Chapter 3
Guide to Impact Analyses

Guide to Impact Analyses

This chapter is included to help readers understand how the impact analyses are presented in Resource Chapters 5, 6, and 7, and Chapters 4, 9, and 10. Information on the environmental consequences of the alternatives presented in this document was prepared by a team of resource specialists using and building upon information contained in the CALFED Final Programmatic EIS/EIR, the Interim South Delta Program (ISDP) Draft EIR/EIS, a series of technical reports, and site visits. Information used from the Final Programmatic EIS/EIR and the ISDP was verified and updated where necessary. In addition, technical reports were prepared for some of the resource categories and form the basis of the affected environment and environmental consequences descriptions in Chapters 5, 6, and 7. Chapter 4 summarizes the environmental consequences as a result of the SDIP. Chapters 9 and 10 discuss Growth-Inducing and Cumulative Impacts, respectively, as a result of the proposed project. Resources evaluated in this EIS/EIR have been grouped into three main categories:

- physical environment,
- biological environment, and
- land and water use, social issues, and economics.

This EIS/EIR evaluates a range of alternatives that vary in both the number of gates to control flows, and the timing of allowed increased diversions. The possible effects of each of these alternatives on each resource area are examined in each section.

Overview of Environmental Impact Evaluations of Reservoir and Delta Operational Changes from the South Delta Improvements Program Alternatives

The SDIP involves operational changes at the CCF intake gates and subsequent changes in Delta channel flows and upstream reservoir operations and river flows. Two basic models have been used by DWR and Reclamation to track and

evaluate these variables for the 2001 and 2020 baseline conditions and for each action alternative evaluated in this EIR/EIS. Because the SWP and CVP water supply systems are operated along with non-project (local) water supply and flood control reservoirs in a semi-integrated manner, monthly changes in SWP pumping that could be allowed with an SDIP alternative may cause changes in upstream SWP or CVP reservoir releases and storage, which may cause environmental impacts in the reservoirs, downstream rivers, or in the Delta channels. Socioeconomic effects of these water management changes may also result (e.g., navigation, recreation, land uses, growth inducement).

Figure 3-1 shows the general flow of information from the water supply operations (CALSIM) and Delta tidal hydraulic (DSM2) models to the various natural resource topics that are evaluated for potential environmental and socioeconomic impacts. The water supply operations and Delta tidal hydraulic models are also used to evaluate the ability of the SDIP alternatives to meet the project purposes of increased CVP and SWP south-of-Delta water deliveries, improved south Delta water quality and quantity, and reduce the movement of San Joaquin River watershed Central Valley fall-/late fall–run juvenile Chinook salmon into the south Delta via Old River.

Changes in water operations are simulated with the CALSIM model and are fully disclosed and described in Section 5.1, but are not evaluated as potential environmental impacts that require mitigation. Resultant direct and indirect effects of the changed SWP/CVP operations on specific environmental resources are evaluated as potential environmental impacts that may require mitigation.

Water Supply Changes

The CVP exports and deliveries are tracked separately from the SWP exports and deliveries to fully disclose the shifts in water supply allocations and sharing that would result from the SDIP alternatives compared to the baseline water supply conditions.

These shifts between CVP and SWP water exports and deliveries are governed by the State Water Board Delta water rights D-1641, and by agreements and protocols that are established between SWP and CVP contractors. The ability to meet project purposes is compared for each alternative. There may be subsequent shifts in the allocation agreements to provide a more equitable split of benefits from an SDIP alternative; however, no mitigation is required for these changes in water supply conditions.

South Delta Level and Water Quality Changes

The DSM2 Delta tidal hydraulic and water quality model is used in a similar way to simulate the expected changes in south Delta tidal level and flow conditions that may influence the SDIP objectives of local diversions and reduced salinity.

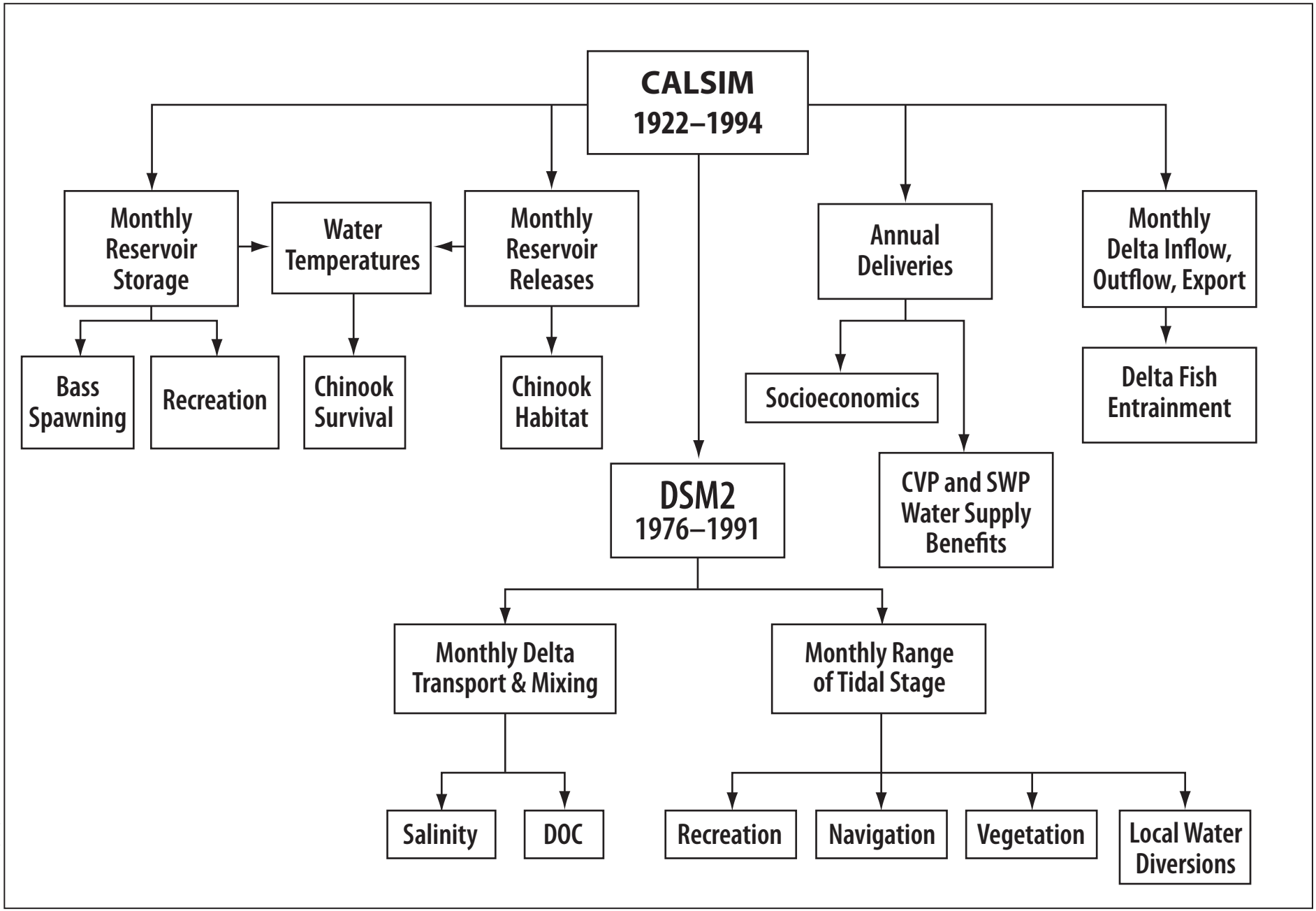

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Figure 3-1
Use of CALSIM and DSM2 Model Results for SDIP Alternatives Impact Assessments

Mitigation measures are proposed for impacts on both of these SDIP purposes, so that the SDIP objectives can be more fully achieved by modification of the simulated CCF gate operations and modification of the proposed head of Old River fish control gate operations. These mitigations are proposed to reduce detrimental hydraulic and water quality changes, as well as to improve the overall effectiveness of the SDIP alternatives.

No additional tidal hydraulic or water quality changes are identified as significant impacts that would affect other locations in the Delta, so none of these detrimental changes are considered to be environmental impacts that require mitigation under CEQA or NEPA guidelines.

Environmental Impacts Related to Central Valley Project and State Water Project Operations

Many other potential impacts are related to the CVP and SWP reservoir and Delta operations that may change under the SDIP alternatives. The impact evaluations for these potential impacts use the results of the CALSIM and DSM2 modeling. Table 3-1 provides a summary of the impacts resulting from CVP or SWP monthly operations or the monthly tidal level and flow conditions in the Delta. Mitigation measures for any of these impacts that are found to be significant are required under CEQA and NEPA to minimize the impacts from SDIP alternatives.

The CVP and SWP water supply management evaluation in Section 5.1 and the Delta tidal hydraulic evaluation in Section 5.2, as well as the Delta water quality evaluation in Section 5.3, include the simulation and analysis of SDIP alternative purposes and potential environmental impacts. The fish evaluation in Section 6.1 related to reduced Delta entrainment of San Joaquin River fish (Chinook salmon) also involves one of the SDIP purposes. All subsequent resource evaluations are focused on identifying and mitigating any significant environmental or socioeconomic impacts resulting from the SDIP alternatives.

Impact Analysis Organization

The impact analysis for each resource is divided into several parts, including a summary, a description of the affected environment/existing conditions, and discussions of environmental consequence. Separate sections discuss and analyze growth-inducing and cumulative impacts. Each of these divisions is explained more fully below.

Introduction

The introduction provides an overview of the primary concerns, impacts, and mitigation measures of each section. It also summarizes methods used in the resource analysis.

Summary of Significant Impacts

A summary of significant impacts on each resource is presented in table format at the beginning of each resource section. These tables show the impact, applicable alternatives, mitigation, and the final level of significance. For those resources on which there would be no significant impacts, it is stated that there are none.

Affected Environment

The Affected Environment section provides a historical perspective and a detailed description of the current conditions for each resource. This information is obtained from published environmental documentation, books, web sites, research and journal articles, and personal communications with experts in their fields. Specifically, this EIS/EIR relies on the ISDP Draft EIR/EIS, the CALFED Programmatic EIS/EIR, and site visits for information regarding the existing conditions of the proposed project site and its alternatives. Information provided in these documents was verified, and updated if necessary, before inclusion in this EIS/EIR.

Regulatory Framework

This section lists and describes laws, regulations, and policies that affect the resource or the assessment of impacts to the resource. Often, as in water quality and biological resources, the regulatory framework is the basis for the conclusion of the level of significance, and therefore plays a crucial role in impact assessment. The regulatory framework applied can be found within each resource section, and additional detail is provided in Chapter 8, "Compliance with Applicable Laws, Policies, and Plans and Regulatory Framework."

Assessment Methods

Descriptions of assessment methods are resource specific and provide the approach used to identify and assess the environmental consequences for the resource category. Analytical models used in the evaluation are also identified. Table 3-2 shows the assessment methods for each section.

Table 3-1. Linkages between CVP and SWP Reservoir and Delta Operations and Potential SDIP Alternative Impacts

Resource Topic	Section	CVP Delta Pumping and Deliveries	SWP Delta Pumping and Deliveries	Changes in Delta Flows	Changes in Delta Tidal Levels	Changes in Reservoir Storage	Changes in Reservoir Releases
SDIP Project Objectives							
CVP & SWP Water Supply	5.1	WS-1	WS-2				
South Delta Diversions	5.2				HY-1 to HY-7		
South Delta Water Quality	5.3			WQ-4–12, 17			
Reduce SJR Fish Entrainment	6.1			Fish-33			
Environmental and Socioeconomic Impacts							
Flooding/Levees	5.5				FC-7		
Delta Sedimentation				SS-5			
Groundwater Pumping	5.7				GW-5		
Navigation	5.8				TN-8		
Noise			NZ-8				
Fish Entrainment	6.1	Fish-46, 47, 58, 63, 68, 73, 78	Fish-46, 47, 58, 63, 68, 73, 78				
Fish Habitat	6.1			Fish-60, 61, 62, 65, 66, 67, 70, 71, 72, 76	Fish-60, 61, 62, 65, 66, 67, 70, 71, 72		Fish-42, 43, 44, 49, 50, 51, 54, 55, 56, 75, 77
Fish Temperature Mortality	6.1					Fish-45, 52, 57	Fish-45, 52, 57
Food Availability for Fish	6.1	Fish-64, 69, 74, 79	Fish-64, 69, 74, 79				Fish-48, 53, 59
Loss of Vegetation and Vegetation Habitat	6.2	VEG-12, 13, 14	VEG-12, 13, 14		VEG-11, 12, 13, 14, 15, 16		
Regional Land Use Changes	7.1	LW-10	LW-10				
Urban and Agricultural Water Supply Economic Benefits	7.2	SOC-7	SOC-7				
In-Delta Recreation	7.4				REC-7		
South-of-Delta Recreation	7.4					REC-9	
North-of-Delta Recreation	7.4			REC-10		REC-8	
Aesthetics	7.6					VR-24	
Growth-Inducing Effects	9						

Table 3-2. Assessment Methods

Resource	Existing Conditions Assessment	Impacts Assessment
Water Supply	Bay-Delta projects, State Water Board reports, CALSIM monthly model	CALSIM
Hydrodynamics and Hydraulics	CALSIM, DSM2	CALSIM, DSM2
Water Quality	DSM2	DSM2
Geology, Seismicity, and Soils	Maps, general plans, ISDP Draft EIR/EIS	General Plans, technical reports, grading ordinances, ISDP Draft EIR/EIS, and information from DWR
Flood Control and Levee Stability	ISDP Draft EIR/EIS, Sacramento–San Joaquin Delta Atlas, technical studies, CALFED Programmatic EIS/EIR	DSM2 Model, CALFED Final Programmatic EIS/EIR Technical Appendix
Sediment Transport	Technical Reports, Monitoring Reports, ISDP Draft EIR/EIS	ISDP Monitoring Reports, DSM2 Model, field assessment, design standards and guidelines
Groundwater Resources	Maps, General Plans, ISDP Draft EIR/EIS	DSM2 Model, ISDP Draft EIR/EIS, and information from DWR
Transportation and Navigation	ISDP Draft EIR/EIS, site visits, nautical maps, information from DWR	Significance thresholds
Air Quality	Information published by air quality management districts, ISDP Draft EIR/EIS, CARB web site	CARB's EMFAC2002
Noise	General Plans, ISDP Draft EIR/EIS, noise control ordinances, noise measurement studies	Methodology developed by the Federal Transit Administration
Fisheries	Resource Agency contacts, literature search, Interagency Ecological Program, California Department of Fish and Game	CALSIM, conceptual models
Vegetation and Wetlands	Studies conducted specifically for the project, published literature, previous studies conducted for the CALFED Bay-Delta Program	Existing biological resource information and current baseline conditions
Wildlife	Wildlife resources sections of the CALFED Programmatic EIR/EIS, the ISDP EIR/EIS, and the CALFED MSCS, habitat mapping and field surveys provided by DWR, a review of aerial photographs and of the CNDDB, species list provided by the USFWS	Existing biological resource information and current baseline conditions
Land and Water Use	DWR Bulletins, California Department of Conservation Farmland Mapping and Monitoring Program data, general plans, and site visits	General plans and GIS data

Resource	Existing Conditions Assessment	Impacts Assessment
Social Issues and Economics	ISDP Draft EIR/EIS, information from DWR, information from the U.S. Census, and the California Department of Finance	IMPLAN (input/output economic model), LCPSIM, CVPM
Utilities and Public Services	ISDP Draft EIR/EIS, general plans, and site visits	ISDP Draft EIR/EIS, site visits, and information from utility providers
Recreation Resources	ISDP Draft EIR/EIS, CALFED Programmatic EIS/EIR, and Delta Boat Survey	CALSIM, DSM2
Power Production and Energy	DWR Bulletin 132 (several years), ISDP Draft EIR/EIS	CALSIM
Visual/Aesthetic	ISDP EIR/EIS, direct field observations, photographic documentation, and CALFED Programmatic EIS/EIR	Field observation, photographs, review of construction drawing, and review of state and federal laws and ordinances
Cultural Resources	Site visits, archival research, identification of known cultural resources	Review of qualification of sites for national or state identification
Public Health and Environmental Hazards	Environmental data reports, California DHS web site, ISDP EIR/EIS, CALFED Programmatic EIS/EIR	Site visits, environmental data reports
Environmental Justice	U.S. Census Bureau Census 2000	Signifiance thresholds and U.S. Census Bureau Census 2000
Indian Trust Assets	GIS coverage of Indian reservations, maps	Review of GIS coverage of Indian reservations and maps

CARB = California Air Resources Board.
CNDDB = California Natural Diversity Database.
DHS = Department of Health Services.
DWR = California Department of Water Resources.
EIS/EIR = environmental impact statement/environmental impact report.
GIS = geographic information systems.
ISDP = Interim South Delta Program.
MSCS = Multi-Species Conservation Strategy.
State Water Board = State Water Resources Control Board .

Significance Criteria

The threshold of significance, or significance criteria, for each resource category varies depending on the resource and standards, if any, set by regulating agencies. These criteria are used to evaluate the significance of an impact. Significance criteria also provide a tool to predict whether it is likely that the impacts identified as potentially significant can be avoided, reduced, or mitigated to a less-than-significant level.

No Action Alternative

This section presents the environmental consequences of the No Action Alternative. The No Action Alternative represents the likely future conditions without implementation of the SDIP. The No Action Alternative includes assumptions about the future condition of the environment based on current expectations about existing trends that may continue into the future and about resultant future water project operations. The impacts of each alternative are compared to both the No Action Alternative and to the existing conditions in Chapters 5, 6, 7, and 9.

Alternatives

It is required by both CEQA and NEPA that a reasonable range of alternatives to the project be identified. Alternatives are developed to show the difference in environmental consequences among varying approaches to a project. Alternatives are feasible and satisfy the objectives and needs of the proposed project. They may identify activities, operations, or construction methods that could lessen adverse effects on the environment while accomplishing the same objectives and goals. Unlike CEQA, NEPA requires that impacts as a result of implementation of the alternatives be identified in the same level of detail. Therefore, this EIS/EIR fully analyzes all alternatives identified in Chapter 2.

Cumulative Impacts

Cumulative environmental impacts must be addressed in EISs and EIRs under both NEPA and CEQA. NEPA defines cumulative impacts as those impacts that result from the "incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency… or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." The definition of cumulative impacts under CEQA is similar: "Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts."

The analysis of cumulative impacts in this document is a separate chapter (Chapter 10) and considers long-term environmental impacts of this project, including those that would be less than significant, together with similar impacts of other projects for each resource.

In general, the analysis of cumulative impacts is qualitative. Impacts were identified based on: (1) information extracted from existing environmental documents or studies for the resource categories potentially affected by each project, (2) investigation of other state and federal agencies' and privately funded

project plans in the south Delta area over the next 15 years, and (3) knowledge of expected effects of similar projects in the study area. Because of the preliminary phase of most of the projects considered (environmental reviews may not have been initiated, drafted, or finalized), comparable environmental information for identifying cumulative impacts was sparse.

For the water resources (water supply, tidal hydraulics, and water quality) cumulative impacts were identified based on results of the OCAP Modeling, as this document modeled the cumulative effect of all of the past, present, and reasonably foreseeable future water projects, including the SDIP. The analysis of cumulative impacts on fish was also based on this analysis and the associated BOs.

Chapter 10 contains a detailed description and analysis of the expected cumulative impacts of the proposed project.

Growth-Inducing Impacts

Growth-inducing impacts are those that "foster economic or population growth" or that "remove obstacles to growth" (CEQA Guidelines section 15126.2[d]). Chapter 9, "Growth-Inducing Impacts," discusses the growth-inducing impacts that may result from implementation of the SDIP. Specifically, the potential for this project to promote growth in the south Delta area and areas where water is exported from the south Delta is analyzed. Discussions of whether additional water supplies and/or improvements in water supply reliability induce growth often result in differences of opinion among experts. Chapter 9 provides a full discussion of growth-inducing impacts as a result of the SDIP alternatives.

Relationship between Short-Term Uses and Long-Term Productivity

This section discusses the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity and sustainability. A summary of the short-term uses in the project area and the maintenance and enhancement of long-term productivity in the area is provided in Chapter 4, "Summary of Environmental Impacts."

Irreversible and Irretrievable Commitments

This section fulfills the requirement to address irreversible and irretrievable commitments of resources. Irreversible impacts are those that cause, through direct or indirect effects, use or consumption of resources in such a way that they cannot be restored or returned to their original condition despite mitigation. Potentially irreversible impacts are also documented in this report. An

irretrievable impact or commitment of resources occurs when a resource is removed or consumed. These types of impacts are evaluated to ensure that consumption is justified. The discussion of Irreversible and Irretrievable Commitments can be found in Chapter 4, "Summary Comparison of Environmental Consequences."

Mitigation Measures

Mitigation measures include actions such as implementation of plans to minimize effects. For example, dust as a result of construction activities may be identified as a significant impact to air quality, but the implementation of a Dust Suppression Plan will mitigate the impact to a less-than-significant level. The CALFED Programmatic EIS/EIR identifies program-wide mitigation measures that may be used to avoid, minimize, restore, or compensate for potentially significant adverse impacts. Not all of the programmatic mitigation measures are implemented in this document; however, where feasible, they are integrated into the SDIP mitigation measures. The Social Issues and Economics, Growth-Inducing, and Cumulative sections do not contain a separate mitigation measures section.