Chapter 6
Comparison of Alternative Plans

This chapter compares the four groupings of alternative plans for the Investigation based on the information available at this stage of the feasibility study planning process; presents the rationale for selection of a grouping of alternative plans at a single storage site; and rationale for continuation of the feasibility study. Technical studies will continue to refine and complete analyses of potential effects, potential benefits, and estimated costs in the next stage of the feasibility study.

Alternative Plans Comparison

This section includes comparisons of the groupings of alternative plans described and evaluated in Chapter 5. These comparisons of alternative plans will inform the selection of a grouping of alternative plans at a single surface water storage site, from which a recommended plan will be identified in the Final Feasibility Report. Four types of comparison summaries for the groupings of alternative plans are discussed below:

1. Accomplishments, benefits, and costs.

2. Ability to address the stated planning objectives, opportunities, constraints, and considerations.

3. Evaluation based on the planning criteria of completeness, effectiveness, efficiency, and acceptability, as identified in the P&G.

4. Potential effects of the four P&G accounts, the NED, RED, EQ, and OSE, at this stage of the planning process.

Accomplishments, Benefits, and Costs

Table 6-1 summarizes accomplishments, potential benefits, and estimated costs for the alternative plans that had the highest potential monetary benefits within each grouping. For each alternative plan grouping, several operational scenarios were formulated and evaluated to assess the sensitivity of accomplishments for the alternatives to different operational strategies. The operational scenarios vary according to the approaches applied for the extent of operations integration, available transvalley conveyance, and reservoir balancing.

Table 6-1. Summary of Potential Alternative Plan Accomplishments, Potential Benefits, and Estimated Costs

Item	No-Action/ No-Project Alternative	Temperance Flat RM 274 Reservoir		Temperance Flat RM 274 Reservoir with Trans Valley Canal		Temperance Flat RM 279 Reservoir		Temperance Flat RM 279 Reservoir with Trans Valley Canal	
		Operations Integration							
		SWP/CVP/ Friant	SWP/ Friant	SWP/CVP/ Friant	SWP/ Friant	SWP/CVP/ Friant	SWP/ Friant	SWP/CVP/ Friant	SWP/ Friant
Physical Characteristics									
Additional Storage Capacity (TAF)	0	1,260				690			
Additional Conveyance Capacity (cfs)	0	N/A		1,000		N/A		1,000	
Accomplishments									
Dry and Critical Year Increase in Delivery (TAF)[1]	0	168	171	254	230	120	103	137	126
Long-Term Avg. Increase in Delivery (TAF)[1]	0	180	158	240	177	132	107	158	120
Increase in Cold-Water Volume in All Year-Types	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Replacement of Impacted Hydropower Generation (%)	N/A	97%	98%	94%	NE	100%	100%	NE	NE
Available Flood Space at 90% Exceedence (TAF)	170	301	285	210	257	191	191	172	180
Potential Annual Benefits and Estimated Costs ($ million)[2]									
Agricultural Water Supply Reliability	$0	$55.2	$50.4	$59.1	$50.4	$44.4	$40.0	$45.0	$40.0
M&I Water Supply Reliability	$0	$57.3	$74.2	$81.9	$93.2	$36.5	$46.3	$41.2	$57.1
M&I Water Quality	$0	$8.2	$7.4	$16.4	$15.2	$7.5	$7.4	$15.7	$13.0
Flood Damage Reduction	$0	$2.3	$2.1	$1.4	$1.9	$0.7	$0.7	$0.1	$0.3
Net Hydropower Generation[3]	$0	-$0.4	-$0.3	-$1.2	-$0.3	$0.3	$0.3	$0.3	$0.3
Recreation	$0	$7.3	$7.3	$7.3	$7.3	$4.0	$4.0	$4.0	$4.0
Emergency Water Supply	$0	$14.6	$14.5	$23.8	$22.0	$11.5	$11.1	$15.8	$15.0
Ecosystem	$0	$24.5	$24.5	$24.5	$24.5	$24.5	$24.5	$24.5	$24.5
Total Potential Monetary Benefits ($million)	$0	$169.0	$180.1	$213.2	$214.2	$129.5	$134.4	$146.6	$154.2
Total Estimated Capital Cost ($million)	$0	$3,358		$4,045		$2,962		$3,662	
Total Estimated Annual Cost ($million)[4]	$0	**$169.1**		**$204.1**		**$149.7**		**$185.2**	
Potential Net Benefits ($million)	N/A	-$0.2	$11.0	$9.1	$10.2	-$20.2	-$15.3	-$38.6	-$31.0
Preliminary Benefit-Cost Ratio	N/A	1.00	1.06	1.04	1.05	0.87	0.90	0.79	0.83

Notes:
General: All alternative plans listed in this table assume available transvalley conveyance capacity in Shafter-Wasco Pipeline, Cross Valley Canal, and Arvin-Edison Canal.
General: Potential benefits for alternative plans listed in this table are based on the Millerton Baseline reservoir balancing option.
General: All costs and benefits are preliminary and subject to revision in the Feasibility Report.
[1] Increase in water supply deliveries compared to the No-Action/No-Project Alternative. Dry and critical years as defined by the Sacramento River hydrologic index.
[2] Based on October 2006 price levels.
[3] Net hydropower generation benefits include hydropower generation in the primary study area and minor effects to hydropower generation in the CVP/SWP system.
[4] Based on 4-7/8 discount rate and 100-year period of analysis.

Key:
cfs = cubic feet per second
CVP = Central Valley Project
Avg. = average
M&I = municipal and industrial
N/A = not applicable
NE = not estimated
RM = river mile
SWP = State Water Project
TAF = thousand acre-feet

All of the alternative plans can provide a wide variety of accomplishments and benefits. The major portion of the monetary benefits of the alternative plans, between 70 and 80 percent, is attributed to water supply-related benefits. Ecosystem benefits account for 10 to 20 percent of the monetary benefits across the alternative plans, and benefits related to other opportunities (hydropower, flood damage reduction, M&I water quality, and recreation) represent about 10 to 15 percent of the monetary benefits.

At this stage in the planning process, the estimates of potential net benefits and the benefit-cost ratios are preliminary and subject to further refinement, but are useful for comparison purposes. Temperance Flat RM 274 Reservoir operated for SWP and Friant integration has the greatest preliminary net benefits and highest preliminary benefit cost-ratio. The alternative plans including Temperance Flat RM 274 Reservoir shown in Table 6-1 have a benefit-cost ratio ranging from 1.00 to 1.06. Alternative plans including Temperance Flat RM 279 have a preliminary benefit-cost ratio ranging from 0.79 to 0.90.

Planning Objectives, Opportunities, Constraints, and Considerations

Table 6-2 summarizes how well alternative plans address planning objectives and opportunities, and meet planning constraints and considerations. For the planning objective of enhancing water temperature and flow conditions in the San Joaquin River, the Temperance Flat RM 274 Reservoir and Temperance Flat RM 274 Reservoir with Trans Valley Canal alternative plans provide the greatest improvement in the capability, reliability, and flexibility to store and release water at suitable temperatures for anadromous fish downstream from Friant Dam. These improvements are illustrated in Table 6-2 through the change in cold water volume from September to December compared to future without-project conditions. The period of September to December corresponds to months that Investigation alternatives may provide the most benefits associated with enhancing water temperature conditions in the San Joaquin River. In other months of the year, the TCDs allow release of water at warmer temperatures than in the without-project conditions, but still at or below target temperatures, thus preserving additional cold water for later months.

A comparison of cold-water management flexibility for the Temperance Flat RM 274 and RM 279 reservoir alternative plans, indicated by cold-water volume multipliers (alternative divided by without-project conditions), is shown in Figure 6-1. All of the alternative plans evaluated demonstrate substantial improvements in the volume of cold water that would be available for management and release to the San Joaquin River to support assumed restoration targets throughout the year. Based on cold-water multiplier ranges observed for these alternatives, Temperance Flat RM 274 Reservoir alternative plans show more improvement in cold-water volume compared to Temperance Flat RM 279 Reservoir alternative plans. All alternative plans are comparable in their ability to provide flows to the San Joaquin River below Friant Dam during critically low years.

Table 6-2. Summary Comparison of Alternative Plans Related to Planning Objectives, Opportunities, Constraints, and Considerations

Planning Objectives, Constraints, and Considerations	No-Action/ No-Project Alternative	Temperance Flat RM 274 Reservoir		Temperance Flat RM 274 Reservoir with Trans Valley Canal		Temperance Flat RM 279 Reservoir		Temperance Flat RM 279 Reservoir with Trans Valley Canal	
		Operations Integration Option							
		SWP/CVP/ Friant	SWP/ Friant	SWP/CVP/ Friant	SWP/ Friant	SWP/CVP/ Friant	SWP/ Friant	SWP/CVP/ Friant	SWP/ Friant
OBJECTIVES									
Enhance water temperature and flow conditions in the San Joaquin River									
Dry Year Increase in Cold-Water Volume Below 52°F (September to December) (TAF)	0	119	119	134	NE	61	63	NE	NE
Dry Year Increase in Cold-Water Volume Below 60°F (September to December) (TAF)	0	184	184	205	NE	123	116	NE	NE
Long-Term Avg. Increase in Cold-Water Volume Below 52°F (September to December) (TAF)	0	365	359	396	NE	183	178	NE	NE
Long-Term Avg. Increase in Cold-Water Volume Below 60°F (September to December) (TAF)	0	553	543	596	NE	313	305	NE	NE
Ability to Provide Restoration Flows to the San Joaquin River Below Friant Dam During Critical Years	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Increase Water Supply Reliability and System Operational Flexibility									
Dry and Critical Year Change in Delivery (TAF)	0	168	171	254	230	120	103	137	126
Long-Term Avg. Change in Delivery (TAF)	0	180	158	240	177	132	107	158	120
Operational Flexibility	Very Low	High	High	High	High	Medium	Medium	Medium	Medium
ADDRESSES PLANNING OPPORTUNITIES	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MEETS PLANNING CONSTRAINTS	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MEETS PLANNING CONSIDERATIONS	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
COMBINED RANKING FOR ADDRESSING OBJECTIVES, AND MEETING PLANNING CONSTRAINTS AND CRITERIA	**VERY LOW**	**HIGH**	**HIGH**	**HIGH**	**HIGH**	**MEDIUM**	**MEDIUM**	**MEDIUM**	**MEDIUM**

Key:
Avg. = average
cfs = cubic feet per second
CVP = Central Valley Project
°F = degrees Fahrenheit
M&I = municipal and industrial
N/A = not applicable
NE = not estimated
RM = river mile
SWP = State Water Project
TAF = thousand acre-feet

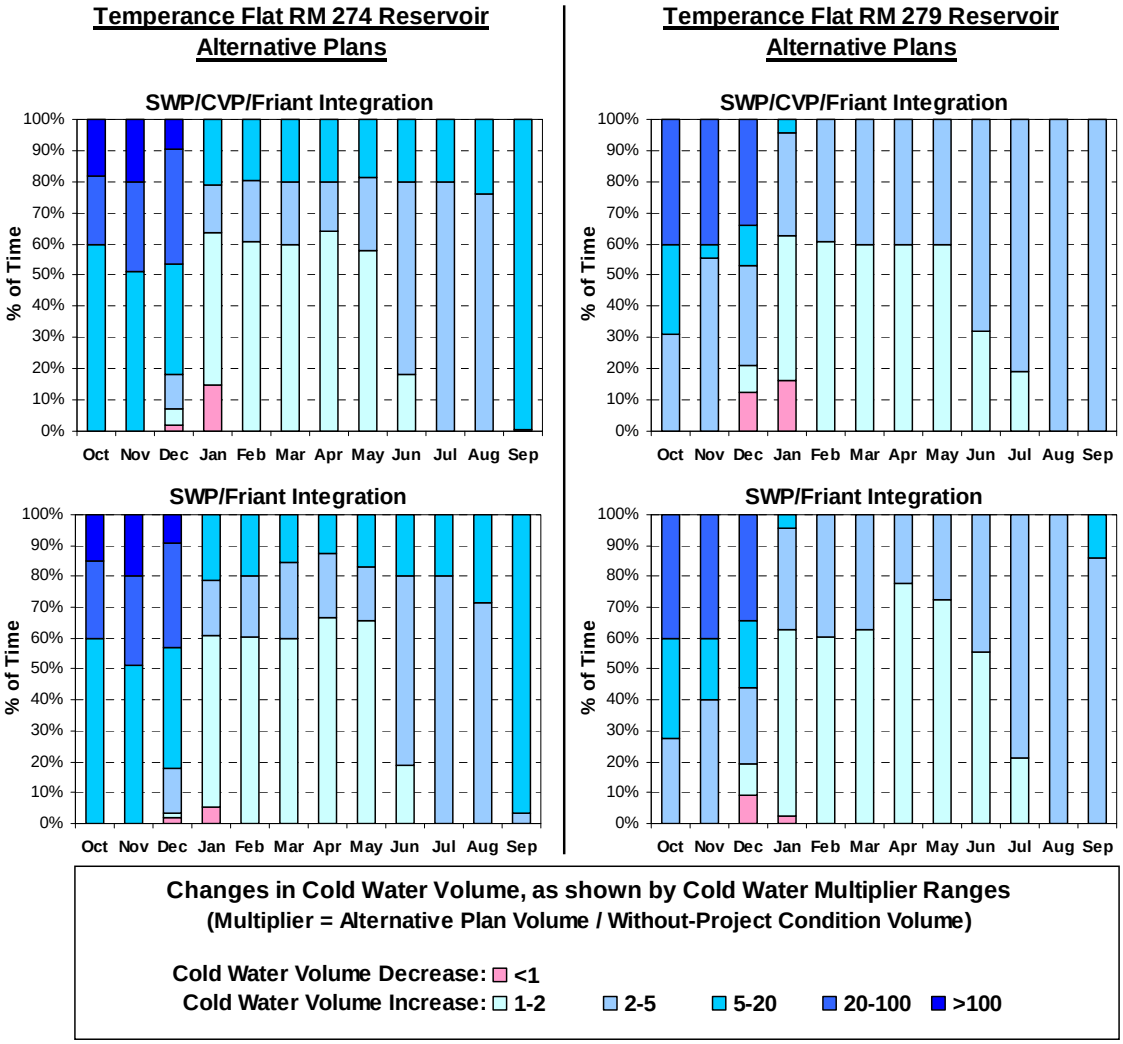

Figure 6-1. Changes in Cold-Water Volume Below 52ºF for Temperance Flat RM 274 Reservoir and Temperance Flat RM 279 Reservoir Alternative Plans

For the planning objective of increasing water supply reliability and system operational flexibility, the Temperance Flat RM 274 Reservoir and Temperance Flat RM 274 Reservoir with Trans Valley Canal alternative plans provide the greatest ability to increase water supply reliability through developing the most change in water deliveries compared to future without-project conditions.

The smaller storage capacity associated with Temperance Flat RM 279 Reservoir alternative plans appears to limit the amount of water than can be exchanged, thus reducing the additional water supply developed compared to Temperance Flat RM 274 Reservoir alternative plans. Without the Trans Valley Canal, the Temperance Flat RM 274 Reservoir alternative plans could provide, on average, about 50 percent more water supply than the Temperance Flat RM 279 alternative plans.

Temperance Flat RM 274 Reservoir and Temperance Flat RM 274 Reservoir with Trans Valley Canal alternative plans were also ranked high in their ability to improve system operational flexibility due to greater water storage and transvalley conveyance capacity for integrated operations of Friant Dam with SWP and/or CVP facilities outside the Friant Division.

Opportunities for the Investigation are described in Chapter 2. All alternative plans (except the No-Action/No-Project Alternative) were formulated to address opportunities for the Investigation, and provide benefits associated with the opportunities to varying degrees.

Basic constraints and other considerations specific to the Investigation were developed and identified to guide the feasibility study and help formulate, evaluate, and compare the alternative plans. At this stage in the planning process, all alternative plans meet planning constraints and considerations identified for the Investigation.

Federal Planning Criteria for Evaluating Alternative Plans Evaluations

Table 6-3 compares the groupings of alternative plans for the four P&G planning criteria: (1) effectiveness, (2) efficiency, (3) acceptability, and (4) completeness (WRC, 1983). The following sections describe each criterion and the comparative rankings for the alternative plans. At this stage of the planning process, the effectiveness criterion was given twice the weight compared to each of the efficiency, acceptability, and completeness criteria in determining a combined ranking.

Table 6-3. Summary of Alternative Plan Comparison Related to Planning Criteria

Criterion	No-Action/ No-Project Alternative	Temperance Flat RM 274 Reservoir	Temperance Flat RM 274 Reservoir with Trans Valley Canal	Temperance Flat RM 279 Reservoir	Temperance Flat RM 279 Reservoir with Trans Valley Canal
Effectiveness	N/A	High	High	Medium	Medium
Enhance water temperature and flow conditions in the San Joaquin River	N/A	High	High	Medium	Medium
Increase Water Supply Reliability and System Operational Flexibility	N/A	High	High	Medium	Medium
Efficiency	N/A	High	High	Medium	Medium
Acceptability	N/A	Medium	Medium	High	High
Completeness	N/A	High	Medium	High	Medium
COMBINED RANKING[1]	**N/A**	**HIGH**	**HIGH**	**MEDIUM**	**MEDIUM**

Note:
[1] In developing a combined ranking, the effectiveness criterion was given twice the weight compared to each of the efficiency, acceptability, and completeness criteria.

Key:
N/A = not applicable
RM = river mile

Effectiveness

As described in Chapter 4, effectiveness is the extent to which an alternative plan addresses planning objectives and opportunities. Accomplishments for alternative plans related to addressing planning objectives and opportunities are shown in Table 6-2. The No-Action/No-Project Alternative does not address any of the planning objectives for the Investigation, and is not ranked for effectiveness. The Temperance Flat RM 274 Reservoir and Temperance Flat RM 274 Reservoir with Trans Valley Canal alternative plans rank highest in their ability to enhance water temperature and flow conditions in the San Joaquin River, and to improve water supply reliability (Table 6-3). These alternatives also rank highest in their ability to address opportunities for the Investigation.

Efficiency

Chapter 4 describes the efficiency planning criterion as the extent to which an alternative plan is the most cost-effective means of alleviating the specified problems and realizing the specified opportunities, consistent with protecting the Nation's environment. The most efficient plans would best address the planning objectives with the least cost and adverse environmental effects. Table 6-1 shows costs, benefits, and benefit-cost ratios for alternative plans. Because the No-Action/No-Project Alternative does not address the planning objectives for the Investigation, this alternative was not ranked for efficiency

Temperance Flat RM 274 Reservoir alternative plans were ranked high for the efficiency criterion. With and without the Trans Valley Canal, the Temperance Flat RM 274 Reservoir alternative plans have higher ratios of potential annual monetary benefits to estimated costs than Temperance Flat RM 279 Reservoir alternative plans. Based on pre-appraisal-level cost estimates, and economic analyses conducted during plan formulation, incremental estimated costs and incremental potential benefits associated with the Trans Valley Canal above those with Temperance Flat RM 274 Reservoir without transvalley conveyance, are approximately equivalent.

Acceptability

As described in Chapter 4, acceptability is the workability and viability of the alternative plans with respect to acceptance by Federal, State, and local entities and the public, and compatibility with existing laws, regulations, and public policies. An alternative plan with less support is not infeasible or unacceptable; rather, it is simply less preferred. The No-Action/No-Project Alternative was not ranked for acceptability. Although this alternative is workable and viable, it addresses none of the planning objectives.

Each of the action alternative plans evaluated is compatible with existing laws, regulations, and public policies. Some additional subfactors pertinent to acceptability discussed in Chapter 4 include potential to develop adequate mitigation in the project vicinity, and willingness of private landowners to sell

affected lands. Considering all subfactors for acceptability, Temperance Flat RM 279 Reservoir alternative plans were ranked higher than Temperance Flat RM 274 alternative plans.

Completeness

Chapter 4 describes completeness as the extent to which a given alternative plan provides and accounts for all necessary investments and other actions to ensure realization of the planned effects. The completeness of each alternative is identified through determining that all necessary components of actions are identified, including the adequate mitigation of significant adverse impacts, other types of public or private plans if the other plans are crucial to realization of the contributions to the objective, and degree of uncertainty (or reliability) of achieving the intended planning objectives. The No-Action/No-Project Alternative was not ranked for completeness. Although this alternative requires no additional action, it addresses none of the planning objectives.

Assessing completeness is conceptual at this phase of the feasibility study, with information on specific mitigation needs, and detailed designs and cost estimates under development. Temperance Flat RM 274 Reservoir and Temperance Flat RM 279 Reservoir alternative plans were ranked the same for the completeness criterion. Additional engineering, environmental, and economic studies related to the Trans Valley Canal are under development. Therefore, alternative plans that include the Trans Valley Canal were ranked medium.

Four Accounts of Potential Economic and Environmental Effects

The P&G (WRC, 1983) identify four "accounts" (NED, RED, EQ, and OSE) to assess and display the potential effects when evaluating alternatives. A preliminary analysis of potential NED benefits is shown in Table 6-1. Other information required by law, or that would have a material bearing on the decision-making process, is considered in the other accounts (EQ, RED, and OSE).

- The NED account assesses changes in the economic value of the national output of goods and services.
- The RED account indicates the regional incidence of NED effects, income transfers, and employment effects.
- The EQ account shows effects on ecological, cultural, and aesthetic attributes of significant natural and cultural resources that cannot be easily or effectively measured in monetary terms.
- The OSE account shows urban, rural, and community impacts and effects on life, health, and safety.

National Economic Development Account

Table 6-1 summarizes the total potential monetary NED benefits for each alternative plan. The benefits are displayed in millions of dollars annually; values are annualized assuming the project has been completed and is operating at full capacity.

Associated with each alternative plan is a summary of the annualized cost. This provides an opportunity to compare the annual benefits to costs, net benefits (difference), and the preliminary benefit-cost ratio based on these estimates. A review of the benefit-cost ratios for all alternatives indicates that three of the four alternative plans that include Temperance Flat RM 274 Reservoir have benefit-cost ratios at or above 1.0. In contrast, the alternatives that include Temperance Flat RM 279 Reservoir are all below 1.0. Temperance Flat RM 274 Reservoir with SWP/Friant operations integration could yield about $11.0 million in annual net benefits, and would have a benefit-cost ratio of approximately 1.06 to 1. The total benefits are highest, at $214.2 million per year, for Temperance Flat RM 274 Reservoir with the Trans Valley Canal and SWP/Friant operations integration. This alternative also has the most physical component features and, hence, the highest cost. Temperance Flat RM 279 Reservoir with SWP/CVP/Friant operations integration has the lowest total benefits, at $129.5 million annually.

Regional Economic Development Account

Potential RED impacts have been estimated at both the California and the Friant Division regional levels for two representative alternatives involving Temperance Flat RM 274 or RM 279 reservoir (Table 6-4). With additional water supply, the value of agricultural output (in the Friant Division) increases, primarily reflected in an increase in farm income. The change in agricultural income is the largest driver of RED impacts at this phase in the Investigation, although additional changes in agricultural output and recreation expenditures are also included.

For the California State model, the agricultural output change extends to an area larger than the six counties of the Friant Division, and the direct effects are larger. In addition to agricultural income and output, a change in personal income is included that reflects cost savings that would be associated with the water quality improvement (i.e., a decrease in water rates resulting from lower treatment costs). Additional RED analyses will be conducted for all alternatives studied in the feasibility phase. Nevertheless, the impacts in the RED account are expected to be similar across the alternatives, but proportional to the respective NED benefits.

Table 6-4. Representative RED Impacts

Alternative Plan	Impact Area	Output ($million)		Income ($million)		Employment (jobs)	
		Direct	Total	Direct	Total	Direct	Total
Temperance Flat RM 274 Reservoir with Trans Valley Canal	Friant Division	$31.1	$42.9	$6.4	$10.1	190	290
	Statewide	$45.5	$70.8	$12.7	$22.9	270	460
Temperance Flat RM 279 Reservoir	Friant Division	$23.3	$32.0	$4.8	$7.5	140	210
	Statewide	$29.8	$46.6	$8.1	$14.6	170	300

Key: RM = river mile

Environmental Quality Account

In addition to biological and cultural effects, the alternative plans could have an effect on ecosystem improvement leading to protection or recovery of ESA-listed species, and biodiversity enhancement. Benefits may also occur related to climate change adaptation. Ecosystem restoration generates value either because services induce specific economic uses or because the ecosystem restoration services themselves are valued. However, not all values can be measured in the market, and not all values can or should reasonably be measured in quantitative terms. Nevertheless, these benefits should be recognized and will influence the decision of selecting a recommended alternative plan among the alternatives. A limited effort has been made to address issues that would fall within the EQ account. The SJRRP, while not specifically related to the alternatives, can be an important source of information in the feasibility study for analysis and inclusion in the EQ account. EQ will be developed further in the next stage of the feasibility study, and results will be presented in the Feasibility Report and EIS/EIR. Differences in the effects of the alternatives related to the EQ account have not been evaluated at this phase of the Investigation.

Other Social Effects Account

As defined in the P&G, urban, rural, and community impacts and effects of the alternatives on life, health, and safety are included in the OSE account. The OSE have not been investigated or documented in detail for this PFR. However, some of the most significant effects are addressed in general terms in this section. The alternative plans would result in increased agricultural output (sales), net farm income, and personal income. Alternatives may also provide limited opportunities for increased employment in other sectors of the economy. However, it is useful to examine how the changes in personal income are distributed among socioeconomic sectors in the affected area. Although the counties encompassing the Friant Division are among the highest in terms of revenue from agricultural products, average incomes among those employed in

agriculture are generally less than in other sectors of the economy. Increases in employment would accrue largely to agricultural workers. The extent to which the alternatives would provide benefits to lower income groups will be examined in the feasibility study.

In addition to income and employment distribution, the effect of the alternative plans on communities is also important to note. The effect on communities can take the form of the types and geographic location of affected communities, quality of community life, and fiscal impacts on local and regional governments and the services they provide. The affected counties in the Friant Division include several large cities and suburbs, plus many small, agriculturally based towns and unincorporated areas. The prominence of agriculture in the economic base of the region, combined with the direct effect of the alternatives on agricultural production, is likely to result in demonstrable community benefits.

The extended study area is a region of considerable ethnic and cultural diversity, high population growth, and an increasing proportion of minority representation. In addition, agricultural workers in the region are one of the poorest and most disadvantaged socioeconomic groups, and highly represented among minorities. The alternative plans have the potential of having a significant effect on these population groups. The alternative plans include features that would allow water to be exchanged with urban water users outside the Friant Division. Urban areas in the SOD service area could see a reduction in water costs stemming from reduced water treatment costs. The effects are likely to be widespread and positive, while having little, if any, disproportionate effect on a particular population or socioeconomic group.

Finally, there could be some short term effects associated with all the storage alternative plans:

- Temporary construction-related benefits could derive to local communities in the areas of the alternative plan features.

- Potential short-term adverse effects could occur for those directly affected by construction, related to pressures on housing, public services, transportation, and schools.

OSE will be developed further in the next stage of the feasibility study, and results will be presented in the Feasibility Report and EIS/EIR. Differences in the effects of the alternative plans related to the OSE account have not been evaluated at this phase of the Investigation.

Storage Site Selection

Chapter 4 of this document concluded with the identification of Temperance Flat RM 274 Reservoir (1,260 TAF) and Temperance Flat RM 279 Reservoir (690 TAF) as retained surface water storage measures for alternative plans. The four groupings of alternative plans were further evaluated in Chapter 5 and compared above in this chapter. This section summarizes the rationale for selection of a grouping of alternative plans that will be considered in detail in the Feasibility Report and EIS/EIR, and will inform the selection of a recommended plan.

Temperance Flat RM 274 (1,260 TAF) and Temperance Flat RM 279 (690 TAF) Alternative Plans

The Temperance Flat RM 274 Reservoir grouping of alternative plans is retained for further evaluation in the feasibility phase of the Investigation and the Temperance Flat RM 279 Reservoir grouping of alternative plans will not be retained for further evaluation for the following major reasons:

- Temperance Flat RM 274 Reservoir (1,260 TAF) alternative plans have greater benefits, greater net benefits, and a higher benefit-cost ratio compared to the Temperance Flat RM 279 Reservoir (690 TAF) alternative plans.

- Most of the Temperance Flat RM 274 Reservoir (1,260 TAF) alternative plans provide positive net benefits, but Temperance Flat RM 279 Reservoir (690 TAF) alternative plans do not provide positive net benefits.

- Temperance Flat RM 274 Reservoir (1,260 TAF) alternative plans address the planning objectives of enhancing water temperature and flow conditions in the San Joaquin River, and increasing water supply reliability and operational flexibility to a greater degree than Temperance Flat RM 279 Reservoir (690 TAF) alternative plans.

- Based on comparing the groupings of alternative plans according to the four P&G planning criteria, Temperance Flat RM 274 Reservoir (1,260 TAF) alternative plans ranked higher than Temperance Flat RM 279 Reservoir (690 TAF) alternative plans.

Trans Valley Canal Component of Alternative Plans

As discussed in Chapter 5, there is a high degree of uncertainty related to the specific features, operations, and estimated costs of the Trans Valley Canal. Cost and design information for the Trans Valley Canal component of alternative plans has not been developed at the same level of analysis as the surface water storage components. Potential operations and alignments of the Trans Valley Canal are also very preliminary. With the extent of information collected at this phase in the planning process (based on pre-appraisal cost estimates for the Trans Valley Canal), in combination with Temperance Flat RM 274 Reservoir alternative plans, it appears that the estimated annual costs for the Trans Valley Canal are approximately equivalent to the potential incremental benefits it would provide. The Trans Valley Canal provides greater benefits in combination with the larger storage capacity of Temperance Flat RM 274 Reservoir than with Temperance Flat RM 279 Reservoir.

The Trans Valley Canal will not be retained for further evaluation in the feasibility phase of the Investigation. The ranking of alternative plans and benefit-cost ratios are not substantially affected by including the Trans Valley Canal with the Temperance Flat reservoirs, and the canal is not needed to achieve a positive benefit-cost ratio. The Trans Valley Canal is a potentially beneficial increment that could be added to an alternative at a later time. As other studies related to a potential Trans Valley Canal progress, benefits, costs and effects of this potential facility would be taken into account. It is likely that such a facility would be jointly pursued by a variety of local, regional, State, and/or Federal water interests, and its justification would likely not be specifically attached to Investigation alternatives.

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