CHAPTER 4.0

Other Impacts and Commitments

This chapter discusses the cumulative and growth-inducing impacts that may occur as a result of other related programs and activities. Several of these related programs are being implemented. Others are currently undergoing planning the preparation of environmental documentation. This chapter also contains a discussion of irreversible and irretrievable resource commitments, and a comparison of short-term impacts versus long-term environmental benefits. Finally, this chapter contains a summary of commitments, mitigation, and significant unavoidable impacts for the alternatives (Table 4-4 at the end of Section 4.5).

4.1 Cumulative Impacts

Cumulative impacts are the impacts on the environment that result from the incremental impacts of the proposed action when added to other past, present, and reasonably foreseeable future actions.

Cumulative impacts are the impacts on the environment that result from the incremental impacts of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or entity undertakes such other actions. It is recognized that the proposed action may be implemented in an interactive manner with other concurrent projects. In addition, these other projects may affect the impacts of the proposed action. The cumulative analysis addresses impacts associated with several related actions including:

- Implementation of CVPIA
- SWRCB water rights process and CALFED Bay-Delta Program
- Deregulation of the electric industry in California
- Changes in federal farm support programs
- Changes in demand for agricultural products
- Changes to fisheries management
- Changes in demand / supply for timber products
- Changes in demand for recreational activities in the Trinity River Basin not related to the Trinity River or the mainstem reservoirs
- Changes in Trinity River Basin Consumptive Water Use

There are many other water resource activities planned in the state of California. These include water transfer actions and conveyance facilities in the Central Valley and central and southern coastal areas,

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and as well as wetlands and other habitat restoration projects in the Central Valley. However, the cumulative impact of these programs on the proposed action would be minimal. The following actions are described at length because, in some instances, they could potentially change the level of impacts to the natural or human environment from that which has been described in previous chapters. Given the uncertainty as to how, when, and to what degree each of these programs and activities will be implemented, this analysis identifies only the primary issues associated with each.

Special mention should be made of why certain aspects of the CVPIA implementation program (discussed immediately below) were not assumed in the "No Action" conditions assessed in previous chapters, but instead were included here within the cumulative impact analysis. In order to be able to clearly identify the impacts of the alternatives discussed in this document, as opposed to the impacts of key CVPIA programs (i.e., the dedication of water to environmental purposes generally and to wildlife refuges specifically which are currently being implemented), it was decided not to include such programs in the No Action analyses. This approach has the effect of crystallizing the impacts of the Preferred Alternative and other alternatives analyzed in Chapter 3, in a manner that does not cause them to be blurred within a larger discussion of overall CVPIA implementation. This approach does not lead to any underestimation of impacts, as this chapter fully accounts for the CVPIA projects. Furthermore, the preceding chapters and sections represent a fair assessment of the various alternatives because each was based on the same set of assumptions.

4.1.1 Implementation of Central Valley Project Improvement Act

On October 30, 1992, President Bush signed into law the Reclamation Projects Authorization and Adjustment Act of 1992 (Public Law 102-575) that included Title XXXIV, the CVPIA. The CVPIA amends the previous authorizations of the CVP to include fish and wildlife protection, restoration, and mitigation as project purposes having equal priority with irrigation and domestic uses, and fish and wildlife enhancement as a project purpose equal to power generation. The CVPIA identifies a number of specific measures to meet these new purposes and directs the Secretary to (1) operate the CVP consistent with these purposes, (2) meet federal trust responsibilities to protect the fishery resources of affected federally recognized Indian tribes, (3) meet all requirements of federal and California law, and (4) achieve a reasonable balance among competing demands for the use of CVP water.

As stated above, the implementation of CVPIA was modeled and included in the cumulative impact analysis. The draft CVPIA PEIS, which was released for public review in September 1997 and is available for review from Reclamation, evaluated:

- ***Anadromous Fish Restoration Program*** (AFRP) using flow and non-flow restoration methods, fish passage improvements, and Shasta TCD.
- Reliable water supply program for refuges and wetlands.
- Land retirement program for willing sellers for land with poor drainage.
- CVP water contract provisions for contract renewals, water pricing, water metering / monitoring, water conservation methods, and water transfers.
- Trinity River fish and wildlife studies recommendations.

Implementation of the alternatives considered in the draft CVPIA PEIS would improve fish and wildlife habitats, but would reduce water supply reliability to CVP water service contractors.

Implementation of the alternatives considered in the draft CVPIA PEIS would improve fish and wildlife habitats, but would reduce water supply reliability to CVP water service contractors (see Section 4.1.2). Assumed increases in groundwater pumping to substitute for decreased surface water supplies would increase the potential for ground subsidence in portions of the Central Valley, as well as increase the cost of groundwater pumping. Some of the alternatives would increase the amount of fallow land in portions of the Central Valley. The draft CVPIA PEIS also considered acquisition of water from water rights holders for purposes of increasing instream fish flows. These actions could also lead to more fallowed lands. The regional economies could be impacted by primary and secondary impacts associated with the reduction in irrigated lands.

The draft CVPIA PEIS alternatives also would modify the flow release patterns from CVP reservoirs by increasing releases in spring and reducing releases in summer. This change would reduce the amount of power generated at CVP facilities and substantially reduce the value of power produced. This would lead to an increase in power costs and a reduction in available CVP-generated power for preference power customers served by Western. In addition, changes in reservoir levels would potentially impact recreational use at various CVP and SWP reservoirs.

4.1.2 SWRCB Water Rights Process and CALFED Bay-Delta Program

The purpose of the SWRCB water rights process for Delta water quality and quantity is to develop a methodology to provide adequate flows to meet the new Delta water quality standards

developed in 1995. The SWRCB process is evaluating several alternatives that would require different programs, including the CVP and SWP, to release water in a manner to protect Delta quality. The purpose of the CALFED Bay-Delta program is to develop a long-term solution to problems affecting the Delta. The CALFED program is evaluating alternatives to improve water quality and reliability, including several water storage options that include groundwater banking, offstream surface-water storage, and ***conjunctive use***, as well as several water conveyance alternatives in the Delta. Both the SWRCB and CALFED processes are intended to improve the Bay-Delta ecosystem and water quality, which would lead to increased salmon populations in Central Valley streams. Both processes may implement many of the same actions identified under the CVPIA DPEIS.

Both the SWRCB and CALFED processes are intended to improve the Bay-Delta ecosystem and water quality.

Under the SWRCB process, water rights holders use water in a new pattern that would reduce the need for releases by CVP and SWP to meet Delta water quality standards. These changes could increase water supply reliability of the CVP and SWP. However, the improvements to CVP water deliveries may be less than those realized by the SWP due to implementation of CVPIA provisions, including increased instream flow releases in the Trinity River.

Under the CALFED process, storage and conveyance alternatives are being evaluated that would restore water supply reliability, which was lost due to releases for habitat and water quality improvements. The new storage facilities could be designed to restore water supply reliability losses caused by increased instream flow releases on the Trinity River. The public draft CALFED Bay-Delta Programmatic EIS/EIR was released for public review in June 1999 and is available from the CALFED Bay-Delta Program office.

The SWRCB is proceeding with a multi-phase water rights hearing on the Bay-Delta, including extension of the Bay-Delta Accord (Phase 1); the San Joaquin River Agreement (Phases 2, 2A, and 2B); the Suisun Marsh Agreement, (Phase 3); Mokelumne and Sacramento River Agreements (Phase 4); Compliance with the Flow-Dependent Water Quality Objectives (Dissolved Oxygen and salinity) of the Delta (Phase 5); the petition by the Bureau of Reclamation and DWR to combine their respective points of diversion in the southern Delta (Phase 6); the Bureau of Reclamation's petition to expand and consolidate the CVP places and purposes of use (Phase 7); and Phase 8, which is intended to deal with the issues/water right holders remaining after the previous phases.

Trinity County, as a party to the Bay-Delta Water Right Hearing, has requested of the SWRCB for phases 5, 6, and 7 the following:

- That minimum permitted instream fishery flows for the Trinity River be increased from 120,500 to 340,000 af to reflect the CVPIA.
- That Trinity River temperature objectives contained in the "Water Quality Control Plan for the North Coast Region" be enforced through water permit terms and conditions.
- That the SWRCB commit to a water rights proceeding on the Trinity River after the Interior Secretary makes a decision pursuant to CVPIA and this EIS/EIR.
- That the SWRCB make a finding that delivering CVP water to portions of the West San Joaquin Division of the CVP with drainage problems is a wasteful and unreasonable use of water in violation of Article X, Section 2 of the California Constitution.

Approval of Trinity County's requests by the SWRCB could:

- Eliminate the State Permit Alternative from further consideration.
- Ensure more formal compliance with Trinity River temperature objectives.
- Ensure that the SWRCB reviews and updates Reclamation's Trinity River water permits following the Secretary's Trinity flow decision.
- Provide a source of mitigation water to other CVP contractors, while also significantly reducing CVP deliveries to the Westlands Water District (and resultant reductions in agricultural output) and other districts within the West San Joaquin Division of the CVP.

4.1.3 Deregulation of Electric Industry in California

Assembly Bill 1890 (AB 1890) was passed in 1996 by the California State Legislature. AB 1890 provides the legal framework for a newly organized electric industry. The basic intent of AB 1890 is to increase competition and choices, lower prices, and assure the same reliable service. The power generation component of electric service was deregulated by the legislation because it is a "commodity." The two other components, transmission and distribution, will remain regulated under the legislation. A newly established Independent System Operator (ISO) manages the entire long-distance transmission grid (the structure of large power lines, towers, and transformers connecting California consumers and power generation sources). An independent organization, the Power Exchange (PX), was created as a power pool for the state. Instead of selling electricity directly to customers, all investor-owned utilities in California compete to sell generation resources through the PX. Other independent electricity

producers may also sell through the PX. The premise is that competitive bidding at the PX will decrease overall generation prices.

As of March 31, 1998, customers of PG&E, San Diego Gas & Electric, and Southern California Edison Company were able to choose another electric service provider for the generation portion of their electricity. State law allows each municipally owned electric utility to decide whether or not their customers will have a choice of electric service providers.

Energy users have the opportunity to purchase electricity from independent generators that may or may not be located in the state. This will probably lead to a reduction in energy costs for large users or users that purchase electricity in a group manner. This also may lead to users transferring generators to "green power," which may include hydropower or other non-emission power sources.

The preferred alternative in this DEIS/EIR would reduce available CVP hydropower generation annually and in peak power demand periods (i.e., summer months).

The preferred alternative in this DEIS/EIR would reduce available CVP hydropower generation annually and in peak power demand periods (i.e., summer months). If this power is not available for use by Western preference power customers, the customers or Western would need to purchase power from other sources. Therefore, the cost of power for all users would probably increase due to market forces.

Significant cumulative impacts (primarily air quality impacts) could occur if these reductions in power supplies induced increased generation from either existing gas-fired generators or the construction of new facilities. It is important to note, however, that the facilities that generate power from fossil fuel sources are generally subject to stringent air quality regulation pursuant to the federal Clean Air Act and, within California and many other states, state statutes and regulations. These regulations frequently require some sort of mitigation (e.g., "offsets" and/or "best available control technology") to reduce the severity of localized and regional air quality impacts. Because electricity in the Western United States is supplied through a complicated "grid" covering numerous states, and because individual utilities decide where to purchase power based on a number of changing factors such as price, it is impossible at present to predict with any level of reliability where localized or regional air pollution increases might occur.

It is possible that future storage facilities considered under CALFED could increase power generation. However, other aspects of the CALFED alternatives would probably reduce power availability from CVP and other hydropower facilities and the timeframe for the construction of such facilities is speculative.

4.1.4 Changes in Federal Farm Support Programs

The 1996 Farm Bill revised the way federal farm subsidies are determined and decoupled the size of the subsidies from production levels. There remains, however, some uncertainty about how the U.S. Department of Agriculture (USDA) would treat lands that are part of a grower's base acreage, yet fallowed if CVP water supplies are reduced. For purposes of this DEIS/EIR, it was assumed that USDA would remove such lands from the grower's base acreage and reduce their federal subsidies accordingly, resulting in a savings to the federal treasury.

In contrast, if growers who fallow their land due to water supply reductions continue to receive farm program payments associated with that land, then no savings would accrue to the federal treasury. However, net revenues to the farmers would increase. This may lead to greater participation in the Central Valley water transfer market, which may lead to a lower cost for water. Either or both of these impacts could increase the amount of water available for ***water acquisition.*** This would then increase water supply reliability of agricultural or municipal users. The water also could be acquired to increase instream flow releases. Because the 1996 Farm Bill extends for only a limited number of years, great uncertainty remains about the cumulative effects of the program.

4.1.5 Changes in Demand for Agricultural Products

The analyses in this DEIS/EIR used recent agricultural prices and costs. However, some evidence exists that demand for farm produce, especially fruits and vegetables grown in California, will increase in the future and cause their price to increase faster than the overall inflation rate. If this occurs, then the estimated costs associated with acreage reductions in this DEIS/EIR are understated. However, it is possible that increasing competition from expanding production regions, especially in Central and South America, will decrease demand and hold future price increases to below the level of inflation. If this occurs, then the estimated costs associated with acreage reductions are overstated.

Changes in demand could change the ratio of permanent to annual crops. If more permanent crops were planted, the effects of changes in annual water availability could become more significant.

4.1.6 Changes to Fisheries Management

Artificial propagation of game fish, including west coast anadromous fish, has been an important tool in fishery management. Numerous federal, state, and local fish hatcheries and rearing facilities have made successful and substantial contributions to the size of anadromous fish populations. Most of these programs are well funded by

their respective agencies, including the TRSSH, which has undergone a major rehabilitation to improve water quality and production facilities. Increased hatchery production could increase the number of salmon in the ocean, and therefore, increase the number of returning fish to all streams, including the Trinity River. However, concerns have been raised about the use of hatchery fish that are not subject to natural selection during reproduction and rearing. Hatchery-raised fish may also reduce genetic variability and lead to genetic abnormalities that are transferred to natural stock. Hatchery-raised fish may also be more subject to disease.

Salmon spend over two-thirds of their life cycle in the ocean. During this stage of their lives they are difficult to study. Both sport and commercial harvests appear to have a major role in returning fish populations. However, until harvest impacts can be discerned from natural phenomena of the sea (e.g., changes to temperature, upwellings, currents, and food availability), there is no exact method to assess the impacts of ocean fisheries. The NMFS has made advances in resolving some of these issues and will continue to address these concerns, leading to improved management of ocean fisheries. The preferred alternative focuses on restoring natural fish production and, as such, is projected to increase the number of fish produced and available for harvest accordingly.

4.1.7 Changes in Demand for Recreational Opportunities

The impact analyses in this DEIS/EIR assumed a constant demand for recreational opportunities not associated with Trinity River and mainstem reservoirs and a constant revenue source. The preferred alternative is anticipated to provide additional opportunities for many activities, including fishing, associated with increased fish production and in-stream flows in some months. Associated regional economic benefits are expected to increase accordingly.

4.1.8 Changes in Trinity River Basin Consumptive Water Use

The authorizing legislation for the TRD acknowledged the potential for an increased water demand of 50,000 af in the Trinity River. Additional TRD water could be released for in-basin consumptive uses. This would reduce TRD exports and power generation above that identified in this DEIS/EIR. The resultant impacts would be influenced by the timing and amount of the releases and associated decreased exports.

4.1.9 Five Counties Coho Conservation Program

As a result of the proposed listing of the coho salmon in the northern California/southern Oregon ESU, the counties of Humboldt, Trinity, Del Norte, Siskiyou, and Mendocino joined together to assist in the

recovery of coho, and now steelhead. The overall goal of the counties is to address and improve anadromous salmonid habitat as well as conservation and restoration within the five-county area, such that the listings do not result in massive economic impacts similar to the spotted owl listing. Significant funding has or is being provided by NMFS, SWRCB (Proposition 204 Delta Tributary Watershed Program), CDFG (SB 271) for the Sake of the Salmon, and the California Resources Agency.

Work accomplished to date includes an University of California Cooperative Extension review of current land use activities, prioritization of watersheds by local fisheries biologists, outreach, grant writing, completion of a fish migration barrier assessment for portions of Humboldt County, and an annual Road/Fisheries Academy for county road department staff. Future work includes extensive road inventories; on-the-ground restoration related to county roads; completion of a model grading ordinance and equipment operators' certification training program, education; and completion of a five-county Facilities Management Plan and a Policies and Procedures Manual. Depending upon the level of implementation and funding, the Five Counties Coho Conservation Program could assist in the long-term improvement of water quality and fish habitat in the Trinity and Klamath rivers.

4.1.10 Total Maximum Daily Load (TMDL)

The South Fork Trinity River, Mainstem Trinity River and Klamath River are listed on the State of California's Clean Water Act (CWA) Section 303(d) Impaired Waterbodies list (303(d) list). The 303(d) list describes waters that do not fully support all beneficial uses or are not meeting water quality objectives. The South Fork Trinity and Mainstem Trinity are identified as impaired by sediment, with the South Fork also impaired by temperature. The Klamath River is identified as impaired by nutrients, temperature, and dissolved oxygen. For such water bodies, the CWA requires the development of Total Maximum Daily Load (TMDL) allocations for the pollutants of concern. A TMDL allocation must estimate the total maximum daily load, with seasonal variations and a margin of safety, for all suitable pollutants and thermal loads, at a level that would assure protection and propagation of a balanced indigenous population of fish, shellfish, and wildlife.

As a result of a stipulated dismissal of a lawsuit by numerous environmental and fishery groups against the EPA, the South Fork Trinity River TMDL was completed by the EPA in December, 1998. The Trinity River TMDL is scheduled for completion in 2001. The Klamath River TMDL is scheduled for completion in 2004. Implementation of the respective TMDLs will likely require incorporation

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into the North Coast Regional Water Quality Control Board's (NCRWQCB) "***Water Quality Control Plan for the North Coast Region"*** (Basin Plan) through an amendment process. To date, only the TMDL for the Garcia River has been incorporated into the Basin Plan. There is no current schedule for inclusion of the South Fork Trinity TMDL into the Basin Plan. However, ultimate completion and adoption of TMDL's for the South Fork Trinity River, mainstem Trinity River, and Klamath River could assist in the long-term improvement of water quality and fish habitat in the Trinity and Klamath rivers.

4.1.11 Lower Klamath Restoration Partnership

The Yurok Tribe is participating in a major Lower Klamath Restoration Partnership (LKRP), a program to reduce sediment yields and improve fish habitat in the lower Klamath River and its tributaries. The LKRP is a cooperative effort between the Yurok Tribe, Simpson Timber Company, the California State Coastal Conservancy, and the Northern California Indian Development Council. The LKRP is a holistic approach to ecosystem management, which focuses on the protection, restoration, and management of the entire basin rather than focusing on the enhancement of single, isolated projects. This process involves a prioritization of watersheds to be restored based on geomorphology, road densities, management history, in-stream habitat, and biological surveys. All road systems and landslides within priority watersheds are assessed, followed by implementation of restoration projects to solve the major erosion problems within the watershed. During the summer of 1999, five excavators and five bulldozers were working to repair priority erosion problems that were previously identified as priority projects by assessment efforts.

4.1.12 Changes in California Forest Practice Rules

The California Board of Forestry, which is a nine-member, governor-appointed body, is responsible for promulgation and adoption of rules and regulations which affect the harvest of timber from private lands within California. The listing of coho salmon as threatened or endangered throughout California and the CWA 303(d) listing of several north coast streams (see TMDL above), has resulted in proposed changes to the Forest Practice Rules (FPR) to better protect impaired water bodies, as well as salmon and steelhead populations and their habitat. The proposed rule changes are a result of a scientific panel's review of the FPR, which identified serious deficiencies in the FPRs in terms of protection for aquatic ecosystems, riparian ecosystems, and watersheds. If the FPRs are strengthened as proposed, it is anticipated that the rule changes will complement current efforts to restore aquatic ecosystems, fish habitat, and

watershed health in the Trinity River basin and elsewhere by reducing sediment input to streams and rivers.

4.1.13 Tribal Water Quality Control Planning

Pursuant to Section 303(c) of the federal Clean Water Act, the EPA is authorized to delegate water quality authority to federally recognized Indian tribes. The Hoopa Valley Tribal Council (HVTC) has received 303(c) water quality authority from EPA, becoming the first tribe in California to receive such approval. The Yurok and Karuk Tribes have received Clean Water Act Section 106 grants from EPA to undertake baseline assessments, with the intent of developing water quality control plans and standards, which are expected to be completed in 2001.

In 1997, the HVTC approved and forwarded to the EPA a Water Quality Control Plan (WQCP), which included temperature objectives for protection of the anadromous fishery. The HVTC subsequently withdrew the Plan from EPA in 1999 to conduct a bi-annual review as required by the WQCP and the CWA. The HVTC is now in the process of revising its WQCP and standards to reflect the recent completion of the TRFE recommendation and other scientific findings related to heavy metals. In the event that the HVTC approves a revised plan, it will submit it to EPA for final approval. Ultimate approval and implementation of tribal water quality control plans that include site- and time-specific temperature objectives protective of the anadromous fishery resources could provide an additional tool to provide the water quality necessary to help restore habitat and fish populations in the Trinity and Klamath Rivers.

4.1.14 Cumulative Impacts Analysis

The simulation of the future cumulative condition includes consideration of:

- Projected increase in state-wide population growth and associated demand for CVP water supplies in 2020, incorporating "probable future projects" (i.e., the No Action assumptions).
- All CVP contracts allocations identified in Table 4-1 are fully used (i.e., the full allocation identified for a given contract is in fact used, which as shown on Table 4-1, is in addition to what is assumed in the No Action alternative, since such full allocation is not expected to occur by 2020).

Notably, the analysis of project impacts throughout this DEIS/EIR effectively addressed cumulative impacts by relying on models (e.g., PROSIM) that attempt to predict impacts in 2020, both of the Preferred Alternative (and other alternatives), as well as other projects

TABLE 4-1
CVP Contract Allocation Assumed to be Used in Existing Conditions, No Action, Preferred Alternative, and Cumulative Impacts Scenarios

CVP Water Users	Existing Conditions (simulated 1995 levels) (taf)	No Action & Preferred Alternative (simulated 2020 levels) (taf)	Cumulative Impacts (simulated 2020 levels)[a] (taf)
North of the Delta			
Agricultural Water Service Contractors	420	420	510
Sacramento River Water Rights Settlement Contractors	2,070	2,070	2,200
Municipal Water Rights	440	550	570
Municipal Water Service Contractors	250	270	540
Refuge Water Supplies	90	90	190
South of the Delta			
Agricultural Water Service Contractors	1,980	1,980	1,980
San Joaquin River Exchange Contractors	880	880	880
Municipal Water Service Contractors	140	140	140
Refuge Water Supplies	160	160	290
CVP Contracts on the Stanislaus River	160	160	160

[a]Assumed that full contract allocation is used.

placing demands on the CVP and SWP systems. Although each chapter or subchapter of this EIS/EIR, in order to comply with CEQA, includes a section comparing the impacts of the Preferred Alternative to "existing conditions" in 1995 in order to ascertain what are commonly known as "project specific impacts," the remainder of the impact analysis compares the effects of various alternatives with "no action" (2020) conditions, which predict conditions in 2020 without the project.

The models on which 2020 projections were based take account for "probable future projects." As such, this approach satisfies the separate CEQA obligation to address cumulative impacts. In addition, as identified above, the cumulative analysis also includes full contract allocations not assumed for the No Action 2020 condition as shown in Table 4-1.

Between 1995 and the year 2020, projected annual CVP M&I water service contracts and water rights demands are assumed to increase

by approximately 320,000 af north of the Delta. Annual SWP entitlements are projected to increase from 3.5-4.2 maf by the year 2020. The cumulative impacts analysis includes the re-operation of the CVP in response to the Trinity River DEIS/EIR Preferred Alternative, and then adds the implementation of the following CVPIA measures and programs:

- Implementation of CVP re-operation and 3406(b)(2) water management for upstream and Delta actions similar to those defined in the November 20, 1997, Administrative Paper released by Reclamation and the Service.
- Acquisition of up to 140,000 af/yr from willing sellers on the Stanislaus, Tuolumne, Merced, Calaveras, Mokelumne, and Yuba Rivers to meet instream and Delta fisheries needs. Acquired water may be exported from the Delta if conditions allow.
- Provision of firm Level 2 (typically the amount of water specific refuges received historically) refuge water supplies, including a 25 percent shortage provision in dry years based on the 40-30-30 Index (as described in the SWRCB 1995 Water Quality Control Plan).
- Acquisition of Level 4 (quantity of water specified in Interior reports assumed to allow for optimum management of each refuge specifically included in CVPIA) refuge water supplies, including shortage criteria based on the reliability of the source from which the acquisition is made (Table 4-1).

The cumulative analysis also assumes that all CVP contracts allocations are fully used.

In addition to these actions, the cumulative analysis also assumes that all CVP contracts allocations identified in Table 4-1 are fully used (i.e., the full allocation identified for a given contract is in fact used).

Potential changes to reservoir storage levels and water deliveries were modeled using PROSIM. These data were then used as input to analyze potential impacts to groundwater levels, as well as changes to agricultural production and associated land fallowing using the CVGSM and CVPM models, respectively. These same models were used to identify impacts associated with each of the proposed alternatives in Chapter 3, Affected Environment and Environmental Consequences. Additional information about these models is presented in Section 3.3 (Water Resources) and Section 3.9 (Land Use), as well as the associated technical appendices.

The operation threshold of CVP facilities (e.g., dam outlet structures) was assumed to be the ultimate "floor" when attempting to meet future demands and operating requirements in the year 2020.

CVP Operations. In conducting the initial cumulative impacts analysis, all CVP facilities (other than Trinity Reservoir) were assumed to be operational down to their operation thresholds. The operation threshold of CVP facilities (e.g., dam outlet structures) was assumed to be the ultimate "floor" when attempting to meet future demands and operating requirements in the year 2020. For example,

operations at Shasta Reservoir were simulated to provide releases to meet agricultural, M&I, and environmental demands down to 500,000 af, the minimum storage level at which the reservoir could feasibly operate. It is believed that when Shasta Reservoir falls below this level, dam releases result in vortexing at the outlet structure and infeasible operations. Indeed, operations were severely impacted during 1977, when Shasta Reservoir recorded its lowest minimum storage ever of 560,000 af.

In conducting the initial cumulative impact analysis (which again, assumes development in the year 2020, the actions described above, and the Preferred Alternative), it was found that simulated storage levels in Shasta Reservoir during the dry period (1928-1934) as well as one other critically dry year (1924) over the simulation period were substantially below feasible operating levels. Therefore, a second cumulative impact analysis (i.e., PROSIM run) was conducted, attempting to maintain Shasta Reservoir storage within 10 percent of the 500,000 af minimum storage target. In order to meet this threshold, the minimum storage level in Trinity Reservoir was reduced from 600,000 af (the assumed minimum storage level for the Preferred Alternative), to 400,000 af (the minimum storage for the 1995 existing conditions and 2020 No Action scenarios). As such, impacts associated with a 600,000 af carryover storage scenario would be greater than are described below. In reality, the threshold for Trinity Dam operations is approximately 225,000 af; however, the storage level was held at 400,000 af in an attempt to meet Trinity River temperature objectives.

Under the second cumulative impacts analysis, simulated end-of-water-year storage in Trinity Reservoir is decreased in approximately 85 percent of the years compared to 1995 existing conditions (Figure 4-1). In 80 percent of the years, the 600,000 af Preferred Alternative carryover threshold is met (compared to 90 percent of the years under No Action).

Compared to 1995 existing conditions, simulated end-of-water-year storage in Shasta Reservoir decreases in approximately 90 percent of the years under the second cumulative impacts analysis (Figure 4-2). Simulated minimum end-of-month storage in Shasta Reservoir drops to the minimum storage threshold (two months in simulated water-year 1932), even assuming a Trinity Reservoir carryover storage level of 400,000 af.

Minimum contract deliveries and even deliveries to water rights holders cannot be maintained in the American River Division in some critically dry years.

As a result of increased water demand assumed for the cumulative impacts analysis, minimum contract deliveries and even deliveries to water rights holders cannot be maintained in the American River Division in some critically dry years throughout the simulation period. End-of-water-year storage differences in Folsom Reservoir are presented on Figure 4-3. Comparisons of simulated average

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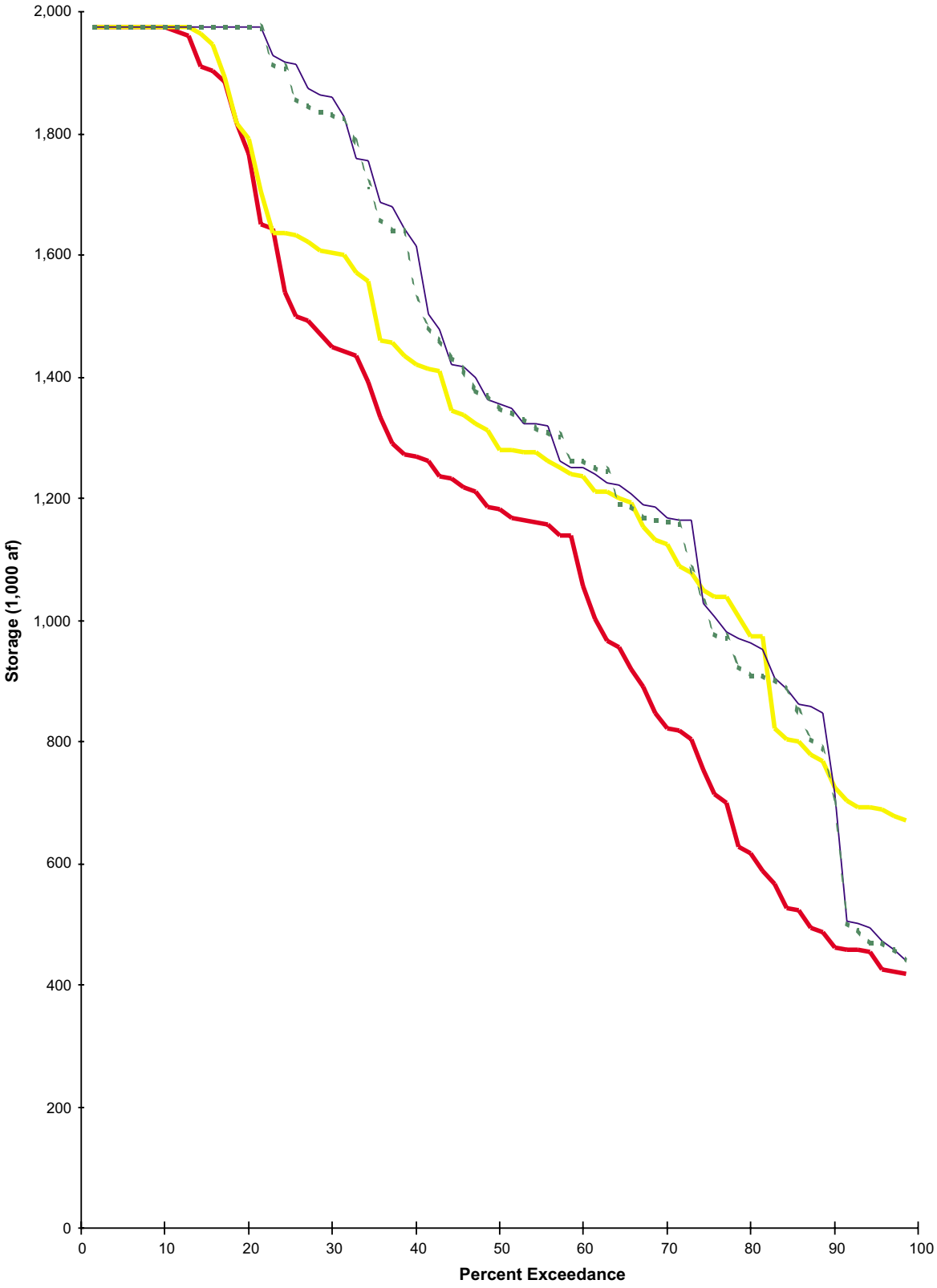

LEGEND

- No Action Alternative
- Cumulative Impacts
- Flow Evaluation Alternative
- Existing Conditions

FIGURE 4-1
TRINITY RESERVOIR SIMULATED FREQUENCY OF END-OF-WATER-YEAR STORAGE, WATER YEARS 1922-1990
TRINITY RIVER MAINSTEM FISHERY RESTORATION EIS/EIR

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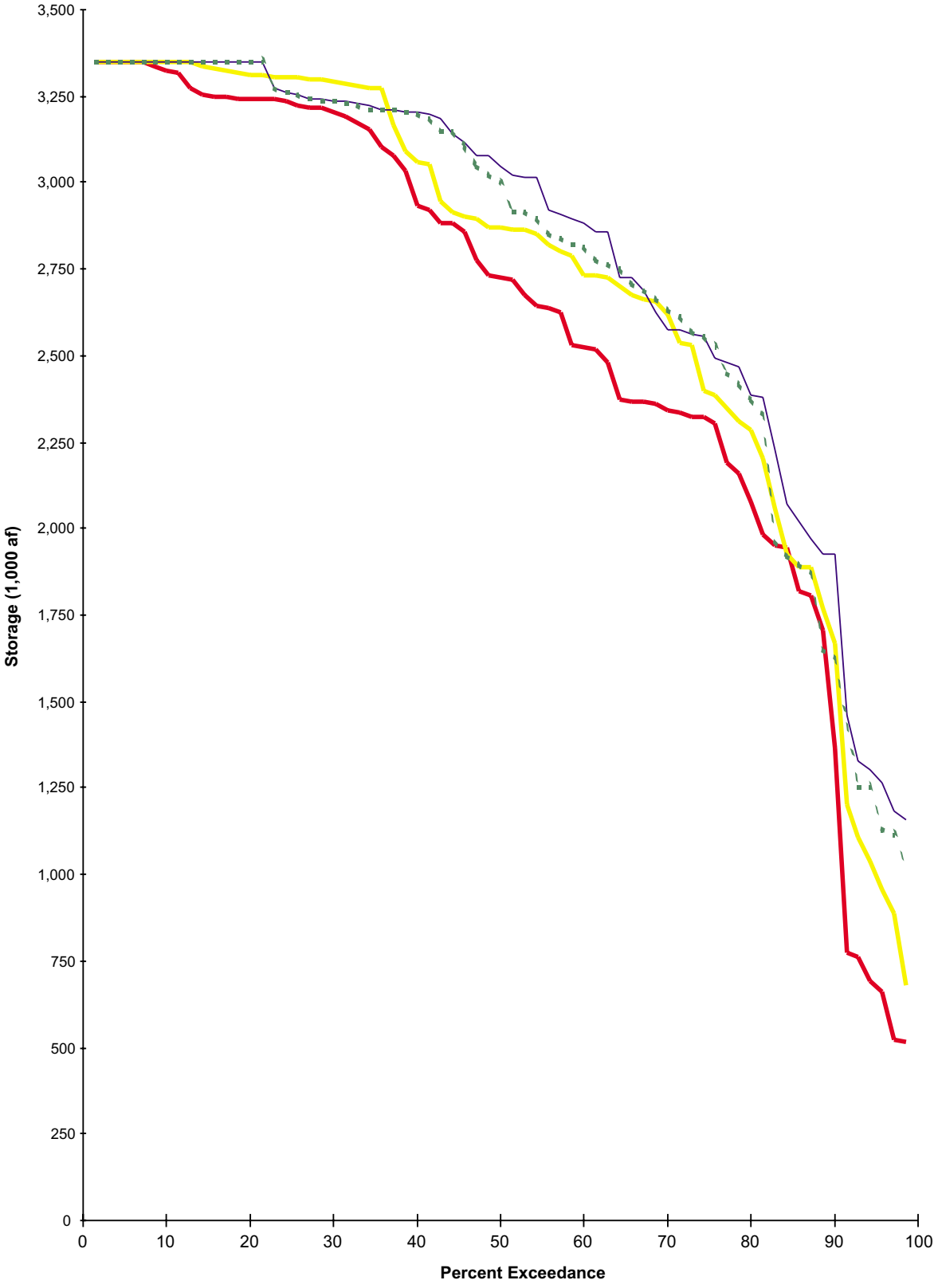

FIGURE 4-2
SHASTA RESERVOIR SIMULATED FREQUENCY OF END-OF-WATER-YEAR STORAGE, WATER YEARS 1922-1990
TRINITY RIVER MAINSTEM FISHERY RESTORATION EIS/EIR

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monthly flows in the American River below Folsom and Natomas Reservoirs during the dry, wet, and long-term average periods are presented on Figure 4-4. Compared to 1995 existing conditions, simulated average monthly flows during the summer months in the second cumulative impacts analysis are reduced in all three periods due to full contract allocations, including diversions upstream of Folsom and Natomas Reservoirs.

CVP Water Contract Deliveries. In the second cumulative impacts analysis, CVP/SWP operations were simulated to accommodate the increased contract allocations (Table 4-2). Deliveries in the wet period were increased even for the cumulative impacts analysis because of the need to meet increased demands.

TABLE 4-2
Comparison of CVP Deliveries in the Existing Conditions, No Action, Preferred Alternative, and Cumulative Impacts Simulations

		Simulated Average Annual CVP Deliveries (taf)			
Years	Type of Period	Existing Conditions (simulated 1995 levels)	No Action (simulated 2020 levels)	Preferred Alternative (simulated 2020 levels)	With Cumulative Impacts (simulated 2020 levels)
1922-1990	Long-term Average	5,380	5,690	5,600	5,460
1928-1934	Dry Period	4,020	4,260	4,100	3,820
1967-1971	Wet Period	5,860	6,200	6,180	6,270

Note: CVP deliveries include deliveries to agricultural and M&I water service contractors, Sacramento River water rights contractors, other water rights contractors, and San Joaquin River exchange contractors. CVP deliveries do not include refuge water supplies.

CVP Water Deliveries North of the Delta. Deliveries to agricultural and M&I water service contractors north of the Delta are a function of CVP available water supply. As available water supply in 2020 is reduced due to increased demands, decreased TRD exports, full contract allocations, and implementation of CVPIA, there is a resulting decrease in deliveries to CVP water service contractors. In general, there is a reduction in annual deliveries in all but the wetter years.

Compared to 1995 conditions, simulated annual deliveries in 2020 to CVP agricultural water service contractors north of the Delta are greater in wetter years, due to the increase of full contract allocations. In the cumulative impacts analysis, simulated full annual deliveries occur less frequently than in existing conditions (55 percent of the years instead of 65 percent). In both the existing conditions and cumulative impacts analysis, the simulated minimum annual delivery in the driest years is 0 af, but this zero delivery occurs more frequently

Simulated full annual deliveries occur less frequently than in existing conditions (55 percent of the years instead of 65 percent).

in the cumulative impacts analysis (10 percent of the years instead of 1 percent).

Compared to existing conditions, simulated maximum annual deliveries to CVP M&I water service contractors north of the Delta are greater during wet periods due to meeting the full contract allocations. However, the occurrence of simulated full annual deliveries is reduced from 80 percent of the years in existing conditions to 65 percent. Simulated annual deliveries below 75 percent of the contract amount are made in about 6 percent of the years in the existing conditions, and 20 percent of the years in the cumulative impacts analysis.

CVP Water Deliveries South of the Delta. Deliveries to agricultural and M&I water service contractors south of the Delta are a function of available CVP water supply and the amount of water exported through the Tracy Pumping Plant in the Delta. In general, there is a reduction in annual deliveries in all but the wetter years.

Under cumulative impacts analysis, annual deliveries to CVP agricultural water service contractors south of the Delta are less in most years due to reduced available water supply and the April/May export restrictions specified as part of (b)(2) water management identified in the CVPIA. The occurrence of full annual deliveries is reduced from 45 percent of the years in existing conditions to 15 percent of the years. In both the existing conditions and cumulative impacts analyses, the simulated minimum annual delivery in the driest years is 0 af, but this zero delivery occurs more frequently in the cumulative impacts analysis (7 percent of the years instead of 1 percent).

The occurrence of full annual deliveries is reduced from 45 percent of the years in existing conditions to 15 percent of the years.

Simulated annual deliveries to CVP M&I water service contractors south of the Delta are less in many years due to the same reasons stated for CVP agricultural water service contractors. The occurrence of simulated full annual deliveries is reduced from 70 percent of the years in existing conditions to 40 percent of the years. Simulated annual deliveries below 75 percent of the contract amount are made in 6 percent of the years in existing conditions and 19 percent of the years in the cumulative impacts analysis.

SWP Operations. SWP operations are also affected by the changes in the operation of CVP reservoirs. These changes to operations shift the timing of flow entering the Delta and affect the SWP responsibility to help meet in-basin water rights and Delta water quality requirements under the COA. Compared to existing conditions, simulated end-of-water-year storage in Oroville Reservoir is reduced in wetter years because of the increase demands at the year 2020 level of development and the implementation of the CVPIA (Figure 4-5). In drier years, the reduction in simulated end-of-water-year storage

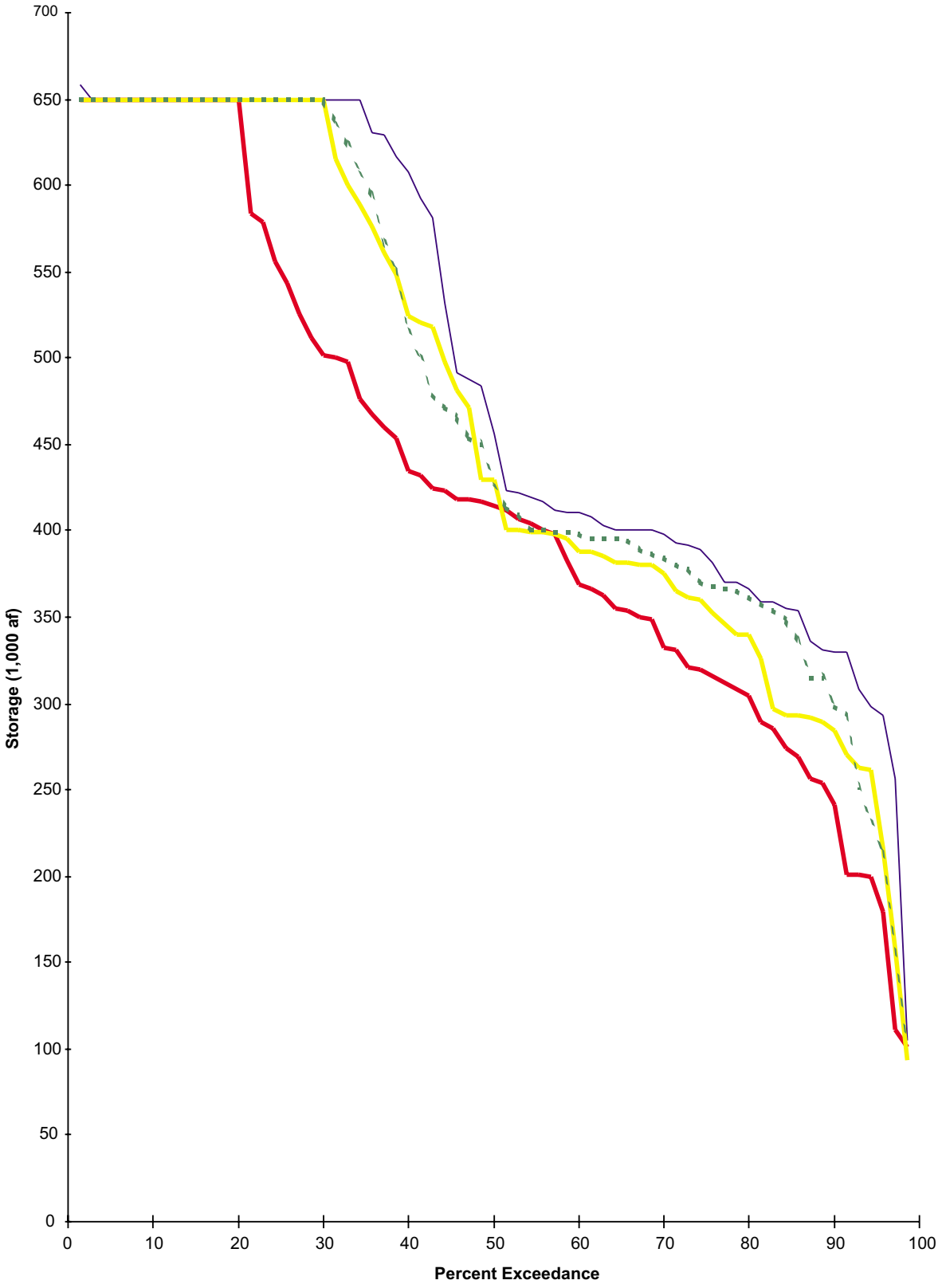

FIGURE 4-3
FOLSOM RESERVOIR SIMULATED FREQUENCY OF END-OF-WATER-YEAR STORAGE, WATER YEARS 1922-1990
TRINITY RIVER MAINSTEM FISHERY RESTORATION EIS/EIR

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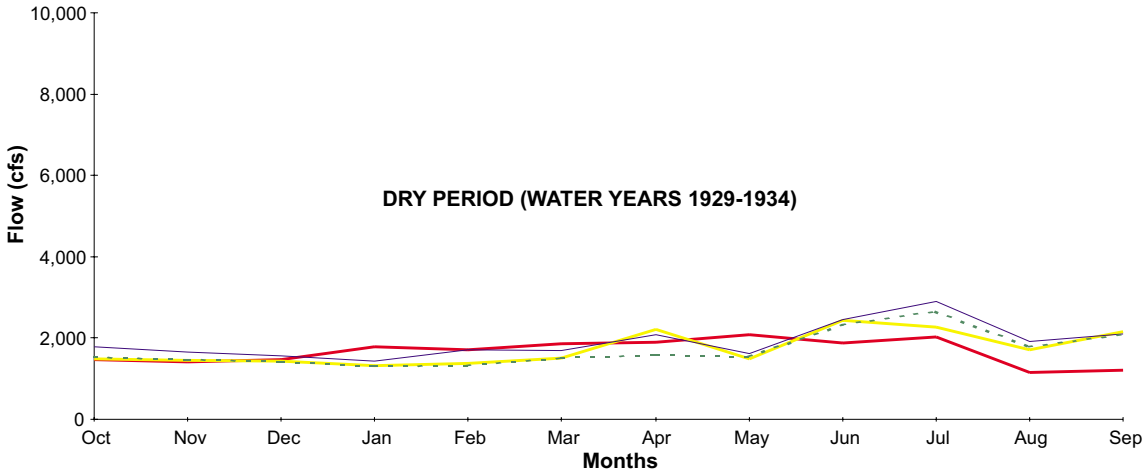

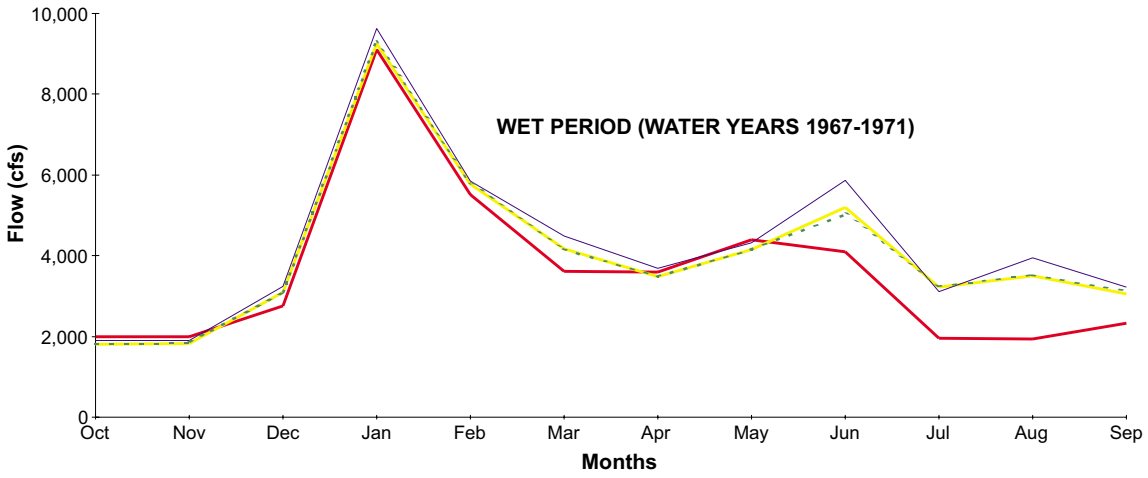

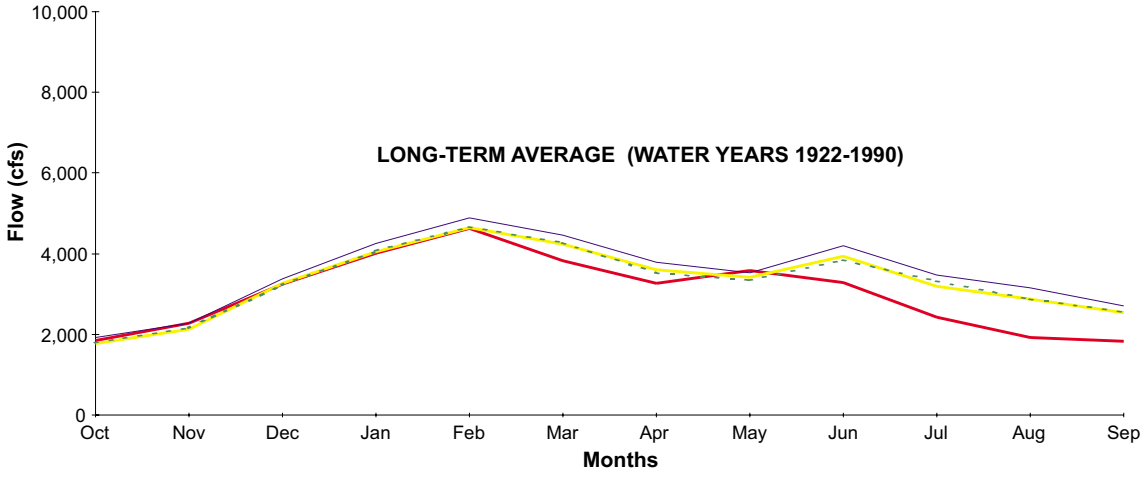

LEGEND

- No Action Alternative
- Cumulative Impacts
- Flow Evaluation Alternative
- Existing Conditions

FIGURE 4-4
AMERICAN RIVER BELOW NATOMAS
SIMULATED MONTHLY FLOWS
TRINITY RIVER MAINSTEM FISHERY RESTORATION EIS/EIR

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is less noticeable because of the ability of the Banks Pumping Plant in the Delta to export water released from upstream CVP reservoirs for CVPIA purposes.

SWP Entitlement Water Deliveries. Deliveries to SWP entitlement holders south of the Delta are a function of the available SWP water supply and the amount of water exported through the Banks Pumping Plant. During April and May, exports through the Banks Pumping Plant are restricted per CVPIA (b)(2) water management. During subsequent months, additional water is often released from Oroville Reservoir to compensate for the water that could not be exported during April and May. These increased releases reduce storage in Oroville Reservoir.

In general, there is a slight increase in simulated annual deliveries to SWP entitlement holders in wetter years because of the increase in demands at the year 2020 level of development (Table 4-3). In the dry period there is also a slight increase in SWP deliveries, which is attributable to the available capacity at the Banks Pumping Plant to export excess flows in the Delta associated with the (b)(2) water management flows specified in the CVPIA. However, deliveries would decrease in some of the most critically dry years because of the change in SWP operations to meet in-basin water rights and Delta water quality requirements under the COA. In existing conditions, simulated full annual deliveries to SWP entitlement holders south of the Delta are made in 65 percent of the years; in the cumulative impacts analysis, full annual deliveries are made in 35 percent of the years.

(SWP) deliveries would decrease in some of the most critically dry years because of the change in SWP operations to meet in-basin water rights and Delta water quality requirements under the COA.

Issue-specific Cumulative Impact Analysis. The following discussion identifies potentially significant cumulative impacts that are anticipated as a result of implementing the Preferred Alternative in relation to past, present, and reasonably foreseeable projects. In other words, the discussion identifies those areas in which the impacts of the Preferred Alternative, when viewed against the backdrop of these other projects, would cause an incremental impact that is "cumulatively considerable" within the meaning of CEQA. Impacts discussed within issue areas which are not included below were omitted because the incremental impact of the Preferred Alternative was considered to be "de minimus" (CEQA Guidelines §§15130). A "de minimus contribution means that the environmental conditions would essentially be the same whether or not the proposed project is implemented" (CEQA Guidelines §§15130).

Fishery Resources. Implementation of the Preferred Alternative is expected to result in a cumulatively beneficial impact in terms of increased anadromous fish production within the Trinity River Basin. As described in Chapter 3, this increase in fish production would result in beneficial recreational impacts, as well as increased

economic benefits within the Trinity River Basin and Lower Klamath River Basin / Coastal Area. Modeled adverse impacts to anadromous

TABLE 4-3

Comparison of SWP Deliveries in the Existing Conditions, No Action, Preferred Alternative, and Cumulative Impacts Simulations

		Simulated Average Annual SWP Deliveries (taf)			
Years	Type of Period	Existing Conditions (simulated 1995 levels)	No Action (simulated 2020 levels)	Preferred Alternative (simulated 2020 levels)	With Cumulative Impacts (simulated 2020 levels)
1922-1990	Long-term Average	2,780	3,220	3,210	3,150
1928-1934	Dry Period	1,860	1,810	1,840	1,910
1967-1971	Wet Period	3,000	4,000	3,960	3,940

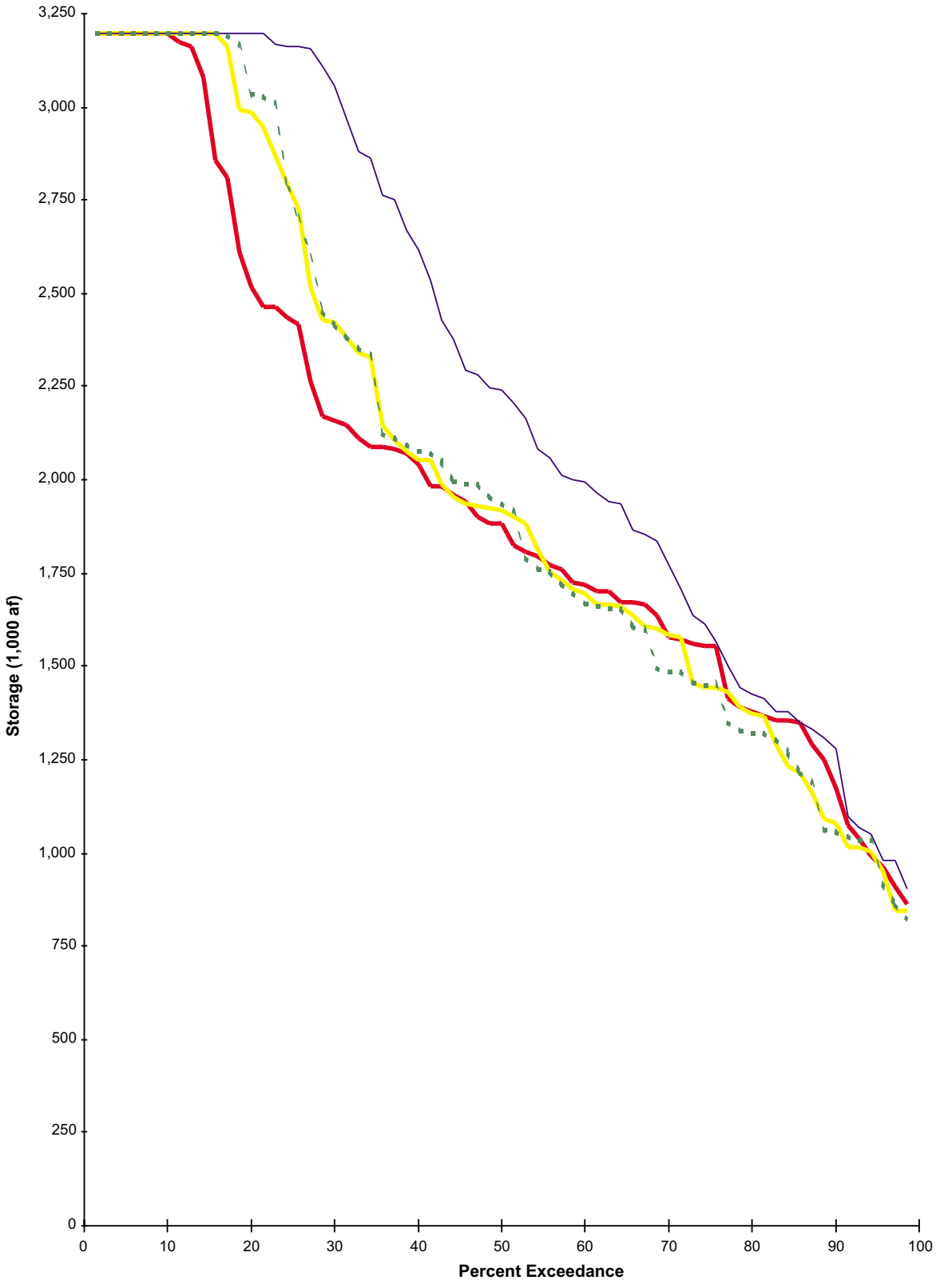
Note: SWP deliveries include deliveries south of the Delta to entitlement holders. SWP deliveries do not include refuge water supplies.

fish within the Sacramento River would be expected to occur with regard to increased losses of early life-stages (eggs and sac-fry) of some runs of Sacramento River chinook salmon compared to the No Action Alternative, as well as existing conditions. These impacts are attributable to a slight anticipated mortality of chinook salmon eggs and sac-fry from increases of Sacramento River water temperature and would be significant.

The cumulative effects of the implementation of preferred alternatives and full CVP deliveries on Delta species would likely be minor compared to No Action. The average absolute change in the position of X2 (in km) in the Delta during February through June would be less than 1.7 km, a relative change of less than 3 percent. These changes in geographic position of X2 may not be sufficiently large as to affect transport of larvae and juveniles into areas in the Delta where they could be entrained into the Delta pumps. However, reductions in outflows in the Delta in comparison to the No-Action, and existing conditions scenario may adversely affect Delta species by relocating them in less productive or areas of lower habitat value within the Delta. These changes would be considered significant.

Agricultural Land Use. Surface-water deliveries to agricultural water rights, exchange, settlement, and water service contractors north and south of the Delta could be influenced by future demands for water as well as CVP and SWP operational limitations in meeting other needs.

Impacts Relative to the No Action Alternative. Average surface-water delivery is estimated to increase by 110,000 af in the Sacramento Valley Region. Reduction in groundwater pumping would result in only minor changes in total irrigated acreage.



LEGEND

- No Action Alternative
- Cumulative Impacts
- Flow Evaluation Alternative
- Existing Conditions

FIGURE 4-5
OROVILLE RESERVOIR SIMULATED FREQUENCY OF END-OF-WATER-YEAR STORAGE, WATER YEARS 1922-1990
TRINITY RIVER MAINSTEM FISHERY RESTORATION EIS/EIR

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The cumulative reduction in surface water delivered south of Delta is estimated to be 357,000 af in the San Joaquin Valley and 79,000 af in the Tulare Basin. A portion of this reduction occurs in areas also affected by the CVPIA land retirement program.

Irrigated acreage would drop by about 66,000 acres south of Delta due to land retirement and water supply reductions. Impacts would be focused in the Delta-Mendota and San Luis service (including WWD) areas of the CVP. Irrigated acreage would decrease approximately 9 percent within the Westlands subregion. This would exceed the 5 percent threshold established in Section 3.9 (Land Use) and would therefore be significant.

In the San Felipe Unit, irrigated acres would decline by approximately 9,000.

Additional land retirement is expected to be implemented in SWP service areas within Kings and Kern Counties. In areas not implementing land retirement, changes in surface-water supply are largely matched by regional changes in groundwater pumping. Irrigated acreage reductions would be more pronounced in areas with limited usable groundwater. In the San Felipe Unit, irrigated acres would decline by approximately 9,000, with an average gross revenue reduction of about $32 million per year. This reduction in irrigated acreage represents a significant decrease of almost 38 percent within the subregion.

Gross revenue from irrigated crops would remain about the same in the Sacramento Valley, but would fall substantially in the San Joaquin Valley and Tulare Basin regions affected by land retirement and water cutbacks. Potential net revenue impacts from land retirement would be reduced by the payments made to growers who retire land. Substantially higher water costs face CVP water service contractors due to CVPIA water pricing changes and, south of Delta, due to higher cost groundwater pumping.

Impacts Relative to Existing Conditions. Agricultural impacts in the Sacramento Valley and the San Felipe Unit would be similar to those described relative to the No Action Alternative. Impacts to the San Felipe Unit would be significant with regard to increased reductions in irrigated acreage (reduction of approximately 42 percent). Higher losses of CVP delivery are estimated south of Delta, caused by additional deliveries made to urban water rights in the Sacramento Valley.

Total reduction in surface water applied for irrigation is estimated to be 643,000 af on average in the San Joaquin Valley and 256,000 af in the Tulare Basin. Although much of the reduction is offset by groundwater pumping, over 190,000 acres would still go out of production. Of this, 75,000 acres is due to the land retirement program, 80,000 acres is due to other land conversion between now and 2020, and the remaining 35,000 acres would be caused by water cutbacks.

These reductions would be most concentrated in CVP water service areas. The reduction in irrigated acreage within the San Joaquin Valley would be equivalent to approximately 5 percent of the region, which would be significant.

Groundwater Resources. For the Sacramento River Region, average groundwater pumping would be 22 taf/yr less than non-project conditions (i.e., No Action Alternative) on the west side, and 137 taf/yr less on the east side of the Sacramento Valley, with similar decreases in existing conditions and Preferred Alternative. These decreases in groundwater pumping are in direct response to additional CVP deliveries assumed under No Action. Groundwater storage increased under the cumulative impacts analysis compared to existing conditions, No Action, and the Preferred Alternative.

There were no modeled differences in regional groundwater levels from the Tehama-Glenn county line north to Redding. In several areas along the west side of the Sacramento Valley (south of Tehama County), groundwater levels were lower under the cumulative impacts analysis than under the No Action Alternative by up to 5 feet. This response is due primarily to a decrease in CVP project water deliveries to the Tehama-Colusa Canal service area. This would be a significant cumulative impact.

Under the cumulative impacts analysis, modeled groundwater elevations declined very little in areas of potential land subsidence. No additional land subsidence would be induced in comparison to the existing conditions, No Action conditions, and the Preferred Alternative.

San Joaquin Valley average groundwater pumping would increase by 97 taf/yr, with similar increases observed in the existing conditions and Preferred Alternative. These increases are in direct response to a decrease in CVP deliveries to the west side of the region. Groundwater elevations were similar under the cumulative impacts analysis, existing conditions, No Action, and the Preferred Alternative, with the exception of the southwest corner of the region where groundwater elevations decrease 5 to 10 feet under the cumulative impacts analysis. This decrease of groundwater elevations would cause land subsidence in the southwest corner of the region of 1 to 5 feet. This would be a significant cumulative impact.

Under the cumulative impacts analysis, Tulare Basin average annual groundwater pumping would increase compared to existing conditions and the No Action and Preferred Alternatives. These increases are in direct response to a decrease in CVP deliveries to the west side of the region. This increased pumping would cause groundwater elevations on the west side of the region to decrease 5 to 55 feet compared to the No Action Alternative. Similar decreases were observed

in the existing conditions and Preferred Alternative simulations. This decrease is groundwater elevations would cause land subsidence on the west side of the region of 1 to 20 feet. This would be a significant cumulative impact.

Water Quality. As described in Section 3.4, Water Quality, Trinity River instream temperatures associated with Lewiston releases are identified as improving compared to the No Action and Existing Conditions scenarios. This is in part due to shifting exports to the summer and fall months decrease the potential for warming of water within Lewiston. Under the cumulative scenario, Trinity Reservoir temperatures are assumed to degrade below No Action levels, primarily in normal and dry conditions as a result of greater future CVP demands driving the need to decrease Trinity Reservoir carryover storage. This would be a significant impact with regard to Trinity River temperatures.

Modeled water temperature impacts within the Sacramento River are modeled to be slightly greater than what is anticipated for the Preferred Alternative. Associated temperature-related impacts to fisheries are discussed previously under Fishery Resources.

Power Resources. As described in Section 3.10, Power Resources, and above under Section 4.1.3, the Preferred Alternative would reduce available CVP hydropower generation annually and in peak power demand periods (i.e., summer months). If this power is not available for use by Western preference power customers, the customers or Western would need to purchase power from other sources. Therefore, the cost of power for all users would probably increase due to market forces. Significant cumulative impacts (primarily air quality impacts) could occur if these reductions in power supplies induced increased generation from either existing gas-fired generators or the construction of new facilities. Such impacts are anticipated to be further exacerbated under the cumulative condition. The overall cumulative impact from the Preferred Alternative and probable future projects is therefore considered potentially significant. In addition, the Preferred Alternative's incremental contribution to this condition is considered to be cumulatively considerable.

Recreation. As identified in Section 4.1.7 above, the Preferred Alternative is expected to result in both beneficial and adverse impacts. Beneficial recreation impacts and associated economic benefits are expected to occur as a result of increased fish production. While some Trinity River-specific impact to recreational opportunities are anticipated to be significant, they are not considered to be significant in a cumulative sense given no additional projects or actions which would further adversely impact flow related opportunities are anticipated. Potential adverse impacts with regard to recreational opportunities at various CVP reservoirs associated with varied reservoir

levels are anticipated to be very minor, and therefore less than significant.

Mitigation. Potentially significant cumulative groundwater, power, water quality (Trinity River-related temperature impacts) and land use (agricultural)-related impacts could occur as a result of decreased surface-water supplies. Although water supply changes per se were not considered an impact, the development of additional water supplies to meet demands would lessen the associated impacts. A number of demand- and supply-related programs are currently being studied across California, many of which are being addressed through the ongoing CALFED and CVPIA programs and planning processes. Although none of these actions would be directly implemented as part of the alternatives discussed in this DEIR/EIS, each could assist in offsetting impacts resulting from decreased Trinity River exports. Examples of actions being assessed in the CALFED and CVPIA planning processes include:

- Develop and implement additional groundwater and/or surface-water storage. Such programs could include the construction of new surface reservoirs and groundwater storage facilities, as well as expansion of existing facilities. Potential locations include sites throughout the Sacramento and San Joaquin Valley watersheds, the Trinity River Basin and the Delta.
- Purchase long- and/or short-term water supplies from willing sellers (both in-basin and out-of-basin) through actions including, but not limited to, temporary or permanent land fallowing.
- Facilitate willing buyer/willing seller inter- and intra-basin water transfers that derive water supplies from activities such as conservation, crop modification, land fallowing, land retirement, groundwater substitution, and reservoir re-operation.
- Promote and/or provide incentive for additional water conservation to reduce demand.
- Decrease demand through purchasing and/or promoting the temporary fallowing of agricultural lands.
- Increase water supplies by promoting additional water recycling.

4.2 Growth-inducing Impacts

A project could have growth-inducing impacts in several ways, including the removal of obstacles to population growth, or actions that encourage and facilitate other activities beyond those proposed by the project. The availability of adequate water supplies, employment opportunities, and improved cultural amenities are examples of actions that could be growth-inducing impacts. Growth inducement may or may not be detrimental, beneficial, or significant. However, if the induced growth impacted the environment, or the ability of agencies to provide public services to an extent not envisioned due to the project actions, the impacts would be considered to be adverse.

For this project, growth could be induced if the anticipated increase in recreational opportunities along the Trinity River associated with the Preferred Alternative attracts more people to live in the area. It is difficult to predict the responses of people to improved recreational opportunities; however, such changes are not anticipated to result in a substantial increase in growth within the Trinity River Basin anymore than is anticipated by Trinity County's existing General Plan and associated environmental documentation. Trinity County will continue to analyze potential changes in land use patterns and population growth and density. These changes will be influenced by employment opportunities; availability and cost of land and housing; adequacy of community services such as transportation, fire protection, police, hospitals, and schools; availability of recreational opportunities; and local government policies on growth.

Based upon current land use policies and transportation infrastructure, it does not appear that the proposed action would result in significant changes in the community or the population. If growth were induced beyond the projections used in this report, mitigation would consist of the measures in the Trinity County General Plan. The plan lists procedures to evaluate the benefits and impacts of potential changes.

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4.3 Irreversible and Irretrievable Commitments of Resources and Significant Impacts that Would Remain Unavoidable Even after Mitigation

Irreversible and irretrievable impacts are those that cause consumption of resources that cannot be restored or returned to original condition despite mitigation efforts. Commitment of water to increased instream flow in the Trinity River is lost for uses in the Central Valley.

Alternatives that would require construction of habitat restoration, conveyance facility modifications, and other facilities would result in use of construction materials that could not be restored (e.g., metal materials, excavation and / or importing of soils and rocks, and energy used to manufacture, transport, or construct the facilities), as well as the use of non-renewable resources (e.g., fuel) to operate construction equipment. Increased recreational opportunities also would result in increased use of energy to transport the people involved in the recreational activities.

Implementation of alternatives increasing flows in the Trinity River is justified in the near future, as opposed to later, because the harms currently suffered by the Trinity River fisheries will only grow worse with time in the absence of increased flows.

Those impacts which are found to be significant and unavoidable would require Trinity County to prepare a Statement of Overriding Considerations per State CEQA Guidelines §§15093. As shown in Table 4-4, Summary of Significant Adverse Environmental Impacts and Proposed Mitigation, the following impacts are identified as potentially significant and unavoidable:

Groundwater. Significant declines in groundwater levels could occur in the Sacramento Valley and Tulare Basin regions, primarily in areas receiving CVP agricultural service contract water (Maximum Flow, Flow Evaluation, Percent Inflow).

The groundwater level declines could result in increased land subsidence within limited areas within the San Joaquin Valley and Tulare Basin regions (Maximum Flow, Flow Evaluation, Percent Inflow).

Additional groundwater pumping could result in upwelling of groundwater high in TSD into productive groundwater zones within limited areas within the San Joaquin Valley and Tulare Basin regions (Maximum Flow, Flow Evaluation, Percent Inflow).

Water Quality. Violate temperature objectives and carryover storage criteria established in the Sacramento River winter run chinook salmon Biological Opinion (Maximum Flow, Flow Evaluation, Percent Inflow).

Violate state temperature objectives established for the Trinity River (Maximum Flow, Percent Inflow, State Permit).

Fishery Resources. Would affect native anadromous species utilizing the Trinity River due to inadequate habitat conditions and water temperature. (State Permit).

Violate temperature objectives and carryover storage criteria established in the Sacramento River winter run chinook salmon Biological Opinion (Maximum Flow, Flow Evaluation, Percent Inflow).

Impacts to Delta smelt and Sacramento splittail as a result of changes in Delta inflow and outflow (Maximum Flow, Flow Evaluation, Percent Inflow).

Vegetation, Wildlife, and Wetlands. Further degradation of riparian vegetation due to reduced flows (State Permit).

Continued degradation and reduction of habitat as a result of reduced flows (State Permit).

Recreation. Impacts from flows to a number of recreation activities for at least a portion of the recreation season (Maximum Flow, Flow Evaluation, Percent Inflow, Mechanical Restoration, and State Permit).

Land Use. Increased flooding of Trinity River structures and/or residences (Maximum Flow, Flow Evaluation, Percent Inflow).

Potentially significant M&I related impacts as a result of decreased surface-water supplies (Maximum Flow).

Substantially decrease irrigated acreage within the San Felipe Unit (Maximum Flow, Flow Evaluation).

Power. Potentially significant power-related impacts (assumed to be primarily related to air quality) from decreased surface-water supplies (Maximum Flow, Flow Evaluation, Percent Inflow).

4.4 Short-term Uses of the Environment Versus Long-term Productivity

Short-term impacts are primarily related to construction activities and were identified in the impact assessment (e.g., turbidity associated with channel rehabilitation projects). Specific resources that could be affected during implementation of many of the alternatives include surface water, groundwater, geology and soils, air quality, fish and wildlife habitat, vegetation, flood protection, power production and energy, transportation, noise, and recreational opportunities.

The proposed action does not detract from long-term environmental productivity. Rather, the action changes long-term conservation of water resources, enhancing the net productivity of the Trinity River Basin natural environment. In turn, the action would reduce long-term productivity of the human environment with respect to agricultural and urban CVP water contractors and with respect to power used by Western preference power customers in the Central Valley.

4.5 Environmental Commitments and Mitigation and Significant Unavoidable Impacts

Table 4-4 summarizes the anticipated significant impacts, including those considered significant and unavoidable from the implementation of the alternatives described in Chapter 2, as well as the associated commitment/mitigation (where determined feasible). Each alternative is generally listed in the order of anticipated level of impact (e.g., the Maximum Flow Alternative is anticipated to have the greatest affect with regard to groundwater). Those impacts that are found to be significant and unavoidable would require Trinity County to prepare a Statement of Overriding Considerations per State CEQA Guidelines §§15093.

In accordance with PRC §§21081.6 and State CEQA Guidelines §§15091(d), Trinity County will prepare a mitigation and monitoring plan (MMP) stating the impact, mitigation, and who will monitor and report that the mitigation has been implemented for all impacts determined to be avoidable (after mitigation). This MMP will be developed prior to Trinity County approving the project.

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TABLE 4-4
Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
		Water Resources	
Groundwater			
Maximum Flow Flow Evaluation Percent Inflow	Significant declines in groundwater levels could occur in the Sacramento Valley and Tulare Basin regions, primarily in areas receiving CVP agricultural service contract water.	Although changes to surface water supply *per se* were not considered an impact, the development of additional water supplies to meet demands would lessen the associated impacts (e.g., groundwater impacts). A number of demand- and supply-related programs are currently being studied across California, many of which are being addressed through the ongoing CALFED and CVPIA programs and planning processes. Although none of these actions would be directly implemented as part of the alternatives discussed in this DEIS/EIR, each could assist in offsetting impacts resulting from decreased Trinity River exports. Examples of actions being assessed in the CALFED and CVPIA planning processes include: • Develop and implement additional groundwater and/or surface-water storage. Such programs could include the construction of new surface reservoirs and groundwater storage facilities, as well as expansion of existing facilities. Potential locations include sites throughout the Sacramento and San Joaquin Valley watersheds, as well as the Delta. • Purchase long- and/or short-term water supplies from willing sellers (both in-basin and out-of-basin) through actions including, but not limited to, temporary or permanent land fallowing. • Facilitate willing buyer/willing seller inter- and intra-basin water transfers that derive supplies from activities such as conservation, crop modification, land fallowing, land retirement, groundwater substitution, and reservoir re-operation. • Promote and/or provide incentive for additional water conservation to reduce demand. • Decrease demand through purchasing and/or promoting the temporary fallowing of agricultural lands. • Increase water supplies by promoting additional water recycling.	Significant
Maximum Flow Flow Evaluation Percent Inflow	The groundwater level declines could result in increased land subsidence within limited areas within the San Joaquin Valley and Tulare Basin regions.	See above.	Significant

TABLE 4-4
Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
Maximum Flow Flow Evaluation Percent Inflow	Additional groundwater pumping could result in upwelling of groundwater high in TSD into productive groundwater zones within limited areas within the San Joaquin Valley and Tulare Basin regions.	See above.	Significant
		Water Quality	
Flow Evaluation Mechanical Restoration Percent Inflow	The channel rehabilitation projects would result in short-term Trinity River turbidity impacts.	• A 401 water quality certification would be obtained from the NCRWQCB, and a construction procedure would be developed to meet the Basin Plan turbidity requirements. Monitoring would be conducted as specified by the NCRWQCB, and efforts would be taken to reduce levels if they are 20 percent or more over background (e.g., isolating the work area and/or slowing or halting construction until the 20-percent level is achieved). • Notify individual diverters with state diversion permits within 2 miles downstream of any mechanical channel rehabilitation activity at least 2 days in advance of activities likely to produce turbidity.	Less than significant
Maximum Flow Flow Evaluation Percent Inflow	Violate temperature objectives and carryover storage criteria established in the Sacramento River winter run chinook salmon Biological Opinion.	Significant impacts identified for the increased frequency of temperature and carryover storage violations would need to be evaluated by the NMFS. Such consultation could result in modification of the existing Biological Opinion. Given the result of this consultation is unknown, this significant impact is considered to be unmitigable at this time. (See also water supply related impacts under Groundwater.)	Significant
Maximum Flow Percent Inflow State Permit	Violate state temperature objectives established for the Trinity River.	Significant impacts identified for violation of state temperature objectives would be evaluated by the NCRWQCB. Consultation with NMFS would occur pursuant to Trinity River coho salmon. Bypassing the Trinity Powerplant could offset impacts to temperature in the Trinity River. Preliminary analysis of powerplant bypasses indicates that pulling colder water from lower in the reservoir could alleviate temperature impacts. Further evaluation of the benefits and costs would be needed before a full assessment could be made. Given the result of consultations and bypass analysis is unknown, this significant impact is considered to be unmitigable at this time.	Significant

TABLE 4-4
Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
		Fishery Resources	
Native Anadromous Species			
State Permit	Would affect native anadromous species utilizing the Trinity River due to inadequate habitat conditions and water temperature.	Anticipated significant impacts to native anadromous salmonids in the Trinity River from implementation of this alternative would be unmitigatable.	Significant
Maximum Flow Flow Evaluation Percent Inflow	Violate temperature objectives and carryover storage criteria established in the Sacramento River winter run chinook salmon Biological Opinion.	(See mitigation for water quality related impacts under Water Quality.) Consult with NMFS and implement any required conservation measures. Given the result of this consultation is unknown, this significant impacts is considered to be unmitigable at this time.	Significant
Resident Native and Non-native Fish			
State Permit	Increased water temperatures, which would reduce non-native Trinity River fish habitat.	Anticipated significant impacts to resident fish in the Trinity River from implementation of this alternative would be unmitigatable.	Significant
Maximum Flow Flow Evaluation Percent Inflow	Impacts to Delta smelt and Sacramento splittail as a result of changes in Delta inflow to export ratios.	Consult with Service and implement any required conservation measures. Given the result of this consultation is unknown, this significant impact is considered to be unmitigable at this time.	Significant
Reservoirs			
Maximum Flow	Impacts to largemouth and smallmouth bass spawning in Trinity Reservoir due to reduced water surface levels.	A smallmouth and largemouth bass stocking program shall be instituted similar to the existing stocking program for coldwater species.	Less than significant
Ocean Fisheries Economics			
State Permit	Reduced angler benefits and net income of charter boat operators in the Mendocino Region.	No mitigation is available.	N/A
State Permit	Reduced commercial fishing harvests and related economic benefits.	No mitigation is available.	N/A
		Tribal Trust	
State Permit	Reduced flows would lead to further decline in tribal access to trust resources.	No mitigation is available.	Significant

TABLE 4-4
Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
Vegetation, Wildlife, and Wetlands			
Vegetation			
Maximum Flow Flow Evaluation Percent Inflow Mechanical Restoration	Ground disturbing activities could result in a loss of vegetation and special-status plant populations.	Conduct site-specific environmental reviews prior to mechanical ground-disturbing activities. Such reviews shall, when appropriate, include surveys for federal and state endangered, threatened, and proposed species, or for other species if required by permitting agencies (e.g., USFS). If such species are present, actions shall be taken to avoid impacts. Develop and implement a revegetation plan for all ground-disturbing activities (excluding channel rehabilitation sites). Revegetation shall use plant species found adjacent to the impact area or from similar habitats, subject to land-owner and/or agency concurrence. Replacement ratios and monitoring plans, if determined necessary, will be developed in cooperation with the Corps, Service, and CDFG.	Less than significant
State Permit	Further degradation of riparian vegetation due to reduced flows.	No mitigation is available.	Significant
Wildlife			
Flow Evaluation Percent Inflow Mechanical Restoration	Direct mortality of foothill yellow-legged frogs or egg masses, adult western pond turtles and hatchlings, or willow flycatcher nests and young during construction (and maintenance for the Mechanical Restoration) of the channel rehabilitation sites.	Conduct site-specific environmental reviews prior to mechanical ground-disturbing activities. Such reviews shall, when appropriate, include surveys for federal and state endangered, threatened, and proposed species, or for other species if required by permitting agencies (e.g., USFS). If such species are present, actions shall be taken to avoid impacts (e.g., delay construction until after willow flycatcher chicks fledge).	Less than significant
State Permit	Continued degradation and reduction of habitat as a result of reduced flows.	No mitigation is available.	Significant
Wetlands			
Flow Evaluation Percent Inflow Mechanical Restoration	The mechanical channel rehabilitation projects could impact wetland resources.	Conduct pre-construction delineation of wetland areas at sites that may contain wetlands. Consult with the Corps on potential impacts to wetland resources. No mitigation is available.	Less than significant

TABLE 4-4
Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
		Recreation	
Riverine			
Maximum Flow Flow Evaluation Mechanical Restoration State Permit Percent Inflow	Impacts from flows to a number of recreation activities for at least a portion of the recreation season.	Flow-related significant impacts would be unmitigable without changing the flow release schedule which is inherent to the alternative.	Significant
Maximum Flow Flow Evaluation State Permit Percent Inflow	Impacts to public safety from river flows that are too high or too low (i.e., outside the preferred range for boating).	Post signs at river access points showing daily flows. Offer a toll-free telephone number so recreationalists can call to obtain daily flow information. Post daily flows on the Internet.	Less than significant
Maximum Flow Flow Evaluation Percent Inflow Mechanical Restoration	Impacts to recreation activities from turbidity associated with the construction (and maintenance for Mechanical Restoration) of the channel rehabilitation sites.	(See mitigation for water quality related impacts under Water Quality.)	Less than significant
Reservoirs			
Maximum Flow Flow Evaluation	Increase the frequency at which Trinity Reservoir boat ramps are unusable, which would indirectly impact marinas and campgrounds.	All affected boat ramps should be extended a sufficient distance to accommodate the new water levels. Marina owners should be compensated for additional costs associated with moving their facilities or to construct new facilities to accommodate the new water levels. Campground facilities should be modified or funding provided to accommodate the revised operational approach.	Less than significant
		Land Use	
Residential/Municipal and Industrial			
Maximum Flow Flow Evaluation Percent Inflow	Increased flooding of Trinity River structures and/or residences.	Property owners could be compensated at fair market value for all flood-related structure/improvement losses incurred, or funding would be provided to retrofit structures/improvements to withstand peak flows. Property owners who have parcels with buildable sites outside of the current 100-year floodplain that would be regularly inundated could be compensated at fair market value for the loss of development rights to that parcel. Given funding for these efforts is not yet been determined, this significant impact is considered to be unmitigable at this time.	Significant

TABLE 4-4
Summary of Significant Adverse Environmental Impacts and Proposed Mitigation

DEIS/EIR Action Alternative	Description of Significant Impact	Mitigation	Level of Significance after Mitigation
Maximum Flow	Potentially significant M&I related impacts as a result of decreased surface-water supplies.	(See water supply related impacts under Groundwater.)	Significant
Agriculture			
Maximum Flow Flow Evaluation	Substantially decrease irrigated acreage within the San Felipe Unit.	(See water supply related impacts under Groundwater.)	Significant
		Power	
Maximum Flow Flow Evaluation Percent Inflow	Potentially significant power-related impacts from decreased surface-water supplies.	(See water supply related impacts under Groundwater.)	Significant
		Cultural Resources	
Maximum Flow Flow Evaluation Percent Inflow Mechanical Restoration	Impacts to cultural resources.	Conduct cultural resource surveys of project areas (including areas of ancillary activities, such as staging areas, gravel mining areas, etc.) prior to ground disturbance. Areas containing cultural resources shall be demarcated and activities planned to avoid these areas. If cultural resources cannot be avoided, additional research or test excavations (as appropriate) will be undertaken to determine whether the resources meet CEQA and/or NRHP significance criteria. Unavoidable impacts on significant resources would be mitigated for in a manner that is deemed appropriate. Mitigation for significant resources may include, but is not limited to, data recovery, public interpretation, performance of a Historic American Building Survey or Historic American Engineering Record, or preservation by other means.	Less than significant
		Air Quality	
Maximum Flow Flow Evaluation Percent Inflow Mechanical Restoration	Spawning gravel placement and other heavy equipment work associated with the alternatives would result in potentially significant PM_{10} impacts as a result of fugitive dust.	Implement a dust control program, which includes: watering of stockpiles, roads, etc. as necessary, and identify an individual to monitor dust control and to respond to citizen complaints.	Less than significant