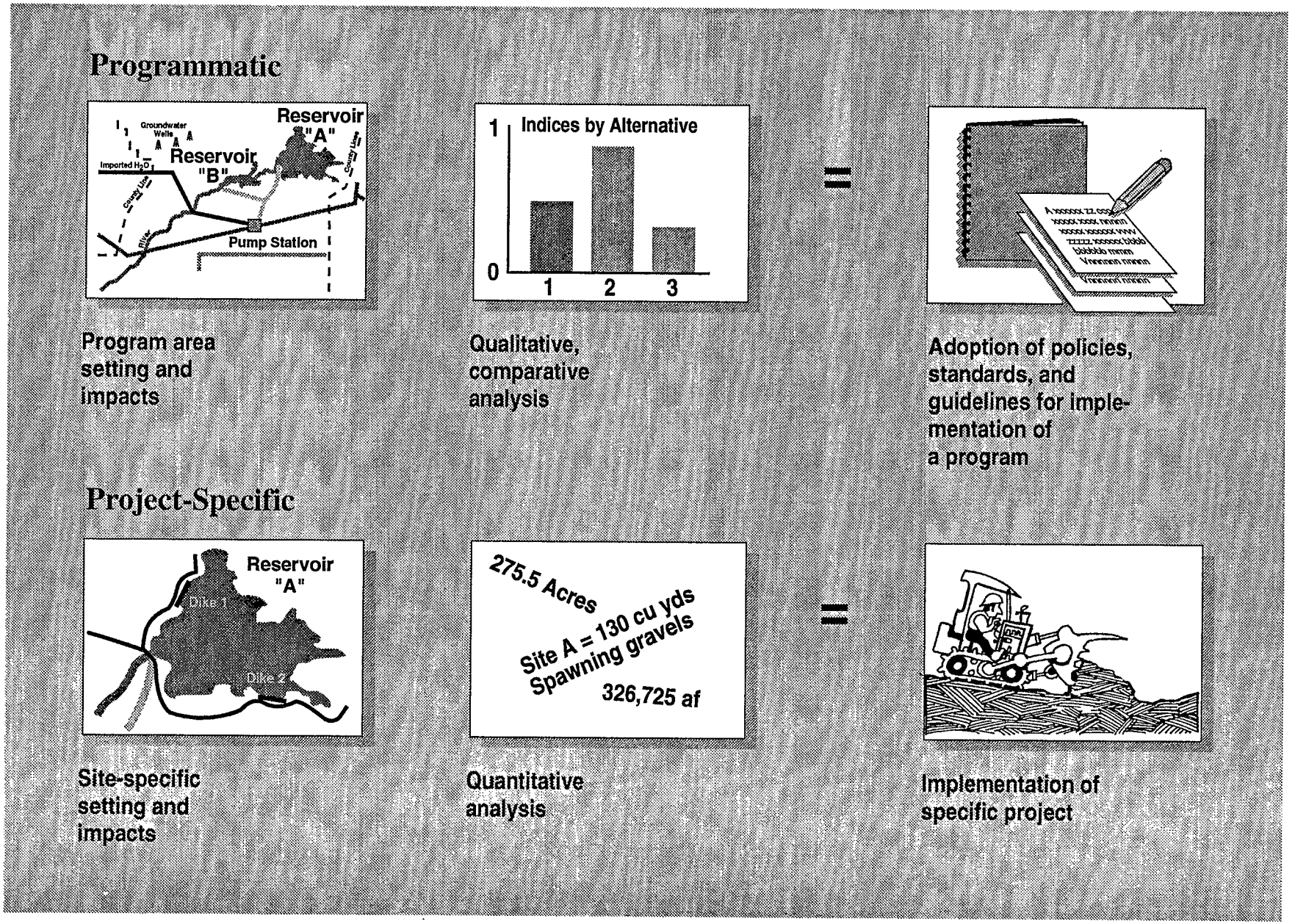
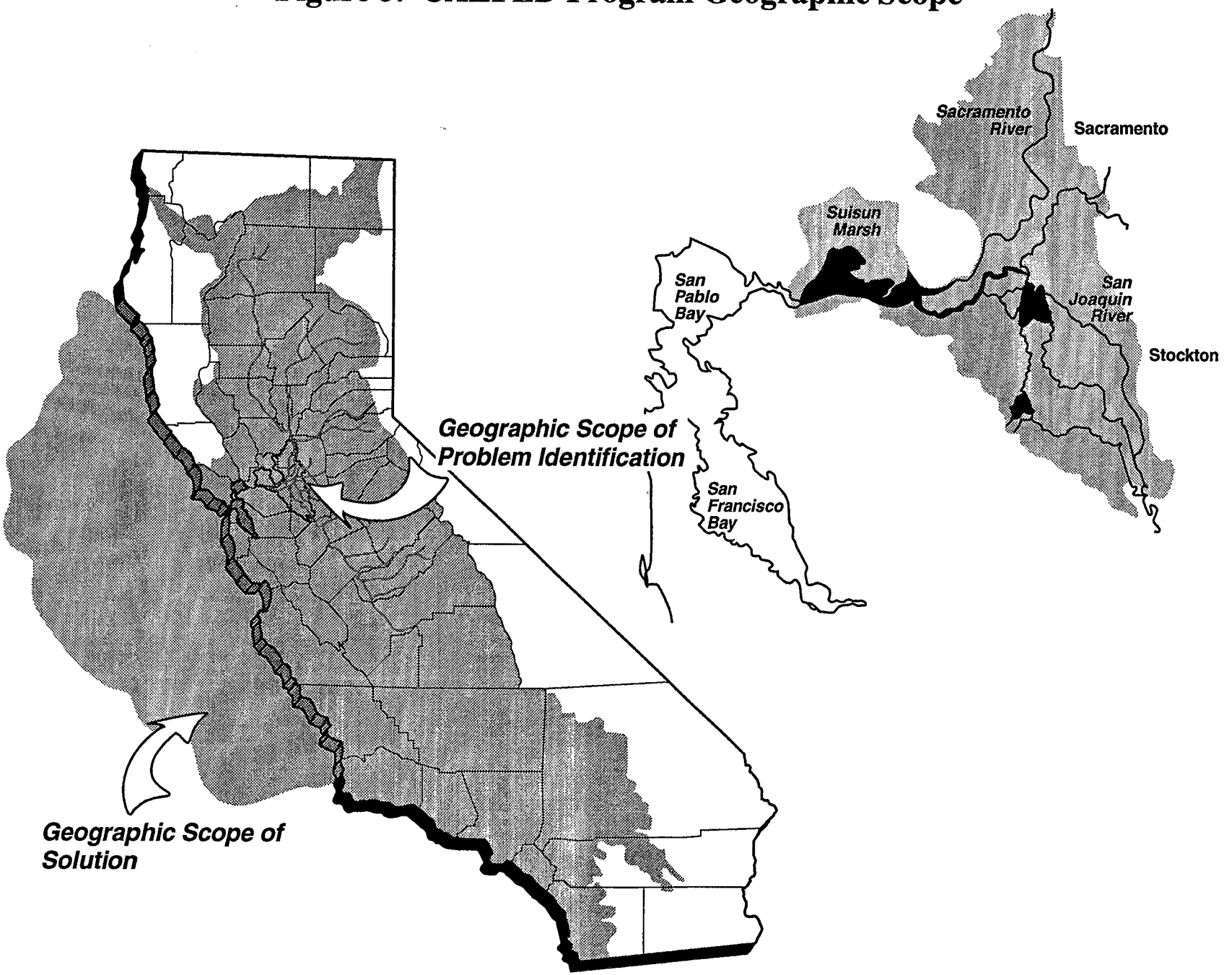


Figure 3. CALFED Program Geographic Scope



To conduct the analysis of the program alternatives, CALFED is identifying the most appropriate assessment methods to use during the Phase II environmental assessment. The assessment methods will be used in the Programmatic EIR/EIS to compare and display the range of impacts and benefits associated with the various alternatives. The intent of the assessment process is to:

- understand the effects of the CALFED action components and linkages between those components,
- provide information for comparative assessments of the CALFED alternatives, and
- avoid unnecessary detail and complexity and therefore allow meaningful programmatic assessments to be completed within the CALFED Phase II timeframe.

ELEMENTS OF THE ASSESSMENT PROCESS

The overall CALFED assessment process intends to identify: 1) assessment variables and relationships linking CALFED actions to assessment variables, and 2) assessment methods to evaluate those relationships (Figure 4).

Assessment Variables and Relationships

An assessment variable represents an important change to environmental conditions that can be judged to be beneficial or detrimental relative to human values and uses.

The direction and intensity of changes to each assessment variable are determined by a "chain of relationships" connecting a CALFED action (e.g., increasing river flows during the critical period for smolt outmigration) to the assessment variable deemed important and being evaluated (e.g., chinook salmon smolt outmigration success [Figure 5]).

The links in the chain between a CALFED action and an assessment variable are called supporting variables.

Supporting variables are directly changed by a CALFED action or component (e.g., flow management would directly change river flows); additional links or supporting variables complete the chains of relationships (e.g., river flows would affect water temperature, which could change the area of quality habitat for spawning success); the relationships between supporting variables lead to changes in the measured assessment variable (e.g., spawning, incubation, and emergence success).

Figure 4. Elements of the CALFED Programmatic EIR/EIS Assessment Process

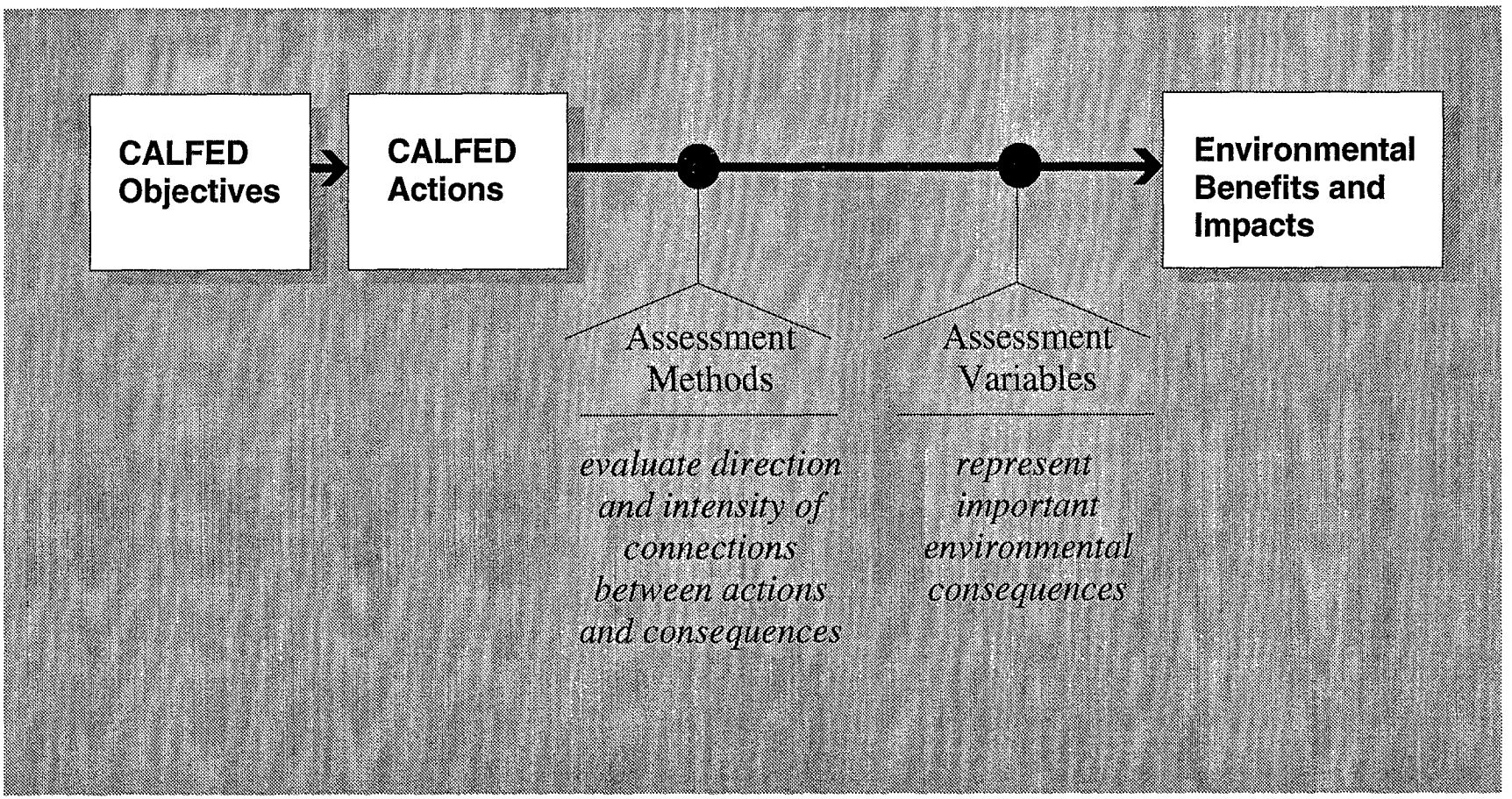
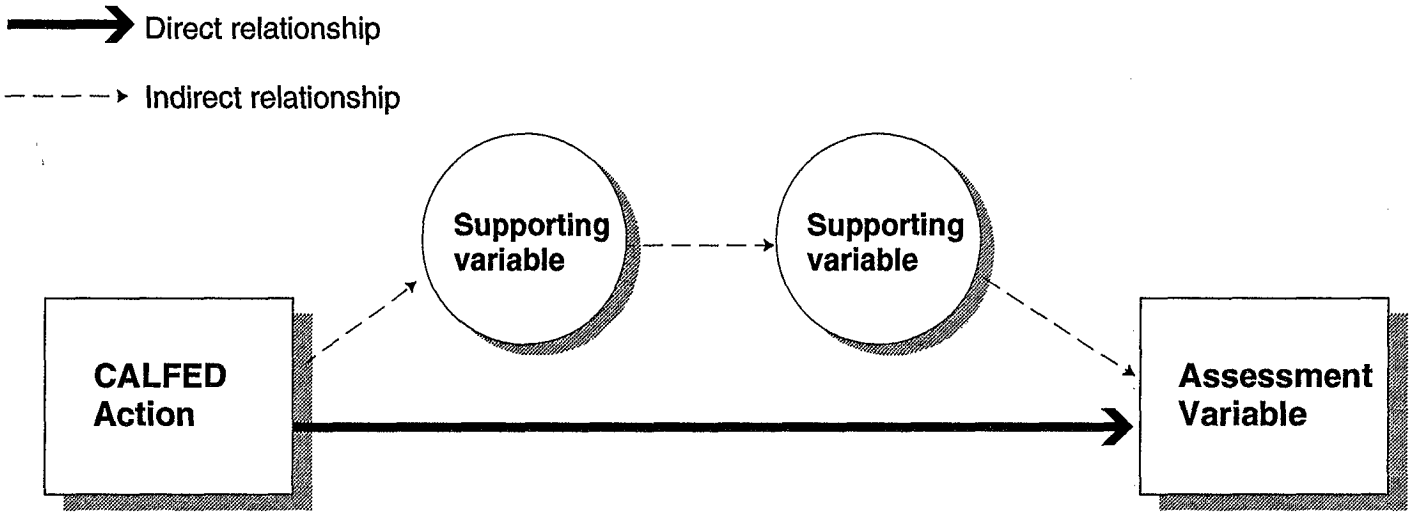
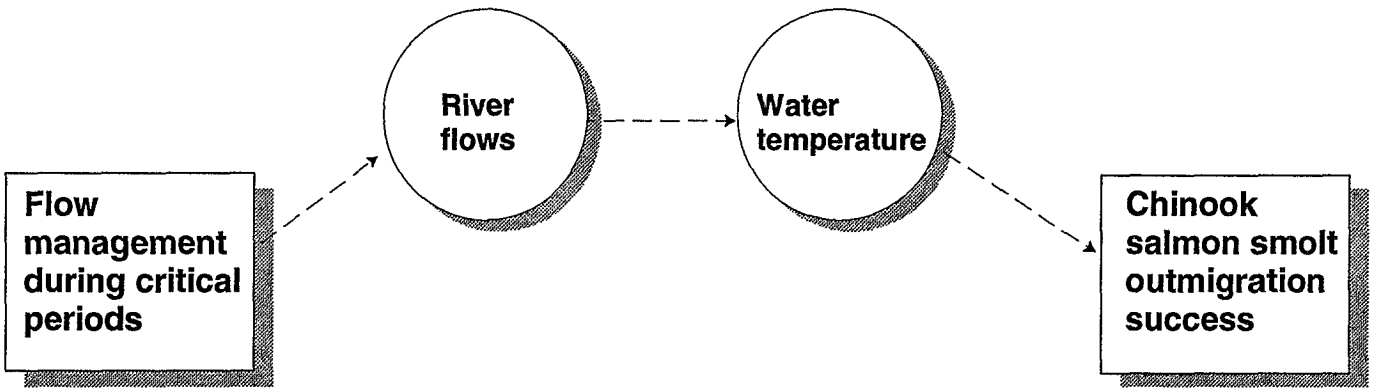


Figure 5. Example of the Relationship Between CALFED Action and Assessment Variable



Possible Relationship between CALFED Actions and Assessment Variables



Example of an Indirect Relationship between a CALFED Action and Assessment Variable

Table 1 lists the proposed assessment variables selected to indicate important changes to environmental conditions which could be impacted by CALFED actions. The assessment variables are organized by resource topic in Table 1 within the categories of "Physical Environment", "Biological Environment", and "Socioeconomic Environment". Assessment variables were identified according to the following criteria:

- They could be altered or modified substantially by one or more of the potential CALFED actions (i.e., they are sensitive and responsive to possible changes).
- They represent the environmental resources for which beneficial or detrimental changes relative to human uses and values can be assessed.
- They are useful in summarizing and distinguishing impacts and benefits of alternatives and actions defined at the programmatic level of detail.
- They are at an appropriate level of detail for the CALFED programmatic alternatives.

The proposed assessment variables presented in Table 1 are intended to represent the important beneficial and detrimental consequences of implementing the CALFED alternatives. The list of proposed assessment variables has been assembled from impact assessment methods used in other recent environmental documents on Delta and California water resource projects (e.g., CVPIA PEIS and Delta Wetlands Project EIR/EIS).

A key source of assessment variables for biological resources was the June 1996 document entitled "Restoration of the San Francisco Bay-Delta-River System: Choosing Indicators of Ecological Integrity" prepared for CALFED and the U.S. Environmental Protection Agency. The June 1996 document recommended indicators of ecosystem health to be used by CALFED in setting goals and measuring the success of its program for ecosystem restoration. The proposed assessment variables in Table 1 encompass both the ecosystem-level and species-level indicators recommended in the June 1996 document.

The assessment variables listed in Table 1 may not include all variables that are needed to assess cumulative or growth-inducing impacts of the alternatives. The assessment variables and methods for conducting the cumulative impact assessment will be determined following discussion and input on projects to be included in the cumulative impact assessment at the July 11, 1996 CALFED workshop. Generally, the assessment methods and variables to be used for the cumulative assessment will be similar to those presented in Table 1 but would be at a more general scale.

Table 1. Proposed Assessment Variables

I. Physical Environment

A. Surface Water Hydrology
1. Runoff from watersheds
2. Evapotranspiration from program features

B. Water Management Facilities and Operations
1. Reservoir storage volumes, releases, and spills
2. Instream flow targets, deficits, and surpluses
3. Diversions/exports targets, deficits, and surpluses
4. Agricultural drainage volumes
5. Remaining opportunities for storage, diversion, and instream flow

C. Groundwater Hydrology
1. Groundwater supply yield
2. Groundwater storage capacity

D. Riverine Hydraulics
1. Hydraulic geometry relative to natural erosion/deposition processes

E. Bay-Delta Hydrodynamics
1. Delta outflow
2. X2 location
3. Channel flows at key Delta locations
4. Water entrainment in diversions/exports

F. Water Quality
1. EC in agricultural irrigation water
2. Chloride and bromide levels in export water
3. Dissolved organic carbon levels in export water
4. Disinfection byproduct concentrations in treated drinking water
5. Dissolved oxygen concentration in San Joaquin River at Stockton
6. Selenium levels in San Joaquin River inflow
7. Heavy metal and pesticide residue concentrations

Table 1 - Continued

G. Geomorphology and Soils
   1. Soil erosion from agricultural operations
   2. Bank erosion from channel migration
   3. Soil salinity
   4. Subsidence caused by peat oxidation
   5. Subsidence caused by groundwater withdrawals

H. Air Quality
   1. Dust and smoke from agricultural operations
   2. Power plant emissions caused by changes in hydropower generation or pumping
   3. Emissions produced by construction and operation of facilities

II. Biological Environment

A. Riverine Aquatic Habitat
   1. Area of suitable spawning substrates
   2. Area of suitable rearing and migration habitat
   3. Area of floodplain subject to natural erosion/deposition processes
   4. Area of floodplain subject to periodic wet-year inundation
   5. Total channel length and length of non-riprap bank
   6. Length of shaded riverine aquatic (SRA) habitat
   7. Flow through unscreened diversions
   8. Connectivity and juxtaposition of restored habitats

B. Estuarine Aquatic Habitat
   1. Area of shallow tidal habitat (depth ranges: <1m, 1-2 m, >2 m)
   2. Area of shallow/SRA habitat
   3. Length of SRA habitat
   4. Area of channel subject to natural erosion/deposition processes
   5. Flow through unscreened diversions
   6. Connectivity and juxtaposition of restored habitats
   7. Primary productivity in key rearing habitats

C. Fishery Resources
   1. Winter-run chinook salmon
   2. Spring-run chinook salmon
   3. Late fall-run chinook salmon
   4. Sacramento fall-run chinook salmon
   5. San Joaquin fall-run chinook salmon
   6. Steelhead trout

Table 1 - Continued

7. American shad
8. Green sturgeon
9. White sturgeon
10. Striped bass
11. Splittail
12. Delta smelt
13. Longfin smelt

D. Wetland and Terrestrial Habitat
1. Area of freshwater marsh habitat
2. Area of riparian woodland habitat
3. Area of agricultural lands providing wildlife habitat values

E. Plants and Wildlife
(species and groups to be identified)

III. Economics and Social Environment

A. Land Use
1. Acres in agricultural uses
2. Acres in open space and habitat uses
3. Acres in developed uses

B. Agricultural Economics
1. Agricultural net income
2. Value of production
3. Cost of production

C. Municipal and Industrial Water Supply Economics
1. Cost of water supply
2. Cost of water shortage
3. Cost of treatment

D. Flood Control System and Other Infrastructure
1. Value of flood damage protection
2. Cost of repair after levee failure
3. Probability of levee failure
4. Cost of flood damage protection

Table 1 - Continued

E. Power Production
   1. Quantity and value of energy produced
   2. Quantity and cost of energy consumed

F. Recreation Resources
   1. Recreation use and opportunities
   2. Recreation economics (income, employment, and spending)

G. Commercial Fishing
   1. Value of harvest
   2. Cost of harvest

H. Visual Resources
   1. Visual conditions

I. Cultural Resources
   1. Risk to archeological sites
   2. Risk to historic sites

J. Regional Economics
   1. Income
   2. Employment
   3. Fiscal conditions

Assessment Methods

Assessment methods will be used to determine the effects of CALFED actions, components, and alternatives on an assessment variable. An assessment method may be a quantitative model, simple index, qualitative description, or some combination thereof used to measure and discuss changes in an assessment variable. Where the selected assessment method is a qualitative description, the method will be used to measure and discuss changes in a given resource or variable at the program level and distinguish relative impacts and benefits between alternatives and CALFED's common components. Qualitative descriptions based on existing studies, historical data, and expert opinion will be used in the Programmatic EIR/EIS where no specific quantitative method exists or where the relationships between actions and assessment variables are not easily quantifiable or well known. Figure 6 describes three general categories of assessment methods that will be used in the Programmatic EIR/EIS.

BENEFITS OF THE ASSESSMENT PROCESS

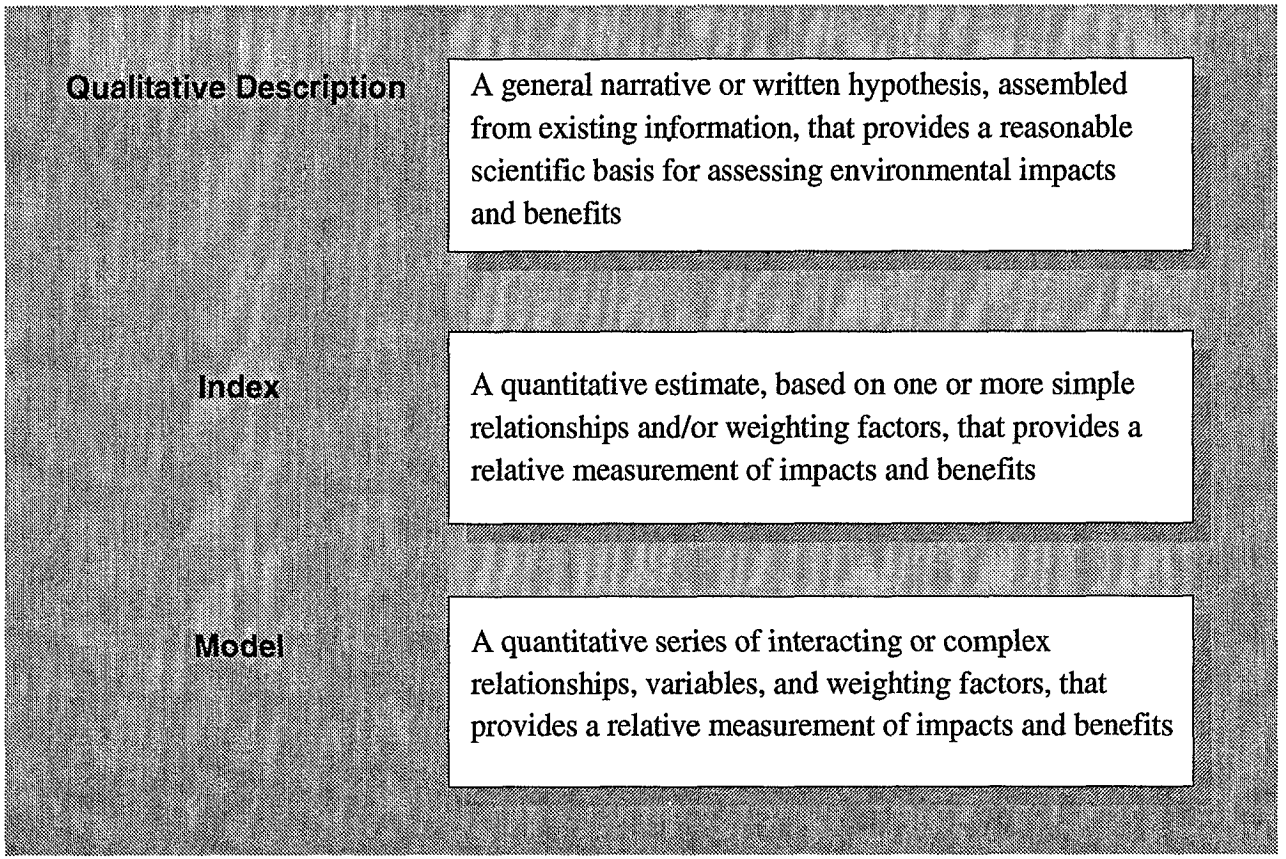
The proposed assessment process is intended to provide the following benefits to the CALFED programmatic environmental impact analysis. The assessment process:

- provides an opportunity for focused discussions by experts on the methods to be used in the impact assessment of program alternatives,
- provides maximum flexibility and adaptability in applying assessment methods to the various CALFED components and actions, and
- allows full participation of all stakeholders and equal consideration of all important issue areas during Phase II assessment by using a compilation of the best assessment methods and information available.

SUMMARY OF PREVIOUS EFFORTS ON THE ASSESSMENT PROCESS

CALFED staff conducted focused work sessions with resource experts from agencies and stakeholder groups to discuss potential assessment variables and methods from June 18 through June 21, 1996. The resource topics covered included water quality, agricultural economics, and riverine and Delta fish habitats and populations. In addition, a preliminary session was held to discuss possible approaches for water management analysis. CALFED staff received feedback at the sessions on the overall assessment process and the specific process for the example resource topics.

Figure 6. Types of Assessment Methods for the CALFED Programmatic EIR/EIS



The key underlying theme from all the sessions was that the assessment process should:

- rely on what is known or generally agreed upon (i.e., avoid speculative assumptions);
- involve agency and stakeholder experts in expanding and extending existing methods;
- select methods that can fairly evaluate the benefits and impacts of CALFED actions under consideration (e.g., Delta conveyance options);
- where no established quantitative methods are available, use qualitative methods based on available information and expert judgments to predict changes in assessment variables; and
- verify the analytical results of the programmatic evaluation later in Phase II by using traditional tools (e.g., simulation models) that have been modified for the CALFED assessment.

Communication between CALFED staff and agency and stakeholder experts is ongoing to determine the most effective and appropriate assessment methods to use in the Programmatic EIR/EIS. The feedback and comments of those experts will contribute to the selection of the most appropriate assessment methods for assessing the benefits and impacts of the wide range of potential CALFED actions.

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