Chapter 8
Findings and Conclusions

The SLWRI is a feasibility study being conducted by Reclamation and includes development, evaluation, and comparison of alternatives consistent with the Federal P&G (WRC 1983). In coordination with this Feasibility Report, a Final EIS has been prepared consistent with NEPA. This chapter summarizes major findings and conclusions of this feasibility study.

Need for the Project

There is a compelling need to implement actions to increase survival of anadromous fish populations in the upper Sacramento River and increase the reliability of water supplies for agricultural, M&I, and environmental purposes. The population of Chinook salmon in the Sacramento River has significantly declined over the last 40 years (CDFW 2014a). Water temperature is among the most significant factors affecting Chinook salmon abundance in the Sacramento River, especially in dry and critically dry years. Demands for water in the Central Valley and elsewhere in the State of California exceed available supplies, and this condition is expected to become more pronounced in the future. Developing projects to increase the reliability of water supplies for agricultural, M&I, and environmental purposes is necessary to meet future demands, consistent with the CALFED Programmatic ROD.

Multiple Cost Effective Plans

A range of alternatives were formulated and evaluated to address the primary and secondary objectives. Four of the comprehensive plans, CP2, CP4, CP4A, and CP5, provide net NED benefits. As shown in Table 8-1, CP4A is estimated to provide the greatest net benefits.

Although CP3 does not provide net NED benefits based on analyses to date, if institutional constraints allowed all developed water to be delivered to CVP water contractors, and if agricultural water supplies were valued based on recent market data, CP3 could also have net NED benefits.

Table 8-1. Estimated Costs and Benefits for Comprehensive Plans ($ millions)[1]

Item	CP1	CP2	CP3	CP4	CP4A	CP5
Estimated Construction Cost ($ millions)	990	1,089	1,257	1,264	1,265	1,283
Annual Cost ($ millions/year)	45.1	51.2	53.8	57.1	59.0	61.0
Total Annual Estimated Benefits ($ millions/year)	29.7	61.6	42.6	86.0	88.9	74.2
Annual Net Benefits ($ millions/year)	(15.4)	10.5	(11.2)	28.9	29.9	13.2

Note:
[1] January 2014 price levels, 100-year period of analysis, and 3-1/2 percent interest rate.

Key:
CP = comprehensive plan

National Economic Development Plan – CP4A – 18.5-Foot Dam Raise, Anadromous Fish Focus with Water Supply Reliability

Based on evaluation of the potential physical accomplishments and the benefits and costs of the alternative plans, CP4A is the alternative that would achieve the highest net NED benefits while protecting the environment and ranks the highest among the comprehensive plans in meeting the P&G criteria. Consistent with the P&Gs, since CP4A generates maximum net NED benefits, CP4A is identified as the NED Plan. CP4A is also identified as the Preferred Alternative pursuant to NEPA (as described in Chapter 32 of the Final EIS) and is synonymous with the Selected Plan and Preferred Plan pursuant to Reclamation Directives and Standards on Water and Related Resources Feasibility Studies (CMP 09-02). Additionally, it is anticipated that CP4A will be identified as the LEDPA pursuant to Section 404 of the Clean Water Act, which is ultimately subject to determination by USACE.

Costs of National Economic Development Plan

Estimated feasibility-level costs for the NED Plan, CP4A, are shown in Table 8-2. Key assumptions for the cost estimate include availability of sufficient funding on an annual basis, and full and open market competition during the procurement processes. All cost estimates, even at a feasibility-level, have inherent risks and uncertainties. A Monte Carlo simulation and risk analysis was prepared for the total construction cost of CP4A. Based on this Monte Carlo simulation at 10 percent and 90 percent, the total construction cost of CP4A ranges from $1,240 million to $1,399 million, respectively. Specifically, the 90 percent estimate has a 90 percent probability that the actual construction cost will not exceed $1,399 million. The feasibility-level estimate for total construction cost of CP4A is $1,265 million. Based on the risk analysis, allowance for a 15 percent increase in total construction cost for CP4A would provide for over 90 percent probability that the actual construction cost would not be exceeded.

Table 8-2. Estimated Costs for the NED Plan[1]

Item	NED Plan
Field Cost ($ millions)	887
Non-Contract Cost ($ millions)	378
Total Construction Cost ($ millions)	1,265
Interest During Construction ($ millions)	105
Annual Cost ($ millions/year)	59.0

Note:
[1] Based on January 2014 price levels, 100-year period of analysis, and 3-1/2 percent interest rate.
Key:
NED = National Economic Development

Although the economic downturn in the late 2000s resulted in price decreases, it is expected that prices will continue to escalate over the long term. The total construction cost in Table 8-2 only includes escalation during the construction period, but does not include an allowance for escalation from the January 2014 price level to the notice to proceed milestone. The notice to proceed milestone is anticipated to be in early 2020, resulting in an approximate 6 year period where escalation is not reflected in the cost estimates.

Benefits of National Economic Development Plan

The NED Plan would contribute to each of the primary and secondary objectives, as shown in Table 8-3. Although some uncertainties remain about future physical, biological, and socioeconomic conditions, the NED Plan is expected to be adaptable and effective under a broad range of future conditions. However, the current Coordinated Operations Agreement (COA) between Reclamation and DWR for the CVP and SWP, as ratified by Congress (Reclamation and DWR 1986), and other water rights decisions limit the benefits of the project to the CVP.

Table 8-3. Summary of Estimated Benefits for the NED Plan

Item	NED Plan
Increase Anadromous Fish Survival	
Dedicated Storage (AF)	191,000
Production Increase (fish)[1]	710,000
Spawning Gravel Augmentation (tons)[2]	10,000
Side Channel Rearing Habitat Restoration	Yes
Increase Water Supply Reliability	
Total Increased CVP/SWP Dry and Critical Year Water Supplies (AF/year)[3]	77,800
Increased CVP/SWP NOD Dry and Critical Year Water Supplies (AF/year)[3]	10,700
Increased CVP/SWP SOD Dry and Critical Year Water Supplies (AF/year)[3]	67,100
Increased Water Use Efficiency Funding	Yes
Increased Emergency Water Supply Response Capability	Yes

Table 8-3. Summary of Estimated Benefits for the NED Plan (contd.)

Item	NED Plan
Reduce Flood Damages	
Increased Reservoir Storage Capacity	Yes
Additional Hydropower Generation[4]	
Increased Hydropower Generation (GWh/year)[5]	125 - 130
Conserve, Restore, and Enhance Ecosystem Resources	
Riparian, Floodplain, and Side Channel Habitat Restoration	Yes
Increased Ability to Meet Flow and Temperature Requirements along Upper Sacramento River	Yes
Improve Water Quality	
Improved Delta Water Quality	Yes
Increased Delta Emergency Response Capability	Yes
Increase Recreation	
Recreation (user days, thousands)[6]	246 - 259
Modernization of Recreation Facilities	Yes

Notes:

[1] Numbers were derived from SALMOD and represent an index of production increase, based on the estimated average annual increase in juvenile Chinook salmon surviving to migrate downstream from the RBPP.

[2] Average amount per year for 10-year period.

[3] Total increased CVP and SWP deliveries during dry and critical years (based on the Sacramento Valley Water Year Hydrologic Water Classification). Does not reflect benefits related to water use efficiency actions.

[4] In addition to increased hydropower generation, all comprehensive plans provide increased capacity benefits (i.e., the rate at which power can be generated) and ancillary services, which provide the ability to manage the electric grid in a reliable manner.

[5] Annual increases in hydropower generation were estimated using two methodologies – at load center (accounting for transmission losses) and at-plant (no transmission losses).

[6] Annual recreation visitor user days were estimated using two methodologies.

Key:

- = not applicable
AF = acre-feet
CVP = Central Valley Project
Delta = Sacramento-San Joaquin Delta
GWh/year = gigawatt-hours per year
NED = National Economic Development
NOD = north of Delta
SALMOD = Salmonid Population Model
SOD = south of Delta
SWP = State Water Project

Feasibility of the National Economic Development Plan

The NED Plan is feasible from technical, environmental, economic, and financial perspectives, as summarized below.

Technical Feasibility

The NED Plan, CP4A, is projected to be technically feasible, constructible, and can be operated and maintained. Designs and cost estimates for CP4A have been developed to a feasibility-level as verified through Reclamation's DEC Review process.

Environmental Feasibility

The NED Plan, CP4A, is included in the accompanying Final EIS. Environmental effects were evaluated and mitigation measures for CP4A were identified. Based on evaluations of environmental benefits and impacts in the

Final EIS, CP4A has been identified as the Preferred Alternative under NEPA because it would best balance and meet both of the primary objectives and maximize benefits relative to costs while protecting the environment (see Chapter 32 of the Final EIS).

Economic Feasibility

CP4A provides the greatest net NED economic benefits of the comprehensive plans and was identified as the NED Plan. CP4A is projected to be economically feasible, generating net benefits of $29.9 million annually, assuming water supply and hydropower costs increase at the same rate as inflation.

Financial Feasibility

An initial allocation of construction costs according to project benefits and the subsequent assignment of costs to reimbursable and nonreimbursable purposes for the NED Plan is shown in Table 8-4. As shown, approximately 51.4 percent of the total construction costs are estimated to be reimbursable and approximately 48.6 percent are estimated to be nonreimbursable.

Table 8-4. Initial Construction Cost Assignment for NED Plan

Purpose/Action	Total		Cost Assignment[1]			
			Nonreimbursable		Reimbursable	
	Percent	Cost ($ millions)	Percent	Cost ($ millions)	Percent	Cost ($ millions)
Irrigation Water Supply	8%	103.8	0%	0.0	100%	103.8
Municipal and Industrial Water Supply	24%	303.6	0%	0.0	100%	303.6
Fish and Wildlife Enhancement	49%	614.5	100%	614.5	0%	0.0
Hydropower	19%	243.6	0%	0.0	100%	243.6
Total	100%	1,265.5	48.6%	614.5	51.4%	651.0

Note:

[1] Reimbursable costs are borne by beneficiaries via construction cost sharing, or repaid via rates or repayment contracts. Nonreimbursable costs are costs that cannot be identified for a specific beneficiary group from which costs can be recovered. Nonreimbursable costs are borne by the Federal, state, or local government via tax or bond revenues because the benefits generally accrue to taxpayers.

[2] All numbers are rounded for display purposes; therefore, line items may not sum to totals.

Key:

NED = National Economic Development

Based on costs allocated to various project purposes, an initial assessment of financial repayment capability of project beneficiaries was conducted for CP4A. Based on this initial assessment, under CP4A, beneficiaries for irrigation water supply, M&I water supply, and hydropower would have the ability to pay the allocated costs, even considering these beneficiaries would still be repaying the outstanding construction costs of the CVP. To fully recover CP4A costs allocated to irrigation and M&I water supply, these allocated costs could be treated as new construction under existing water service contracts and/or new or

amended contracts could be developed with existing CVP and SWP water contractors.

For costs allocated to fish and wildlife enhancement, existing Federal law passed in 1965 provides for either 75% or 100% Federal financing. However, there are many potential beneficiaries, there are more recent cost sharing models, and the Federal budget is constrained. Therefore, it is reasonable to increase the non-Federal share of construction costs allocated to fish and wildlife enhancement.

Federal Interest

For an action to be implementable, there must be a Federal interest in the action and the action must be feasible, as defined by the P&G. Federal actions must contribute to the NED under the P&G. The NED Plan, CP4A, provides net NED benefits while protecting the environment.

Reclamation's Interest

The Secretary of the Interior delegated the responsibility for development of feasibility studies on enlarging Shasta Dam to Reclamation. Reclamation's interest in the action is based upon the agency's mission: to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. Implementing the NED Plan would help improve survival of anadromous fish in the upper Sacramento River and reduce chronic water shortages in the State of California in an environmentally and economically sound manner. The economic benefits of implementing the NED Plan exceed the cost when evaluated at the National level. In addition, implementing the project would reduce the adverse effects to existing CVP contractors from dedicating project water to fish and wildlife with the passage of the CVPIA in a least-cost manner.

Consistency with CALFED and CVPIA

CP4A would contribute to CALFED objectives, including ecosystem quality, water supply reliability, and water quality. CP4A also would be complementary to the objectives of the CVPIA, providing additional increases in anadromous fish survival. The CVPIA identifies actions and programs to mitigate for the impacts for the existing CVP. Although the enhancements (e.g., increases in anadromous fish survival) associated with the NED Plan may precede fulfillment of all CVPIA mitigation activities, these mitigation activities are expected to be completed as required, independent of the enhancements associated with the NED Plan.

Environmental Compliance and Regulatory Requirements for Project Implementation

The SLWRI Final EIS satisfies NEPA by providing a meaningful analysis of all issues relevant to the human environment. However, implementation of the NED Plan or any other plan authorized by Congress would be subject to additional Federal, State, and local laws, policies, and environmental

regulations. All cooperating agencies and other Federal, State, and local agencies with permitting or approval authority over any aspect of project implementation are expected to use the information contained in the Final EIS to meet most, if not all, of their information needs, to make decisions, and/or issue permits with respect to the authorized project. Due to multiple factors, including the ongoing ESA consultation on coordinated long-term operation of the CVP and SWP, a sequenced approach to post-authorization compliance and permitting activities will be needed to meet the proposed project schedule. For example, some compliance and permitting efforts will likely need to proceed for reservoir area construction activities independently from similar efforts required for long-term water operations.

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