

5.0 Alternatives

This chapter describes alternatives to the proposed program and compares the environmental impacts of those alternatives. The alternatives generally correspond to the preliminary approaches described in the CVFPP, and also include two no-project scenarios. This chapter also briefly describes alternatives that were considered but rejected. The various CVFPP “approaches” are referred to as “alternatives” in this chapter; despite the different terminology, these alternatives constitute alternatives as defined under CEQA.

5.1 Introduction

The principles used to guide selection of the alternatives analyzed in this PEIR are provided by Section 15126.6 of the CEQA Guidelines, which specifies that an EIR must do all of the following:

- Describe a reasonable range of potentially feasible alternatives to the project that could feasibly attain most of the basic objectives of the project
- Consider alternatives that could reduce or eliminate any significant environmental impacts of the proposed project, including alternatives that may be more costly or could otherwise impede the project’s objectives
- Evaluate the comparative merits of the alternatives

The focus and definition of the alternatives evaluated in this PEIR are governed by the “rule of reason,” in accordance with Section 15126.6(f) of the CEQA Guidelines. That is, the range of alternatives presented in this PEIR must permit a reasoned choice by DWR and the Central Valley Flood Protection Board (Board). The CEQA Guidelines (Section 15126.6) require that an EIR evaluate at least one “No-Project Alternative,” evaluate a reasonable range of alternatives to the project, identify alternatives that were initially considered but then excluded from further evaluation, and identify the “environmentally superior alternative.”

Although the CEQA Guidelines (Section 15126.6(d)) require that alternatives be evaluated, they permit the evaluation to be conducted in less detail than for the proposed project. Consistent with Section 15126.6(d) of

the CEQA Guidelines, the information provided in this PEIR about each alternative is sufficient to allow for a meaningful evaluation, analysis, and comparison of the alternatives with the proposed program.

The following discussion is intended to inform the public and decision makers of potentially feasible alternatives to the proposed program that could be implemented to attain the basic program objectives (summarized in Section 2.1.2, “Program Objectives”) while substantially reducing one or more of the program’s potentially significant effects.

5.2 Alternatives Considered

Development of the CVFPP involved formulating and evaluating substantially different preliminary alternatives to address CVFPP goals. The preliminary alternatives were used primarily to explore different potential physical changes to the existing flood management system and to assist in highlighting the need for policy changes or other management actions.

The alternatives were derived from a list of more than 90 individual management actions, developed through a collaborative stakeholder process, which were identified and grouped into the following categories:

- Additional floodplain and reservoir storage
- Storage operations
- Flood protection system modifications
- Operations and maintenance
- Ecosystem functions
- Floodplain management
- Disaster preparedness and flood warning
- Flood fighting, emergency response, and flood recovery
- Policy and regulations
- Permitting
- Finance and revenue

The management actions generally encompass broad tactics or strategies, rather than location-specific projects, and vary in their level of detail. They range from physical and operational improvements to the flood management system to residual risk management and overall program implementation considerations.

Given the large number of possible permutations and combinations of these management actions, DWR decided during the development of the CVFPP to focus the analysis by developing three preliminary alternatives. These preliminary alternatives were designed to inform flood management policy development and to explore the potential accomplishments of different combinations of physical investments in the flood management system.

The three preliminary alternatives were intended to bracket the potential range of future flood management options in the Central Valley and address flood problems in fundamentally different ways, not necessarily to achieve the CVFPP goals to the same degree. Information provided through these evaluations allowed DWR to select the better performing characteristics and avoid the poorer performing characteristics of each preliminary alternative to assemble the proposed program.

For the same reasons that the three primary alternatives effectively bracketed the potential range of flood management options, they also bracket key program parameters relevant to environmental effects. For example, some environmental impacts will increase to the extent that the “footprint” of the flood protection system is changed and/or enlarged. Other environmental impacts will increase in relation to the overall magnitude of construction activities. The preliminary alternatives in the CVFPP were reviewed by DWR and found to effectively establish a reasonable range for purposes of CEQA.

CEQA also requires that an EIR evaluate one or more “no-project” alternatives (CEQA Guidelines, Section 15126.6). The no-project alternative is to be based upon the existing conditions as of the date of the notice of preparation (here October 27, 2010), as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved. When the project is the revision of an existing land use or regulatory plan, policy or ongoing operation, the “no-project” alternative will be the continuation of the existing plan, policy or operation into the future. Here, as described in the draft plan document, the CVFPP reflects the ongoing planning, policy development, and operations of the State Plan of Flood Control (SPFC).

In defining the no-project alternative, the lead agency must make assumptions about what would reasonably be expected to occur in the

foreseeable future if the program were not approved, based on current plans and consistent with available infrastructure and community services. With respect to the CVFPP, a key variable in this regard is the availability of funds. As explained in the draft CVFPP on page 4-38, Propositions 84 and 1E provided up to \$3.3 billion that could be used for flood risk reduction in areas protected by facilities of the SPFC. Of these funds, the State has already invested \$1.6 billion over the last 5 years. Accordingly, approximately \$1.5 billion to \$1.7 billion of bond funding has already been authorized for these activities going forward. The No-Project Alternative—Continued Operations Scenario, described below, assumes that these funds will remain available and be expended over approximately the next 5-year period. The CVFPP also recognizes that local agencies will need to provide approximately \$0.5 billion and that federal appropriations of approximately \$1 billion will be needed to undertake activities anticipated during the next 5 years. The No-Project Alternative—Continued Operations Scenario described below assumes that these funds will be forthcoming.

Once these funds are exhausted, the CVFPP acknowledges that the State will need to present a general obligation bond measure to the voters to provide an additional \$4 billion to \$5 billion to cover the remaining State's share of investment in the flood reduction projects outlined in the proposed program. Substantial local and federal funding will also be necessary. The willingness of State voters to approve such a bond measure and the availability of additional local and federal funds are highly uncertain. For purposes of developing the No-Project Alternative—Continued Operations Scenario, DWR has assumed that these substantial additional funds will not be forthcoming in the absence of a coherent and transparent plan such as the CVFPP.

In certain circumstances, CEQA requires that the no-project alternative be based upon a "no-build" scenario where the existing environmental setting is maintained. Although DWR does not consider the evaluation of such a scenario to be required in this circumstance, in light of the near-term funding uncertainties described above, and in order to provide for a broader range of alternatives offering better informed decision-making and public participation, DWR has also considered a No-Project Alternative—No Additional Activities Scenario as described below.

CEQA also requires, in appropriate circumstances, that alternative locations to the project be considered where feasible. Here, flood protection must generally be provided where the flood risk is based, which for purposes of the CVFPP means in proximity to the rivers and tributaries in the Sacramento and San Joaquin basins. As a result, it is apparent that flood protection improvements cannot feasibly achieve the program objectives unless undertaken in the general locations where the flood risk is generated

or presented. To an extent, some of the alternatives below (such as those involving new or expanded bypasses) consider alternative locations. Other alternative locations (such as locating future flood control improvements in entirely different locations) have been determined infeasible and are not evaluated further.

Taking all of these considerations into account, the following alternatives were considered for analysis in this PEIR:

- No-Project Alternative—Continued Operations Scenario
- No-Project Alternative—No Additional Activities Scenario
- Modified State Systemwide Investment Approach (SSIA) Alternative
- Achieve SPFC Design Flow Capacity Alternative
- Achieve SPFC Design Flow Capacity with Strict Engineering Technical Letter (ETL) Compliance Alternative
- Protect High-Risk Communities Alternative
- Enhance Flood System Capacity Alternative
- As indicated above, three of these alternatives were evaluated and described in the CVFPP: the Achieve SPFC Design Flow Capacity Alternative, Enhance Flood System Capacity Alternative, and Protect High Risk Communities Alternative. For a more detailed description of these Alternatives, please refer to the draft plan. In addition to the alternatives listed in the CVFPP, this PEIR also evaluates the Modified SSIA Alternative, Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative, and the two no-project scenarios just described. Each of these alternatives is described briefly below, with those carried forward for further evaluation in this PEIR described in more detail in Section 5.4, “Alternatives Carried Forward for Analysis and Evaluation.”

5.2.1 No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, and without a systemwide flood management plan such as the CVFPP, current flood management trends in the Central Valley would likely continue. Projects that are planned or under way and supported by reasonably anticipated funds would commence and/or continue to completion. The Federal Emergency Management Agency would continue to remap the

floodplains protected by the SPFC with less than 100-year flood protection. Existing partnerships among the federal government, the State, and local entities to implement flood risk reduction projects would continue. However, this alternative assumes that funding beyond that currently authorized under Propositions 84 and 1E would not be available, substantially constraining the scale of construction and other activities under this alternative. Local agencies' planning obligations that would be triggered by adoption of the CVFPP would not be triggered under this alternative, and system maintenance would still be challenged by the need to complete annual maintenance activities. The vegetation management strategy (VMS), including the life-cycle management (LCM) component, would be implemented with or without the adoption of the CVFPP.

5.2.2 No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that this scenario does not assume that projects not already under way will be commenced, and further does not assume that funding will be forthcoming for projects other than those already commenced. This scenario also assumes that the component of the VMS reflected in *California's Central Valley Flood System Improvement Framework* (Framework) (DWR, 2009), adopted on February 27, 2009—vegetation management in the vegetation management zone for purposes of visibility and access—will continue to be implemented by maintaining agencies. However, it assumes that the LCM component—long-term elimination of trees in the vegetation management zone—will not be adopted or applied. Under this scenario, some recruitment of new trees on SPFC levees will incidentally be prevented by maintenance undertaken for purposes of visibility and access, but less thoroughly and at a slower rate than would be the case with LCM, so that some trees likely would remain.

5.2.3 Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative is similar to the proposed program in that it is based on the urban protection provided by the Protect High-Risk Communities Alternative and adds some small-community protection, but with more limited construction activities than for other alternatives. The alternative also includes expanding the Yolo Bypass and widening Fremont Weir, but does not include any of the other bypass expansions and related improvements contained in the proposed program. This alternative presents a less construction-intensive alternative that addresses only the most critical stressors on public safety, operations and maintenance, and ecosystem function, while minimizing potential adverse environmental effects. Work

would focus on repairing and improving existing levees in urban areas with only limited work on expanding floodways.

5.2.4 Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative focuses on addressing the condition of existing SPFC levees so that the channels convey their design flows with a high degree of reliability based on current engineering criteria. The system was largely constructed based on geometric criteria using available soil materials without extensive investigation of foundation conditions. The majority of SPFC levees do not meet current engineering criteria. This alternative addresses an element of the authorizing legislation (CWC Section 9614(g)), which requires that DWR evaluate structural projects that could be undertaken to reconstruct SPFC facilities to bring each of the facilities of the SPFC to within its design standard. This alternative involves addressing levee conditions primarily in place, without making major changes to the footprint or operation of those facilities. Levee improvements would be made regardless of the areas they protect or the level of protection they provide. This alternative would provide little opportunity to incorporate benefits beyond flood management.

5.2.5 Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative is the same as the Achieve SPFC Design Flow Capacity Alternative but presents a different method of addressing the issue of vegetation on levees. The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative involves meeting two goals simultaneously:

1. Improve existing SPFC levees so that they convey their design flow capacities.
2. Ensure the strictest compliance with the U.S. Army Corps of Engineers (USACE) guidance provided in ETL 1110-2-571, *Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures*.

(All references to the “ETL” in this chapter are specifically to ETL 1110-2-571.)

This alternative assumes that DWR would not use USACE’s associated draft policy guidance letter, *Process for Requesting a Variance from Vegetation Standards for Levees and Floodwalls; Additional Findings (77 Federal Register 9637–9650, February 17, 2012) (PGL)*. The variance

process allows for retention of some woody vegetation on or near levees under certain very specific circumstances.

5.2.6 Protect High-Risk Communities Alternative

The Protect High-Risk Communities Alternative evaluates improvements to levees to protect life safety and property for high-risk population centers, including urban and small communities. Most levees in rural-agricultural areas would remain in their existing configurations; however new training levees, ring levees, or floodwalls immediately adjacent to the communities may be constructed. This alternative would provide a minor opportunity to incorporate benefits beyond flood management.

5.2.7 The Enhanced Flood System Capacity Alternative

The Enhanced Flood System Capacity Alternative involves seeking opportunities to achieve multiple benefits by enhancing the flood system's storage and conveyance capacity, protecting high-risk communities, and fixing levees in place in rural-agricultural areas. This alternative combines the features of other alternatives and provides greater capacity within flood conveyance channels to lower flood stages in most of the system.

5.3 Alternatives Considered but Rejected

The alternatives described below were rejected from further consideration and analysis because they failed to meet most of the basic program objectives, were determined to be infeasible, would not avoid or substantially lessen significant environmental impacts, and/or would be so similar to another alternative that it would not add to expand the range of alternatives evaluated in this PEIR. Factors taken into account when addressing the feasibility of alternatives were site availability and suitability, economic viability (i.e., project cost), availability of infrastructure, regulatory constraints (i.e., ability to obtain permits), and technical limitations (i.e., ability to reasonably construct and/or operate the alternative).

5.3.1 Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

As described above, the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative is the same as the preliminary Achieve SPFC Design Flow Capacity Alternative, but presents a different method of addressing the issue of vegetation on levees. This alternative assumes strict compliance with USACE's ETL and little to no pursuit of variances to allow retention of some woody vegetation on or near levees. It would therefore result in the near-term removal of all woody vegetation on all parts of the levees, including the waterside slope below the vegetation

management zone (from the river up to a line 20 feet below the levee crown).

This alternative was rejected from further analysis for several reasons. Ensuring strict ETL compliance while making necessary improvements to the SPFC would be cost prohibitive, primarily resulting from very high mitigation costs to compensate for loss of riparian habitat and habitat for threatened and endangered species. In addition, mitigating impacts associated with strict ETL compliance would be nearly impossible due to the limited availability of waterside acreage to provide compensatory shaded riverine aquatic habitat (see Section 3.5, “Biological Resources—Aquatic,” for information on shaded riverine aquatic habitat). This would leave the State unable to gain the proper permits to implement this alternative.

As discussed in greater detail in Section 2.3.7, “Vegetation Management Strategy and Life-Cycle Management,” and Section 5.4.1, “No-Project Alternative—Continued Operations Scenario,” the State recognizes that woody vegetation on levees must be carefully managed. However, other levee failure mechanisms (or risk factors), such as underseepage, through-seepage, slope and structural instability, erosion, and deep rodent burrows, have been demonstrated to have substantially greater adverse effects on levee integrity and public safety. Science has shown that woody vegetation has the potential to increase or reduce risk, depending on a variety of factors; DWR believes that it is appropriate to characterize woody vegetation as only a “potential risk factor” that should be considered relative to unequivocal risk factors and site-specific conditions. One of the findings of DWR’s *Flood Control System Status Report* (DWR, 2011) is that although risk factors such as seepage, stability, and erosion were rated as medium to high relative threats, levee vegetation was rated as a low threat to levee integrity. This is consistent with the fact that no documented levee failures in California have ever been attributed to vegetation.

The State’s levee VMS focuses on improving public safety by providing for levee integrity, visibility, and accessibility for inspections, maintenance, and flood-fight operations. At the same time, it protects important and critical environmental resources, with a focus on protecting and enhancing the remaining shaded riverine aquatic habitat associated with the SPFC. From a flood threat perspective, lower waterside slope vegetation rarely presents an unacceptable threat to levee integrity. Removing such vegetation is a very low priority and generally is not justified until high levee risk factors (as documented in the *Flood Control System Status Report* (DWR, 2011)) are addressed.

These factors cause this alternative to be cost prohibitive and impossible to implement under the existing regulatory framework. Consequently, this alternative is not considered further because it (1) would not satisfy the program objectives; (2) would be infeasible because of major cost implications and regulatory constraints; and (3) would not avoid or lessen significant environmental impacts, but actually would cause substantially greater environmental impacts on biological resources.

5.3.2 Protect High-Risk Communities Alternative

The Protect High-Risk Communities Alternative was rejected from further analysis because it would not satisfy most of the eight program objectives. CEQA requires that the range of potential alternatives to the program include those that could feasibly accomplish most of the basic objectives of the program. The Protect High-Risk Communities Alternative is also very similar to the Modified SSIA Alternative, which is carried forward in the analysis. The Protect High-Risk Communities Alternative differs from the Modified SSIA Alternative only in terms of minor increases in the measures benefiting small communities, and by including an expanded Yolo Bypass and modifications to the Fremont Weir. Accordingly, further consideration and analysis of this alternative would not add to or expand the range of alternatives considered in this PEIR.

The only material difference between the Protect High-Risk Communities Alternative and the Modified SSIA Alternative is that the Protect High-Risk Communities Alternative would include some impacts on agricultural lands in an expanded Yolo Bypass. However, this feature of the alternative is shared with both No-Project Alternative scenarios and is adequately captured by those alternatives.

Consequently, this alternative is not considered further because it (1) would not satisfy most of the program objectives and (2) would be so similar to other alternatives that its inclusion in this PEIR for analysis would not add to or expand the reasonable range of alternatives under consideration.

5.4 Alternatives Carried Forward for Analysis and Evaluation

The following alternatives were carried forward for further analysis and evaluation in this PEIR:

- No-Project Alternative—Continued Operations Scenario
- No-Project Alternative—No Additional Activities Scenario
- Modified SSIA Alternative

- Achieve SPFC Design Flow Capacity Alternative
- Enhance Flood System Capacity Alternative

Although they do not meet any of the program objectives, the two No-Project Alternative scenarios were carried forward for further analysis and evaluation because an EIR is required to evaluate at least one No-Project Alternative. All other alternatives were determined to meet most of the program objectives, were feasible, would avoid or substantially lessen significant environmental impacts, and collectively provide a reasonable range of feasible alternatives to evaluate in this PEIR.

The alternatives carried forward for analysis and evaluation are described below using the following format:

- Each description first discusses the scale/magnitude of the proposed Alternative, then discloses the estimated cost and time required to implement the alternative and the percentage of activities that would occur within or outside the footprint of the SPFC (onsite or offsite).
- Next, the description characterizes the features and expected performance of the alternative.
- Lastly, the description discloses whether the alternative would meet all, some, or none of the program objectives.

Table 5.4-1 presents a summary comparison of the proposed program and the alternatives carried forward for analysis and evaluation.

Cost estimate information provided for each alternative includes initial costs to implement physical on-the-ground improvements and ongoing annual costs over 25 years to manage the residual flood management risk. Note that cost estimates for all alternatives are based on 2011 price levels and will differ in the future. Actual implementation costs will likely be higher than the estimates because of inflation and the length of time needed to implement the work. The estimates include costs associated with planning studies, design, and permitting.

The estimates of time to implement each alternative described below are based on experience with past flood risk reduction projects but also assume more efficient execution of planning and design, engaged federal and local partners, streamlined permitting, and available funding. In the past, many flood risk reduction projects have remained in the feasibility study phase for a decade or longer. Large, complicated projects have often taken several decades to progress from initial concept to completion. Maintaining focus

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to complete projects in a timely manner is often difficult, especially given changing commitments from State, federal, and local partners over long periods.

Where “on-site” and “off-site” footprints are described, “on-site” represents all activities on or directly adjacent to existing SPFC facilities, including slurry cutoff walls in existing levees, adjustments to levee geometry, seepage berms, relief wells, and similar facilities. “Off-site” facilities are those that extend geographically away from existing SPFC facilities, such as new bypasses and setback levees that result in significant floodway expansions.

Table 5.4-1. Summary of Proposed Program and Alternatives

Alternative	Scale/Magnitude		Percentage of Footprint Onsite/Offsite	Features					Performance				Program Objectives	Feasible
	Cost	Time to Implement		Storage and Operations	Bypasses	Flood Structure Improvements	Urban/Small-Community/Rural Levee Improvements	Ecosystem Restoration Projects	Urban/Rural Flood Risk Reduction	Estimated Annual Damages	Ecosystem Restoration Opportunities	Other Benefits		
Proposed Program	\$13.9 to 16.9 billion	20–25 years	40/60	F-BO/F-CO	Yes	Yes (e.g., major structures, system erosion, bypass sediment removal)	200-year flood protection for urban areas; 100-year flood protection for small communities; design capacity elsewhere	Fish passage, conservation easements, local setbacks	<10% of total SPA population with less than 100-year flood protection	75% reduction	Enhanced opportunities (more than some/limited, less than substantial)	Increased opportunities	Meets objectives	Yes
No-Project Alternative—Continued Operations Scenario	\$3.3 billion	5 years	100/0	F-CO	No	Restricted to current emergency repairs process	Restricted to currently authorized and/or funded projects	Restricted to currently authorized and funded projects except as required for mitigation	84% of total SPA population with less than 100-year flood protection	\$329 million	Limited opportunities	Limited opportunities	Does not meet objectives	Yes
No-Project Alternative—No Additional Activities Scenario	<\$3.3 billion	5 years	100/0	F-CO, but not expanded	No	Restricted to current emergency repairs process	Restricted to projects already commenced	Restricted to projects already commenced except as required for mitigation	>84% of total SPA population with less than 100-year flood protection	>\$329 million	Very limited opportunities	Very limited opportunities	Does not meet objectives	Yes
Modified State Systemwide Investment Approach Alternative	\$8 to 12 billion	30–35 years	90/10	F-BO/F-CO	Limited to Fremont Weir and Yolo Bypass	None	Urban only; nonstructural for small communities/rural areas	Yolo Bypass only	8% of total SPA population with less than 100-year flood protection	65% reduction	Some opportunities	Limited opportunities	Meets most objectives—does not spread out benefits between Sacramento and San Joaquin river systems	Yes
Achieve SPFC Design Flow Capacity Alternative	\$19 to 23 billion	30–35 years	100/0	F-BO/F-CO	No	None	SPFC design capacity through urban/rural areas	None	46% of total SPA population with less than 100-year flood protection	49% reduction	Some opportunities	Limited opportunities	Meets some objectives	No (most projects would not meet cost-benefit tests)
Enhance Flood System Capacity Alternative	\$32 to 41 billion	35–40 years	30/70	F-BO/F-CO, new reservoirs, reservoir allocations, floodplain easements	Yes	Yes (e.g., major structures, addressing system erosion, bypass sediment removal)	200-year flood protection for urban areas; 100-year flood protection for small communities; design capacity elsewhere	Fish passage, conservation easements, substantial setbacks	5% of total SPA population with less than 100-year flood protection	80% reduction	Substantial opportunities	Increased opportunities	Meets most objectives	No (overall program would likely not be financially feasible)

Source: 2012 Central Valley Flood Protection Plan

Key:
 F-BO = Forecast-Based Operations
 F-CO = Forecast-Coordination Operations
 SPA = Systemwide Planning Area
 SPFC = State Plan of Flood Control

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5.4.1 No-Project Alternative—Continued Operations Scenario

Analysis of the No-Project Alternative allows decision makers to use this PEIR to compare the impacts of approving the proposed program with the future conditions that would result from not approving the program. Under CEQA, the No-Project Alternative is not the baseline for assessing the significance of impacts of the proposed project. Section 15126.6(e)(2) of the CEQA Guidelines indicates that no-project conditions include existing conditions and reasonably foreseeable changes that would occur without the project, based on current plans and consistent with available infrastructure and community services. The key limiting language in the Guidelines is the phrase “based on current plans and consistent with available infrastructure and community services.” This qualifying language limits the number of assumptions that a CEQA lead agency can make about potential future actions.

Under the No-Project Alternative—Continued Operations Scenario, and without a systemwide flood management plan such as the CVFPP, current flood management trends in the Central Valley would likely continue. The following are the most notable conditions:

- Projects currently planned or under way and supported by reasonably anticipated funds are assumed to commence and/or continue to completion. An example is the Marysville ring levee element of the Yuba River Project, which currently meets these criteria because it is planned and being implemented.
- The Federal Emergency Management Agency’s ongoing flood risk mapping program, conducted in coordination with State and local communities, would remap the floodplains protected by the SPFC with less than 100-year (1-percent-annual-chance) flood protection. This would impose substantial long-term burdens on farms, homeowners, and businesses in these areas, including higher flood insurance premiums and limitations on repairing, reconstructing, and expanding structures.
- The existing partnership among the federal government, the State, and local entities for implementing flood risk reduction projects would continue. Current federal regulations strongly favor flood management projects in urban areas. Primarily to demonstrate a federal interest, the flood damage reduction benefits of a project must exceed project costs. In other words, the benefit-to-cost ratio must be greater than 1. To be recommended for funding in the President’s budget, a more robust benefit-to-cost ratio is generally required. Although each of these

projects is implemented taking into consideration its effects on the system as a whole, this process is by its very nature a piecemeal alternative. These regulations also do not take into account the long-term benefit of integrating environmental restoration projects, thus undervaluing the importance of rural projects. The historical federal/State/local partnership has created a dichotomous system in which urban areas have a much higher level of protection than rural-agricultural areas and receive the majority of available funding. Recently, the State has taken a stronger leadership role in the project delivery process, including project formulation, design, and advancing of funds to cover much of what traditionally has been the federal cost share, with the hope of obtaining credit against future State cost-sharing obligations. An example of a project with stronger State leadership is the American Rivers Common Features Remaining Sites.

- Local agency planning obligations that would be triggered by the adoption of the CVFPP would not occur. Specifically, local agencies would not be required to amend their general plans and zoning ordinances to incorporate the information contained in the CVFPP, and would not be required to make findings regarding an urban level of flood protection when making project approvals. However, those local agency planning obligations that do not depend on the adoption of the CVFPP would continue. Examples of such obligations include the requirements to (1) identify in the land use elements of local general plans those areas subject to flooding, and (2) identify flood hazard information upon the next revision of local general plans' housing elements and establish goals, policies, and objectives and feasible mitigation measures to protect communities from an unreasonable risk of flooding.
- System maintenance would continue to be challenged by the need to complete annual maintenance activities, such as mowing grass, trimming trees and brush, filling animal burrows on levees, clearing sediment, and restoring patrol roads, while minimizing impacts on special-status terrestrial and aquatic species. The result would be a combination of rapidly rising maintenance costs, shortening maintenance windows, high mitigation costs, and uncertainty.
- For the reasons described in DWR's April 15, 2010 comments on USACE's *Process for Requesting a Variance from Vegetation Standards for Levees and Floodwalls* (75 *Federal Register* 6364–6368, February 9, 2010), the State does not anticipate conforming under any reasonable scenario to guidance provided by USACE in ETL 1110-2-571 with respect to currently existing "legacy" levees in the SPFC. As described in detail in DWR's April 15, 2010 comments, in the context

of the SPFC, vegetation removal at the scale and of the nature required by the ETL would not provide public-safety benefits, would be prohibitively expensive and divert finite financial resources from more important activities, and would have significant and likely unmitigable environmental effects. DWR has therefore determined, if necessary, to forgo Public Law 84-99 funding if a precondition to that funding is the wholesale removal of vegetation within the SPFC as prescribed by the ETL. Instead, the CVFPP includes a VMS that is better tailored to the Central Valley situation, as described in greater detail in the draft plan. The VMS is based upon DWR's October 2007 "Interim Vegetation Inspection Criteria," which in turn were incorporated into the Framework in February 2009.

The VMS contains two principal components. First is a maintenance protocol that has essentially been carried forward without modification from the Framework. This maintenance protocol involves no vegetation removal other than as necessary for critical safety reasons on the waterside of levees more than 20 feet below the crown. Above that point on the waterside, on the crown, and on the landside of the levee, vegetation is to be removed to provide for visibility and access is described in greater detail in the draft plan.

- DWR and other maintaining agencies began undertaking maintenance in accordance with the 2007 interim inspection criteria and the 2009 Framework shortly after their adoption. As reflected in the December 2011 *Flood Control System Status Report* (DWR, 2011) (attached to the draft CVFPP), based on site inspections through July 2010, all but approximately 15 miles of the SPFC levees are now compliant with this component of the VMS. The No-Project Alternative—Continued Operations Scenario assumes that the remaining 15 miles of SPFC levees would receive vegetation management consistent with this component of the VMS, and that the SPFC overall would continue to be maintained in accordance with the VMS.
- The VMS also includes an additional component labeled life-cycle management (referred to in this PEIR as LCM), which involves focused efforts to ensure that new trees do not become established on SPFC levees. Existing trees not posing an unacceptable safety hazard are allowed to remain, but will not be replaced upon their deaths. Over time, the LCM component of the VMS will result in the gradual elimination of this large woody vegetation from the SPFC levees. To help provide the basis for an ETL variance from USACE, DWR has determined to begin implementing this component of the VMS regardless of whether the CVFPP is adopted. Accordingly, this

component of the VMS is included in the No-Project Alternative—Continued Operations Scenario.

- Without improved alternatives to improve the effectiveness and efficiency of the environmental regulatory process, the complexity of meeting the variety of environmental regulations may continue to result in project delays and costs and inadequate environmental improvements. Continued collaboration at the local, State, and federal levels will be important in navigating regulatory complexities and crafting alternatives that will support the shift to long-term integrated management of a system that serves both public safety and environmental needs.

The assumptions used for the No-Project Alternative—Continued Operations Scenario are limited to current and/or ongoing conditions and activities: existing conditions, as described in Chapter 3.0, “Environmental Setting, Impacts, and Mitigation Measures”; ongoing routine maintenance; project-level maintenance activities, flood fighting (efforts made during a high-water event to prevent or mitigate the effects of floodwaters), and postflood repairs associated with the flood management system in the Central Valley; and programs and plans that have been or are reasonably anticipated to be adopted. The assumptions of the No-Project Alternative—Continued Operations Scenario also reflect future trends in population, water supply reliability, climate change, State and federal regulations, and water quality.

Scale/Magnitude

The SPFC contains more than a thousand miles of levees and associated structures necessary to operate the system. Under the No-Project Alternative—Continued Operations Scenario, DWR would continue to operate the 118 different units that make up the SPFC, and routine maintenance responsibilities of these units would continue to be divided among DWR and 81 different local maintaining agencies (LMAs). These LMAs are primarily levee districts and reclamation districts, but they also consist of a variety of cities, counties, and other public agencies and municipalities. The assignment of maintenance responsibilities varies between the Sacramento River and San Joaquin River basins. In the Sacramento River Basin, levee maintenance is split between DWR and the LMAs. In the Sacramento River Flood Control Project, DWR is responsible for levees identified in Section 8361 of the California Water Code, State maintenance areas, and flood control channel conveyance. However, LMAs are responsible for maintaining levees and flood control channel conveyance in the San Joaquin River Basin.

Cost

Under the No-Project Alternative—Continued Operations Scenario, SPFC improvements would be conducted and funded as they currently are. Without a systemwide plan in place, it would become more difficult for the State to secure funding for maintenance and repair projects.

Time to Implement

Under the No-Project Alternative—Continued Operations Scenario, the timing of repairs and improvements to and maintenance of SPFC facilities would not immediately change. However, the time required to implement repairs, improvements, and maintenance may increase as funding becomes more difficult to obtain and deferred flood risk reduction projects increase in scope and become more constrained by regulations.

Percentage of Footprint Onsite/Offsite

One hundred percent of the activities proposed under this alternative would occur within the current footprint of the SPFC.

Features

Storage and Operations The existing Forecast-Coordination Operations (F-CO) Program would be implemented and possibly expanded at reservoirs in the Sacramento River and San Joaquin River basins. (This program is summarized for the proposed program in Section 2.4.2, “Near-Term Storage-Related Management Activities.”) No other modifications to the operation of existing facilities would be implemented and no additional floodwater storage would be developed and implemented to achieve systemwide benefits.

Bypasses No bypass modifications are included in this alternative.

Flood Structure Maintenance, Repairs, and Improvements The No-Project Alternative—Continued Operations Scenario assumes a continuation of current routine maintenance activities, including those activities typically implemented every year to maintain the operation and integrity of the flood management system. Routine maintenance falls into three broad categories: levees, channels, and structures. Levee maintenance typically includes vegetation management; rodent control (including grouting of burrows); and minor repairs of erosion or revetment damage (by rain or wave action), boils, seepage, or slumping. Channel maintenance activities typically include vegetation management, channel bank monitoring and repair of minor damage caused by erosion, and removal of debris and sediment to maintain flow capacity. Structure maintenance includes maintenance and minor repair of control structures, weirs, barriers, flap gates, signs, and other appurtenant structures. Additionally, authorized and/or funded Proposition 1E Early Implementation Projects planned or

under construction in the project area will be completed even without implementation of the 2012 CVFPP.

Without a systemwide flood management plan and flood system improvements, most urban, rural, and small communities would generally continue to have their current levels of protection from floods, although climate change over time may be expected to increase flood frequency, duration, and magnitude.

Ecosystem Restoration Many ecosystem restoration activities described in the proposed program rely on expansions to the conveyance system that would not occur under the No-Project Alternative—Continued Operations Scenario. However, absent the CVFPP, it is still assumed that ecosystem restoration projects already authorized and/or funded, such as the San Joaquin River Restoration Program, would continue to move forward under the No-Project Alternative—Continued Operations Scenario.

Performance

Urban/Rural Flood Risk Reduction Under the No-Project Alternative—Continued Operations Scenario, many urban areas would remain without an urban level of flood protection, and in rural areas and small communities the level of flood protection would continue to vary widely. Flooding poses a high risk to life, property, and public health and safety for many communities, particularly those located in deep floodplains. The level of protection may decrease in the future, as the system ages and current piecemeal repair programs fail to provide needed maintenance. This would leave approximately 84 percent of the total Systemwide Planning Area (SPA) population with less than 100-year flood protection. The level of flood protection may be affected by ongoing or already authorized and/or funded Early Implementation Projects and ecosystem restoration projects in the SPFC.

Estimated Annual Damages Under the No-Project Alternative—Continued Operations Scenario, normal repairs and maintenance would continue, but repairs would not be tailored to improving systemwide operations. This alternative would result in expected annual damages of approximately \$329 million. Estimated annual damages might be affected by ongoing or already authorized and/or funded Early Implementation Projects and ecosystem restoration projects in the SPFC.

Ecosystem Restoration Effects of the No-Project Alternative—Continued Operations Scenario on aquatic and terrestrial biological resources are discussed separately below. Future ecosystem conditions may be affected by ongoing or already authorized and/or funded Early Implementation Projects and ecosystem restoration projects in the SPFC.

Other Benefits The No-Project Alternative—Continued Operations Scenario would not include a coordinated alternative to increase resiliency in the design, operation, and regulation of flood protection facilities, thus leaving many communities at greater risk in the future. In addition, the more comprehensive habitat restoration that is envisioned as part of the CVFPP Conservation Strategy and that would sequester greenhouse gas (GHG) emissions would not be implemented under the No-Project Alternative—Continued Operations Scenario. It is assumed that local agencies implementing individual projects would perform habitat planting to mitigate project-specific effects; however, in the absence of the CVFPP Conservation Strategy, it is less likely that these plantings would be incorporated into project designs.

Program Objectives

The No-Project Alternative—Continued Operations Scenario does not meet any of the program objectives presented in Section 2.1.2 of this PEIR.

5.4.2 No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario except that it assumes only the completion of projects already commenced. It also does not include the LCM component of the VMS.

Scale/Magnitude

Because new projects are assumed not to be commenced, and because less intensive vegetation management is assumed, this alternative would involve less construction and allow more vegetation to remain than the No-Project Alternative—Continued Operations Scenario.

Cost

This alternative assumes that no additional funds beyond those already committed to specific projects currently under way would be available. Given the elimination of the LCM component of the VMS, the potential to obtain a USACE variance from ETL maintenance standards would be further reduced, and the potential loss of Public Law 84-99 funding would be correspondingly more likely.

Time to Implement

Under this alternative, the timing of repairs and improvements to and maintenance of SPFC facilities would not immediately change. However, the time required to implement repairs, improvements, and maintenance may increase as funding becomes more difficult to obtain and flood risk reduction projects become more constrained by regulations.

Percentage of Footprint Onsite/Offsite

One hundred percent of the activities proposed under this alternative would occur within the current footprint of the SPFC.

Features

Storage and Operations The existing F-CO Program would continue to be implemented, but it would not be expanded at reservoirs in the Sacramento River and San Joaquin River basins. No other modifications to the operation of existing facilities would be implemented, and no additional floodwater storage would be developed and implemented to achieve systemwide benefits.

Bypasses No bypass modifications are included in this alternative.

Flood Structure Maintenance, Repairs, and Improvements This scenario assumes a continuation of current routine maintenance activities, including those activities typically implemented every year to maintain the operation and integrity of the flood management system. However, it does not include the LCM component of the VMS. Only those projects currently under way are assumed to be completed.

Ecosystem Restoration Only those ecosystem restoration projects currently under way are assumed to be completed under this alternative, except such projects required by regulatory agencies as mitigation for other activities.

Performance

Urban/Rural Flood Risk Reduction Under this alternative, even fewer flood risk reduction projects would be undertaken, with a corresponding increase in flood risk. No estimate has been made of the percentage of the total SPA population that would have less than 100-year flood protection under this alternative. However, that percentage would likely be greater than the 84 percent of the No-Project Alternative—Continued Operations Scenario.

Estimated Annual Damages Annual damages under this alternative have not been estimated, but they are anticipated to be greater than under any of the other alternatives.

Ecosystem Restoration Because no new ecosystem restoration activities would commence, this alternative offers fewer ecosystem benefits than any of the other alternatives.

Other Benefits This alternative would not include a coordinated alternative to increase resiliency in the design, operation, and regulation of flood protection facilities, thus leaving many communities at greater risk in

the future. In addition, the more comprehensive habitat restoration that is envisioned as part of the CVFPP Conservation Strategy and that would sequester GHG emissions would not be implemented under this scenario. It is assumed that local agencies implementing individual projects would perform habitat planting to mitigate project-specific effects; however, in the absence of the CVFPP Conservation Strategy, it is less likely that these plantings would be incorporated into project designs.

Program Objectives

The No-Project Alternative—No Additional Activities Scenario does not meet any of the program objectives presented in Section 2.1.2 of this PEIR.

5.4.3 Modified Systemwide Investment Approach Alternative

The Modified SSIA Alternative is similar to the proposed program in that it is based on the urban protection provided by the Protect High-Risk Communities Alternative and adds some small-community protection, but with more limited construction activities than for other alternatives. The alternative also includes expanding the Yolo Bypass and widening Fremont Weir, but does not include any of the other bypass expansions and related improvements contained in the proposed program. The Modified SSIA Alternative thus contains several elements of the proposed program, but focuses more on critical repairs and actions that are less likely to improve flood management on a systemwide basis.

Scale/Magnitude

The overall scale/magnitude of the Modified SSIA Alternative would be somewhat less than that of the proposed program and addresses critical stressors on public safety, operations and maintenance, and ecosystem function while minimizing potential adverse environmental effects. However, the off-site footprint for this alternative is smaller than the footprint for the proposed program because fewer modifications would be made to bypasses and floodways.

Cost

Cost estimates for the Modified SSIA Alternative range from \$8 billion to \$12 billion.

Time to Implement

The time required to implement repairs and maintenance under this alternative would range from 30 to 35 years.

Percentage of Footprint Onsite/Offsite

Approximately 90 percent of the elements associated with the Modified SSIA Alternative would be located within the current SPFC footprint.

Repairs and improvements would be implemented within the footprints of current facilities wherever feasible (in-place fixes). The off-site footprint (10 percent) of this alternative encompasses the areas into which the Yolo Bypass and Fremont Weir would be expanded.

Features

Storage and Operations The F-CO and Forecast-Based Operations (F-BO) programs would be implemented at reservoirs in the Sacramento River and San Joaquin River basins. No additional floodwater storage would be developed and implemented to achieve systemwide flood risk reduction benefits.

Bypasses Bypass elements included in this alternative are limited to expanding the Yolo Bypass and widening Fremont Weir.

Flood Structure Improvements No flood structure improvements are included in this alternative.

Urban/Small-Community/Rural Levee Improvements No initial systemwide investment would be made to address identified deficiencies in SPFC levees. The levees would continue to be repaired and maintained as under the No-Project Alternative—No Additional Activities Scenario.

Ecosystem Restoration Physical improvements to the flood management system under the Modified SSIA Alternative would provide opportunities for ecosystem restoration; however, available land and other constraints could limit the effectiveness of these efforts. The primary ecosystem restoration opportunity associated with the Modified SSIA Alternative would be the Yolo Bypass expansion area.

Performance

Urban/Rural Flood Risk Reduction Under the Modified SSIA Alternative, urban areas would receive a 200-year level of protection by means of structural repairs and improvements to levees and other facilities (including levee raises). No additional construction measures would be taken to protect small communities; those areas would be protected by residual risk management only. This would leave approximately 8 percent of the total SPA population with less than 100-year flood protection.

Estimated Annual Damages This alternative would provide an approximately 65-percent reduction in annual flood damages compared to existing conditions. Substantial reductions would occur throughout urban areas, but little reduction would occur in rural areas and small communities.

Ecosystem Restoration Physical improvements to the flood management system under the Modified SSIA Alternative would be designed and implemented in ways that would integrate achievement of conservation and environmental stewardship principles. The primary opportunity for ecosystem restoration associated with improvements to the flood management system would be the Yolo Bypass.

Other Benefits Because 90 percent of the elements associated with the Modified SSIA Alternative would be located within the current SPFC footprint, this alternative provides limited opportunities to achieve additional benefits.

Program Objectives

Because the Modified SSIA Alternative does not evenly distribute benefits between the Sacramento and San Joaquin River systems, it only partially meets the following program objectives presented in Section 2.1.2 of this PEIR, but does meet most of the program objectives as follows:

- Improve Flood Risk Management
- Improve Operations and Maintenance
- Promote Ecosystem Functions
- Improve Institutional Support
- Promote Multi-Benefit Projects
- Maximize Flood Risk Reduction Benefits Within the Practical Constraints of Available Funds
- Adopt the CVFPP by July 1, 2012
- Promote the Multiple Objectives Established in Water Code Section 9616, as Feasible

5.4.4 Achieve SPFC Design Flow Capacity Alternative

This alternative focuses on reconstructing SPFC facilities to meet current engineering criteria without making major changes to the footprint or operation of those facilities. Engineering risk assessment, design, and construction methods have greatly evolved since the original construction of the SPFC facilities. Because the system was largely constructed based on geometric criteria using available soil materials without extensive investigation of foundation conditions, the majority of the SPFC levees are not capable of carrying their design flows with the degree of reliability

based on current engineering criteria. The Achieve SPFC Design Flow Capacity Alternative focuses on reconstructing existing SPFC facilities throughout the system so that they can reliably accommodate project design flows or design water surface elevations. This alternative was formulated to address legislation that requires DWR to consider structural actions necessary to reconstruct SPFC facilities to their design standard (California Water Code, Section 9614(g)).

This alternative includes major remedial actions to address medium and high threats to facilities of the SPFC. These threats are identified and described in the *Flood Control System Status Report* (DWR, 2011). Remedial actions include major reconstruction of SPFC facilities. Medium- and high-threat factors are those judged to pose the greatest potential threat to SPFC facility integrity. These factors include inadequate levee freeboard, inadequate levee geometry, structural instability, and excessive seepage, as well as inadequate channel capacity to convey design flows.

This alternative also addresses requests from stakeholders to consider reconstructing the existing flood management system in place or without major modification to facility locations. It does not involve improving SPFC facilities to carry flood flows greater than project design flows or completing other enhancements (e.g., to levee height, width, or footprint). This alternative also does not seek a specific level of flood protection in any area.

This alternative was one of the “approaches” considered during the development of the CVFPP. For a more detailed description of this alternative, please refer to the draft plan.

Scale/Magnitude

This alternative involves reconstructing approximately 170 miles of urban SPFC levees and 1,400 miles of nonurban SPFC levees. Repairs would be made to address threats to SPFC facility integrity as identified and described in the *Flood Control System Status Report* (DWR, 2011).

Cost

Cost estimates for this alternative range from \$19 billion to \$23 billion. Investments in SPFC reconstruction would initially reduce SPFC operations and maintenance costs. However, the long-term cost to maintain the system would remain high (similar to current conditions) because reconstruction alone would not address chronic erosion, sedimentation, or other geomorphic conditions inherent to the current system configuration.

Time to Implement

The time required to implement repairs and maintenance under this alternative would range from 30 to 35 years.

Percentage of Footprint Onsite/Offsite

One hundred percent of the activities proposed under the Achieve SPFC Design Flow Capacity Alternative would occur within the current footprint of the SPFC.

Repairs would primarily include modifications to levees in their current locations, as follows:

- SPFC levees would be modified or reconstructed to address identified adverse geotechnical conditions so that the levees would accommodate design flows with a high degree of reliability.
- Levee height would be raised to achieve design freeboard, where needed, to accommodate the design water surface elevation.

Remedial actions associated with this alternative would include constructing different types of stability and seepage berms, constructing cutoff walls, providing rock slope protection, increasing levee height and/or improving levee geometry, and constructing replacement levees needed for the system to convey design flows.

Features

Storage and Operations The F-CO and F-BO programs would be implemented at reservoirs in the Sacramento River and San Joaquin River basins. No additional floodwater storage would be developed and implemented to achieve systemwide benefits.

Bypasses No bypass modifications are included in this alternative.

Flood Structure Improvements No flood structure improvements are included in this alternative.

Urban/Small-Community/Rural Levee Improvements Design capacities of all SPFC facilities would be restored in urban and rural areas protected by the SPFC. Levels of flood protection associated with SPFC design flow capacities would continue to vary throughout the system.

Ecosystem Restoration Because the footprint and operation of an SPFC facility would remain largely unchanged under this alternative, opportunities to integrate ecosystem restoration and enhancement would be limited and would not contribute to improved ecosystem functions on a systemwide scale. Therefore, existing conflicts between environmental

stewardship and levee maintenance practices would continue to hamper the improvement of ecosystem conditions and public safety.

Performance

Urban/Rural Flood Risk Reduction Implementing this alternative would improve the level of flood risk reduction throughout the system, but the improvements would be highly variable spatially, leaving 46 percent of the total SPA population with less than 100-year flood protection. The improvements would be made in some urban areas and in some small communities protected by SPFC facilities.

Estimated Annual Damages This alternative would provide an approximately 49-percent reduction in annual flood damages compared to current conditions. The greatest level of flood risk reduction would occur throughout rural areas; urban areas would have a lesser level of reductions.

Ecosystem Restoration Implementing this alternative would present limited opportunities to integrate ecosystem restoration into in-place repairs to SPFC facilities.

Other Benefits The Achieve SPFC Design Flow Capacity Alternative offers limited opportunities to integrate other benefits into repairs to SPFC facilities. Restoring SPFC design flow capacities would not substantially improve flood system resiliency or adaptability to climate change.

Program Objectives

The Achieve SPFC Design Flow Capacity Alternative meets the following program objectives presented in Section 2.1.2 of this PEIR:

- Improve Flood Risk Management
- Adopt the CVFPP by July 1, 2012
- However, this alternative fails to meet the other program objectives presented in Section 2.1.2.

5.4.5 Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative focuses on enhancing the flood system's storage and conveyance capacity to achieve multiple benefits. It includes several elements intended to reduce flood risks in urban and small communities and to at least restore SPFC system capacity to rural areas. Enhancements to flood system capacity would be designed on a systemwide scale to integrate multiple benefits, including environmental restoration and water supply reliability.

This alternative involves modifying the existing footprint and function of the flood management system, primarily to increase overall conveyance capacity and floodwater storage, but also to provide opportunities for ecosystem restoration and related water resources benefits. This alternative also involves protecting high-risk communities and fixing levees in place in rural-agricultural areas to achieve design flow capacities. It does not include improvements that may be needed to address interior drainage or other local sources of flooding. This alternative also does not include improvements to non-SPFC levees that protect some urban areas.

This alternative was one of the “approaches” considered during the development of the CVFPP. For a more detailed description of this alternative, please refer to the draft plan.

Scale/Magnitude

In general, under this alternative, flood system capacity would be increased by widening floodways and bypasses, setting back levees away from the active river channel, and increasing floodwater storage. Floodwater storage would be increased by making operational changes to existing reservoirs, creating new reservoir storage, and modifying or creating new floodplain storage.

Widening floodways and setting back levees along some reaches of major rivers and tributaries also would provide substantial opportunities to restore native habitat quantity, quality, and connectivity and to restore natural processes necessary to support healthy ecosystems.

Cost

Cost estimates for the Enhance Flood System Capacity Alternative range from approximately \$32 billion to \$41 billion.

Time to Implement

The time required to implement repairs and maintenance under this alternative would range from 35 to 40 years.

Percentage of Footprint Onsite/Offsite

Approximately 30 percent of the elements associated with the Enhance Flood System Capacity Alternative would be located within the current SPFC footprint. Most (70 percent) of the improvements would occur on non-SPFC lands because they involve construction of new bypasses and setback levees and expansion of current bypasses, weirs, and floodways.

Features

Storage and Operations The F-CO and F-BO programs would be implemented at reservoirs in the Sacramento River and San Joaquin River basins. Operational changes would include modifying the reservoir release schedule and increasing the flood storage allocation of the Feather River to effectively manage the 200-year event. In the San Joaquin River Basin, the State would partner with interested reservoir operators to increase the flood storage allocation to effectively manage the 100-year flood event. These changes would be made to help manage the timing and magnitude of peak flood flows before they enter the Sacramento and San Joaquin rivers.

Floodplain easements in both the Sacramento River and San Joaquin River Basins would also be obtained.

Bypasses Existing weirs, bypass systems, and appurtenant SPFC facilities would be modified to achieve a variety of benefits, such as increased conveyance capacity, reduced water stages, and restored ecosystem processes, where determined feasible. New bypasses or weirs would also be constructed.

Flood Structure Improvements Flood system improvements would include a combination of new construction, erosion management, and bypass sediment removal at various locations.

Urban/Small-Community/Rural Levee Improvements Overall flood protection would increase under the Enhance Flood System Capacity Alternative, but specific levels of protection would continue to vary throughout the system. The SPFC would also have an improved capacity to manage flood peaks through enhanced storage and conveyance. Urban areas would receive a 200-year level of protection, with 100-year protection provided to small communities under this alternative.

Ecosystem Restoration Implementing this alternative would present substantial opportunities to integrate ecosystem restoration into in-place repairs to SPFC facilities.

Performance

Urban/Rural Flood Risk Reduction Flood risk reduction would vary under this alternative, but improvements would be seen in urban areas, small communities, and rural areas through a combination of conveyance, storage, and in-place levee improvements. Implementing this alternative would leave 5 percent of the total SPA population with less than 100-year flood protection.

Estimated Annual Damages Under the Enhance Flood System Capacity Alternative, SPFC improvements related to increased storage and conveyance would result in an estimated 80-percent reduction in damages in urban and rural-agricultural areas.

Ecosystem Restoration Implementing this alternative would provide substantial opportunities to restore native habitats (aquatic, riparian, and floodplain habitats) and improve the quality and connectivity of environmental resources in the flood management system. Flood structure improvements would also support improved fish passage, conservation easements, and a large number of setback levees. Floodplain expansion associated with this alternative could occur at various locations and would improve ecosystem functions; fish passage; and the quantity, quality, and diversity of habitats.

Other Benefits Implementing the Enhance Flood System Capacity Alternative would provide enhanced opportunities for multi-benefit projects by increasing the number of opportunities to integrate water quality, recreation, power, and other benefits. In addition, it would provide opportunities to improve (1) water supply reliability through multipurpose reservoir storage projects, (2) conjunctive management of groundwater and surface water resources, and (3) groundwater recharge in floodplain storage areas. Implementing this alternative also would improve flood system resiliency and the system's ability to adapt to climate change by enhancing storage and conveyance.

Program Objectives

The Enhance Flood System Capacity Alternative meets most of the program objectives presented in Section 2.1.2 of this PEIR as follows:

- Improve Flood Risk Management
- Improve Operations and Maintenance
- Promote Ecosystem Functions
- Improve Institutional Support
- Promote Multi-Benefit Projects
- Adopt the CVFPP by July 1, 2012
- Promote the Multiple Objectives Established in Water Code Section 9616, as Feasible

However, this alternative fails to meet the other program objective presented in Section 2.1.2 because it fails to account for the practical constraints of reasonably anticipated funding. If sufficient funding were made available for this alternative, it would then satisfy all of the program objectives.

5.5 Impact Analysis

The following section compares the environmental impacts of each alternative described above with the impacts of the proposed program (i.e., the CVFPP SSIA). Impacts are compared for each environmental issue area addressed in Chapter 3.0 of this PEIR, “Environmental Setting, Impacts, and Mitigation Measures.”

As discussed above, the CEQA Guidelines (Section 15126.6(d)) permit the alternatives to be evaluated in less detail than the proposed project. Consistent with Section 15126.6(d) of the CEQA Guidelines, the analysis below provides a general comparison of the environmental effects of the alternatives against the effects from the proposed program, focusing on whether the alternative would result in effects greater than, less than, or similar to those identified for the proposed program.

The comparative environmental impacts of the alternatives generally result from differences in the following aspects of the activities anticipated under each alternative:

- **Construction Impacts**—The alternatives vary in relation to the scale and nature of the construction activities that would be involved. These differences, in turn, affect the level of construction-related impacts, such as air pollutant and GHG emissions from construction vehicles and construction materials manufacturing, construction noise, and construction traffic. These construction impacts are generally temporary and localized; nonetheless, some may be considered significant.
- **Operations and Maintenance Impacts**—Operations and maintenance impacts vary relative to the scale and nature of any new facilities that would need to be operated and maintained, and relative to any changes to the ongoing operations and maintenance of existing facilities, such as vegetation management and reservoir reoperations. These impacts generally would be less intense than construction-period impacts, but would occur for longer periods of time and over larger geographic scales.

- **“Footprint” Effects**—The alternatives vary in terms of the degree to which they would involve the use of lands not currently part of the flood protection system. Where the “footprint” of flood protection system facilities would be expanded, effects on the current uses of those areas (such as agricultural uses) and on the environmental values of those areas (such as habitat, cultural resources, and mineral resources) could result. These impacts would generally be long-term, but may include both adverse and beneficial effects depending upon the nature of the activity and the environmental topic being addressed.
- **Habitat Enhancements**—The plan identifies several potential habitat enhancements. Additional habitat enhancements would be evaluated during project-level permitting processes and during the development of the CVFPP Conservation Strategy. The alternatives vary in the degree to which they would be able to accommodate or facilitate these habitat enhancements.
- **Beneficial Effects from Flood Protection**—Floods can have environmental effects in addition to their impacts on property and public safety. For example, reconstruction activities made necessary by the damage from a flood can create construction impacts. Floods can also damage habitats, cause the release of hazardous substances in the flooded area, impair existing land uses, and place water supplies at risk. As discussed in several sections of Chapter 3.0, “Environmental Setting, Impacts, and Mitigation Measures,” the beneficial effects of minimizing the frequency and intensity of flood events could offset, in whole or in part, some of the adverse affects of the program. The degree to which these beneficial effects could be considered to offset the program’s adverse effects would depend on assumptions about the likelihood and severity of the future flooding events that would be avoided. These beneficial effects also would generally be infrequent, episodic, and localized.
- In many cases, alternatives would result in both beneficial and adverse effects. For example, the creation of long-term habitat in expanded bypasses could cause the displacement of current agricultural uses. Also, the location, timing, likelihood, and/or scale of the beneficial and adverse effects may differ. Nonetheless, the analysis below attempts to identify the most likely “net” result of each alternative in each impact area. Generally, this is based on the most severe impact category identified for the environmental issue area.

As directed by CEQA, the analysis below focuses on the ability of each alternative to reduce impacts of the proposed program that are considered to be significant and unavoidable or potentially significant and

unavoidable. The following summary of those significant and unavoidable and potentially significant and unavoidable impacts is intended to help focus the analysis below:

- **Agriculture and Forestry Resources**—The proposed program would involve either facility construction or management changes in some areas currently subject to agricultural production. The program also includes an extensive set of mitigation measures, such as avoidance of Important Farmland where feasible and consideration of agricultural conservation easements. However, given the nature and scale of certain elements of the proposed program, particularly the proposed expansion of bypasses and creation of additional habitat areas, this impact is considered potentially significant and unavoidable. The scope of this potentially significant and unavoidable impact is limited to those situations where identified Important Farmlands cannot be avoided and feasible mitigation is not adequate to address the impact.
- **Air Quality**—Construction-period air pollutant emissions for some of the larger projects that are anticipated to occur could exceed the CEQA thresholds established by certain air pollution control districts, even after mitigation, resulting in a potentially significant and unavoidable impact. The scope of this potentially significant and unavoidable impact is temporary and limited to these larger projects exceeding applicable air district CEQA thresholds.
- **Biological Resources—Aquatic**—The proposed program includes a requirement that all activities be undertaken in compliance with all applicable regulatory requirements, including requirements that generally require full mitigation of any effects on aquatic habitats. The program also includes enhancements to aquatic biological resources, particularly under the CVFPP Conservation Framework. This PEIR also establishes a set of mitigation measures designed to achieve an overall performance standard of no net loss of biological resource functions and values. As a result, impacts on aquatic biological resources generally are anticipated to be less than significant. However, given the scope and nature of the program, there may be situations in which local or temporary effects could not be fully mitigated. If those effects were of a sufficient scale, they could result in potentially significant and unavoidable impacts.
- **Biological Resources—Terrestrial**—The proposed program includes a requirement that all activities be undertaken in compliance with all applicable regulatory requirements, including requirements that generally require full mitigation of any effects on terrestrial habitats. The program also includes enhancements to terrestrial biological

resources, particularly under the CVFPP Conservation Framework, and including the riparian forest planting. This PEIR also establishes a set of mitigation measures designed to achieve an overall performance standard of no net loss of biological resource functions and values. As a result, impacts on terrestrial biological resources generally are anticipated to be less than significant. However, given the scope and nature of the program, there may be situations in which local or temporary effects could not be fully mitigated. If those effects were of a sufficient scale, they could result in potentially significant and unavoidable impacts.

- **Cultural and Historical Resources**—Much of the proposed program would occur in areas that have already been disturbed by agricultural and other activities and/or have been in flood protection uses for a long time. However, it is anticipated that some cultural and historical resources and/or traditional cultural properties may be encountered during activities under the proposed program. The program includes extensive mitigation measures requiring the identification and avoidance of these resources, where feasible, and documentation recording the resource whenever the resource cannot be avoided. However, given the nature and scale of the proposed program, there may be situations in which historic properties must be removed or traditional cultural properties would be adversely affected in a way that cannot be feasibly mitigated, resulting in potentially significant and unavoidable impacts.
- **Mineral and Paleontological Resources**—Much of the proposed program would occur in areas that have already been disturbed by agricultural and other activities and/or have been in flood protection uses for a long time. Mining activity is generally precluded within or in the immediate vicinity of existing structures, such as levees, to preserve the stability of those structures. However, widening floodways and constructing weirs, new bypasses, or setback levees outside the existing footprint or the immediate vicinity of the footprint of existing structures could prevent access to locally valuable mineral resources (particularly aggregate materials), resulting in potentially significant and unavoidable impacts.
- **Land Use and Planning** —The significant and unavoidable impacts on agricultural resources, described above are also considered to reflect corresponding significant and unavoidable land use impacts of the same nature and scope.
- **Transportation and Traffic**— Operation and maintenance of projects under the proposed program would not generate substantial long-term

traffic. Also, construction traffic for most projects could be accommodated by the existing circulation system without resulting in significant impacts. However, for very large construction projects (i.e., those involving several million cubic yards of fill requiring transport over public roads), significance thresholds recommended by the Institute of Transportation Engineers could be exceeded and sufficient reduction of peak hour construction traffic may not be feasible, resulting in a potentially significant and unavoidable impact. In addition, in rare situations projects could require transportation infrastructure to be removed or disrupted for a substantial period of time, and detours or alternate routes may not be feasible, resulting in a potentially significant and unavoidable impact.

5.5.1 Aesthetics

The proposed program would not result in significant aesthetics impacts after mitigation, as described in greater detail in Section 3.2, “Aesthetics.” The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the aesthetic benefits from flood risk reduction would not compensate for the impacts of the proposed program because those benefits would generally be short term (i.e., flooded areas are anticipated to recover to pre-flood conditions as repairs are made and vegetation returns) while many of the aesthetic impacts of the proposed program would be permanent.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine operations and maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would continue to be implemented as part of the No-Project Alternative—Continued Operations Scenario. DWR intends to implement the VMS, and associated elements such as LCM, whether or not the CVFPP is adopted. Therefore, changes in visual conditions resulting from management and removal of vegetation associated with levee maintenance would be the same for the No-Project Alternative—Continued Operations Scenario and the proposed program. However, the CVFPP Conservation Strategy, which would have beneficial visual effects in some areas associated with habitat creation and vegetative screening, would not be implemented under this alternative. It is assumed that local agencies implementing individual projects would perform habitat planting to mitigate project-specific effects under both the No-Project Alternative—Continued Operations Scenario and the proposed program, and that mitigation would also be provided by an appropriate agency for

riparian vegetation removal resulting from the VMS. Therefore, impacts on aesthetic resources from system operations and maintenance would be similar under both alternatives.

The visual impacts of project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. In addition, as under the proposed program, activities occurring as part of this alternative would require development and implementation of mitigation measures to reduce significant or potentially significant visual impacts. Examples of such measures include providing visual screening and conforming to applicable lighting standards when needed. Mitigation measures would be equally effective at reducing small-scale, localized visual impacts to a less-than-significant level under either the No-Project Alternative—Continued Operations Scenario or the proposed program.

With fewer improvements to the flood protection system under the No-Project Alternative—Continued Operations Scenario, system failures and associated damage from flooding would be more frequent and more severe than under the proposed program. Therefore, impacts on aesthetic resources via flooding and postflood repairs would be greater under this alternative. As described above, impacts on aesthetic resources from system operations and maintenance would be similar under the No-Project Alternative—Continued Operations Scenario and the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, aesthetic impacts could be equally mitigated under both alternatives. There would be greater flood-related visual impacts under the No-Project Alternative—Continued Operations Scenario, but these would be infrequent and episodic. Given these conditions, the overall impact of the No-Project Alternative—Continued Operations Scenario on aesthetics is expected to be similar to that of the proposed program. *[Similar]*

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. Therefore, changes in visual conditions resulting from management and removal of vegetation for levee maintenance would be similar under the No-Project Alternative—No Additional Activities Scenario and the proposed program, except that over

time, more trees would likely be present on the levees under this alternative, reducing aesthetic impacts somewhat.

The CVFPP Conservation Strategy, which would have beneficial visual effects in some areas associated with habitat creation and vegetative screening, would not be implemented under the No-Project Alternative—No Additional Activities Scenario. It is assumed that local agencies implementing individual projects would perform habitat planting to mitigate project-specific effects under both this alternative and the proposed program, and that mitigation would also be provided by an appropriate agency for riparian vegetation removal resulting from the VMS. Therefore, impacts of system operations and maintenance on aesthetic resources would be similar for both alternatives.

The visual impacts of project-level construction of new facilities and of repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. In addition, as under the proposed program, activities occurring as part of this alternative would require development and implementation of mitigation measures to reduce significant or potentially significant visual impacts. Mitigation measures would be equally effective at reducing small-scale, localized visual impacts to a less-than-significant level under either the No-Project Alternative—No Additional Activities Scenario or the proposed program.

With fewer improvements to the flood protection system under the No-Project Alternative—No Additional Activities Scenario, system failures and associated damage from flooding would be more frequent and more severe than under the proposed program. Therefore, impacts of flooding and postflood repairs on aesthetic resources would be greater under this alternative. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, aesthetic impacts could be equally mitigated under either alternative. There would be greater flood-related visual impacts under the No-Project Alternative—No Additional Activities Scenario, but these would be infrequent and episodic. Given these conditions, the overall impact of the No-Project Alternative—No Additional Activities Scenario on aesthetics is expected to be similar to that of the proposed program. *[Similar]*

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same operations and maintenance regime as the proposed program, and impacts of system maintenance on aesthetic resources would be similar. The Modified SSIA Alternative would address only the most critical stressors on public safety,

operations and maintenance, and ecosystem function; thus, the construction and land disturbance footprint would be smaller under this alternative than under the proposed program. This alternative also focuses on flood protection in urban areas, which may have higher concentrations of viewers; however, scenic viewsheds or areas where viewers expect aesthetic conditions of higher quality are generally concentrated in rural, undeveloped areas. Therefore, construction-related impacts on aesthetics would be less under the Modified SSIA Alternative than under the proposed program. Mitigation measures would be equally effective at reducing small-scale, localized visual impacts to a less-than-significant level under either the Modified SSIA Alternative or the proposed program. This alternative would provide some opportunities for ecosystem restoration, which would result in a beneficial effect on aesthetics; however, the opportunities for larger scale restoration would be limited to the Yolo Bypass, meaning that much fewer aesthetic benefits would occur. This alternative would reduce the risk of flood-related impacts on aesthetics at a level slightly less than that of the proposed program. Because the ground disturbance footprint would be smaller, the overall impact of the Modified SSIA Alternative on aesthetics would be less than the impact of the proposed program. *[Lesser]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). It would implement the same operations and maintenance regime as the proposed program, and impacts of system operations and maintenance on aesthetic resources would be similar. The Achieve SPFC Design Flow Capacity Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction-related impacts on aesthetics would be less under this alternative. Mitigation measures would be equally effective at reducing small-scale, localized visual impacts to a less-than-significant level under either this alternative or the proposed program.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, this alternative would not reduce the risk of flood-related impacts on aesthetics as much as the proposed program. Because it would provide few opportunities for ecosystem restoration, the benefits to aesthetics from restoration would be more limited under this alternative than under the proposed program. Because the ground disturbance footprint would be smaller, the overall impact of the Achieve SPFC Design Flow Capacity Alternative on aesthetics would be less than the impact of the proposed program. *[Lesser]*

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways. This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on aesthetic resources would be similar. New reservoirs would have maintenance requirements not included in the proposed program; however, impacts on aesthetic resources would result primarily from constructing and operating a reservoir in a location where one does not currently exist, and not necessarily from maintaining that reservoir once it is in place.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see Table 5.4-1); as a result, the reduction in potential flood-related impacts on aesthetics would also be slightly greater. This alternative would provide somewhat greater opportunities for ecosystem restoration than the proposed program, which would result in correspondingly greater benefits to aesthetics. However, more and larger new facilities could be constructed under this alternative, resulting in greater impacts on aesthetics. Mitigation measures similar to those recommended for the proposed program could be implemented; however, it is uncertain whether those measures would be sufficient to reduce all aesthetics impacts to a less-than-significant level for reservoirs and all other large new facilities associated with this alternative. Therefore, impacts on aesthetics would be greater under the Enhance Flood System Capacity Alternative than under the proposed program. [*Greater*]

5.5.2 Agriculture and Forestry Resources

The proposed program would result in potentially significant and unavoidable agricultural resources impacts after mitigation, as described in greater detail in Section 3.3, “Agriculture and Forestry Resources.” The scope of these potentially significant and unavoidable impacts is limited to those situations in which identified Important Farmlands could not be avoided and feasible mitigation would not be adequate to address the impact. Impacts of the VMS on riparian forests, discussed in detail in Section 3.5, “Biological Resources—Aquatic,” and Section 3.6, “Biological Resources—Terrestrial,” are also considered to be of the same nature and scope as impacts on forestry resources as broadly defined in the CEQA Guidelines. The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the benefits to agricultural resources from flood risk reduction would not compensate for the impacts of the proposed program because those benefits would generally be short term (i.e., flooded areas are anticipated to recover to pre-flood conditions as lands dry out and farming can resume), while many of the impacts of the proposed program on agricultural resources would be permanent.

No-Project Alternative—Continued Operations Scenario

Routine maintenance of flood control facilities has little effect on agricultural resources, and maintenance effects from the No-Project Alternative—Continued Operations Scenario would be similar to those from the proposed program.

The impacts on agricultural lands from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. With a smaller cumulative project footprint, conversion of agricultural land to nonagricultural use would be reduced. The proposed program also includes a larger amount of habitat restoration and creation, which would cause some amount of agricultural land to be converted to nonagricultural use.

As under the proposed program, activities occurring as part of the No-Project Alternative—Continued Operations Scenario would require development and implementation of mitigation measures to reduce significant or potentially significant impacts on agricultural resources. Examples of such measures include preserving the agricultural productivity of Important Farmland, complying with the Surface Mining and Reclamation Act as applicable for reclamation of borrow sites, and minimizing the effects of inundation and saturation. Mitigation measures would be equally effective at reducing temporary impacts on agricultural resources to a less-than-significant level under either the No-Project Alternative—Continued Operations Scenario or the proposed program. However, it would not be feasible to fully mitigate the conversion of Important Farmland under either alternative.

Effects on agricultural resources from flood protection system failures would be greater under the No-Project Alternative—Continued Operations Scenario than under the proposed program because reductions in flood risk would be smaller under this alternative. Although some improvements to the flood protection system would occur this alternative, many areas would experience nominal to no reductions in flood risk. Therefore, the potential for adverse effects on agricultural land from a catastrophic flood event would be greater.

Although the impacts of flooding would be greater under the No-Project Alternative—Continued Operations Scenario than under the proposed program, these impacts would be infrequent and generally temporary. There would be greater permanent conversions of agricultural lands to nonagricultural uses under the proposed program, both from facility construction and from habitat restoration and creation. Therefore, the overall impact of the No-Project Alternative—Continued Operations Scenario on agricultural resources is expected to be less than that of the proposed program. [*Lesser*]

No-Project Alternative—No Additional Activities Scenario

Routine maintenance of flood control facilities has little effect on agricultural resources, and maintenance effects from the No-Project Alternative—No Additional Activities Scenario would be similar to those from the proposed program.

The impacts on agricultural lands from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. With a smaller cumulative project footprint, conversion of agricultural land to nonagricultural use would be reduced. The proposed program also includes a larger amount of habitat restoration and creation, which would cause some amount of agricultural land to be converted to nonagricultural use.

As under the proposed program, activities occurring as part of the No-Project Alternative—No Additional Activities Scenario would require development and implementation of mitigation measures to reduce significant or potentially significant agricultural resources impacts. Mitigation measures would be equally effective at reducing temporary impacts on agricultural resources to a less-than-significant level under either the No-Project Alternative—No Additional Activities Scenario or the proposed program. However, it would not be feasible to fully mitigate the conversion of Important Farmland under either alternative.

Effects on agricultural resources from failures of the flood protection system would be greater under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because reductions in flood risk would be smaller under this alternative. Although some improvements to the flood protection system would occur under this alternative, many areas would experience nominal to no reductions in flood risk. Therefore, the potential for adverse effects on agricultural land from a catastrophic flood event would be greater.

Although the impacts of flooding would be greater under the No-Project Alternative—No Additional Activities Scenario, these impacts would be infrequent and generally temporary. There would be greater permanent conversions of agricultural lands to nonagricultural uses under the proposed program, both from facility construction and from habitat restoration and creation. Therefore, the overall impact of the No-Project Alternative—No Additional Activities Scenario on agricultural resources is expected to be less than that of the proposed program. *[Lesser]*

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on agricultural resources would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller under this alternative than under the proposed program. As a result, it is likely that less agricultural land would be converted to other uses. As under the proposed program, activities occurring as part of the Modified SSIA Alternative would require development and implementation of mitigation measures to reduce significant impacts on agricultural resources. Mitigation measures would be equally effective at reducing temporary impacts on agricultural resources to a less-than-significant level under either the Modified SSIA Alternative or the proposed program. However, it would not be feasible to fully mitigate the conversion of Important Farmland under either alternative.

Under the Modified SSIA Alternative, only minimal measures would be taken to reduce flood risk for rural-agricultural areas. Flood protection in agricultural areas would not increase to the same degree as under the proposed program, and system failures resulting in inundation of agricultural land would be greater than under the proposed program. Although the impacts associated with flooding of agricultural land would be greater under the Modified SSIA Alternative, these impacts would be infrequent and generally temporary. There would be greater permanent conversions of agricultural lands to nonagricultural uses under the proposed program, both from facility construction and from habitat restoration and creation. Therefore, the overall impact of the Modified SSIA Alternative on agricultural resources is expected to be less than that of the proposed program. *[Lesser]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation

of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on agricultural resources would be similar. This alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, conversion of agricultural land to accommodate new or modified facilities and habitat restoration and creation would be less under this alternative. Mitigation measures would be equally effective at reducing temporary impacts on agricultural resources to a less-than-significant level under either the Achieve SPFC Design Flow Capacity Alternative or the proposed program. However, it would not be feasible to fully mitigate the conversion of Important Farmland under either alternative.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, this alternative would not reduce the risk of flood-related impacts on agricultural resources as much as the proposed program. The impacts associated with flooding of agricultural land would be greater under this alternative, but these impacts would be infrequent and generally temporary. There would be greater permanent conversions of agricultural lands to nonagricultural uses under the proposed program, both from facility construction and from habitat restoration and creation. Therefore, the overall impact of the Achieve SPFC Design Flow Capacity Alternative on agricultural resources is expected to be less than that of the proposed program. *[Lesser]*

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on agricultural resources would be similar. New reservoirs would have maintenance requirements not included in the proposed program; however, impacts on agricultural resources would result primarily from constructing and operating a reservoir on agricultural land, and not necessarily from maintaining that reservoir once it is in place.

It is uncertain how changing the management and operation of storage facilities under this alternative would affect agricultural lands. Depending on the timing, duration, and locations of water reallocation, more or less water could be available for agricultural irrigation.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see Table 5.4-1); as a result, the reduction in potential flood-related impacts on agricultural resources would also be slightly greater. More and larger new facilities could be constructed under this alternative, resulting in greater conversion of agricultural land to nonagricultural use. Similarly, this alternative provides greater opportunities for habitat restoration and enhancement, potentially resulting in greater conversions of agricultural land. As under the proposed program, activities occurring as part of the Enhance Flood System Capacity Alternative would require development and implementation of mitigation measures to reduce significant impacts on agricultural resources. Mitigation measures would be equally effective at reducing temporary impacts on agricultural resources to a less-than-significant level under either the Enhance Flood System Capacity Alternative or the proposed program. However, it would not be feasible to fully mitigate the conversion of Important Farmland under either alternative. Given these conditions, impacts on agricultural resources would be greater under the Enhance Flood System Capacity Alternative than under the proposed program. *[Greater]*

5.5.3 Air Quality

The proposed program could have potentially significant and unavoidable air quality impacts, as described in greater detail in Section 3.4, “Air Quality.” These potentially significant and unavoidable impacts could occur in connection with the construction of relatively large projects, resulting in air pollutant emissions that could exceed the levels identified in applicable air district CEQA thresholds. The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the air quality benefits from flood risk reduction would not be materially different from the impacts of the proposed program. It is assumed that reconstruction efforts would involve comparable numbers of large projects exceeding applicable air district CEQA thresholds.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of operations and routine maintenance of flood control facilities would continue following existing programs. Both the proposed program and the No-Project Alternative—Continued Operations Scenario include implementation of the VMS. The proposed program includes some new facilities that could cause air pollutant emissions from operations and maintenance to increase. However, the program also includes elements that

would reduce future maintenance requirements for existing facilities (e.g., by limiting ongoing erosion of facilities). Overall, air pollutant emissions from operations and maintenance would be similar under the two alternatives.

Because fewer and smaller facilities would be constructed under the No-Project Alternative—Continued Operations Scenario, construction emissions would be less than under the proposed program. Specifically, construction of facilities resulting in air pollution emissions exceeding local air district CEQA thresholds would be substantially reduced. Both alternatives would require development and implementation of mitigation measures to reduce significant or potentially significant air quality impacts from construction emissions, such as using equipment with reduced emissions and limiting idling times. Mitigation measures would be equally effective at reducing short-term construction-related impacts on air quality to a less-than-significant level under either the No-Project Alternative—Continued Operations Scenario or the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, air pollutant emissions from recovery and repair after failures of the flood protection system would be greater under this alternative than under the proposed program. Although pollutant emissions associated with recovery and repair from flood system failures would be greater under the No-Project Alternative—Continued Operations Scenario, these impacts would be infrequent. Emissions from facility operations and maintenance would be similar under the two alternatives. Construction-related emissions would be greater under the proposed program because of the larger number of projects. Given these conditions, the overall impacts of the No-Project Alternative—Continued Operations Scenario and the proposed program on air quality would be similar. *[Similar]*

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. The proposed program includes new facilities that could cause air pollutant emissions from operations and maintenance to increase. However, the program also includes elements that would reduce future maintenance requirements for existing facilities (e.g., by limiting ongoing erosion of facilities). Overall, air pollutant emissions

from operations and maintenance would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program.

Because fewer and smaller facilities would be constructed under the No-Project Alternative—No Additional Activities Scenario, construction emissions would be less than under the proposed program. Specifically, construction of facilities resulting in air pollutant emissions exceeding local air district CEQA thresholds would be substantially reduced. Both alternatives would require development and implementation of mitigation measures to reduce significant or potentially significant air quality impacts from construction emissions. Mitigation measures would be equally effective at reducing short-term construction-related impacts on air quality to a less-than-significant level under either the No-Project Alternative—No Additional Activities Scenario or the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—No Additional Activities Scenario, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, air pollutant emissions from recovery and repair after failures of the flood protection system would be greater under this alternative than under the proposed program. Although pollutant emissions associated with recovery and repair from flood system failures would be greater under the No-Project Alternative—No Additional Activities Scenario, these impacts would be infrequent. Emissions from facility operations and maintenance would be less under this alternative than under the proposed program. Construction-related emissions would be greater under the proposed program because of the larger number of projects. Given these conditions, the overall impacts of the No-Project Alternative—No Additional Activities Scenario on air quality would be less than the impacts of the proposed program. [*Lesser*]

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same operations and maintenance regime as the proposed program, and impacts of system operations and maintenance on air quality would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller under this alternative than under the proposed program. As a result, emissions from construction-related activities would be expected to be less. As under the proposed program, activities occurring as part of the Modified SSIA Alternative would require development and implementation of mitigation measures to reduce significant impacts from pollutant emissions.

Mitigation measures would be equally effective at reducing air quality impacts to a less-than-significant level under either the Modified SSIA Alternative or the proposed program.

The overall reduction in flood risk by the Modified SSIA Alternative would be slightly less than the flood risk reduction of the proposed program. Therefore, the potential for flooding from system failures during high-water events would be slightly greater, as would pollutant emissions from recovery and repair after failures of the flood protection system.

Emissions associated with operations and maintenance would be similar under the proposed program and the Modified SSIA Alternative; however, construction emissions would generally be anticipated to be less under this alternative because the construction footprint would be smaller. Specifically, under the Modified SSIA Alternative, there would be fewer large projects likely to exceed local air district CEQA thresholds. Therefore, impacts of the Modified SSIA Alternative on air quality are expected to be less than those of the proposed program. [*Lesser*]

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity Alternative would implement the same operations and maintenance regime as the proposed program, and impacts on air quality from system operations and maintenance would be similar. This alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction emissions would be less. Mitigation measures would be equally effective at reducing construction emission impacts under either the Achieve SPFC Design Flow Capacity Alternative or the proposed program.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, this alternative would not reduce emissions from recovery and repair of flood events as much as the proposed program. Although pollutant emissions associated with recovery and repair from flood system failures would be greater under this alternative, these impacts would be infrequent. Emissions from facility operations and maintenance would be similar under the two alternatives. Construction-related emissions would be anticipated to be greater under the proposed program because the project footprint would be larger. Specifically, under the Achieve SPFC Design Flow Capacities Alternative, there would be fewer large projects likely to exceed local air district CEQA thresholds. Given these conditions, the overall impact of the

Achieve SPFC Design Flow Capacity Alternative on air quality would be expected to be less than that of the proposed program. [*Lesser*]

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on air quality would be similar. New reservoirs would have maintenance requirements not included in the proposed program, which could result in increased pollutant emissions relative to the proposed program.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see Table 5.4-1); as a result, the reduction in potential flood-related impacts on air quality would also be slightly greater. More and larger new facilities could be constructed under this alternative, resulting in greater construction emissions. Specifically, under the Enhance Flood System Capacity Alternative, there would be more large projects likely to exceed local air district CEQA thresholds. As under the proposed program, activities occurring as part of this alternative would require development and implementation of mitigation measures to reduce significant impacts on air quality. Mitigation measures would be equally effective at reducing construction emission impacts to a less-than-significant level under either the Enhance Flood System Capacity Alternative or the proposed program. Given these condition, impacts on air quality would be greater under the Enhance Flood System Capacity Alternative than under the proposed program. [*Greater*]

5.5.4 Biological Resources—Aquatic

- The proposed program could have potentially significant and unavoidable aquatic biological resources impacts, as described in greater detail in Section 3.5, “Biological Resources—Aquatic.” Most impacts on aquatic biological resources are anticipated to be less than significant after mitigation. However, given the scope and nature of the program, there may be situations in which local or temporary effects could not be fully mitigated; if those effects were of a sufficient scale, they could result in potentially significant and unavoidable impacts. The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the benefits to aquatic biological resources from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be minimal, well-planned, and substantially mitigated, while the adverse habitat impacts from a major flood event would be unplanned and unmitigated, and could be of significant scope.

The alternatives also vary substantially in the degree to which they would include or accommodate habitat enhancements that go beyond the requirements of applicable regulatory programs.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine operations and maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of this alternative. DWR intends to implement the VMS and associated elements such as LCM whether or not the CVFPP is adopted. Therefore, changes in general riparian habitat and shaded riverine aquatic habitat caused by management and removal of vegetation for levee maintenance would be the same under the No-Project Alternative—Continued Operations Scenario as under the proposed program. However, the CVFPP Conservation Strategy, which could have beneficial effects on riparian and shaded riverine aquatic habitats in some areas from habitat creation, would not be implemented under this alternative. It is assumed that local agencies implementing individual projects would perform habitat planting to mitigate project-specific effects under both the No-Project Alternative—Continued Operations Scenario and the proposed program, and that mitigation would also be provided by an appropriate agency for riparian vegetation removal resulting from the VMS. However, the elements of the CVFPP Conservation Strategy that would promote restoration of ecosystem functions and other benefits beyond the minimum needed for project-specific mitigation would not be implemented. Therefore, impacts of system maintenance on aquatic biological resources could be greater under the No-Project Alternative—Continued Operations Scenario than under the proposed program.

The increased flexibility in reservoir operations included in the proposed program would not be a part of the No-Project Alternative—Continued Operations Scenario. As described in Subsection 3.5.5, “Environmental Impacts and Mitigation Measures for LTMA,” of Section 3.5, “Biological Resources—Aquatic,” it is unclear how reservoir reoperation and other program elements that could affect flows (e.g., new bypasses redirecting flows) would interact to affect aquatic biological resources. Net effects on various waterways could be beneficial, adverse, or neutral depending on

the specific circumstances. Therefore, it is not known whether implementing the No-Project Alternative—Continued Operations Scenario would result in less of a beneficial effect, less of an adverse effect, or similar effects relative to the proposed program.

The effects on aquatic biological resources from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. As under the proposed program, activities occurring as part of this alternative would require development and implementation of mitigation measures to reduce significant or potentially significant impacts on aquatic biological resources. Examples of such measures include securing applicable State and/or federal permits and implementing permit requirements, completing inventories and replacing shaded riverine aquatic habitat, conforming to National Marine Fisheries Service guidelines for pile-driving activities, and replacing lost vegetation and instream woody material. Mitigation measures would be equally effective at reducing small-scale and short-term impacts on aquatic biological resources to a less-than-significant level under either the No-Project Alternative—Continued Operations Scenario or the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, impacts on aquatic biological resources caused by flooding of urban and agricultural areas, such as contamination of floodwaters and fish stranding after floodwaters recede, would be greater under this alternative.

As described above, impacts of system maintenance on aquatic biological resources would be greater under the No-Project Alternative—Continued Operations Scenario than under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, impacts on aquatic biological resources could be equally mitigated under either alternative. Flood-related impacts would be greater under the No-Project Alternative—Continued Operations Scenario, although these would be infrequent and episodic. Given these conditions, the overall impact of the No-Project Alternative—Continued Operations Scenario on aquatic biological resources is expected to be greater than that of the proposed program. [*Greater*]

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that

fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. However, without the LCM component of the VMS, changes in general riparian habitat and shaded riverine aquatic habitat resulting from management and removal of vegetation for levee maintenance would be less than changes under the proposed program. Additionally, the CVFPP Conservation Strategy, which could have beneficial effects on riparian and shaded riverine aquatic habitats in some areas associated with habitat creation, would not be implemented under this alternative. It is assumed that local agencies implementing individual projects would perform habitat planting to mitigate project-specific effects under both this alternative and the proposed program, and that mitigation would also be provided by an appropriate agency for riparian vegetation removal resulting from the VMS. Therefore, impacts of system maintenance on aquatic biological resources would be less under the No-Project Alternative—No Additional Activities Scenario.

The increased flexibility in reservoir operations included in the proposed program would not be a part of the No-Project Alternative—No Additional Activities Scenario. As described in Subsection 3.5.5, “Environmental Impacts and Mitigation Measures for LTMAAs,” of Section 3.5, “Biological Resources—Aquatic,” it is unclear how reservoir reoperation and other program elements that could affect flows (e.g., new bypasses redirecting flows) would interact to affect aquatic biological resources. Net effects on various waterways could be beneficial, adverse, or neutral depending on the specific circumstances. Therefore, it is not known whether implementing the No-Project Alternative—No Additional Activities Scenario would result in less of a beneficial effect, less of an adverse effect, or similar effects relative to the proposed program.

The effects on aquatic biological resources from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. As under the proposed program, activities occurring as part of this alternative would require development and implementation of mitigation measures to reduce significant or potentially significant impacts on aquatic biological resources. Mitigation measures would be equally effective at reducing small-scale and short-term impacts on aquatic biological resources to a less-than-significant level under either the No-Project Alternative—No Additional Activities Scenario or the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—No Additional Activities Scenario, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, impacts on aquatic biological resources caused by flooding of urban and agricultural areas, such as contamination of floodwaters and fish stranding after floodwaters recede, would be greater under the No-Project Alternative—No Additional Activities Scenario.

As described above, impacts of system maintenance on aquatic biological resources would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would not be incremental impacts from LCM. The beneficial elements of the CVFPP Conservation Strategy would not be implemented under this alternative. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, impacts on aquatic biological resources could be equally mitigated under either alternative. There would be greater flood-related impacts under this alternative, although these would be infrequent and episodic. On balance, taking all of these factors into account, the overall impact of the No-Project Alternative—No Additional Activities Scenario on aquatic biological resources is expected to be greater than that of the proposed program.

[Greater]

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same overall operations and maintenance regime as the proposed program, and impacts on aquatic biological resources from system operations and maintenance would be similar. This alternative would address only the most critical stressors on public safety and ecosystem function; thus, the construction and land disturbance footprint would be smaller under this alternative than under the proposed program. As a result, construction-related impacts on aquatic biological resources would be less under the Modified SSIA Alternative than under the proposed program. Mitigation measures would be equally effective at reducing construction-related impacts to a less-than-significant level under either the Modified SSIA Alternative or the proposed program. This alternative would provide some opportunities for ecosystem restoration, which would result in a beneficial effect on aquatic biological resources; however, the opportunities for larger scale restoration would be limited to the Yolo Bypass, meaning that much fewer benefits would occur. This alternative would reduce the risk of flood-related impacts on aquatic biological resources at a level slightly less than the proposed program. Given these reduced benefits, the overall impact of the Modified SSIA Alternative on aquatic biological resources would be greater than the impact of the proposed program. *[Greater]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity Alternative would implement the same operations and maintenance regime as the proposed program, and impacts of system operations and maintenance on aquatic biological resources would be similar. The Achieve SPFC Design Flow Capacity Alternative would result in a smaller construction and land disturbance footprint than under the proposed program; therefore, construction-related impacts on aquatic biological resources would be less. Mitigation measures would be equally effective at reducing impacts to a less-than-significant level under either this alternative or the proposed program.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, this alternative would not reduce the risk of flood-related impacts on aquatic biological resources as much as the proposed program. Because this alternative would provide few opportunities for ecosystem restoration, the benefits to aquatic biological resources from restoration would be more limited under this alternative than under the proposed program. Primarily because of the more limited benefits under the Achieve SPFC Design Flow Capacity Alternative, impacts on aquatic biological resources would be greater under this alternative than under the proposed program. *[Greater]*

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways. This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on aquatic biological resources would be similar. New reservoirs would have maintenance requirements not included in the proposed program; however, impacts on aquatic biological resources would result primarily from constructing and operating a reservoir in a location where one does not currently exist, and not necessarily from maintaining that reservoir once it is in place.

The Enhance Flood System Capacity Alternative would provide increased flexibility in reservoir operations exceeding the greater flexibility included in the proposed program, and new reservoirs would be operated. As described for the proposed program in Subsection 3.5.5, “Environmental Impacts and Mitigation Measures for LTMAAs,” of Section 3.5, “Biological Resources—Aquatic,” it is unclear how modified flows below reservoirs

would affect aquatic biological resources. Net effects on various waterways could be beneficial, adverse, or neutral depending on the specific circumstances. Therefore, it is not known whether implementing the Enhance Flood System Capacity Alternative would result in less of a beneficial effect, less of an adverse effect, or similar effects relative to the proposed program.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see Table 5.4-1); as a result, the reduction in potential flood-related impacts on aquatic biological resources would also be slightly greater. This alternative would provide somewhat greater opportunities for ecosystem restoration than the proposed program, which would result in correspondingly greater benefits to aquatic biological resources. The greater level of floodplain expansion associated with the Enhance Flood System Capacity Alternative (via setback levees, bypass widening, and new bypasses) would improve ecosystem functions, fish passage, and the quantity, quality, and diversity of habitats to a greater degree than under the proposed program. However, more and larger new facilities could be constructed under this alternative, resulting in greater impacts on aquatic biological resources. Mitigation measures similar to those recommended for the proposed program could be implemented; however, it is uncertain whether those measures would be sufficient to reduce all impacts on aquatic biological resources to a less-than-significant level for reservoirs and all other large new facilities associated with this alternative.

The Enhance Flood System Capacity Alternative would result in greater benefits to aquatic biological resources than the proposed program, but also has a greater potential to result in adverse effects. Therefore, the overall impact of this alternative on aquatic biological resources would be greater than that of the proposed program. *[Greater]*

5.5.5 Biological Resources—Terrestrial

- The proposed program could result in potentially significant and unavoidable impacts on terrestrial biological resources, as described in greater detail in Section 3.6, “Biological Resources—Terrestrial.” Most impacts on terrestrial biological resources are anticipated to be less than significant after mitigation. However, given the scope and nature of the program, there may be situations in which local or temporary effects could not be fully mitigated; if those effects were of a sufficient scale, they could result in potentially significant and unavoidable impacts. The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the benefits to terrestrial biological resources from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be minimal, well-planned, and substantially mitigated, while the adverse habitat impacts from a major flood event would be unplanned and unmitigated, and could be of significant scope.

The alternatives also vary substantially in the degree to which they would include or accommodate habitat enhancements that go beyond the requirements of applicable regulatory programs.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine operations and maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of this alternative. DWR intends to implement the VMS and associated elements such as LCM whether or not the CVFPP is adopted. Therefore, changes in the extent and location of riparian habitat caused by management and removal of vegetation for levee maintenance would be the same for the No-Project Alternative—Continued Operations Scenario and the proposed program. However, the CVFPP Conservation Strategy, which could have beneficial effects on riparian habitats in some areas from habitat restoration and creation, would not be implemented under this alternative. It is assumed that local agencies implementing individual projects would perform habitat planting to mitigate project-specific effects under both the No-Project Alternative—Continued Operations Scenario and the proposed program, and that mitigation would also be provided by an appropriate agency for riparian vegetation removal resulting from the VMS. However, the elements of the CVFPP Conservation Strategy that would promote restoration of ecosystem functions and other benefits beyond the minimum needed for project-specific mitigation would not be implemented. Therefore, impacts of system maintenance on terrestrial biological resources could be greater under the No-Project Alternative—Continued Operations Scenario than under the proposed program.

The increased flexibility in reservoir operations included in the proposed program would not be a part of the No-Project Alternative—Continued Operations Scenario. As described in Subsection 3.6.5, “Environmental Impacts and Mitigation Measures for LTMAAs,” of Section 3.6, “Biological Resources—Terrestrial,” reservoir reoperation combined with other program elements that could affect flows (e.g., new bypasses redirecting flows) would not alter flows sufficiently to significantly adversely affect the species and resources addressed in the analysis. As identified for

aquatic biological resources, program-related changes in flows could have an overall adverse effect, beneficial effect, or neutral effect on a particular area. However, for terrestrial species and habitats, which are typically already subjected to similar variability in flows, any adverse effect of the program that might occur would not be sufficient to exceed a threshold of significance used in the PEIR. Given these conditions, the effects on terrestrial biological resources from changes in river flows under the No-Project Alternative—Continued Operations Scenario would be similar to those from the proposed program.

The effects on terrestrial biological resources from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. As under the proposed program, activities occurring as part of this alternative would require development and implementation of mitigation measures to reduce significant or potentially significant impacts on terrestrial biological resources. Examples of such measures include conducting biological resources surveys, minimizing and compensating for impacts on critical habitats and sensitive species, and securing applicable State and/or federal permits and implementing permit requirements. Mitigation measures would be equally effective at reducing small-scale and short-term impacts on terrestrial biological resources to a less-than-significant level under either the No-Project Alternative—Continued Operations Scenario or the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, impacts on terrestrial biological resources resulting from flooding of habitat areas would be greater under this alternative.

As described above, impacts of system maintenance on terrestrial biological resources would be greater under the No-Project Alternative—Continued Operations Scenario than under the proposed program. Impacts from changes in downstream flows would be similar. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, impacts on terrestrial biological resources could be equally mitigated under either alternative. There would be greater flood-related impacts under the No-Project Alternative—Continued Operations Scenario, although these would be infrequent and episodic. Given these conditions, the overall impact of the No-Project Alternative—Continued Operations Scenario on terrestrial biological resources is expected to be greater than that of the proposed program. *[Greater]*

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. Therefore, changes in the extent and location of riparian habitat caused by management and removal of vegetation for levee maintenance would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program. However, the CVFPP Conservation Strategy, which could have beneficial effects on riparian habitats in some areas from habitat restoration and creation, would not be implemented under this alternative. It is assumed that local agencies implementing individual projects would perform habitat planting to mitigate project-specific effects under both the No-Project Alternative—No Additional Activities Scenario and the proposed program. However, the elements of the CVFPP Conservation Strategy that would promote restoration of ecosystem functions and other benefits beyond the minimum needed for project-specific mitigation would not be implemented. Therefore, impacts of system maintenance on terrestrial biological resources would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program.

The increased flexibility in reservoir operations included in the proposed program would not be a part of the No-Project Alternative—No Additional Activities Scenario. As identified for aquatic biological resources, program-related changes in flows could have an overall adverse effect, beneficial effect, or neutral effect on a particular area. However, for terrestrial species and habitats, which are typically already subjected to similar variability in flows, any adverse effect of the program that might occur would not be sufficient to exceed a threshold of significance used in the PEIR. Given these conditions, the effects on terrestrial biological resources from changes in river flows under the No-Project Alternative—No Additional Activities Scenario would be similar to those from the proposed program.

The effects on terrestrial biological resources from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. As under the proposed program, activities occurring as part of this alternative would require development and implementation of mitigation measures to reduce significant or potentially significant impacts on terrestrial biological resources. Mitigation measures

would be equally effective at reducing small-scale and short-term impacts on terrestrial biological resources to a less-than-significant level under either the No-Project Alternative—No Additional Activities Scenario or the proposed program.

Because fewer improvements to the flood protection system would be made under this alternative, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, impacts on terrestrial biological resources resulting from flooding of habitat areas would be greater under the No-Project Alternative—No Additional Activities Scenario.

As described above, impacts of system maintenance on terrestrial biological resources would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program. Impacts from changes in downstream flows would be similar. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, impacts on terrestrial biological resources could be equally mitigated under either alternative. There would be greater flood-related impacts under the No-Project Alternative—No Additional Activities Scenario, although these would be infrequent and episodic. Given these conditions, the overall impact of the No-Project Alternative—No Additional Activities Scenario on terrestrial biological resources is expected to be greater than that of the proposed program. [*Greater*]

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same overall operations and maintenance regime as the proposed program, and impacts of system operations and maintenance on terrestrial biological resources would be similar. This alternative would address only the most critical stressors on public safety and ecosystem function; thus, the construction and land disturbance footprint would be smaller under this alternative than under the proposed program. Therefore, construction-related impacts on terrestrial biological resources would be less under the Modified SSIA Alternative than under the proposed program. Mitigation measures would be equally effective at reducing construction-related impacts to a less-than-significant level under either this alternative or the proposed program. The Modified SSIA Alternative would provide some opportunities for ecosystem restoration, which would result in a beneficial effect on terrestrial biological resources; however, the opportunities for larger scale restoration would be limited to the Yolo Bypass, meaning that fewer benefits would occur. This alternative would reduce the risk of flood-related impacts on terrestrial biological resources at a level slightly less than the proposed program. Given these reduced benefits, the overall

impact of the Modified SSIA Alternative on terrestrial biological resources would be greater than the impact of the proposed program. *[Greater]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). It would implement the same operations and maintenance regime as the proposed program, and impacts of system operations and maintenance on terrestrial biological resources would be similar. The Achieve SPFC Design Flow Capacity Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction-related impacts on terrestrial biological resources would be less than under the proposed program. Mitigation measures would be equally effective at reducing impacts to a less-than-significant level under either this alternative or the proposed program.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, this alternative would not reduce the risk of flood-related impacts on terrestrial biological resources as much as the proposed program. Because this alternative would provide few opportunities for ecosystem restoration, the benefits to terrestrial biological resources from restoration would be more limited than under the proposed program. Primarily because of the more limited benefits under the Achieve SPFC Design Flow Capacity Alternative, impacts on terrestrial biological resources would be greater under this alternative than under the proposed program. *[Greater]*

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways. This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on terrestrial biological resources would be similar. New reservoirs would have maintenance requirements not included in the proposed program; however, impacts on terrestrial biological resources would result primarily from constructing and operating a reservoir in a location where one does not currently exist, and not necessarily from maintaining that reservoir once it is in place.

The Enhance Flood System Capacity Alternative would provide increased flexibility in reservoir operations exceeding the greater flexibility included in the proposed program, and new reservoirs would be operated. It is

unclear how possible substantial modifications to flows below new and existing reservoirs would affect terrestrial biological resources. Net effects in various waterways could be beneficial, adverse, or neutral depending on the specific circumstances. Therefore, it is not known whether implementing the Enhance Flood System Capacity Alternative would result in less of a beneficial effect, less of an adverse effect, or similar effects relative to the proposed program.

This alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see Table 5.4-1); as a result, the reduction in potential flood-related impacts on terrestrial biological resources would also be slightly greater. The Enhance Flood System Capacity Alternative would provide somewhat greater opportunities for ecosystem restoration than the proposed program, which would result in correspondingly greater benefits to terrestrial biological resources. The greater level of floodplain expansion associated with the Enhance Flood System Capacity Alternative (via setback levees, bypass widening, and new bypasses) would improve ecosystem functions and the quantity, quality, and diversity of habitats to a greater degree than under the proposed program. However, more and larger new facilities could be constructed under this alternative, resulting in greater impacts on terrestrial biological resources. Mitigation measures similar to those recommended for the proposed program could be implemented; however, it is uncertain whether those measures would be sufficient to reduce all impacts on terrestrial biological resources to a less-than-significant level for new reservoirs and all other large new facilities associated with this alternative.

The Enhance Flood System Capacity Alternative would result in greater benefits to terrestrial biological resources than the proposed program, but also has a greater potential to result in adverse effects. Therefore, the overall impact of this alternative on terrestrial biological resources would be greater than that of the proposed program. *[Greater]*

5.5.6 Climate Change and Greenhouse Gas Emissions

The proposed program would not result in significant impacts related to climate change and GHG emissions, as described in greater detail in Section 3.7, "Climate Change and Greenhouse Gas Emissions." The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the climate change benefits from flood risk reduction would compensate for the impacts of the proposed program because the avoided GHG emissions from reconstruction following a major flood event are anticipated to be greater than the GHG emissions from construction activities under the proposed program.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine operations and maintenance of flood control facilities would continue following existing programs. The proposed program includes new facilities that could result in a net systemwide increase in maintenance effort and associated GHG emissions. However, it could also result in increased maintenance efficiency at existing facilities, generating a net reduction in systemwide GHG emissions. Therefore, it is unknown whether the maintenance-generated GHG emissions would be more or less under the No-Project Alternative—Continued Operations Scenario than under the proposed program.

Although the proposed program includes modifications to reservoir operations, these would not alter overall hydropower production (see Section 2.6, “No Near- or Long-Term Reduction in Water or Renewable Electricity Deliveries,” in Chapter 2.0, “Program Description”). Implementing the No-Project Alternative—Continued Operations Scenario also would not alter hydropower production relative to existing conditions. Therefore, neither the proposed program nor this alternative would alter GHG emissions related to the increased or decreased use of fossil fuel-generated electricity that might result from changes in hydropower production.

As under the proposed program, the VMS described in the CVFPP would be implemented as part of the No-Project Alternative—Continued Operations Scenario. DWR intends to implement the VMS, and associated elements such as LCM, whether or not the CVFPP is adopted. Therefore, GHG emissions associated with implementation of this program would be roughly the same as the proposed program and this alternative. However, the CVFPP Conservation Strategy, which could increase the overall extent of riparian forest habitat and therefore increase CO₂ sequestration, would not be implemented under the No-Project Alternative—Continued Operations Scenario. It is assumed that local agencies implementing individual projects would perform habitat planting to mitigate project-specific effects under both the No-Project Alternative—Continued Operations Scenario and the proposed program. However, the elements of the CVFPP Conservation Strategy that would promote habitat restoration and creation beyond the minimum needed for project-specific mitigation would not be implemented. Therefore, the potential for CO₂ sequestration from restoration and creation of riparian forest habitat would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program.

GHG emissions resulting from project-level construction of new facilities and repair and improvement of existing facilities would be less under the

No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. As described in Section 3.7, “Climate Change and Greenhouse Gas Emissions,” impacts of construction-related GHG emissions under the proposed program would be less than significant. The same would be true of construction-related emissions under this alternative.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, GHG emissions associated with recovery and repair after flood system failures would be greater under the No-Project Alternative—Continued Operations Scenario.

As described above, it is unclear whether system maintenance under the No-Project Alternative—Continued Operations Scenario would result in greater or lesser GHG emissions than the proposed program. Changes in reservoir operations would not affect GHG emissions under either alternative. Construction-related GHG emissions would be less under this alternative because fewer projects would be constructed, although the impact of GHG emissions under the proposed program would be less than significant. There would be greater flood-related impacts under the No-Project Alternative—Continued Operations Scenario, and although these would be infrequent and episodic, GHG emissions associated with flood system failures would be substantial. Given these conditions, the overall impact of the No-Project Alternative—Continued Operations Scenario related to GHG emissions is expected to be greater than that of the proposed program. *[Greater]*

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. The proposed program includes new facilities that could result in a net systemwide increase in maintenance effort and associated GHG emissions, along with increased maintenance efficiency at existing facilities that would generate a net reduction in systemwide GHG emissions. Because there would be substantially fewer facilities under the No-Project Alternative—No Additional Activities Scenario, this alternative would result in fewer net GHG emissions than the proposed program.

Although the proposed program includes modifications to reservoir operations, these would not alter overall hydropower production. Implementing the No-Project Alternative—No Additional Activities Scenario also would not alter hydropower production relative to existing conditions. Therefore, neither the proposed program nor this alternative would alter GHG emissions related to the increased or decreased use of fossil fuel-generated electricity that might result from changes in hydropower production.

Because the VMS described in the CVFPP would not be implemented as part of the No-Project Alternative—No Additional Activities Scenario, the associated GHG emissions would not occur. However, the CVFPP Conservation Strategy, which could increase the overall extent of riparian forest habitat and therefore increase CO₂ sequestration, would also not be implemented under this alternative. It is assumed that local agencies implementing individual projects would perform habitat planting to mitigate project-specific effects under both the No-Project Alternative—No Additional Activities Scenario and the proposed program, and that mitigation would also be provided by an appropriate agency for riparian vegetation removal resulting from the VMS. However, the elements of the CVFPP Conservation Strategy that would promote habitat restoration and creation beyond the minimum needed for project-specific mitigation would not be implemented. Therefore, the potential for CO₂ sequestration from restoration and creation of riparian forest habitat would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program.

GHG emissions resulting from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. The impacts of construction-related GHG emissions would be less than significant under both the proposed program and this alternative.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—No Additional Activities Scenario, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, GHG emissions associated with recovery and repair after flood system failures would be greater under this alternative.

As described above, system maintenance would result in lesser GHG emissions under the No-Project Alternative—No Additional Activities Scenario than the proposed program. Changes in reservoir operations would not affect GHG emissions under either alternative. Construction-

related GHG emissions would be less under the No-Project Alternative—No Additional Activities Scenario because fewer projects would be constructed, although the impact of GHG emissions under the proposed program would be less than significant. There would be greater flood-related impacts under the No-Project Alternative—No Additional Activities Scenario, and although these would be infrequent and episodic, GHG emissions associated with flood system failures would be substantial. Given these conditions, the overall impact of the No-Project Alternative—No Additional Activities Scenario related to GHG emissions is expected to be greater than that of the proposed program. *[Greater]*

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same operations and maintenance regime as the proposed program, and effects of system operations and maintenance on net GHG emissions (including consideration of hydropower production) would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller under this alternative than under the proposed program. As a result, GHG emissions from construction-related activities would be expected to be less. As described in Section 3.7, “Climate Change and Greenhouse Gas Emissions,” impacts of construction-related GHG emissions under the proposed program would be less than significant. The same would be true of construction-related emissions under the Modified SSIA Alternative. However, any reduced levels of habitat restoration under this alternative could also result in reduced opportunities for carbon sequestration from net increases in riparian forest habitat. The overall reduction in flood risk by the Modified SSIA Alternative would be slightly less than the flood risk reduction of the proposed program. Therefore, the potential for flooding from system failures during high-water events would be slightly greater, as would GHG emissions from recovery and repair after failures of the flood protection system.

GHG emissions associated with operations and maintenance would be similar under the proposed program and the Modified SSIA Alternative; however, construction emissions would generally be anticipated to be less under this alternative because the construction footprint would be smaller. Given these factors, GHG emissions from the Modified SSIA Alternative that would affect climate change are expected to be similar to those of the proposed program. *[Similar]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix

levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity Alternative would implement the same operations and maintenance regime as the proposed program, and GHG emissions from system operations and maintenance (including consideration of hydropower production) would be similar. This alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, GHG emissions from construction would be less. As described in Section 3.7, “Climate Change and Greenhouse Gas Emissions,” impacts of construction-related GHG emissions under the proposed program would be less than significant. The same would be true of construction-related emissions under the Achieve SPFC Design Flow Capacity Alternative. This alternative would also provide less opportunity for ecosystem restoration activities. Any reduced levels of habitat restoration under the Achieve SPFC Design Flow Capacity Alternative could also result in reduced opportunities for carbon sequestration from net increases in riparian forest habitat.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, GHG emissions associated with recovery and repair from flood system failures would be greater under this alternative. Although repair and recovery from flood system failures would be infrequent and episodic, GHG emissions associated with these events would be substantial.

As described above, GHG emissions from facility operations and maintenance would be similar under the Achieve SPFC Design Flow Capacity Alternative and the proposed program. Construction-related emissions would be anticipated to be greater under the proposed program because the project footprint would be larger, although this alternative would provide less opportunity for carbon sequestration via restoration and creation of riparian forest habitat. The SPFC Design Flow Capacity Alternative would result in greater GHG emissions from recovery and repair after flood system failures. Given these conditions, the overall impact of the SPFC Design Flow Capacity Alternative on GHG emissions would be expected to be greater than that of the proposed program.

[Greater]

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways. This alternative would implement the same maintenance regime as the proposed program, and impacts of maintenance of existing facilities on GHG emissions would

be similar. However, new reservoirs would have maintenance requirements not included in the proposed program, which could result in increased GHG emissions relative to the proposed program. It is unknown whether the combination of new reservoirs and reoperation of existing reservoirs under this alternative would result in greater or lesser overall generation of hydropower. Other new facilities such as bypasses and setback levees could result in a net systemwide increase in maintenance effort and associated GHG emissions. However, these new facilities could also result in increased maintenance efficiencies where they replace existing facilities or result in the overall system operation improvements, which would generate a net reduction in systemwide GHG emissions. Therefore, it is unknown whether the overall maintenance-generated GHG emissions would be more or less under the Enhance Flood System Capacity Alternative than under the proposed program.

This alternative would provide greater opportunity for ecosystem restoration activities than the proposed program and therefore could result in higher levels of carbon sequestration from net increases in riparian forest habitat. The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see Table 5.4-1); as a result, the reduction in potential flood-related impacts on GHG emissions would also be slightly greater. More and larger new facilities could be constructed under this alternative, resulting in greater construction GHG emissions. As described in Section 3.7, “Climate Change and Greenhouse Gas Emissions,” impacts of construction-related GHG emissions under the proposed program would be less than significant. It is unclear whether the same would be true of construction-related emissions under the Enhance Flood System Capacity Alternative. If construction GHG emissions were significant under this alternative, various mitigation options are available that could reduce the impact to a less than significant level. Given the conditions described above, and in particular the substantial uncertainties associated with operation, maintenance, and hydropower generation from new reservoirs, it is unknown whether net GHG emissions would be greater or lesser under the Enhance Flood System Capacity Alternative compared to the proposed program. *[Unknown]*

5.5.7 Cultural and Historic Resources

- The proposed program could result in potentially significant and unavoidable impacts on cultural and historic resources, as described in greater detail in Section 3.8, “Cultural and Historic Resources.” Most cultural and historic resources impacts are anticipated to be less than significant after mitigation. However, given the nature and scale of the proposed program, there may be situations in which historic properties

must be removed or traditional cultural properties would be adversely affected in a way that could not be feasibly mitigated, resulting in potentially significant and unavoidable impacts. The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the benefits to cultural and historic resources from flood risk reduction would not be materially different from the impacts of the proposed program. It is assumed that construction would cause a greater level of potentially permanent, adverse change to cultural and/or historic resources.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of the No-Project Alternative. DWR intends to implement the VMS, and associated elements such as LCM, whether or not the CVFPP is adopted. Therefore, potential impacts on cultural and historic resources caused by levee maintenance (e.g., damage to or destruction of known and unknown historic and prehistoric resources, disturbance of human burials) would be the same under the No-Project Alternative—Continued Operations Scenario as under the proposed program.

Potential impacts on cultural and historic resources from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., damage to or destruction of known and unknown historic and prehistoric resources, disturbance of human burials). However, the lower level of construction activity would minimize the potential for adverse effects.

As under the proposed program, activities occurring as part of the No-Project Alternative—Continued Operations Scenario would require development and implementation of mitigation measures for significant and potentially significant impacts. Examples of such measures include conducting cultural resources studies and avoiding effects on archaeological resources, immediately halting construction if cultural resources are discovered and implementing an emergency discovery plan, capping archaeological sites to protect deposits, and following the Secretary of the Interior's standards for the treatment of historic properties. Mitigation measures would be equally effective at reducing most impacts

on cultural resources to a less-than-significant level under either the No-Project Alternative—Continued Operations Scenario or the proposed program. However, impacts related to damage to or destruction of historic structures and traditional cultural properties may be potentially significant and unavoidable under either this alternative or the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, flooding impacts on cultural resources, primarily historic structures and architectural resources, would be greater under this alternative.

As described above, impacts of system maintenance on cultural resources under the No-Project Alternative—Continued Operations Scenario would be similar to those for the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, impacts on cultural resources could be equally mitigated under either alternative. There would be greater flood-related impacts under the No-Project Alternative—Continued Operations Scenario; however, these would be infrequent and episodic. Given these conditions, the overall impact of the No-Project Alternative—Continued Operations Scenario on cultural resources is expected to be less than that of the proposed program. [*Lesser*]

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. Therefore, potential impacts on cultural and historic resources caused by levee maintenance (e.g., damage to or destruction of known and unknown historic and prehistoric resources, disturbance of human burials) would be similar under the No-Project Alternative—No Additional Activities Scenario and the proposed program.

Potential impacts on cultural and historic resources from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same (e.g., damage to or destruction of known and unknown historic and prehistoric resources, disturbance of human burials). However, the lower

level of construction activity would minimize the potential for adverse effects.

As under the proposed program, activities occurring as part of the No-Project Alternative—No Additional Activities Scenario would require development and implementation of mitigation measures for significant and potentially significant impacts. Mitigation measures would be equally effective at reducing most impacts related to cultural resources to a less-than-significant level under either this alternative or the proposed program. However, impacts related to damage to or destruction of historic structures and traditional cultural properties may be significant and unavoidable under either the No-Project Alternative—No Additional Activities Scenario or the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—No Additional Activities Scenario, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, impacts on cultural resources, primarily historic structures and architectural resources, would be greater under this alternative.

As described above, impacts of system maintenance on cultural resources under the No-Project Alternative—No Additional Activities Scenario would be similar to those for the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, impacts on cultural resources could be equally mitigated under either alternative. There would be greater flood-related impacts under the No-Project Alternative—No Additional Activities Scenario, although these would be infrequent and episodic. Given these conditions, the overall impact of the No-Project Alternative—No Additional Activities Scenario on cultural resources is expected to be lesser than that of the proposed program. [*Lesser*]

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on cultural and historic resources would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller under this alternative than under the proposed program. As a result, impacts on cultural and historic resources would be expected to be less under this alternative. As under the proposed program, activities occurring as part of the Modified SSIA Alternative would require development and

implementation of mitigation measures to reduce significant impacts on cultural and historic resources. Mitigation measures would be equally effective at reducing most impacts on cultural resources to a less-than-significant level under either the Modified SSIA Alternative or the proposed program. However, impacts related to damage to or destruction of historic structures and traditional cultural properties may be potentially significant and unavoidable in either case.

Under the Modified SSIA Alternative, the overall risk of flooding would be slightly greater than the risk under the proposed program; therefore, a slightly lesser reduction in impacts on cultural and historic resources from flooding and flood-related cleanup activities would occur. Because fewer and/or smaller components would be constructed under the Modified SSIA Alternative, the overall impact of this alternative on cultural and historic resources would be less than that of the proposed program. *[Lesser]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). It would implement the same maintenance regime as the proposed program, and impacts of system maintenance on cultural and historic resources would be similar. The Achieve SPFC Design Flow Capacity Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, impacts on cultural and historic resources would be less under this alternative. Mitigation measures would be equally effective at reducing construction-related and operational impacts on cultural and historic resources to a less-than-significant level under either this alternative or the proposed program. Because of its limited nature and its primary objective of fixing levees in place, the Achieve SPFC Design Flow Capacity Alternative would likely avoid impacts related to damage to or destruction of historic structures and traditional cultural properties that could be potentially significant and unavoidable under the proposed program.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program; however, flooding would continue in existing areas that are already flood-prone. Implementing this alternative would not cause or result in any “new” flooding in different areas that are not already flood-prone or are projected to be flood-prone in the future.

Because fewer and smaller facilities would be constructed under this alternative than under the proposed program, the overall impact of the

Achieve SPFC Design Flow Capacity Alternative on cultural and historic resources would be less than that of the proposed program. *[Lesser]*

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on cultural and historic resources would be similar.

More and larger new facilities could be constructed under the Enhance Flood System Capacity Alternative than under the proposed program, resulting in greater potential for disturbance or destruction of historic and prehistoric resources, including human burials. As under the proposed program, activities occurring as part of this alternative would require development and implementation of mitigation measures to reduce significant impacts on cultural and historic resources. Mitigation measures would be equally effective at reducing most cultural and historic resources impacts to a less-than-significant level under either the Enhance Flood System Capacity Alternative or the proposed program. However, impacts related to damage to or destruction of historic structures and traditional cultural properties may be potentially significant and unavoidable in either case.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see Table 5.4-1); as a result, there would be a slightly greater reduction in potential flood-related impacts on cultural and historic resources under this alternative.

In summary, because more and larger facilities would be constructed under this alternative than under the proposed program, the overall impact of the Enhance Flood System Capacity Alternative on cultural and historic resources would be greater than that of the proposed program. *[Greater]*

5.5.8 Energy

The proposed program would not result in significant energy impacts, as described in greater detail in Section 3.9, “Energy.” The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the benefits to energy resources from flood risk reduction would not be materially different from the

impacts of the proposed program. It is not anticipated that reconstruction efforts would involve the inefficient, wasteful, or unnecessary use of energy or cause a substantial reduction in the generation of renewable energy.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of this alternative. DWR intends to implement the VMS, and associated elements such as LCM, whether or not the CVFPP is adopted. Therefore, the potential for energy impacts caused by levee maintenance (e.g., wasteful or inefficient use of petroleum products and electricity) would be the same under the No-Project Alternative—Continued Operations Scenario as under the proposed program.

The potential for energy impacts from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., wasteful or inefficient use of petroleum products and electricity). However, the lower level of construction activity would minimize the potential for adverse effects. As under the proposed program, activities occurring as part of the No-Project Alternative—Continued Operations Scenario would require development and implementation of mitigation measures for potentially significant impacts. Examples of such measures include using energy-efficient processes and equipment, using equipment exhaust controls, and scheduling activities to reduce energy usage during periods of peak energy demand (as feasible). Mitigation measures would be equally effective at reducing energy impacts to a less-than-significant level under either the No-Project Alternative—Continued Operations Scenario or the proposed program.

Operational energy impacts that would occur under the proposed program (i.e., reduced generation of renewable energy because of altered flow releases at hydropower facilities caused by changes in reservoir operations) are not likely to occur under the No-Project Alternative—Continued Operations Scenario. Therefore, the operational impacts of this alternative would be less than those of the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures and associated damage from flooding would be more

frequent than under the proposed program. However, flood events would have little effect on the wasteful or inefficient use of energy.

As described above, impacts of system maintenance on energy under the No-Project Alternative—Continued Operations Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, energy impacts could be equally mitigated under either alternative. Operational impacts of the No-Project Alternative—Continued Operations Scenario would be less than those of the proposed program. Flooding would have little effect on energy resources. Given these conditions, the overall impact of the No-Project Alternative—Continued Operations Scenario on energy is expected to be less than that of the proposed program. [*Lesser*]

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. Therefore, the potential for energy impacts caused by levee maintenance (e.g., wasteful or inefficient use of petroleum products and electricity) under the No-Project Alternative—No Additional Activities Scenario would be similar to the potential for such impacts under the proposed program.

The potential for energy impacts from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., wasteful or inefficient use of petroleum products and electricity). However, the lower level of construction activity would minimize the potential for adverse effects. As under the proposed program, activities occurring as part of the No-Project Alternative—No Additional Activities Scenario would require development and implementation of mitigation measures for potentially significant impacts. Mitigation measures would be equally effective at reducing energy impacts to a less-than-significant level under either this alternative or the proposed program.

Operational energy impacts that would occur under the proposed program (i.e., reduced generation of renewable energy because of altered flow releases at hydropower facilities caused by changes in reservoir operations) would not occur under the No-Project Alternative—No Additional

Activities Scenario. Therefore, operational impacts of this alternative would be less than those of the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—No Additional Activities Scenario, system failures and associated damage from flooding would be more frequent than under the proposed program. However, flood events would have little effect on the wasteful or inefficient use of energy.

As described above, impacts of system maintenance on energy under the No-Project Alternative—No Additional Activities Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, energy impacts could be equally mitigated under either alternative. Operational impacts of the No-Project Alternative—No Additional Activities Scenario would be less than those of the proposed program. Flooding would have little effect on energy resources. Given these conditions, the overall impact of the No-Project Alternative—No Additional Activities Scenario on energy is expected to be less than that of the proposed program. [*Lesser*]

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on energy would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller under this alternative than under the proposed program. As a result, impacts from wasteful or inefficient usage of energy would be less. As under the proposed program, activities occurring as part of the Modified SSIA Alternative would require development and implementation of mitigation measures to reduce construction-related and operational energy impacts. Mitigation measures would be equally effective at reducing energy impacts to a less-than-significant level under either this alternative or the proposed program.

Under the Modified SSIA Alternative, the overall risk of flooding would be slightly greater than the risk under the proposed program; however, flood events would have little effect on the wasteful or inefficient use of energy.

Because fewer and/or smaller components would be constructed, impacts related to the potential for wasteful or inefficient use of energy from constructing and operating project components would be less under this alternative than under the proposed program. Therefore, the overall impact

of the Modified SSIA Alternative on energy resources is expected to be less than that of the proposed program. *[Lesser]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on energy would be similar. This alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, the potential for construction activities to result in wasteful or inefficient use of energy would be less. Mitigation measures would be equally effective at reducing energy impacts from construction to a less-than-significant level under either the Achieve SPFC Design Flow Capacity Alternative or the proposed program.

Operational energy impacts of the proposed program (i.e., reduced generation of renewable energy because of altered flow releases at hydropower facilities caused by changes in reservoir operations) are not likely to occur under the Achieve SPFC Design Flow Capacity Alternative. Therefore, operational impacts of this alternative would be less than those of the proposed program.

Under the Achieve SPFC Design Flow Capacity Alternative, the overall risk of flooding would be similar to the risk under the proposed program; however, flood events would have little effect on the wasteful or inefficient use of energy.

Because fewer and/or smaller components would be constructed, the potential for wasteful or inefficient use of energy caused by construction and operation of project components would be less under this alternative than under the proposed program. Therefore, the overall impact of the Achieve SPFC Design Flow Capacity Alternative on energy resources is expected to be less than that of the proposed program. *[Lesser]*

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. This alternative would implement the same maintenance regime as the proposed program, and impacts of system

maintenance related to wasteful or inefficient use of energy would be similar.

More and larger new facilities could be constructed under the Enhance Flood System Capacity Alternative, resulting in greater potential for wasteful or inefficient use of energy during construction and operation. There would also be greater potential for reduced generation of renewable energy because of altered flow releases at hydropower facilities caused by changes in reservoir operations. As under the proposed program, activities occurring as part of this alternative would require development and implementation of mitigation measures to reduce significant energy impacts. Mitigation measures would be equally effective at reducing construction-related and operational energy impacts to a less-than-significant level under either the Enhance Flood System Capacity Alternative or the proposed program.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see Table 5.4-1); however, flood events would have little effect on the wasteful or inefficient use of energy.

Construction and operation of components under the Enhance Flood System Capacity Alternative would be greater than under the proposed program, potentially resulting in greater potential for wasteful or inefficient use of energy. However, mitigation measures would be equally effective at reducing energy impacts to a less-than-significant level under either this alternative or the proposed program. In addition, this alternative would enhance opportunities to promote multi-benefit projects by fostering integration of benefits to water quality, recreation, power, and other resources. Therefore, the overall level of impact of the Enhance Flood System Capacity Alternative on energy resources would be similar to that of the proposed program. *[Similar]*

5.5.9 Geology, Soils, and Seismicity (Including Mineral and Paleontological Resources)

The proposed program generally would not result in significant impacts on geology, soils, and seismicity after mitigation, as described in greater detail in Section 3.10, “Geology, Soils, and Seismicity (Including Mineral and Paleontological Resources).” However, it may not be possible during widening floodways and constructing weirs, new bypasses, or setback levees outside the existing footprint or the immediate vicinity of the footprint of existing structures to avoid mineral resources or prevent access to locally valuable mineral resources (particularly aggregate materials), resulting in potentially significant and unavoidable impacts. The following

analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the benefits to mineral resources from flood risk reduction would not compensate for the impacts of the proposed program because those benefits would generally be short term (i.e., flooded areas are anticipated to recover to preflood conditions as lands dry out and mining can resume), while the mineral resources impacts of the proposed program would generally be permanent.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of this alternative. DWR intends to implement the VMS, and associated elements such as LCM, whether or not the CVFPP is adopted. Therefore, the potential for impacts on geology, soils, and seismicity caused by levee maintenance (e.g., damage from seismic activity and construction in expansive soils, erosion, damage to unique paleontological resources) would be the same under the No-Project Alternative—Continued Operations Scenario as under the proposed program.

Potential impacts on geology, soils, and seismicity from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., damage to or destruction of unique paleontological resources, loss of mineral resources). However, the lower level of construction activity would minimize the potential for adverse effects.

As under the proposed program, activities occurring as part of the No-Project Alternative—Continued Operations Scenario would require development and implementation of mitigation measures for potentially significant impacts. Examples of such measures include preparing a paleontological resources assessment, conducting construction worker education, stopping work if paleontological resources are encountered during earth-moving activities, and implementing recovery plans. Mitigation measures would be equally effective at reducing construction impacts on paleontological resources to a less-than-significant level under either the No-Project Alternative—Continued Operations Scenario or the proposed program. However, operational impacts related to loss of mineral

resources could be potentially significant and unavoidable under the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures and associated flood-related erosion impacts would occur more frequently and would be more severe than under the proposed program. Therefore, the impacts of flooding and postflood repairs on geology, soils, and seismicity would be greater under this alternative.

As described above, impacts of system operations and maintenance on geology, soils, and seismicity under the No-Project Alternative—Continued Operations Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed, and this alternative would avoid the potentially significant and unavoidable impact related to loss of mineral resources. There would be greater flood-related erosion impacts under the No-Project Alternative—Continued Operations Scenario; these impacts would be infrequent but would be more likely to result in long-term continuing damage to existing levees. However, this alternative would involve no project construction on new footprints that could restrict access to mineral resources. As a result, the overall impact of the No-Project Alternative—Continued Operations Scenario on geology, soils, and seismicity is expected to be less than that of the proposed program. [*Lesser*]

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. Therefore, the potential for impacts on geology, soils, and seismicity caused by levee maintenance (e.g., damage from seismic activity and construction in expansive soils, erosion, damage to unique paleontological resources) would be similar under the No-Project Alternative—No Additional Activities Scenario and the proposed program.

Potential impacts on geology, soils, and seismicity from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., damage to or destruction of unique

paleontological resources, loss of mineral resources). However, the lower level of construction activity would minimize the potential for adverse effects.

As under the proposed program, activities occurring as part of the No-Project Alternative—No Additional Activities Scenario would require development and implementation of mitigation measures for potentially significant impacts. Mitigation measures would be equally effective at reducing construction impacts on paleontological resources to a less-than-significant level under either this alternative or the proposed program. However, operational impacts related to loss of mineral resources could be significant and unavoidable under the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—No Additional Activities Scenario, system failures and associated flood-related erosion impacts would occur more frequently and would be more severe than under the proposed program. Therefore, impacts of flooding and postflood repairs on geology, soils, and seismicity would be greater under the No-Project Alternative—No Additional Activities Scenario.

As described above, impacts of system operations and maintenance on geology, soils, and seismicity under the No-Project Alternative—No Additional Activities Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed, and this alternative would avoid the potentially significant and unavoidable impact related to loss of mineral resources. There would be greater flood-related erosion impacts under the No-Project Alternative—No Additional Activities Scenario; these impacts would be infrequent but would be more likely to result in long-term continuing damage to existing levees. However, this alternative would involve less project construction on new footprints that could restrict access to mineral resources. As a result, the overall impact of the No-Project Alternative—No Additional Activities Scenario on geology, soils, and seismicity is expected to be less than that of the proposed program. [*Lesser*]

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on geology, soils, and seismicity would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller under this alternative than under the proposed program. As a result, impacts

related to loss or destruction of unique paleontological resources and loss of mineral resources would be expected to be less. As under the proposed program, activities occurring as part of the Modified SSIA Alternative would require development and implementation of mitigation measures to reduce significant impacts on paleontological and mineral resources. Mitigation measures would be equally effective at reducing construction impacts on paleontological resources to a less-than-significant level under either the Modified SSIA Alternative or the proposed program. However, operational impacts related to potential loss of mineral resources could be potentially significant and unavoidable under either this alternative or the proposed program.

Under the Modified SSIA Alternative, the overall risk of flooding would be slightly greater than the risk under the proposed program; therefore, a slightly lesser reduction in erosion resulting from flooding would occur.

Because fewer and/or smaller components would be constructed, construction-related and operational impacts from loss of mineral resources and damage or destruction of paleontological resources would be less than those of the proposed program. Therefore, the overall impact of the Modified SSIA Alternative on geology, soils, and paleontological resources would be less than that of the proposed program. *[Lesser]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on geology, soils, and seismicity would be similar. This alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction-related and operational impacts on geology, soils, and seismicity would be less. Mitigation measures would be equally effective at reducing construction impacts (potential damage or destruction of paleontological resources) to a less-than-significant level under either the Achieve SPFC Design Flow Capacity Alternative or the proposed program.

Because of the nature of the activities that would be implemented under the Achieve SPFC Design Flow Capacity Alternative, this alternative would likely avoid the proposed program's potentially significant and unavoidable operational impact, loss of mineral resources.

The Achieve SPFC Design Flow Capacity Alternative would provide a lower overall level of flood protection than the proposed program; however, this alternative would address the problem of flood-related levee erosion. Therefore, the impacts of the Achieve SPFC Design Flow Capacity Alternative on geology, soils, and seismicity would be less than those of the proposed program. [*Lesser*]

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on geology, soils, and seismicity would be similar.

More and larger new facilities could be constructed under this alternative, resulting in greater potential for damage or destruction of paleontological resources and loss of access to mineral resources. As under the proposed program, activities occurring as part of the Enhance Flood System Capacity Alternative would require development and implementation of mitigation measures to reduce significant impacts on paleontological and mineral resources. Mitigation measures would be equally effective at reducing construction-related impacts on paleontological resources to a less-than-significant level under either the Enhance Flood System Capacity Alternative or the proposed program. However, operational impacts related to potential loss of mineral resources could be potentially significant and unavoidable under either alternative.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see Table 5.4-1); as a result, there would be a slightly greater reduction in potential flood-related impacts from levee erosion.

In summary, impacts of system maintenance on geology, soils, and seismicity would be similar and mitigation measures would be equally effective at reducing impacts on paleontological resources under the Enhance Flood System Capacity Alternative or the proposed program. However, operational impacts related to loss of mineral resources could be potentially significant and unavoidable under either alternative. The Enhance Flood System Capacity Alternative would result in only a slightly greater reduction in flood-related erosion of levees. However, given the increased scale of construction activity on new footprints, the potential to impair access to mineral resources would be greater than that of the proposed program. As a result, the overall impact of the Enhance Flood

System Capacity Alternative on geology, soils, and seismicity would be greater than that of the proposed program. [*Greater*]

5.5.10 Groundwater Resources

The proposed program would not result in significant impacts on groundwater resources after mitigation, as described in greater detail in Section 3.11, “Groundwater Resources.” The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the benefits to groundwater resources from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be minimal, well-planned, and substantially mitigated, while the adverse impacts on groundwater resources from a major flood event would be unplanned and unmitigated, and could be of a relatively greater scope.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of this alternative. DWR intends to implement the VMS, and associated elements such as LCM, whether or not the CVFPP is adopted. Therefore, potential groundwater impacts caused by levee maintenance (e.g., localized degradation of groundwater quality from construction activities) would be the same under the No-Project Alternative—Continued Operations Scenario as under the proposed program.

The potential for impacts on groundwater from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., localized degradation of groundwater quality from construction activities). However, the lower level of construction activity would minimize the potential for adverse effects. As under the proposed program, construction activities occurring as part of the No-Project Alternative—Continued Operations Scenario would be less than significant.

The proposed program’s operational impacts on groundwater from modifying reservoir operations and implementing a groundwater banking program would not occur under this alternative. Therefore, the effects of operation of the No-Project Alternative—Continued Operations Scenario

on existing groundwater conditions would be less than those of the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures and associated decreases in groundwater quality from contaminated floodwaters would be more frequent.

As described above, impacts on groundwater from system maintenance under the No-Project Alternative—Continued Operations Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, groundwater quality impacts from construction would be less than significant under both alternatives. Potential adverse effects on groundwater quality from floods resulting from system failures would be greater under this alternative. Given these conditions, the overall impact of the No-Project Alternative—Continued Operations Scenario on groundwater is expected to be greater than that of the proposed program. [*Greater*]

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. Therefore, potential groundwater impacts caused by levee maintenance (e.g., localized degradation of groundwater quality from construction activities) would be similar under the No-Project Alternative—No Additional Activities Scenario and the proposed program.

The potential for impacts on groundwater from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., localized degradation of groundwater quality from construction activities). However, the lower level of construction activity would minimize the potential for adverse effects. As under the proposed program, construction activities occurring as part of the No-Project Alternative—No Additional Activities Scenario would be less than significant.

The proposed program's operational impacts on groundwater from modifying reservoir operations and implementing a groundwater banking program would not occur under the No-Project Alternative—No Additional Activities Scenario. Therefore, the effects of operation of this alternative on existing groundwater conditions would be less than those of the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—No Additional Activities Scenario, system failures and associated decreases in groundwater quality from contaminated floodwaters would be more frequent.

As described above, impacts on groundwater from system maintenance under the No-Project Alternative—No Additional Activities Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, groundwater quality impacts from construction would be less than significant under both alternatives. Potential adverse effects on groundwater quality from floods resulting from system failures would be greater under the No-Project Alternative—No Additional Activities Scenario. Given these conditions, the overall impact of the No-Project Alternative—No Additional Activities Scenario on groundwater is expected to be greater than that of the proposed program. *[Greater]*

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on groundwater would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller under this alternative than under the proposed program. As a result, construction-related impacts on groundwater quality would be expected to be less. As under the proposed program, construction activities occurring as part of the Modified SSIA Alternative would be less than significant.

The Modified SSIA Alternative would not include a groundwater banking program, and would only provide opportunities for groundwater recharge through expansion of the Yolo Bypass. The proposed program's potentially significant impacts from operation of a groundwater banking program would not occur under this alternative, but those impacts could be mitigated to a less-than-significant level. Furthermore, this alternative would reduce the overall amount of flooding to a slightly lesser degree than the proposed program; therefore, there would be a slightly greater potential

for adverse effects on groundwater quality from flood system failures. Given these conditions, the overall impact of the Modified SSIA Alternative on groundwater would be greater than that of the proposed program. *[Greater]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on groundwater would be similar. This alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction-related impacts on groundwater would be less.

The Achieve SPFC Design Flow Capacity Alternative would not include a groundwater banking program; therefore, the new opportunities for groundwater recharge created by the proposed program would not occur under this alternative. The proposed program's potentially significant impacts from operating a groundwater banking program would not occur under the Achieve SPFC Design Flow Capacity Alternative, but those impacts could be mitigated to a less-than-significant level.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, the potential adverse effects on groundwater quality from flood system failures would be greater. Given these conditions, the impacts of the Achieve SPFC Design Flow Capacity Alternative on groundwater would be greater than those of the proposed program. *[Greater]*

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. This alternative would implement the same maintenance regime as the proposed program, and the impacts of system maintenance on groundwater would be similar.

More and larger new facilities could be constructed under the Enhance Flood System Capacity Alternative, resulting in greater potential for degradation of groundwater quality during construction. However, construction-related impacts on groundwater under either this alternative or the proposed program would be less than significant.

Both the Enhance Flood System Capacity Alternative and the proposed program would implement a groundwater banking program. However, this alternative would enhance opportunities to promote multi-benefit projects by fostering integration of benefits to water quality, recreation, power, and other resources. In addition, opportunities would exist to improve (1) water supply reliability (through multipurpose reservoir storage projects), (2) conjunctive management of groundwater and surface water resources, and (3) groundwater recharge within floodplain storage areas. Operational impacts on groundwater under either the Enhance Flood System Capacity Alternative or the proposed program could be mitigated to less-than-significant levels.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see Table 5.4-1); as a result, there would be a slightly greater reduction in potential adverse effects on groundwater quality from flood system failures. Given the conditions described above, the overall impacts of the Enhance Flood System Capacity Alternative on groundwater would be less than those of the proposed program. [*Lesser*]

5.5.11 Hazards and Hazardous Materials

The proposed program would not result in significant impacts related to hazards and hazardous materials after mitigation, as described in greater detail in Section 3.12, “Hazards and Hazardous Materials.” The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the benefits related to hazards and hazardous materials from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be minimal, well-planned, and substantially mitigated, while the adverse impacts related to hazards and hazardous materials from a major flood event would be unplanned and unmitigated, and could be of significant scope. Specifically, the volumes and toxicity of hazardous materials that could be released into the environment after a major flood event (e.g., pesticides, fuels) would likely be substantially greater than those involved in construction activities under the program. In addition, the program would directly reduce flood risk hazards.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of this alternative. DWR intends to implement the VMS, and associated elements

such as LCM, whether or not the CVFPP is adopted. Therefore, the potential for hazardous materials impacts from levee maintenance (e.g., accidental fuel spills when using motorized equipment) would be the same under the No-Project Alternative—Continued Operations Scenario and the proposed program.

The potential for impacts associated with hazards and hazardous materials from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., potential to encounter existing hazardous materials during construction, accidental spills of hazardous materials during construction). However, the lower level of construction activity would minimize the potential for adverse effects.

As under the proposed program, activities occurring as part of the No-Project Alternative—Continued Operations Scenario would require development and implementation of mitigation measures for significant and potentially significant impacts. Examples of such measures include avoiding contact with contaminated areas, locating oil and gas wells and transmission lines and coordinating with owner/operators to avoid conflicts with existing infrastructure, and training construction workers on hazardous materials. Mitigation measures would be equally effective at reducing impacts related to hazards and hazardous materials to a less-than-significant level under either the No-Project Alternative—Continued Operations Scenario or the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures and associated release and spread of hazardous materials from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, impacts of flooding and postflood repairs related to hazards and hazardous materials would be greater under the No-Project Alternative—Continued Operations Scenario.

As described above, impacts of system operations and maintenance on hazardous materials under the No-Project Alternative—Continued Operations Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, hazardous materials impacts could be equally mitigated under either alternative. There would be greater flood-related hazardous materials impacts under the No-Project Alternative—Continued Operations Scenario.

These impacts would be infrequent, but they would be more likely to result in long-term damage to the environment as hazardous materials were released and spread over a wider area. Given these conditions, the overall impact of the No-Project Alternative—Continued Operations Scenario related to hazardous materials is expected to be greater than that of the proposed program. *[Greater]*

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. Therefore, the potential for hazardous materials impacts from levee maintenance (e.g., accidental fuel spills when using motorized equipment) would be similar under the No-Project Alternative—No Additional Activities Scenario and the proposed program.

The potential for impacts associated with hazards and hazardous materials from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., potential to encounter existing hazardous materials during construction, accidental spills of hazardous materials during construction). However, the lower level of construction activity would minimize the potential for adverse effects.

As under the proposed program, activities occurring as part of the No-Project Alternative—No Additional Activities Scenario would require development and implementation of mitigation measures for significant and potentially significant impacts. Mitigation measures would be equally effective at reducing impacts related to hazards and hazardous materials to a less-than-significant level under either the No-Project Alternative—No Additional Activities Scenario or the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—No Additional Activities Scenario, system failures and associated release and spread of hazardous materials from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, impacts of flooding and postflood repairs related to hazards and hazardous materials would be greater under this alternative.

As described above, impacts of system operations and maintenance on hazardous materials under the No-Project Alternative—No Additional Activities Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, hazardous materials impacts could be equally mitigated under either alternative. There would be greater flood-related hazardous materials impacts under the No-Project Alternative—No Additional Activities Scenario. These impacts would be infrequent, but they would be more likely to result in long-term damage to the environment as hazardous materials were released and spread over a wider area. Given these conditions, the overall impact of the No-Project Alternative—No Additional Activities Scenario related to hazardous materials is expected to be greater than that of the proposed program. *[Greater]*

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance related to hazardous and hazardous materials would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller than under the proposed program. As a result, impacts from accidental spills of hazardous materials during construction and operation and from hazardous materials encountered during construction would be expected to be less. As under the proposed program, activities occurring as part of the Modified SSIA Alternative would require development and implementation of mitigation measures to reduce significant impacts on hazardous materials. Mitigation measures would be equally effective at reducing hazardous materials impacts to a less-than-significant level under either this alternative or the proposed program.

Under the Modified SSIA Alternative, only minimal measures would be taken to reduce flood risk for rural-agricultural areas. Flood protection in agricultural areas would not increase to the same degree as under the proposed program, and system failures resulting in inundation of agricultural land would be greater than under the proposed program. Both underground storage tanks containing hazardous materials and private septic systems may be present on agricultural land; fertilizers, pesticides, and other agricultural chemicals are typically stored above ground in agricultural areas. A flood event in an agricultural area could cause hazardous materials to be released from these and other sources. The flood-related impacts of the Modified SSIA Alternative would occur infrequently, but they would be more likely to result in long-term damage to the environment as hazardous materials were released and spread over a

wider area. Therefore, the Modified SSIA Alternative would have greater impacts related to hazards and hazardous materials than the proposed program. *[Greater]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance related to hazards and hazardous materials would be similar. The Achieve SPFC Design Flow Capacity Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, the construction-related and operational impacts related to hazards and hazardous materials would be less. Mitigation measures would be equally effective at reducing hazardous materials impacts from construction and operation to a less-than-significant level under either the Achieve SPFC Design Flow Capacity Alternative or the proposed program.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, the overall potential for flood damage to result in hazardous materials spills or exposure to hazardous substances would be much greater under this alternative than under the proposed program. These impacts would occur infrequently, but they would be more likely to result in long-term damage to the environment as hazardous materials were released and spread over a wider area. Therefore, the Achieve SPFC Design Flow Capacity Alternative would have greater impacts related to hazards and hazardous materials than the proposed program. *[Greater]*

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. This alternative would implement the same maintenance regime as the proposed program, and impacts on hazards from system maintenance would be similar.

More and larger new facilities could be constructed under this alternative than under the proposed program, resulting in greater potential for accidental spills of hazardous materials during construction and operation and greater potential to encounter contaminated soils or hazardous materials during construction activities. As under the proposed program,

activities occurring as part of the Enhance Flood System Capacity Alternative would require development and implementation of mitigation measures to reduce significant impacts related to hazardous materials. Mitigation measures would be equally effective at reducing hazardous materials impacts to a less-than-significant level under either this alternative or the proposed program.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see Table 5.4-1); as a result, there would be a greater reduction in potential flood-related impacts from releases of hazardous materials.

In summary, impacts of system maintenance related to hazards and hazardous materials would be similar and mitigation measures would be equally effective at reducing hazardous materials impacts under either the Enhance Flood System Capacity Alternative or the proposed program. This alternative would result in a somewhat greater reduction in flood-related releases of hazardous materials. Therefore, the overall impact on hazardous materials would be less than that of the proposed program. [*Lesser*]

5.5.12 Hydrology

The proposed program would not result in significant hydrology impacts after mitigation, as described in greater detail in Section 3.13, “Hydrology.” The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the hydrology benefits from flood risk reduction would not compensate for the impacts of the proposed program because those benefits would generally be short term (i.e., flooded areas are anticipated to recover to pre-flood conditions), while many of the impacts of the proposed program would be permanent.

No-Project Alternative—Continued Operations Scenario

Hydrologic resources include surface water (hydraulic), water supply, and flood management resources. Under the No-Project Alternative—Continued Operations Scenario, most elements of routine maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of the No-Project Alternative—Continued Operations Scenario. DWR intends to implement the VMS, and associated elements such as LCM, whether or not the CVFPP is adopted. Therefore, the potential for impacts on hydrology from levee maintenance (e.g., increased erosion and siltation, increased flooding caused by project activities or facilities, placement of housing within a floodplain, risk of inundation by seiche) would be the same under the No-Project

Alternative—Continued Operations Scenario as under the proposed program.

The potential for impacts on hydrology from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., increased erosion and siltation, increased flooding caused by project activities or facilities, risk of inundation by seiche). However, the lower level of construction activity would minimize the potential for adverse effects. Construction impacts would be less than significant under both the No-Project Alternative—Continued Operations Scenario and the proposed program. Furthermore, the proposed program includes large-scale modifications to benefit or improve conditions for hydraulic conveyance, flood management, or water supply throughout the system; those modifications would not occur under the No-Project Alternative—Continued Operations Scenario.

The proposed program's significant operational impacts on hydrology from modifying reservoir operations and altering floodplain inundation patterns are not likely to occur under the No-Project Alternative—Continued Operations Scenario. Therefore, operational impacts of this alternative would be less than those of the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures and associated effects on hydrology (from erosion, sedimentation, and increased likelihood of flooding) would occur more frequently, would be more severe, and would occur over a larger area than under the proposed program. Furthermore, because this alternative does not entail changes to the requirements for findings of local agencies related to land use changes, more housing at risk of 100-year flooding could be approved. Therefore, impacts of flooding and postflood repairs on hydrology would be greater under the No-Project Alternative—Continued Operations Scenario.

As described above, impacts of system operations and maintenance on hydrology under the No-Project Alternative—Continued Operations Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, construction-related hydrology impacts would be less than significant. Operational hydrology impacts of the proposed program could be mitigated. There would be greater flood-related hydrology impacts under the No-Project

Alternative—Continued Operations Scenario: continued potential for placement of housing within 100-year floodplains and flood-related erosion, siltation, and modification of stream channels. Given these conditions, the overall impact of the No-Project Alternative—Continued Operations Scenario on hydrology is expected to be greater than that of the proposed program. *[Greater]*

No-Project Alternative—No Additional Activities Scenario

Hydrologic resources include surface water (hydraulic), water supply, and flood management resources. The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. Therefore, the potential for impacts on hydrology from levee maintenance (e.g., increased erosion and siltation, increased flooding caused by project activities or facilities, placement of housing within a floodplain, risk of inundation by seiche) would be similar under the No-Project Alternative—No Additional Activities Scenario and the proposed program.

The potential for impacts on hydrology from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., increased erosion and siltation, increased flooding caused by project activities or facilities, risk of inundation by seiche). However, the lower level of construction activity would minimize the potential for adverse effects. Construction impacts would be less than significant under both the No-Project Alternative—No Additional Activities Scenario and the proposed program. Furthermore, the proposed program includes large-scale modifications to benefit or improve conditions for hydraulic conveyance, flood management, or water supply throughout the system; those modifications would not occur under the No-Project Alternative—No Additional Activities Scenario.

The proposed program's significant operational impacts on hydrology from modifying reservoir operations and altering floodplain inundation patterns are not likely to occur under the No-Project Alternative—No Additional Activities Scenario. Therefore, operational impacts of this alternative would be less than those of the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—No Additional Activities

Scenario, system failures and associated effects on hydrology (from erosion, sedimentation, increased likelihood of flooding, and continued placement of housing within 100-year floodplains) would occur more frequently, would be more severe, and would occur over a larger area than under the proposed program. Therefore, impacts of flooding and postflood repairs on hydrology would be greater under this alternative.

As described above, impacts of system operations and maintenance on hydrology under the No-Project Alternative—No Additional Activities Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, construction-related hydrology impacts would be less than significant. Operational hydrology impacts of the proposed program could be mitigated. There would be greater flood-related hydrology impacts under the No-Project Alternative—No Additional Activities Scenario: continued potential for placement of housing within 100-year floodplains and flood-related erosion, siltation, and modification of stream channels. Given these conditions, the overall impact of the No-Project Alternative—No Additional Activities Scenario on hydrology is expected to be greater than that of the proposed program. *[Greater]*

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on hydrology would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller under this alternative than under the proposed program. As a result, hydrology impacts during construction and operation would be expected to be less. As under the proposed program, activities occurring as part of the Modified SSIA Alternative would require development and implementation of mitigation measures to reduce potentially significant impacts on hydrology. Mitigation measures would be equally effective at reducing hydrology impacts to a less-than-significant level under either the Modified SSIA Alternative or the proposed program.

Under the Modified SSIA Alternative, the overall risk of flooding would be slightly greater than the risk under the proposed program; therefore, a lesser reduction in hydrology impacts from flooding would occur.

Because fewer and/or smaller components would be constructed under this alternative, construction-related and operational impacts of project components on hydrology would be less than those of the proposed

program. Therefore, the overall impact of the Modified SSIA Alternative on hydrology would be less than that of the proposed program. [*Lesser*]

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on hydrology would be similar. This alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction-related and operational impacts on hydrology would be less under this alternative. Impacts of construction on hydrology would be less than significant, and mitigation measures would be equally effective at reducing hydrology impacts from operation to a less-than-significant level under either the Achieve SPFC Design Flow Capacity Alternative or the proposed program.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, the overall potential for housing to continue being placed in a 100-year flood zone would be greater under this alternative. In the long term, this alternative would result in greater flood damage to housing and potential loss of life and property. Therefore, the Achieve SPFC Design Flow Capacity Alternative would have greater impacts on hydrology than the proposed program. [*Greater*]

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on hydrology would be similar.

More and larger new facilities could be constructed under this alternative than under the proposed program, resulting in greater potential for hydrology impacts from erosion and sedimentation caused by project-related modifications to the flood conveyance system. As under the proposed program, activities occurring as part of the Enhance Flood System Capacity Alternative would require development and implementation of mitigation measures to reduce significant impacts on hydrology. Mitigation measures would be equally effective at reducing

hydrology impacts to a less-than-significant level under either this alternative or the proposed program.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see Table 5.4-1); as a result, there would be a slightly greater reduction in potential flood-related impacts on hydrology.

In summary, impacts of system maintenance on hydrology would be similar and mitigation measures would be equally effective at reducing hydrology impacts under either the Enhance Flood System Capacity Alternative or the proposed program. This alternative would result in only a slightly greater reduction in flood-related impacts on hydrology. Furthermore, the Enhance Flood System Capacity Alternative would enhance opportunities to promote multi-benefit projects by fostering integration of benefits to water quality, recreation, power, and other resources. In addition, opportunities would exist to improve (1) water supply reliability (through multipurpose reservoir storage projects), (2) conjunctive management of groundwater and surface water resources, and (3) groundwater recharge within floodplain storage areas. Therefore, the overall impact of the Enhance Flood System Capacity Alternative on hydrology would be less than that of the proposed program. *[Lesser]*

5.5.13 Land Use and Planning

The proposed program generally would not result in significant impacts on land use and planning after mitigation, as described in greater detail in Section 3.14, “Land Use and Planning.” However, the significant and unavoidable impacts on agricultural resources described above in Section 5.5.2, “Agriculture and Forestry Resources,” are also considered to reflect corresponding significant and unavoidable land use impacts of the same nature and scope. The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the land use and planning benefits from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be indirect and result from State law and policies discouraging development in floodplains, while the adverse impacts from a major flood event would be unplanned and unmitigated, could be of significant scope, and could adversely affect land use and planning options for a lengthy period.

However, for the significant and unavoidable impacts on agricultural resources, the comparison generally assumes that the benefits to agricultural resources from flood risk reduction would not compensate for the impacts of the proposed program because those benefits would

generally be short term (i.e., flooded areas are anticipated to recover to preflood conditions as lands dry out and farming can resume), while many of the impacts of the proposed program on agricultural resources would be permanent.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine operations and maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of this alternative. DWR intends to implement the VMS, and associated elements such as LCM, whether or not the CVFPP is adopted. Managing vegetation on flood control facilities consistent with the VMS would not physically separate an established community, nor would it result in alterations of land uses or patterns of land use in a way that would cause substantial adverse physical environmental effects. Therefore, vegetation management on flood system facilities would have no effect on land use under either the No-Project Alternative—Continued Operations Scenario or the proposed program.

Land use effects of project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. Neither alternative would create conditions that would physically separate an established community; however, construction under this alternative is less likely to result in displacement of some isolated developed uses (e.g., homes, businesses, recreational facilities) because of the smaller cumulative project footprint. With a smaller project footprint, there also would be reduced conversion of agricultural land to a nonagricultural land use. The proposed program also includes a greater amount of habitat restoration and creation, which would result in some level of conversion of existing land uses (including agricultural land uses) to habitat.

As under the proposed program, activities occurring as part of the No-Project Alternative—Continued Operations Scenario would require development and implementation of mitigation measures to reduce significant or potentially significant land use impacts. Examples of such measures include providing financial compensation for property losses and relocation assistance for displaced development, and replacing displaced recreational facilities. Mitigation measures would be equally effective at reducing impacts on displaced development and recreational facilities to a less-than-significant level under either the No-Project Alternative—Continued Operations Scenario or the proposed program. However, it

would not be feasible to fully mitigate for conversion of agricultural land uses to habitat under either alternative.

Under the No-Project Alternative—Continued Operations Scenario, the CVFPP would not be adopted; therefore, the trigger initiating legislative requirements related to the urban level of flood protection would not occur under this alternative. As described in Impact LU-7 (NTMA) in Subsection 3.14.4, “Environmental Impacts and Mitigation Measures for NTMAs,” of Section 3.14, “Land Use and Planning,” assessing the environmental effect of redirecting land use and development to comply with the urban level of flood protection is too speculative to make a significance determination. However, the impact mechanisms described in Impact LU-7 (NTMA) would not occur under the No-Project Alternative—Continued Operations Scenario.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, the potential for flood damage to result in the physical division of an established community (e.g., incomplete postflood repairs and recovery resulting in separation of portions of a community) would be greater under the No-Project Alternative—Continued Operations Scenario. The potential for changes in land use or patterns of land use after a flood that would cause a substantial adverse physical environmental effect would also be greater. However, both of these impact mechanisms would require postflood land uses to differ substantially from preflood land uses, which would be unlikely.

Overall, impacts of system operations and maintenance on land use under the No-Project Alternative—Continued Operations Scenario would be similar to impacts under the proposed program. Significant and unavoidable impacts associated with implementing the urban level of flood protection (i.e., the conversion of agricultural land to urban uses) would not occur under the No-Project Alternative—Continued Operations Scenario. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, land use impacts could be equally mitigated under either alternative. There would be greater potential for flood-related land use impacts under the No-Project Alternative—Continued Operations Scenario, in particular given the lack of development restrictions that would be triggered by adoption of the CVFPP, and a corresponding continuation of development in floodplains. Given these conditions, the overall impact of the No-Project Alternative—Continued Operations Scenario on land use is expected to be less than that of the proposed program. [*Lesser*]

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. However, vegetation management on flood system facilities would have no effect on land use under either the No-Project Alternative—No Additional Activities Scenario or the proposed program.

The land use effects of project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. Neither alternative would create conditions that would physically separate an established community; however, construction under this alternative is less likely to result in displacement of some isolated developed uses (e.g., homes, businesses, recreational facilities) because of the smaller cumulative project footprint. With a smaller footprint, there also would be less conversion of agricultural land to a nonagricultural land use. The proposed program also includes a greater amount of habitat restoration and creation, which would result in some level of conversion of existing land uses (including agricultural land uses) to habitat.

As under the proposed program, activities occurring as part of the No-Project Alternative—No Additional Activities Scenario would require development and implementation of mitigation measures to reduce significant or potentially significant land use impacts. Mitigation measures would be equally effective at reducing impacts on displaced development and recreational facilities to a less-than-significant level under either this alternative or the proposed program. However, it would not be feasible to fully mitigate the conversion of agricultural land uses to habitat under either alternative.

Under the No-Project Alternative—No Additional Activities Scenario, the CVFPP would not be adopted; therefore, the trigger initiating legislative requirements related to the urban level of flood protection would not occur under this alternative. As described in Impact LU-7 (NTMA) in Subsection 3.14.4, “Environmental Impacts and Mitigation Measures for NTMAs,” of Section 3.14, “Land Use and Planning,” assessing the environmental effect of redirecting land use and development to comply with the urban level of flood protection is too speculative to make a significance determination. However, the impact mechanisms described in Impact LU-7 (NTMA)

would not occur under the No-Project Alternative—No Additional Activities Scenario.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—No Additional Activities Scenario, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, the potential for flood damage to result in the physical division of an established community (e.g., incomplete postflood repairs and recovery resulting in separation of portions of a community) would be greater under this alternative. The potential for changes in land use or patterns of land use after a flood that would cause a substantial adverse physical environmental effect would also be greater. However, both of these impact mechanisms would require postflood land uses to differ substantially from preflood land uses, which would be unlikely.

Overall, impacts of system operations and maintenance on land use under the No-Project Alternative—No Additional Activities Scenario would be similar to impacts under the proposed program. Significant and unavoidable impacts from implementing the urban level of flood protection (i.e., conversion of agricultural land to urban land uses) would not occur under this alternative. Construction-related impacts would initially be less under the No-Project Alternative—No Additional Activities Scenario because fewer projects would be constructed; however, land use impacts could be equally mitigated under either alternative. There would be greater potential for flood-related land use impacts under the No-Project Alternative—No Additional Activities Scenario, in particular given the lack of development restrictions that would be triggered by adoption of the CVFPP, and a corresponding continuation of development in floodplains. Given these conditions, the overall impact of the No-Project Alternative—No Additional Activities Scenario on land use is expected to be lesser than that of the proposed program. [*Lesser*]

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on land use would be similar (i.e., little to no impact). Both alternatives would also trigger implementation of requirements related to the urban level of flood protection; impacts via this mechanism would be the same for this alternative and the proposed program. The Modified SSIA Alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller under this alternative than under the proposed program. As a result, the

potential for land use impacts would be expected to be less under this alternative.

As under the proposed program, activities occurring as part of the Modified SSIA Alternative would require development and implementation of mitigation measures to reduce significant land use impacts. Mitigation measures would be equally effective at reducing most significant land use impacts to a less-than-significant level under either this alternative or the proposed program. However, it would not be feasible to fully mitigate the conversion of agricultural lands to another land use under either alternative.

Under the Modified SSIA Alternative, the overall reduction in flood risk would be slightly less than that of the proposed program. Therefore, the potential for flooding from system failures during high-water events would be slightly greater. However, requirements related to the urban level of flood protection would be implemented under the Modified SSIA Alternative, as under the proposed program; therefore, the potential for adverse land use effects would likewise be similar. Primarily because of the smaller overall project footprint under this alternative and the correspondingly lower potential for conversion of agricultural land, the potential for adverse land use impacts is expected to be less under the Modified SSIA Alternative. [*Lesser*]

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). It would implement the same operations and maintenance regime as the proposed program, and impacts of system operations and maintenance on land use would be similar. Both alternatives would also trigger implementation of requirements related to the urban level of flood protection; impacts via this mechanism would be the same for the Achieve SPFC Design Flow Capacity Alternative and the proposed program.

The Achieve SPFC Design Flow Capacity Alternative would result in a smaller construction and land disturbance footprint than the proposed program. Therefore, the potential for land use impacts would be expected to be less under this alternative.

As under the proposed program, activities occurring as part of the Achieve SPFC Design Flow Capacity Alternative would require development and implementation of mitigation measures to reduce significant land use impacts. Mitigation measures would be equally effective at reducing most significant land use impacts to a less-than-significant level under either this

alternative or the proposed program. However, it would not be feasible to fully mitigate the conversion of agricultural lands to another land use under either alternative.

Because fewer improvements to the flood protection system would be made under the Achieve SPFC Design Flow Capacity Alternative, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, the potential for flood damage to result in the physical division of an established community (e.g., incomplete postflood repairs and recovery resulting in separation of portions of a community) would be greater under this alternative. The potential for changes in land use or patterns of land use after a flood that would cause a substantial adverse physical environmental effect would also be greater. However, both of these impact mechanisms would require postflood land uses to differ substantially from preflood land uses, which would be unlikely. The requirements related to the urban level of flood protection would be implemented under the Achieve SPFC Design Flow Capacity Alternative, as under the proposed program; therefore, the potential for adverse land use effects would likewise be similar. Primarily because of the smaller overall project footprint under this alternative and the correspondingly lower potential for conversion of agricultural land, the potential for adverse land use impacts is expected to be less under the Achieve SPFC Design Flow Capacity Alternative than under the proposed program. [*Lesser*]

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on land use would be similar. New reservoirs would have maintenance requirements not included in the proposed program; however, potential land use impacts would result primarily from constructing and operating a reservoir in a location where one currently does not exist, and not necessarily from maintaining that reservoir once it is in place. Both the proposed program and the Enhance Flood System Capacity Alternative would trigger implementation of requirements related to the urban level of flood protection, and impacts via this mechanism would be the same for both alternatives.

It is uncertain how changes in the management and operation of water storage facilities under this alternative would affect land use. Depending on the timing, duration, and locations of water reallocation, more or less water

could be available to support various land uses, which could alter existing and planned land use patterns.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see Table 5.4-1); as a result, the potential for flood-related land use impacts would be slightly less. More and larger new facilities could be constructed under this alternative, resulting in greater potential to physically separate an established community or result in alterations to land uses or patterns of land use that would cause a substantial adverse physical environmental effect. Similarly, the Enhance Flood System Capacity Alternative would provide greater opportunities for habitat restoration and enhancement, potentially resulting in greater conversions of existing land uses (particularly agricultural land) to habitat. As under the proposed program, activities occurring as part of this alternative would require development and implementation of mitigation measures to reduce significant land use impacts. Mitigation measures would be equally effective at reducing most land use impacts to a less-than-significant level under either the Enhance Flood System Capacity Alternative or the proposed program. However, it would not be feasible to fully mitigate the conversion of agricultural land to another use under either alternative. Given these conditions, land use impacts would be greater under the Enhance Flood System Capacity Alternative than under the proposed program. *[Greater]*

5.5.14 Noise

The proposed program would not result in significant noise impacts after mitigation, as described in greater detail in Section 3.15, “Noise.” The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the noise benefits from flood risk reduction would not be materially different from the impacts of the proposed program. It is not anticipated that reconstruction efforts would involve materially different noise impacts from those of the proposed projects, and the impacts of the proposed program and reconstruction would both be temporary.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of this alternative. DWR intends to implement the VMS, and associated elements such as LCM, whether or not the CVFPP is adopted. Therefore, the

potential for noise impacts caused by levee maintenance activities would be the same under the No-Project Alternative—Continued Operations Scenario as under the proposed program.

The potential for noise and vibration impacts from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., increased noise and vibration generated by construction equipment and by operational features such as water pumps). However, the lower level of construction activity would minimize the potential for adverse effects.

As under the proposed program, activities occurring as part of the No-Project Alternative—Continued Operations Scenario would require development and implementation of mitigation measures for significant and potentially significant impacts. Examples of such measures include implementing noise- and vibration-reducing construction practices and implementing design techniques to lessen operational noise. Mitigation measures would be equally effective at reducing noise and vibration impacts to a less-than-significant level under either the No-Project Alternative—Continued Operations Scenario or the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures and associated flood-related cleanup activities would occur more frequently and would be more severe than under the proposed program. Therefore, impacts of flood-related cleanup activities and postflood repairs on noise and vibration would be greater under this alternative.

As described above, impacts of system operations and maintenance related to noise and vibration under the No-Project Alternative—Continued Operations Scenario would be similar to impacts under the proposed program. Construction-related noise and vibration impacts would initially be less under this alternative because fewer projects would be constructed; however, noise and vibration impacts could be equally mitigated under either alternative. There would be greater flood-related noise and vibration impacts under the No-Project Alternative—Continued Operations Scenario, but these would be infrequent and episodic. Given these conditions, the overall impact of the No-Project Alternative—Continued Operations Scenario related to noise and vibration is expected to be less than that of the proposed program. [*Lesser*]

No-Project Alternative—No Additional Activities Scenario

Hydrologic resources include surface water (hydraulic), water supply, and flood management resources. The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. Therefore, the potential for noise impacts caused by levee maintenance activities would be similar under the No-Project Alternative—No Additional Activities Scenario and the proposed program.

The potential for noise and vibration impacts from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., increased noise and vibration generated by construction equipment and by operational features such as water pumps). However, the lower level of construction activity would minimize the potential for adverse effects.

As under the proposed program, activities occurring as part of the No-Project Alternative—No Additional Activities Scenario would require development and implementation of mitigation measures for significant and potentially significant impacts. Mitigation measures would be equally effective at reducing noise and vibration impacts to a less-than-significant level under either this alternative or the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—No Additional Activities Scenario, system failures and associated flood-related cleanup activities would occur more frequently and would be more severe than under the proposed program. Therefore, impacts of flood-related cleanup activities and postflood repairs on noise and vibration would be greater under this alternative.

As described above, impacts of system operations and maintenance related to noise and vibration under the No-Project Alternative—No Additional Activities Scenario would be similar to impacts under the proposed program. Construction-related noise and vibration impacts would initially be less under this alternative because fewer projects would be constructed; however, noise and vibration impacts could be equally mitigated under either alternative. There would be greater flood-related noise and vibration impacts under the No-Project Alternative—No Additional Activities

Scenario, but these would be infrequent and episodic. Given these conditions, the overall impact of the No-Project Alternative—No Additional Activities Scenario related to noise and vibration is expected to be less than that of the proposed program. *[Lesser]*

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance related to noise and vibration would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller under this alternative than under the proposed program. As a result, impacts related to noise and vibration levels during construction and operation would be expected to be less. As under the proposed program, activities occurring as part of the Modified SSIA Alternative would require development and implementation of mitigation measures to reduce significant impacts related to noise and vibration. Mitigation measures would be equally effective at reducing noise and vibration impacts to a less-than-significant level under either this alternative or the proposed program.

Under the Modified SSIA Alternative, the overall risk of flooding would be slightly greater than the risk under the proposed program; therefore, a slightly lesser reduction in noise and vibration levels from flood-related cleanup activities would occur.

Because fewer and/or smaller components would be constructed under this alternative, construction-related and operational noise impacts would be less than those of the proposed program. Therefore, the overall impact of the Modified SSIA Alternative related to noise would be less than that of the proposed program. *[Lesser]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance related to noise and vibration would be similar. The Achieve SPFC Design Flow Capacity Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction-related and operational impacts related to noise and vibration would generally be less. Mitigation measures would be equally effective at reducing noise and vibration levels from construction

and operation to a less-than-significant level under either the Achieve SPFC Design Flow Capacity Alternative or the proposed program.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, the potential for flood-related cleanup and repair activities to increase noise and vibration levels would be greater under this alternative. However, these effects would be infrequent and episodic. Therefore, the overall impact of the Achieve SPFC Design Flow Capacity Alternative related to noise would be similar to that of the proposed program. *[Similar]*

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. The Enhance Flood System Capacity alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance related to noise and vibration would be similar.

More and larger new facilities could be constructed under this alternative, resulting in greater potential for increases in noise and vibration levels during construction and operation. As under the proposed program, activities occurring as part of the Enhance Flood System Capacity Alternative would require development and implementation of mitigation measures to reduce significant impacts related to noise and vibration. Presumably, larger new facilities such as new reservoirs would be constructed in rural areas away from sensitive receptors; therefore, mitigation measures would be equally effective at reducing noise and vibration impacts to a less-than-significant level under either the Enhance Flood System Capacity Alternative or the proposed program.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see 5.4-1); as a result, a slightly greater overall reduction in noise and vibration levels from potential flood-related cleanup and repair would occur.

In summary, impacts of system maintenance related to noise and vibration would be similar, and mitigation measures would be equally effective at reducing noise and vibration impacts from construction and operation to a less-than-significant level, under either the Enhance Flood System Capacity Alternative or the proposed program. This alternative would result in a somewhat greater reduction in flood-related noise and vibration levels;

however, these effects would be infrequent and episodic. Therefore, the overall impact of the Enhance Flood System Capacity Alternative related to noise and vibration would be similar to that of the proposed program.

[Similar]

5.5.15 Population, Employment, and Housing

The proposed program would not result in significant impacts on population, employment, and housing, as described in greater detail in Section 3.16, “Population, Employment, and Housing.” The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the benefits to population, employment, and housing from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be minimal, well-planned, and substantially mitigated, while the adverse impacts from a major flood event would be unplanned and unmitigated, and could be of significant scope. Specifically, recovery from a major flood event could take considerable time and full recovery of employment opportunities and housing availability may not occur in some situations.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of this alternative. DWR intends to implement the VMS, and associated elements such as LCM, whether or not the CVFPP is adopted. Therefore, the potential for impacts on population, employment, and housing caused by routine maintenance would be the same under the No-Project Alternative—Continued Operations Scenario as under the proposed program.

The potential for impacts on population, employment, and housing from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., inducement of substantial population growth, displacement of substantial numbers of people, or inducement of substantial unemployment as a result of project construction, operation, or long-term land use policy changes). However, the lower level of construction activity would minimize the potential for adverse effects. As under the proposed program, activities occurring as part of the No-

Project Alternative—Continued Operations Scenario would likely result in less-than-significant impacts.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Under this alternative, population increases would likely drive changes in land use patterns in flood-prone areas, increasing the populations at risk of flooding. Continued urban development within floodplains would also make future changes to the footprint of the flood management system progressively more costly, and would exacerbate consequences (life safety and damages) when flooding events occur. A greater risk of flooding would have a greater socioeconomic impact related to displacement of residents and property damage from flooding. Therefore, the No-Project Alternative—Continued Operations Scenario could have a significant impact on population and housing; however, the extent of impacts under this alternative is unknown and feasible mitigation may not be sufficient to reduce impacts to a less-than-significant level.

The construction-related and operational impacts of both the No-Project Alternative—Continued Operations Scenario and the proposed program are expected to be less than significant; however, this alternative could have significant population and housing impacts associated with an increased risk of flooding. Thus, the overall impact of the No-Project Alternative—Continued Operations Scenario on population, employment, and housing is expected to be greater than that of the proposed program. [*Greater*]

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. Population increases under this alternative would likely drive changes in land use patterns in flood-prone areas, increasing the populations at risk of flooding. Continued urban development within floodplains would also make future changes to the footprint of the flood management system progressively more costly, and would exacerbate consequences (life safety and damages) when flooding events occur. Increased needs for postflood repairs under the No-Project Alternative—No Additional Activities Scenario could cause more jobs to be created for postflood repairs and cleanup. However, a greater risk of flooding would have a greater socioeconomic impact related to displacement of residents and property damage from flooding. The short-

and long-term creation of jobs associated with large projects that could occur under the proposed program would not be created under the No-Project Alternative—No Additional Activities Scenario.

The proposed program is not expected to have a significant impact on population, employment, or housing; therefore, no mitigation measures would be needed to reduce socioeconomic impacts to a less-than-significant level. The No-Project Alternative—No Additional Activities Scenario could have a significant impact on population and housing; however, the extent of impacts under this alternative is unknown and feasible mitigation may not be sufficient to reduce impacts to a less-than-significant level.

In contrast to the proposed program, the No-Project Alternative—No Additional Activities Scenario could have socioeconomic impacts associated with an increased risk of flooding. Thus, the overall impact of the No-Project Alternative—No Additional Activities Scenario on socioeconomics is expected to be greater than that of the proposed program. *[Greater]*

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on population, employment, and housing would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller than under the proposed program. Because fewer and/or smaller components would be constructed under this alternative, the impact on population, employment, and housing would be less. However, impacts from construction and operation are expected to be less than significant under both the Modified SSIA Alternative and the proposed program.

The Modified SSIA Alternative would result in an overall level of flood protection less than that provided by the proposed program in rural areas; however, the level of flood protection in urban areas would be similar. As population growth continues, a larger percentage of development is expected to occur farther from city centers and in rural areas; thus, over time, this alternative could result in greater socioeconomic impacts on people in rural areas. Given the conditions described above, the overall impact of the Modified SSIA Alternative on population, employment, and housing would be greater than that of the proposed program. *[Greater]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on population, employment, and housing would be similar.

The Achieve SPFC Design Flow Capacity Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction-related and operational impacts on population, employment, and housing would be less under this alternative. However, impacts from construction and operation are expected to be less than significant under both the Achieve SPFC Design Flow Capacity Alternative and the proposed program.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program. As population growth continues, an increasing number of people will have insufficient flood protection; thus, over time, this alternative could result in greater socioeconomic impacts on people in both urban and rural areas. This alternative could also have a greater potential than the proposed program to displace housing or people over time. Therefore, the overall impact of the Achieve SPFC Design Alternative on population, employment, and housing would be greater than that of the proposed program. *[Greater]*

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on population, employment, and housing would be similar.

More and larger new facilities could be constructed under this alternative than under the proposed program; however, the current and future projected labor pool is expected to be sufficient to supply any new temporary construction jobs and long-term operation jobs that could be created. It is unlikely that constructing large new facilities such as reservoirs would displace substantial numbers of people or housing, simply because placing such facilities in developed areas is cost prohibitive and too difficult from a land acquisition standpoint. Therefore, impacts from construction and

operation are expected to be less than significant under both the Enhance Flood System Capacity Alternative and the proposed program.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see 5.4-1); as a result, a slightly greater reduction in potential flood-related impacts from displacement of people and housing would occur.

In summary, impacts of system maintenance on population, employment, and housing would be similar, and mitigation measures would be equally effective at reducing these impacts from construction and operation to a less-than-significant level, under either the Enhance Flood System Capacity Alternative or the proposed program. This alternative would result in only a slightly greater reduction in flood-related population and housing levels. Therefore, the overall impact of the Enhance Flood System Capacity Alternative on population, employment, and housing would be less than that of the proposed program. [*Lesser*]

5.5.16 Public Services

The proposed program would not result in significant impacts on public services, as described in greater detail in Section 3.17, “Public Services.” The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the public services benefits from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be minimal, well-planned, and substantially mitigated, while the public services impacts from a major flood event would be unplanned and unmitigated, and could be of significant scope.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most existing elements of routine maintenance of flood control facilities would remain in place. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of the No-Project Alternative—Continued Operations Scenario. DWR intends to implement the VMS, and associated elements such as LCM, whether or not the CVFPP is adopted. Therefore, the potential for public services impacts caused by levee maintenance (e.g., physical effects resulting in the need for new or altered law enforcement or fire protection facilities) would be the same under the No-Project Alternative—Continued Operations Scenario and the proposed program.

The potential for impacts on public services from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., physical effects resulting in the need for new or altered law enforcement or fire protection facilities). However, the lower level of construction activity would minimize the potential for adverse effects. Impacts on public services are expected to be less than significant under either the No-Project Alternative—Continued Operations Scenario or the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures and associated cleanup and postflood repair activities would result in greater impacts on public services under this alternative. The scale of the repairs could be larger, depending on the extent or magnitude of flood damage, resulting in greater demand on emergency fire and police services than under the proposed program.

As described above, impacts of system operations and maintenance on public services under the No-Project Alternative—Continued Operations Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, public services impacts would be less than significant under both alternatives. There would be greater flood-related impacts on public services under the No-Project Alternative—Continued Operations Scenario. Although these impacts would be infrequent, the overall demand for emergency police and fire services under the No-Project Alternative—Continued Operations Scenario would be greater than that of the proposed program. *[Greater]*

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. Therefore, the potential for public services impacts caused by levee maintenance (e.g., physical effects resulting in the need for new or altered law enforcement or fire protection facilities) would be similar for the No-Project Alternative—No Additional Activities Scenario and the proposed program.

The potential for impacts on public services from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., physical effects resulting in the need for new or altered law enforcement or fire protection facilities). However, the lower level of construction activity would minimize the potential for adverse effects. Impacts on public services are expected to be less than significant under either the No-Project Alternative—No Additional Activities Scenario or the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—No Additional Activities Scenario, system failures and associated cleanup and postflood repair activities would result in greater impacts on public services under this alternative. The scale of the repairs could be larger, depending on the extent or magnitude of flood damage, resulting in greater demand on emergency fire and police services than under the proposed program.

As described above, impacts of system operations and maintenance on public services under the No-Project Alternative—No Additional Activities Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, public services impacts would be less than significant under both alternatives. There would be greater flood-related impacts on public services under the No-Project Alternative—No Additional Activities Scenario. Although these impacts would be infrequent, the overall demand for emergency police and fire services under the No-Project Alternative—No Additional Activities Scenario would be greater than that of the proposed program. *[Greater]*

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same maintenance regime as the proposed program, and impacts related to public services from system maintenance would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller than under the proposed program. Therefore, impacts on public services during construction and operation would be expected to be less under this alternative. As under the proposed program, activities occurring as part of the Modified SSIA Alternative are expected to be less than significant.

Under the Modified SSIA Alternative, only minimal measures would be taken to reduce flood risk for rural-agricultural areas. Because most public services are concentrated in urban areas, the overall impact of this alternative on public services would be similar to that of the proposed program. Given the conditions described above, the overall effects of the Modified SSIA Alternative on public services would be similar to those under the proposed program. *[Similar]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on public services would be similar. The Achieve SPFC Design Flow Capacity Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction-related and operational impacts on public services would be less under this alternative. However, public services impacts are expected to be less than significant under both the Achieve SPFC Design Flow Capacity Alternative and the proposed program.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, the potential for flood damage to result in impacts on public services would be much greater than under the proposed program. The scale of the repairs could be larger, depending on the extent or magnitude of flood damage, resulting in greater demand on emergency fire and police services. Therefore, the Achieve SPFC Design Flow Capacity Alternative would have greater overall impacts on public services than the proposed program. *[Greater]*

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on public services would be similar.

More and larger new facilities could be constructed under this alternative, resulting in greater potential for demand for new fire and police services. For example, constructing new reservoirs could result in the need for new police services—both patrol boats on the water and patrol cars along the

shoreline. However, police and fire services at reservoirs are generally provided by existing facilities as needed; new facilities are generally not constructed. Although new police and fire facilities may not be required, the Enhance Flood System Capacity Alternative could increase demand for new police officers, firefighters, and associated equipment, which could result in a significant impact.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see 5.4-1); as a result, a slightly greater reduction in potential flood-related impacts on public services would occur.

In summary, maintenance and flood protection impacts on public services from the Enhance Flood System Capacity Alternative would be similar to impacts from the proposed program, but this alternative could result in significant impacts on public services from construction and operation of new and larger facilities. Therefore, the Enhance Flood System Capacity Alternative would have a greater overall impact on public services than the proposed program. [*Greater*]

5.5.17 Recreation

The proposed program would not result in significant recreation impacts after mitigation, as described in greater detail in Section 3.18, “Recreation.” The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the recreation benefits from flood risk reduction would not compensate for the impacts of the proposed program because those benefits would generally be short term (i.e., flooded areas are anticipated to recover to pre-flood conditions so that recreational activities can resume, and damaged recreational facilities are reasonably expected to be replaced), while many of the recreation impacts of the proposed program would be permanent.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of this alternative. DWR intends to implement the VMS, and associated elements such as LCM, whether or not the CVFPP is adopted. Therefore, the potential for recreation impacts caused by levee maintenance (e.g., decreased access to recreational facilities and decreased recreation quality as a result of removal of woody vegetation) would be the same under the

No-Project Alternative—Continued Operations Scenario and the proposed program.

The potential for impacts on recreation from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. Many of the impact mechanisms would be similar under this alternative (e.g., decreased access to recreational facilities, increased boating safety hazards from construction barge traffic). However, the lower level of construction activity would minimize the potential for adverse effects.

The permanent loss of access to recreational facilities and decreased recreational quality from changes in reservoir operations that would occur under the proposed program are not likely to occur under the No-Project Alternative—Continued Operations Scenario. Therefore, operational impacts of this alternative would be less than those of the proposed program.

As under the proposed program, activities occurring as part of the No-Project Alternative—Continued Operations Scenario would require development and implementation of mitigation measures for significant and potentially significant impacts. Examples of such measures include avoiding construction activities and staging near recreational facilities, avoiding construction during the high-use recreation season, and maintaining safe boat passage. Because of the much more limited scale of activities under the No-Project Alternative—Continued Operations Scenario, it is anticipated that mitigation measures would be effective at reducing impacts on recreation to a less-than-significant level.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures and associated postflood cleanup activities could result in temporary loss of access to some recreational facilities, depending on the location and severity of the flood event. Therefore, impacts of flooding and postflood repairs on recreation would be greater under this alternative than under the proposed program.

As described above, impacts of system operations and maintenance on recreation under the No-Project Alternative—Continued Operations Scenario would be similar to those under the proposed program. Construction-related and operational impacts would be less under the No-Project Alternative—Continued Operations Scenario because fewer projects would be constructed, and because mitigation measures would

reduce all recreation impacts to a less-than-significant level. There would be greater flood-related recreation impacts under this alternative, but these would be infrequent and episodic. Given these conditions, the overall impact of the No-Project Alternative—Continued Operations Scenario on recreation is expected to be less than that of the proposed program. [*Lesser*]

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. Therefore, the potential for recreation impacts caused by levee maintenance (e.g., decreased access to recreational facilities and decreased recreation quality as a result of removal of woody vegetation) would be similar for the No-Project Alternative—No Additional Activities Scenario and the proposed program.

The potential for impacts on recreation from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. Many of the impact mechanisms would be similar under this alternative (e.g., decreased access to recreational facilities, increased boating safety hazards from construction barge traffic). However, the lower level of construction activity would minimize the potential for adverse effects.

The permanent loss of access to recreational facilities and decreased recreational quality from changes in reservoir operations that would occur under the proposed program would not occur under the No-Project Alternative—No Additional Activities Scenario. Therefore, operational impacts of this alternative would be less than those of the proposed program.

As under the proposed program, activities occurring as part of the No-Project Alternative—No Additional Activities Scenario would require development and implementation of mitigation measures for significant and potentially significant impacts. Because of the much more limited scale of activities under this alternative, it is anticipated that mitigation measures would be effective at reducing impacts on recreation to a less-than-significant level. However, the proposed program would result in significant and unavoidable recreation impacts.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—No Additional Activities Scenario, system failures and associated postflood cleanup activities could result in temporary loss of access to some recreational facilities, depending on the location and severity of the flood event. Therefore, impacts of flooding and postflood repairs on recreation would be greater under this alternative than under the proposed program.

As described above, impacts of system operations and maintenance on recreation under the No-Project Alternative—No Additional Activities Scenario would be similar to those under the proposed program. Construction-related and operational impacts would be less under this alternative because fewer projects would be constructed, and because mitigation measures would reduce all recreation impacts to a less-than-significant level. There would be greater flood-related recreation impacts under the No-Project Alternative—No Additional Activities Scenario, but these would be infrequent and episodic. Given these conditions, the overall impact of the No-Project Alternative—No Additional Activities Scenario on recreation is expected to be less than that of the proposed program.

[Lesser]

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on recreation would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller under this alternative than under the proposed program. Therefore, impacts on recreation during construction and operation would be expected to be less. As under the proposed program, activities occurring as part of the Modified SSIA Alternative would require development and implementation of mitigation measures to reduce significant impacts on recreation, which would reduce those impacts to a less-than-significant level. Mitigation measures would be able to reduce impacts on recreation under both this alternative and the proposed program. However, these impacts would occur to a lesser degree under the Modified SSIA Alternative than under the proposed program.

The Modified SSIA Alternative would provide an overall level of flood protection slightly less than that provided by the proposed program. Therefore, a smaller reduction in flood-related loss of access to recreational facilities would occur under this alternative than under the proposed program.

Overall, maintenance- and flood-related impacts of the Modified SSIA Alternative would be similar to impacts of the proposed program, as would construction-related and operational impacts. Flooding effects would be only slightly greater. Therefore, the overall impact of the Modified SSIA Alternative on recreation would be similar to that of the proposed program. *[Similar]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity Alternative would implement the same maintenance regime as the proposed program, and impacts on recreation from system maintenance would be similar.

The Achieve SPFC Design Flow Capacity Alternative would result in a much smaller construction and land disturbance footprint than the proposed program; therefore, construction-related and operational impacts on recreation would be less. As under the proposed program, activities occurring as part of this alternative would require development and implementation of mitigation measures for significant and potentially significant impacts. Because of the more limited scale of activities under this alternative, it is anticipated that mitigation measures would be effective at reducing impacts on recreation to a less-than-significant level.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, the potential for flooding and postflood cleanup activities to result in the loss of access to some recreational facilities is greater under this alternative than under the proposed program.

Overall, impacts of system operations and maintenance on recreation under the Achieve SPFC Design Flow Capacity Alternative would be similar to impacts of the proposed program. Construction-related and operational impacts would be less under this alternative because fewer projects would be constructed, and because mitigation measures would reduce all recreation impacts to a less-than-significant level. There would be greater flood-related recreation impacts under this alternative, but these would be infrequent and episodic. Given these conditions, the overall impact of the Achieve SPFC Design Flow Capacity Alternative on recreation is expected to be less than that of the proposed program. *[Lesser]*

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. This alternative would implement the same maintenance regime as the proposed program, and impacts on recreation from system maintenance would be similar.

More and larger new facilities could be constructed under this alternative, resulting in greater potential for decreased recreation access and decreased quality of recreation from changes in reservoir operations. As under the proposed program, activities occurring as part of the Enhance Flood System Capacity Alternative would require development and implementation of mitigation measures to reduce significant impacts on recreation. Mitigation measures would be equally effective at reducing some recreation impacts to a less-than-significant level under either this alternative or the proposed program; however, given the larger scale of construction activities, including the construction of new or expanded reservoirs, the Enhance Flood System Capacity Alternative could result in potentially significant and unavoidable recreation impacts.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see 5.4-1); as a result, a slightly greater reduction in potential flood-related impacts on recreation would occur.

In summary, impacts of system operations and maintenance on recreation under the Enhance Flood System Capacity Alternative would be similar to impacts under the proposed program. However, this alternative would enhance opportunities to promote multi-benefit projects by fostering integration of benefits to water quality, recreation, power, and other resources. Construction and operation of components would be greater than under the proposed program, resulting in decreased access to recreational facilities in the short term, and in potentially significant and unavoidable impacts in the long term (similar to the proposed program). Therefore, the impact of the Enhance Flood System Capacity Alternative on recreation would be similar to that of the proposed program. *[Similar]*

5.5.18 Transportation and Traffic

The proposed program generally would not result in significant transportation and traffic impacts after mitigation, as described in greater detail in 3.19, “Transportation and Traffic.” However, for very large construction projects involving large amounts of fill requiring transport over public roads, construction traffic impacts could be potentially

significant and unavoidable. In addition, some projects could require transportation infrastructure to be removed or disrupted for a substantial period of time without available mitigation, resulting in a potentially significant and unavoidable impact. The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the benefits to transportation and traffic from flood risk reduction would not be materially different from the impacts of the proposed program. It is anticipated that reconstruction efforts would generate construction traffic to a similar degree as the proposed program.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of this alternative. DWR intends to implement the VMS, and associated elements such as LCM, whether or not the CVFPP is adopted. Therefore, the potential for transportation and traffic impacts caused by levee maintenance (e.g., increased construction traffic and decreased level of service on roadways) would be the same under the No-Project Alternative—Continued Operations Scenario as under the proposed program.

The potential for impacts on transportation and traffic from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., increased construction traffic, potential to remove or disrupt current transportation infrastructure, decreased level of service on roadways). However, the lower level of construction activity and smaller projects would minimize the potential for adverse effects.

As under the proposed program, activities occurring as part of the No-Project Alternative—Continued Operations Scenario would require development and implementation of mitigation measures for significant and potentially significant impacts. Examples of such measures include implementing a traffic management plan; providing traffic detour routes; and adding turn lanes, traffic signals, or stop signs. Mitigation measures would be equally effective at reducing impacts on transportation and traffic to a less-than-significant level under either the No-Project Alternative—Continued Operations Scenario or the proposed program. However, the proposed program could result in significant and unavoidable impacts—

namely, short-term construction traffic on large projects and permanent loss of existing roadway infrastructure.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures—and the lack of emergency access and blockage of roadways caused by the associated flooding and postflood repairs—would occur more frequently and would be more severe than under the proposed program. Therefore, impacts of flooding and postflood repairs on transportation and traffic would be greater under the No-Project Alternative—Continued Operations Scenario.

As described above, impacts of system operations and maintenance on transportation and traffic under the No-Project Alternative—Continued Operations Scenario would be similar to impacts under the proposed program. Construction-related and operational impacts would be less under the No-Project Alternative—Continued Operations Scenario because fewer and smaller projects would be constructed; therefore, the significant and unavoidable impacts of the proposed program would likely be avoided. There would be greater flood-related transportation and traffic impacts under the No-Project Alternative—Continued Operations Scenario, but these would be infrequent and episodic. Given these conditions, the overall impact of the No-Project Alternative—Continued Operations Scenario on transportation and traffic is expected to be less than that of the proposed program. [*Lesser*]

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. Therefore, the potential for transportation and traffic impacts caused by levee maintenance (e.g., increased construction traffic and decreased level of service on roadways) would be the same under the No-Project Alternative—No Additional Activities Scenario as under the proposed program.

The potential for impacts on transportation and traffic from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., increased construction traffic, potential to remove or disrupt current transportation infrastructure, decreased level of

service on roadways). However, the lower level of construction activity and smaller projects would minimize the potential for adverse effects.

As under the proposed program, activities occurring as part of the No-Project Alternative—No Additional Activities Scenario would require development and implementation of mitigation measures for significant and potentially significant impacts. Mitigation measures would be equally effective at reducing many impacts on transportation and traffic to a less-than-significant level under either the No-Project Alternative—No Additional Activities Scenario or the proposed program. However, the proposed program could result in significant and unavoidable impacts—namely, short-term construction traffic on large projects and permanent loss of existing roadway infrastructure.

As described above, impacts of system operations and maintenance on transportation and traffic under the No-Project Alternative—No Additional Activities Scenario, system failures would be similar to impacts under the proposed program. Construction-related and operational impacts would be less under the No-Project Alternative—No Additional Activities Scenario, system failures because fewer and smaller projects would be constructed; therefore, the significant and unavoidable impacts of the proposed program would likely be avoided. There would be greater flood-related transportation and traffic impacts under the No-Project Alternative—No Additional Activities Scenario, system failures, but these would be infrequent and episodic. Given these conditions, the overall impact of the No-Project Alternative—No Additional Activities Scenario, system failures on transportation and traffic is expected to be less than that of the proposed program. [*Lesser*]

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on transportation and traffic would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller under this alternative than under the proposed program. As under the proposed program, activities occurring as part of the Modified SSIA Alternative would require development and implementation of mitigation measures to reduce significant impacts on transportation and traffic. Mitigation measures would reduce impacts on transportation and traffic under both the Modified SSIA Alternative and the proposed program; however, because of its size, the Modified SSIA could still cause significant and unavoidable impacts—namely, construction traffic and the potential permanent loss of existing roadway infrastructure. However, these

impacts would occur to a lesser degree under this alternative than under the proposed program.

Under the Modified SSIA Alternative, the overall risk of flooding would be slightly greater than the risk under the proposed program; however, the increased flood risks would be concentrated primarily in rural areas. Because the roadway network is generally smaller in rural areas, the impact of flooding and flood-related cleanup activities on traffic and transportation would not be substantially greater under the Modified SSIA Alternative.

As described above, impacts of system operations and maintenance on transportation and traffic under the Modified SSIA Alternative would be similar to impacts under the proposed program. Both the Modified SSIA Alternative and the proposed program would likely result in significant and unavoidable construction-related and operational impacts, but these impacts would occur to a lesser degree under the Modified SSIA Alternative. There would be slightly greater flood-related transportation and traffic impacts under this alternative. Therefore, the overall impact of the Modified SSIA Alternative on traffic and transportation would be similar to that of the proposed program. *[Similar]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). It would implement the same maintenance regime as the proposed program, and impacts of system maintenance on transportation and traffic would be similar.

The Achieve SPFC Design Flow Capacity Alternative would result in a much smaller construction and land disturbance footprint than under the proposed program; therefore, construction-related and operational impacts on transportation and traffic would be less under this alternative. Because of the smaller scale, mitigation measures would likely reduce all transportation and traffic impacts of the Achieve SPFC Design Flow Capacity Alternative to a less-than-significant level. The proposed program would result in significant and unavoidable impacts—namely, construction traffic and the potential permanent loss of existing roadway infrastructure.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program. As a result, there would be greater flood-related transportation and traffic impacts under this alternative, but these would be infrequent and episodic. Therefore, the overall impact of the Achieve SPFC Design Flow Capacity

Alternative on traffic and transportation would be similar to that of the proposed program. [*Similar*]

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on transportation and traffic would be similar.

More and larger new facilities could be constructed under this alternative, resulting in greater potential for construction traffic, decreased levels of service, decreased access for emergency vehicles, and permanent loss of existing roadway infrastructure. As under the proposed program, activities occurring as part of the Enhance Flood System Capacity Alternative would require development and implementation of mitigation measures to reduce significant impacts on transportation and traffic. Mitigation measures would reduce some impacts on transportation and traffic under both the Enhance Flood System Capacity Alternative and the proposed program; however, this alternative entails construction and operation of more and larger facilities. Therefore, the Enhance Flood System Capacity Alternative would still cause significant and unavoidable impacts—namely, construction traffic and potential permanent loss of existing roadway infrastructure.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see 5.4-1); as a result, a slightly greater reduction in potential flood-related impacts on transportation and traffic would occur.

In summary, impacts of system operations and maintenance on transportation and traffic under the Enhance Flood System Capacity Alternative would be similar to impacts under the proposed program. Transportation and traffic impacts from construction and operation under this alternative would be significant and unavoidable and would occur to a greater degree than under the proposed program. This alternative would result in only a slightly greater reduction in flood-related transportation and traffic impacts. Therefore, the overall impact of the Enhance Flood System Capacity Alternative on traffic and transportation would be greater than that of the proposed program. [*Greater*]

5.5.19 Utilities and Service Systems

The proposed program would not result in significant impacts on utilities and service systems after mitigation, as described in greater detail in Section 3.20, “Utilities and Service Systems.” The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the benefits to utilities and service systems from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be minimal, well-planned, and substantially mitigated, while the adverse impacts from a major flood event would be unplanned and unmitigated, and could be of significant scope. Specifically, substantial damage to utilities and service systems could occur as a result of a major flood event, resulting in their unavailability for what could be a lengthy period of time.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of this alternative. DWR intends to implement the VMS, and associated elements such as LCM, whether or not the CVFPP is adopted. Therefore, potential impacts on utilities caused by levee maintenance (e.g., disruption of utility services during construction) would be the same under the No-Project Alternative—Continued Operations Scenario as under the proposed program.

Potential impacts on utilities from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., disruption of utility services during construction and relocation of utilities during operation). However, the lower level of construction activity and operation of fewer and smaller facilities would minimize the potential for adverse effects.

As under the proposed program, activities occurring as part of the No-Project Alternative—Continued Operations Scenario would require development and implementation of mitigation measures for potentially significant impacts. Examples of such measures include coordinating with utility providers to avoid damage to existing utility infrastructure, or relocating or flood-proofing such infrastructure. Mitigation measures would be equally effective at reducing impacts on utilities to a less-than-

significant level under either the No-Project Alternative—Continued Operations Scenario or the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures—and associated interruption in utility service and extensive repairs necessitated by flooding—would occur more frequently and would be more severe than under the proposed program. Relocating utility facilities may result in significant environmental impacts. Therefore, impacts of flooding and postflood repairs on utilities would be greater under the No-Project Alternative—Continued Operations Scenario.

As described above, impacts of system operations and maintenance on utilities under the No-Project Alternative—Continued Operations Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, utilities impacts could be equally mitigated under both alternatives. There would be greater flood-related impacts on utilities under the No-Project Alternative—Continued Operations Scenario than under the proposed program. These effects would be infrequent, but they would be more likely to result in widespread adverse impacts as utility services were interrupted and utility facilities would require repairs or relocation. Given these conditions, the overall impact of the No-Project Alternative—Continued Operations Scenario on utilities is expected to be greater than that of the proposed program.

[Greater]

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. Therefore, potential impacts on utilities caused by levee maintenance (e.g., disruption of utility services during construction) would be similar for the No-Project Alternative—No Additional Activities Scenario and the proposed program.

Potential impacts on utilities from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., disruption of utility services during construction and relocation of utilities during operation). However, the lower level of

construction activity and operation of fewer and smaller facilities would minimize the potential for adverse effects.

As under the proposed program, activities occurring as part of the No-Project Alternative—No Additional Activities Scenario would require development and implementation of mitigation measures for potentially significant impacts. Mitigation measures would be equally effective at reducing impacts on utilities to a less-than-significant level under either this alternative or the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—No Additional Activities Scenario, system failures—and associated interruption in utility service and extensive repairs necessitated by flooding—would occur more frequently and would be more severe than under the proposed program. Relocating utility facilities may result in significant environmental impacts. Therefore, impacts of flooding and postflood repairs on utilities would be greater under the No-Project Alternative—No Additional Activities Scenario.

As described above, impacts of system operations and maintenance on utilities under the No-Project Alternative—No Additional Activities Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, utilities impacts could be equally mitigated under either alternative. There would be greater flood-related impacts on utilities under the No-Project Alternative—No Additional Activities Scenario than under the proposed program. These effects would be infrequent, but they would be more likely to result in widespread adverse impacts as utility services were interrupted and utility facilities would require repairs or relocation. Given these conditions, the overall impact of the No-Project Alternative—No Additional Activities Scenario on utilities is expected to be greater than that of the proposed program. *[Greater]*

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on utilities would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller under this alternative than under the proposed program. Therefore, the Modified SSIA Alternative would be expected to cause less of an interruption of utility service during construction and relocation of utility facilities. As under the proposed program, activities occurring as part of this alternative would require

development and implementation of mitigation measures to reduce potentially significant impacts on utilities. Mitigation measures would be equally effective at reducing utilities impacts to a less-than-significant level under either the Modified SSIA Alternative or the proposed program.

Under the Modified SSIA Alternative, most of the flood improvements would occur in urban areas, which is also where most utilities are located. Therefore, this alternative and the proposed program would reduce flood-related disruption of utility services by a similar amount.

Overall, maintenance- and flood-related impacts of the Modified SSIA Alternative would be similar to impacts of the proposed program, while construction-related and operational impacts would be slightly less than impacts of the proposed program. Therefore, the overall impact of the Modified SSIA Alternative on utilities and service systems would be similar to that of the proposed program. *[Similar]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on utilities would be similar. The Achieve SPFC Design Flow Capacity Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, the construction-related and operational impacts on utilities would be less under this alternative. Mitigation measures would be equally effective at reducing impacts on utilities to a less-than-significant level under either the Achieve SPFC Design Flow Capacity Alternative or the proposed program.

The Achieve SPFC Design Flow Capacity Alternative would provide a lower overall level of flood protection than the proposed program; as a result, the potential for flood damage to cause service interruptions and generate the need for extensive repairs would be much greater under this alternative than under the proposed program. Although these impacts would occur infrequently, they would be more likely to result in widespread service interruptions and repairs that would entail physical environmental impacts from relocation of facilities. Therefore, the Achieve SPFC Design Flow Capacity Alternative would have greater overall impacts on utilities and service systems than the proposed program. *[Greater]*

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. This alternative would implement the same maintenance regime as the proposed program, and impacts on utilities from system maintenance would be similar.

More and larger new facilities could be constructed under the Enhance Flood System Capacity Alternative, resulting in greater potential for service interruptions during construction and for relocation of utilities during project operation. However, large new facilities such as reservoirs are more likely to be constructed in rural areas, where there are fewer existing utilities. As under the proposed program, activities occurring as part of this alternative would require development and implementation of mitigation measures to reduce potentially significant impacts on utilities. Mitigation measures would be equally effective at reducing utilities impacts to a less-than-significant level under either the Enhance Flood System Capacity Alternative or the proposed program.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see 5.4-1); as a result, a slightly greater reduction in potential flood-related impacts from interruptions in utility service and repairs to utility facilities would occur.

In summary, maintenance- and flood-related impacts would be similar and mitigation measures would be equally effective at reducing construction-related and operational utilities impacts to a less-than-significant level under either the Enhance Flood System Capacity Alternative or the proposed program. Therefore, the overall impacts of the Enhance Flood System Capacity Alternative on utilities would be similar to those of the proposed program. *[Similar]*

5.5.20 Water Quality

The proposed program would not result in significant impacts on water quality after mitigation, as described in greater detail in Section 3.21, “Water Quality.” The following analysis compares the anticipated impacts of each alternative to those of the proposed program.

The comparison generally assumes that the water quality benefits from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be minimal, well-planned, and substantially mitigated, while the adverse water quality

impacts from a major flood event would be unplanned and unmitigated, and could be of significant scope. Specifically, water quality conditions that could be affected after a major flood event (e.g., potential increased constituent loading associated with stormwater runoff and increased sediment loading and turbidity as a result of bank and bed erosion) would likely be substantially greater than those involved in construction activities under the program.

No-Project Alternative—Continued Operations Scenario

Under the No-Project Alternative—Continued Operations Scenario, most elements of routine maintenance of flood control facilities would continue following existing programs. However, as under the proposed program, the VMS described in the CVFPP would be implemented as part of this alternative. DWR intends to implement the VMS, and associated elements such as LCM, whether or not the CVFPP is adopted. Therefore, potential water quality impacts caused by levee maintenance (e.g., construction activities that could result in erosion, sedimentation, or accidental fuel spills when motorized equipment is used) would be the same for the No-Project Alternative—Continued Operations Scenario as for the proposed program.

Potential water quality impacts from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—Continued Operations Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms (summarized above in the discussion of impacts caused by levee maintenance) would remain the same under this alternative. However, the lower level of construction activity would minimize the potential for adverse effects. Impacts of both the No-Project Alternative—Continued Operations Scenario and the proposed program would be less than significant.

The proposed program's operational impacts on water quality from modifying reservoir operations and altering floodplain inundation patterns are not likely to occur under the No-Project Alternative—Continued Operations Scenario. Therefore, operational impacts of this alternative would be less than those of the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—Continued Operations Scenario, system failures—and associated decreases in water quality from erosion, sedimentation, and accidental spills of hazardous substances during postflood cleanup activities—would be more frequent and more severe and would occur over a larger area than under the proposed program. Therefore, impacts of flooding and postflood repairs on water quality

would be greater under the No-Project Alternative—Continued Operations Scenario.

As described above, impacts of system maintenance on water quality under the No-Project Alternative—Continued Operations Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, water quality impacts would be less than significant under both alternatives. Operational impacts of the No-Project Alternative—Continued Operations Scenario would be less than impacts of the proposed program. There would be greater flood-related impacts on water quality under this alternative. These effects would be infrequent, but they would be more likely to result in long-term damage as hazardous materials were released and spread in floodwaters over a wider area. Given these conditions, the overall impact of the No-Project Alternative—Continued Operations Scenario on water quality is expected to be greater than that of the proposed program. *[Greater]*

No-Project Alternative—No Additional Activities Scenario

The No-Project Alternative—No Additional Activities Scenario is similar to the No-Project Alternative—Continued Operations Scenario, except that fewer projects would be undertaken in the near term and the proposed LCM component of the VMS would not be implemented. Most elements of routine operations and maintenance of flood control facilities would continue following existing programs. Therefore, potential water quality impacts caused by levee maintenance (e.g., construction activities that could result in erosion, sedimentation, or accidental fuel spills when motorized equipment is used) would be similar for the No-Project Alternative—No Additional Activities Scenario and the proposed program.

Potential water quality impacts from project-level construction of new facilities and repair and improvement of existing facilities would be less under the No-Project Alternative—No Additional Activities Scenario than under the proposed program because there would be fewer and smaller projects. The impact mechanisms would remain the same under this alternative (e.g., construction activities that could result in erosion, sedimentation, or accidental fuel spills when using motorized equipment). However, the lower level of construction activity would minimize the potential for adverse effects. Impacts of both the No-Project Alternative—No Additional Activities Scenario and the proposed program would be less than significant.

The proposed program's operational impacts on water quality from modifying reservoir operations and altering floodplain inundation patterns would not occur under the No-Project Alternative—No Additional

Activities Scenario. Therefore, operational impacts of this alternative would be less than those of the proposed program.

Because fewer improvements to the flood protection system would be made under the No-Project Alternative—No Additional Activities Scenario, system failures—and associated decreases in water quality from erosion, sedimentation, and accidental spills of hazardous substances during postflood cleanup activities—would be more frequent and more severe and would occur over a larger area than under the proposed program. Therefore, impacts of flooding and postflood repairs on water quality would be greater under the No-Project Alternative—No Additional Activities Scenario.

As described above, impacts of system maintenance on water quality under the No-Project Alternative—No Additional Activities Scenario would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because fewer projects would be constructed; however, water quality impacts would be less than significant under both alternatives. Operational impacts of the No-Project Alternative—No Additional Activities Scenario would be less than impacts of the proposed program. There would be greater flood-related impacts on water quality under this alternative. These effects would be infrequent, but they would be more likely to result in long-term damage as hazardous materials were released and spread in floodwaters over a wider area. Given these conditions, the overall impact of the No-Project Alternative—No Additional Activities Scenario on water quality is expected to be greater than that of the proposed program. [*Greater*]

Modified State Systemwide Investment Approach Alternative

The Modified SSIA Alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on water quality would be similar. This alternative would address only the most critical stressors on public safety, operations and maintenance, and ecosystem function; thus, the footprint for facility construction and habitat restoration and enhancement would be smaller under this alternative than under the proposed program. Therefore, erosion and sedimentation impacts and accidental spills of hazardous materials during construction and operation would be expected to be less under this alternative. As under the proposed program, activities occurring as part of the Modified SSIA Alternative would require development and implementation of mitigation measures to reduce potentially significant impacts on water quality. Mitigation measures would be equally effective at reducing water quality impacts to a less-than-significant level under either the Modified SSIA Alternative or the proposed program.

Under the Modified SSIA Alternative, only minimal measures would be taken to reduce flood risk for rural-agricultural areas. Flood protection in agricultural areas would not increase to the same degree as under the proposed program, and system failures resulting in inundation of agricultural land would be greater than under the proposed program. Underground storage tanks containing hazardous materials and private septic systems may be located on agricultural land; fertilizers, pesticides, and other agricultural chemicals are typically stored above ground in agricultural areas. A flood event in an agricultural area could cause hazardous materials to be released from these and other sources, reducing water quality. The flood-related impacts of the Modified SSIA Alternative would occur infrequently, but they would be more likely to result in long-term decreases in water quality as hazardous materials were released and spread over a wider area. Therefore, the Modified SSIA Alternative would have greater impacts on water quality than the proposed program. *[Greater]*

Achieve SPFC Design Flow Capacity Alternative

The Achieve SPFC Design Flow Capacity Alternative would only improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). It would implement the same maintenance regime as the proposed program, and impacts of system maintenance on water quality would be similar.

The Achieve SPFC Design Flow Capacity Alternative would result in a smaller construction and land disturbance footprint than under the proposed program; therefore, construction-related and operational impacts on water quality would be less. Construction-related impacts on water quality would be less than significant, and mitigation measures would be equally effective at reducing operational impacts to a less-than-significant level under either the Achieve SPFC Design Flow Capacity Alternative or the proposed program.

The Achieve SPFC Design Flow Capacity Alternative would provide a much lower overall level of flood protection than the proposed program. As a result, the potential for flood damage to cause the release and spread of hazardous materials—and the resulting decrease in water quality—would be greater under this alternative than under the proposed program. These impacts would occur infrequently, but they would be more likely to result in long-term decreases in water quality as hazardous materials were released and spread in floodwaters over a wider area. Therefore, the Achieve SPFC Design Flow Capacity Alternative would have greater impacts on water quality than the proposed program. *[Greater]*

Enhance Flood System Capacity Alternative

The Enhance Flood System Capacity Alternative could involve constructing new or expanded reservoirs and provides a greater emphasis than the proposed program on constructing new bypasses, changing water operations at existing reservoirs, and widening floodways, which could include constructing setback levees. This alternative would implement the same maintenance regime as the proposed program, and impacts of system maintenance on water quality would be similar.

More and larger new facilities could be constructed under this alternative, resulting in greater potential for water quality impacts from erosion, sedimentation, and accidental spills of hazardous materials during construction and operation. As under the proposed program, activities occurring as part of the Enhance Flood System Capacity Alternative would require development and implementation of mitigation measures to reduce significant impacts on water quality. Mitigation measures would be equally effective at reducing water quality impacts to a less-than-significant level under either the Enhance Flood System Capacity Alternative or the proposed program.

The Enhance Flood System Capacity Alternative would provide a level of flood protection slightly greater than that provided by the proposed program (see 5.4-1); as a result, there would be a slightly greater reduction in potential flood-related impacts on water quality.

In summary, impacts of system maintenance on water quality would be similar and mitigation measures would be equally effective at reducing water quality impacts under either the Enhance Flood System Capacity Alternative or the proposed program. This alternative would result in only a slightly greater reduction in flood-related impacts on water quality. Furthermore, this alternative would enhance opportunities to promote multi-benefit projects by fostering integration of benefits to water quality, recreation, power, and other resources. In addition, opportunities would exist to improve (1) water supply reliability (through multipurpose reservoir storage projects), (2) conjunctive management of groundwater and surface water resources, and (3) groundwater recharge within floodplain storage areas. Therefore, the overall impact of the Enhance Flood System Capacity Alternative on water quality would be less than that of the proposed program. [*Lesser*]

5.6 Environmentally Superior Alternative

Table 5.6-1 provides a summary comparison of the impact levels of the proposed program and alternatives. The impact levels listed for the proposed program in Table 5.6-1 reflect the most substantial environmental effects identified for each environmental resource area.

Table 5.6-1. Comparison of Impact Levels of the Proposed Program and the Alternatives

Environmental Resource	Proposed Program¹	No-Project—Continued Operations Scenario	No-Project—No Additional Activities Scenario	Modified SSIA	Achieve SPFC Design Flow Capacity	Enhance Flood System Capacity
Aesthetics	Less than significant after mitigation	Similar	Similar	Lesser	Lesser	Greater
Agriculture and Forestry Resources	Potentially Significant and unavoidable	Lesser	Lesser	Lesser	Lesser	Greater
Air Quality	Potentially significant and unavoidable	Similar	Lesser	Lesser	Lesser	Greater
Biological Resources—Aquatic	Potentially significant and unavoidable	Greater	Greater	Greater	Greater	Greater
Biological Resources—Terrestrial	Potentially significant and unavoidable	Greater	Greater	Greater	Greater	Greater
Climate Change and Greenhouse Gas Emissions	Less than significant	Greater	Greater	Similar	Greater	Unknown
Cultural and Historic Resources	Potentially significant and unavoidable	Lesser	Lesser	Lesser	Lesser	Greater
Energy	Less than significant	Lesser	Lesser	Lesser	Lesser	Similar
Geology, Soils, and Seismicity (Including Mineral and Paleontological Resources)	Potentially significant and unavoidable	Lesser	Lesser	Lesser	Lesser	Greater
Groundwater Resources	Less than significant after mitigation	Greater	Greater	Greater	Greater	Lesser
Hazards and Hazardous Materials	Less than significant after mitigation	Greater	Greater	Greater	Greater	Lesser
Hydrology	Less than significant after mitigation	Greater	Greater	Lesser	Greater	Lesser

Table 5.6-1. Comparison of Impact Levels of the Proposed Program and the Alternatives (contd.)

Environmental Resource	Proposed Program ¹	No-Project—Continued Operations Scenario	No-Project—No Additional Activities Scenario	Modified SSIA	Achieve SPFC Design Flow Capacity	Enhance Flood System Capacity
Land Use and Planning	Significant and unavoidable (agricultural impacts)	Lesser	Lesser	Lesser	Lesser	Greater
Noise	Less than significant after mitigation	Lesser	Lesser	Lesser	Similar	Similar
Population, Employment, and Housing	Less than significant	Greater	Greater	Greater	Greater	Lesser
Public Services	Less than significant	Greater	Greater	Similar	Greater	Greater
Recreation	Less than significant after mitigation	Lesser	Lesser	Similar	Lesser	Similar
Transportation and Traffic	Potentially significant and unavoidable	Lesser	Lesser	Similar	Similar	Greater
Utilities and Service Systems	Less than significant after mitigation	Greater	Greater	Similar	Greater	Similar
Water Quality	Less than significant after mitigation	Greater	Greater	Greater	Greater	Lesser
Totals		8 Lesser 2 Similar 10 Greater	9 Lesser 1 Similar 10 Greater	9 Lesser 5 Similar 6 Greater	9 Lesser 2 Similar 10 Greater	5 Lesser 4 Similar 10 Greater 1 Unknown

Source: Data compiled by AECOM in 2012

Notes:

¹ Impact categories listed for the Proposed Program provide the most severe impact category identified for the environmental issue area. If there is one or more significant and unavoidable impacts, then "Significant and unavoidable" is placed in the column. If there is one or more potentially significant and unavoidable impacts, then "Potentially significant and unavoidable" is placed in the column. If the most severe impact within the environmental issue area is "Less than significant after mitigation," then this designation is placed in the column. If every impact for the environmental issue area is less than significant, then "Less than significant" is placed in the column.

Key:

Modified SSIA = Modified State Systemwide Investment Approach

SPFC = State Plan of Flood Control

As shown in Table 5.6-1, the Modified SSIA Alternative would be the Environmentally Superior Alternative. This alternative provides the greatest opportunity for avoidance and/or substantial reduction in the significant environmental impacts of the project.

As described above in Section 5.4, “Alternatives Carried Forward for Further Evaluation,” the Modified SSIA Alternative is similar to the proposed program in that it is based on the urban protection provided by the Protect High-Risk Communities Alternative and adds some small-community protection, but with limited construction activities as compared to other alternatives. This alternative also includes expanding the Yolo Bypass and widening Fremont Weir, but does not include any of the other bypass expansions and related improvements contained in the proposed program. In addition, the opportunities for ecosystem restoration would be limited to the Yolo Bypass. The Modified SSIA Alternative thus contains several elements of the proposed program but focuses more on critical repairs and actions that are less likely to improve flood management on a systemwide basis.

It is likely that greater than 8 percent of the total SPA population would have less than 100-year flood protection under the Modified SSIA Alternative. Although the F-CO and F-BO programs would be implemented at reservoirs in the Sacramento River and San Joaquin River basins, no additional floodwater storage would be developed and implemented. Therefore, the benefits of systemwide flood risk reduction would occur. Thus, although this alternative does meet some of the objectives of the CVFPP in certain areas of the Central Valley, it does not meet the stated overall purpose of the CVFPP to develop and implement a sustainable, integrated flood management plan for the entire Central Valley that recognizes the importance of evaluating opportunities and potential impacts from a systemwide perspective, as well as the importance of coordinating across geographic and agency boundaries to treat hydrologic units. The Modified SSIA Alternative also does not fully meet the stated objectives to improve institutional support, promote multi-benefit projects, and maximize flood risk reduction benefits within the practical constraints of available funds.

5.7 Analysis of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

5.5.1 Background

In the DPEIR for the CVFPP, seven alternatives were initially considered in Chapter 5.0, “Alternatives”:

No-Project Alternative—Continued Operations Scenario

No-Project Alternative—No Additional Activities Scenario

Modified State Systemwide Investment Approach (SSIA) Alternative

Achieve SPFC Design Flow Capacity Alternative

Achieve SPFC Design Flow Capacity with Strict Engineering Technical Letter (ETL) Compliance Alternative

Protect High-Risk Communities Alternative

Enhance Flood System Capacity Alternative

(All references to the “ETL” in this chapter are specifically to the U.S. Army Corps of Engineers’ (USACE’s) ETL 1110-2-571, which is described further below.)

In the DPEIR, two of these alternatives were rejected from further consideration and analysis because they failed to meet most of the basic program objectives, were determined to be infeasible, would not avoid or substantially lessen significant environmental impacts, and/or would be so similar to another alternative that they would not add to expand the range of alternatives evaluated in this PEIR. These alternatives were:

- Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative
- Protect High-Risk Communities Alternative

A summary of the reasons for rejecting these alternatives is provided here. For more information on this topic, see Section 5.3, “Alternatives Considered but Rejected,” of the DPEIR.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative was rejected from further analysis for several reasons. Ensuring strict compliance with USACE’s ETL 1110-2-571 while making necessary

improvements to the SPFC would be cost prohibitive, primarily resulting from very high mitigation costs to compensate for losses of riparian habitat and habitat for threatened and endangered species. In addition, mitigating impacts associated with strict ETL compliance would be nearly impossible because of the limited availability of waterside acreage to provide compensatory shaded riverine aquatic (SRA) habitat. This would leave the State unable to gain the proper permits to implement this alternative. Consequently, this alternative was not considered further because it (1) would not satisfy the program objectives; (2) would be infeasible because of major cost implications and regulatory constraints; and (3) would not avoid or lessen significant environmental impacts, but actually would cause substantially greater environmental impacts on biological resources.

The Protect High-Risk Communities Alternative was rejected from further analysis because it would not satisfy most of the eight program objectives. The Protect High-Risk Communities Alternative is also very similar to the Modified SSIA Alternative, which was carried forward in the analysis. The Protect High-Risk Communities Alternative differs from the Modified SSIA Alternative only in terms of minor increases in the measures benefiting small communities, and by including an expanded Yolo Bypass and modifications to the Fremont Weir. Accordingly, further consideration and analysis of this alternative would not add to or expand the range of alternatives considered in the PEIR. Consequently, this alternative was not considered further because it (1) would not satisfy most of the program objectives and (2) would be so similar to other alternatives that its inclusion in this PEIR for analysis would not add to or expand the reasonable range of alternatives under consideration.

5.5.2 Reasons to Include More Detailed Analysis of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative in the PEIR

On February 17, 2012, USACE published a revised proposal to update the process for requesting a variance from vegetation standards for levees and floodwalls as described in the ETL. The proposed update to the variance request process was published 18 calendar days before the scheduled public release of the DPEIR for the CVFPP. In this time frame it was not feasible to review the proposed update, determine whether it had relevance to the PEIR, and if appropriate, add text to the DPEIR before its publication.

After publication of the DPEIR, however, a thorough review of the proposed update to the process for requesting a variance from vegetation standards was conducted. Thorough review of the update failed to identify substantial evidence in the record that would alter the analysis or conclusions in the DPEIR, or the conclusion that the Achieve SPFC Design

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Flow Capacity with Strict ETL Compliance Alternative would be infeasible. On April 13, 2012, DWR sent a letter to USACE officially commenting on, and conveying significant concerns regarding, the proposed update.

An element of the update, however, includes a requirement that a vegetation variance request include:

...all background studies, data, and other information required by USACE to complete the environmental compliance processes under the National Environmental Policy Act (NEPA), ESA [federal Endangered Species Act], and any other applicable environmental resource protection statute. ... The documentation must analyze, as alternatives, the effects of the implementation of the proposed vegetation variance and the implementation of the national standards.

Although DWR has considerable concerns about the proposed variance process, DWR continues to seek an implementable regional vegetation variance for Central Valley levees. However, significant changes to USACE's proposed variance policy will be necessary before this becomes a viable option.

DWR has identified the CVFPP PEIR as a mechanism to analyze "...the effects of the implementation of the proposed vegetation variance and the implementation of the national standards." The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative assumes full implementation of the current "national standards" for vegetation management on levees. Therefore, an analysis comparing the environmental effects of this alternative against those of the SSIA could support an eventual variance request for the SSIA, if necessary. For purposes of supporting a potential variance request, this analysis also compares to the SSIA a scenario involving the SSIA with strict ETL compliance.

DWR continues to consider the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative as infeasible, for the reasons described above. As mentioned previously, DWR does not currently believe that the requirements for obtaining a variance described in USACE's proposed update present a viable option. However, an analysis of the environmental effects of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative is provided here and incorporated into the CVFPP PEIR. The analysis follows the approach, format, and level of detail used in the analysis of alternatives included in the DPEIR, but it also addresses issues pertinent to NEPA because USACE would use this information

consistent with the direction provided under 50 Code of Federal Regulations (CFR) 1506.2(c).

5.5.3 Description of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The following summary description of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative repeats information provided in the DPEIR. See Section 5.4.4, “Achieve SPFC Design Flow Capacity Alternative,” for more detailed information on the “achieve SPFC design flow capacity” element of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative.

Achieving “SPFC design flow capacity” focuses on addressing the condition of existing SPFC levees so that the channels convey their design flows with a high degree of reliability based on current engineering criteria. The system was constructed based largely on geometric criteria using available soil materials without extensive investigation of foundation conditions. The majority of SPFC levees do not meet current engineering criteria. The concept of achieving SFPC design flow capacity addresses an element of the CVFPP authorizing legislation (California Water Code (CWC) Section 9614(g)), which requires that DWR evaluate structural projects that could be undertaken to reconstruct SPFC facilities to bring each facility to within its design standard. This alternative involves addressing levee conditions primarily in place, without making major changes to the footprint or operation of those facilities. Levee improvements would be made regardless of the areas they protect or the level of protection they provide. This alternative would provide little opportunity to incorporate benefits beyond flood management, such as ecosystem restoration.

As flood system improvements are implemented under this alternative, it is assumed that DWR and the Board would also ensure the strictest compliance with the USACE guidance provided in ETL 1110-2-571, *Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures*. Vegetation management on all new and existing levees within the SPFC would be consistent with the ETL. This alternative assumes that DWR would not request a variance from the ETL standards to allow for retention of some woody vegetation on or near levees.

5.5.4 Impact Analysis

Under CEQA, an EIR must include consideration of a range of reasonable alternatives that “could feasibly accomplish most of the basic objective[s] of the project and could avoid or substantially lessen one or more of the

significant effects” (CEQA Guidelines Section 15126.6(c)). This is generally consistent with the requirement under NEPA to “rigorously explore and objectively evaluate all reasonable alternatives” (40 CFR 1502.14). The following section compares the environmental impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative with the impacts of the proposed program (i.e., the CVFPP SSIA). Impacts are compared for each environmental issue area addressed in Chapter 3.0, “Environmental Setting, Impacts, and Mitigation Measures,” of the DPEIR.

The CEQA Guidelines (Section 15126.6(d)) permit alternatives to be evaluated in less detail than the proposed project. Consistent with Section 15126.6(d) of the CEQA Guidelines, the analysis below provides a general comparison of the environmental effects of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative against the effects of the proposed program, focusing on whether the alternative would result in effects greater than, less than, or similar to those identified for the proposed program.

The comparative environmental impacts of alternatives generally result from differences in the following broad categories of program activities:

Construction Impacts—Alternatives may vary in relation to the scale, nature, and timing of their construction activities. These differences, in turn, affect the level of construction-related impacts, such as air pollutant and greenhouse gas (GHG) emissions from construction vehicles and construction materials manufacturing, construction noise, and construction traffic. These construction impacts are generally temporary and localized; nonetheless, some may be considered significant.

Operations and Maintenance (O&M) Impacts—Alternatives may vary with respect to O&M impacts, which vary relative to the scale, nature, and timing of any new facilities that would need to be operated and maintained, and relative to any changes to the ongoing O&M of existing facilities, such as vegetation management and reservoir reoperations. These impacts would occur for longer periods of time than construction impacts and over larger geographic scales.

“Footprint” Impacts—Alternatives may vary in terms of the degree to which they would involve the use of lands not currently part of the flood protection system. Where the “footprint” of flood protection system facilities would be expanded, effects on the current uses of those areas (such as agricultural uses) and on the environmental values of those areas (such as habitat, cultural resources, and mineral

resources) could result. These impacts would generally be long term, but may include both adverse and beneficial effects depending on the nature of the activity and the environmental topic being addressed.

Habitat Enhancement Impacts—Alternatives may vary in the scale and nature of any habitat enhancements included in their design. Alternatives may also vary in the degree to which they would accommodate or facilitate these habitat enhancements. Impacts of habitat enhancements would generally be long term, and may include both beneficial effects (related primarily to biological resources) and adverse effects (related primarily to land use changes), depending on the specific scale and nature of the habitat enhancement feature.

Flood Risk Reduction Effects—Floods can have environmental effects in addition to their impacts on property and public safety. For example, reconstruction activities made necessary by the damage from a flood can create substantial construction impacts. Floods can also damage habitats, cause the release of hazardous substances in flooded areas, impair existing land uses, and jeopardize water supplies. As discussed in several sections of Chapter 3.0, “Environmental Setting, Impacts, and Mitigation Measures,” of the DPEIR, the beneficial effects of minimizing the frequency and intensity of flood events could wholly or partially offset some of the impacts of alternatives. The degree to which these beneficial effects could be considered to offset an alternative’s adverse effects would depend on assumptions about the likelihood and severity of the future flooding events that would be avoided. These beneficial effects also would generally be infrequent, episodic, and localized.

In most cases, an alternative may result in both beneficial and adverse effects. For example, the creation of long-term habitat in expanded bypasses could displace current agricultural uses. Also, the location, timing, likelihood, and/or scale of the beneficial and adverse effects may differ. The analysis below identifies the most likely “net” result for each impact area. Generally, this is based on the most severe impact category identified for the environmental issue area.

As directed by CEQA, the analysis of alternatives focuses on the ability of each alternative to reduce impacts of the proposed program that are considered to be significant and unavoidable or potentially significant and unavoidable. The following summary of significant and unavoidable impacts and potentially significant and unavoidable impacts associated with the proposed program is repeated from the DPEIR and focuses the alternatives analysis:

Agriculture and Forestry Resources—The proposed program would involve either facility construction or management changes in some areas currently subject to agricultural production. The program also includes an extensive set of mitigation measures, such as avoidance of Important Farmland where feasible and consideration of agricultural conservation easements. However, given the nature and scale of certain elements of the proposed program, particularly the proposed expansion of bypasses and creation of additional habitat areas, this impact is considered potentially significant and unavoidable. The scope of this potentially significant and unavoidable impact is limited to those situations where identified Important Farmlands cannot be avoided and feasible mitigation is not adequate to address the impact.

Air Quality—Construction-period air pollutant emissions for some of the larger projects that are anticipated to occur could exceed the CEQA thresholds established by certain air pollution control districts, even after mitigation, resulting in a potentially significant and unavoidable impact. The scope of this potentially significant and unavoidable impact is temporary and limited to these larger projects exceeding applicable air district CEQA thresholds.

Biological Resources—Aquatic—The proposed program includes a requirement that all activities be undertaken in compliance with all applicable regulatory requirements, including requirements that generally require full mitigation of any effects on aquatic habitats. The program also includes enhancements to aquatic biological resources, particularly under the CVFPP Conservation Framework. This PEIR also establishes a set of mitigation measures designed to achieve an overall performance standard of no net loss of biological resource functions and values. As a result, impacts on aquatic biological resources generally are anticipated to be less than significant. However, given the scope and nature of the program, there may be situations in which local or temporary effects could not be fully mitigated. If those effects were of a sufficient scale, they could result in potentially significant and unavoidable impacts.

Biological Resources—Terrestrial—The proposed program includes a requirement that all activities be undertaken in compliance with all applicable regulatory requirements, including requirements that generally require full mitigation of any effects on terrestrial habitats. The program also includes enhancements to terrestrial biological resources, particularly under the CVFPP Conservation Framework, and including the riparian forest planting. This PEIR also establishes a set of mitigation measures designed to achieve an overall performance standard of no net loss of biological resource functions and values. As a

result, impacts on terrestrial biological resources generally are anticipated to be less than significant. However, given the scope and nature of the program, there may be situations in which local or temporary effects could not be fully mitigated. If those effects were of a sufficient scale, they could result in potentially significant and unavoidable impacts.

Cultural and Historical Resources—Much of the proposed program would occur in areas that have already been disturbed by agricultural and other activities and/or have been in flood protection uses for a long time. However, it is anticipated that some cultural and historical resources and/or traditional cultural properties may be encountered during activities under the proposed program. The program includes extensive mitigation measures requiring the identification and avoidance of these resources, where feasible, and documentation recording the resource whenever the resource cannot be avoided. However, given the nature and scale of the proposed program, there may be situations in which historic properties must be removed or traditional cultural properties would be adversely affected in a way that cannot be feasibly mitigated, resulting in potentially significant and unavoidable impacts.

Mineral and Paleontological Resources—Much of the proposed program would occur in areas that have already been disturbed by agricultural and other activities and/or have been in flood protection uses for a long time. Mining activity is generally precluded within or in the immediate vicinity of existing structures, such as levees, to preserve the stability of those structures. However, widening floodways and constructing weirs, new bypasses, or setback levees outside the existing footprint or the immediate vicinity of the footprint of existing structures could prevent access to locally valuable mineral resources (particularly aggregate materials), resulting in potentially significant and unavoidable impacts.

Land Use and Planning—The potentially significant and unavoidable impacts on agricultural resources described above are also considered to reflect similar significant and unavoidable land use impacts of the same nature and scope.

Transportation and Traffic—O&M of projects under the proposed program would not generate substantial long-term traffic. Also, construction traffic for most projects could be accommodated by the existing circulation system without resulting in significant impacts. However, for very large construction projects (i.e., those involving several million cubic yards of fill requiring transport over public roads), significance thresholds recommended by the Institute of Transportation

Engineers could be exceeded and sufficient reduction of peak-hour construction traffic may not be feasible, resulting in a potentially significant and unavoidable impact. In addition, in rare situations projects could require that transportation infrastructure be removed or disrupted for a substantial period of time, and detours or alternate routes may not be feasible, resulting in a potentially significant and unavoidable impact.

Aesthetics

The proposed program would not result in significant aesthetics impacts after mitigation, as described in greater detail in DPEIR Section 3.2, “Aesthetics.” The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the aesthetic benefits from flood risk reduction would not compensate for the impacts of the proposed program because those benefits would generally be short term (i.e., flooded areas are anticipated to recover to pre-flood conditions as repairs are made and vegetation returns), while many of the aesthetic impacts of the proposed program would be permanent.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the vegetation management strategy (VMS) and associated CVFPP elements such as life-cycle management (LCM), vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, effects on aesthetic resources from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

Under the VMS included in the proposed program, woody vegetation on levees would be removed in the vegetation management zone, an area typically extending 15 feet beyond the landside levee toe to 20 feet below the waterside levee crown. Immature trees and woody vegetation in the

vegetation management zone that measures less than 4 inches in diameter at breast height (dbh) would be removed in an authorized manner as part of levee maintenance. Larger trees and woody vegetation greater than 4 inches dbh would be subject to a long-term LCM plan to be implemented by levee maintenance agencies. These larger trees would be allowed to live out their normal life cycles if they do not pose an unacceptable threat, but would not be replaced in the vegetation management zone after their death or removal. (The LCM plan allows immediate removal of trees that pose an unacceptable threat.)

Under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative, the vegetation management zone would cover an area typically extending from 15 feet beyond the landside levee toe to 15 feet beyond the waterside levee toe. All woody vegetation would be removed as part of levee maintenance, with no LCM element allowing larger-dbh woody vegetation to remain in the management zone for an extended period. Therefore, waterside woody vegetation would be removed over a substantially larger area under this alternative, and all woody vegetation in the vegetation management zone would be removed at a more rapid pace. Adverse effects on aesthetic resources caused by losses of riparian habitat would be more rapid and cover a larger area on the waterside of levees under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program.

The CVFPP Conservation Strategy, which could have beneficial effects on riparian habitats in some areas from habitat creation, and hence potentially positive effects on aesthetic resources, would be implemented under this alternative. However, with the vegetation management zone extending substantially farther down the levee slope than under the proposed program (15 feet beyond the waterside levee toe versus 20 feet below the waterside levee crown), opportunities for planting waterside riparian vegetation would be severely limited, which would also limit potential aesthetic resource benefits in these areas.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, the visual impacts of project-level construction of new facilities would be less than under the proposed program. As under the proposed program, activities occurring as part of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would require development and implementation of mitigation measures to reduce significant or potentially significant visual impacts. Examples of such measures include providing visual screening and conforming to applicable lighting standards when needed. Mitigation measures would be equally effective at reducing small-scale, localized

visual impacts to a less-than-significant level under either the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative or the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, system failures and associated damage from flooding would be more frequent and more severe than under the proposed program. Therefore, impacts on aesthetic resources via episodic flooding and postflood repairs would be greater under this alternative.

As described above, impacts of the vegetation management element of system maintenance on aesthetic resources would be greater under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program. Because it would provide a smaller waterside area for ecosystem restoration, the benefits to aesthetics from restoration would be more limited under this alternative than under the proposed program. Construction-related impacts would initially be less under this alternative because there would be a smaller construction and land disturbance footprint; however, aesthetic impacts from construction could be equally mitigated under both alternatives. There would be greater flood-related visual impacts under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative, but these would be infrequent and episodic. Given these conditions, the overall impact of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative on aesthetics is expected to be greater than that of the proposed program. *[Greater]*

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have greater aesthetics impacts than the proposed program is generally based on the additional removal of waterside riparian vegetation and on the reduced ability of the alternative to accommodate restoration components with aesthetics benefits. These impact mechanisms would also apply to the SSIA and an SSIA that includes strict ETL compliance. However, the impacts on aesthetics of an SSIA including strict ETL compliance would be **greater** than the impacts of the SSIA, given the increased removal of vegetation under the ETL and the substantial limitation of the ability to provide for compensatory vegetation providing aesthetics benefits.

Agriculture and Forestry Resources

The proposed program would result in potentially significant and unavoidable agricultural resources impacts after mitigation, as described in greater detail in DPEIR Section 3.3, "Agriculture and Forestry Resources."

The scope of these potentially significant and unavoidable impacts is limited to those situations in which identified Important Farmlands could not be avoided and feasible mitigation would not be adequate to address the impact. Impacts of the VMS on riparian forests, discussed in detail in DPEIR Section 3.5, “Biological Resources—Aquatic,” and Section 3.6, “Biological Resources—Terrestrial,” are also considered to be of the same nature and scope as impacts on forestry resources as broadly defined in the CEQA Guidelines. The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the benefits to agricultural resources from flood risk reduction would not compensate for the impacts of the proposed program because those benefits would generally be short term (i.e., flooded areas are anticipated to recover to pre-flood conditions as lands dry out and farming can resume), while many of the impacts of the proposed program on agricultural resources would be permanent.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, effects on agriculture and forestry resources from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

Under the VMS included in the proposed program, woody vegetation on levees would be removed in the vegetation management zone, an area typically extending 15 feet beyond the landside levee toe to 20 feet below the waterside levee crown. Immature trees and woody vegetation in the vegetation management zone that measures less than 4 inches dbh would be removed in an authorized manner as part of levee maintenance. Larger trees and woody vegetation greater than 4 inches dbh would be subject to a long-term LCM plan to be implemented by levee maintenance agencies. These larger trees would be allowed to live out their normal life cycles if

they do not pose an unacceptable threat, but would not be replaced in the vegetation management zone after their death or removal. (The LCM plan allows immediate removal of trees that pose an unacceptable threat.)

Under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative, the vegetation management zone would cover an area typically extending from 15 feet beyond the landside levee toe to 15 feet beyond the waterside levee toe. All woody vegetation would be removed as part of levee maintenance, with no LCM element allowing larger-dbh woody vegetation to remain in the management zone for an extended period. Therefore, waterside woody vegetation would be removed over a substantially larger area under this alternative, and all woody vegetation in the vegetation management zone would be removed at a more rapid pace. Adverse effects on forestry resources through losses of riparian trees would be more rapid and cover a larger area on the waterside of levees under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program. However, this difference in removal of waterside woody vegetation would not directly alter effects on agricultural resources.

The CVFPP Conservation Strategy, which could have beneficial effects on riparian habitats in some areas from habitat creation, and hence potentially positive effects on forestry resources, would be implemented under this alternative. However, with the vegetation management zone extending substantially farther down the levee slope than under the proposed program (15 feet beyond the waterside levee toe versus 20 feet below the waterside levee crown), opportunities for planting waterside riparian vegetation would be severely limited, which would also limit potential forestry resource benefits in these areas. In addition, with less waterside area available for habitat creation, more landside area could be devoted to this activity, potentially increasing the conversion of agricultural land to habitat. However, the proposed program contains a larger overall habitat restoration component than the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative; therefore, the proposed program would result in a greater overall conversion of agricultural land to habitat.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, impacts on agricultural lands from project-level construction of new facilities and repair and improvement of existing facilities would be less under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program. As under the proposed program, activities occurring as part of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would require development and implementation of

mitigation measures to reduce significant or potentially significant impacts on agricultural resources. Examples of such measures include preserving the agricultural productivity of Important Farmland, complying with the Surface Mining and Reclamation Act as applicable for reclamation of borrow sites, and minimizing the effects of inundation and saturation. Mitigation measures would be equally effective at reducing temporary impacts on agricultural resources to a less-than-significant level under either the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative or the proposed program. However, it would not be feasible to fully mitigate the conversion of Important Farmland under either alternative.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, system failures and associated damage from flooding would be more frequent and more severe than under the proposed program. Therefore, impacts on agriculture and forestry resources via flooding would be greater under this alternative.

As described above, impacts of the vegetation management element of the system maintenance on forestry resources would be greater under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program, although direct effects on agricultural resources via this mechanism would not differ. Because this alternative would provide a smaller waterside area for ecosystem restoration, the benefits to forestry resources from restoration would be more limited under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program. There would be greater permanent conversions of agricultural lands to nonagricultural uses under the proposed program, both from facility construction and from habitat restoration and creation. There would be greater flood-related impacts on agricultural and forestry resources under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative, but these would be infrequent and episodic. Given these conditions, the overall impact of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative on forestry resources is expected to be greater than that of the proposed program; however, impacts on agricultural resources would be less. *[Lesser for Agricultural Resources; Greater for Forestry Resources]*

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have greater forestry resource impacts than the proposed program is generally based on the reduced ability of the alternative to accommodate restoration components with forestry resource benefits, and on the forestry resource impacts of vegetation removal. The

first of these impact mechanisms would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance (i.e., the ability to accommodate restoration components in areas not on the levee prism would be similar for each scenario). The effects of the second impact mechanism would be different for the SSIA and an SSIA that includes strict ETL compliance. The impacts on forestry resources of an SSIA including strict ETL compliance would be **greater** than the impacts of the SSIA, given the increased removal of vegetation under the ETL.

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have lesser agricultural resource impacts than the proposed program is generally based on the fact that there would be greater permanent conversions of agricultural lands to nonagricultural uses under the proposed program, both from facility construction and from habitat restoration and creation. This impact mechanism would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance, because the area of converted agricultural lands as part of the program would be similar. However, the impacts on agricultural resources of an SSIA including strict ETL compliance would be **greater** than the impacts of the SSIA because vegetation removed under the ETL likely would need to be compensated for through planting of vegetation elsewhere, most likely on additional agricultural lands, resulting in additional conversions of agricultural land.

Air Quality

The proposed program could have potentially significant and unavoidable air quality impacts, as described in greater detail in DPEIR Section 3.4, "Air Quality." These potentially significant and unavoidable impacts could occur in connection with the construction of relatively large projects, resulting in air pollutant emissions that could exceed the levels identified in applicable air district CEQA thresholds. The following analysis compares the anticipated impacts of Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the air quality benefits from flood risk reduction would not be materially different from the impacts of the proposed program. It is assumed that reconstruction efforts would involve comparable numbers of large projects exceeding applicable air district CEQA thresholds.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major

changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, effects on air quality from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described above, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in removal of woody vegetation over a larger waterside area and at a more rapid pace than under the proposed program. The ETL also requires excavation of much of the root structure when a tree is removed, and refilling of the excavated area. There would be no such requirement for trees removed under the VMS. Therefore, because of the larger area of woody vegetation removal under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the more labor-intensive removal methodology, air emissions from vegetation management would be greater under this alternative than under the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction emissions would be less. Specifically, the potential for construction of facilities to result in air pollution emissions exceeding local air district CEQA thresholds would be reduced. Both alternatives would require development and implementation of mitigation measures to reduce significant or potentially significant air quality impacts from construction emissions, such as using equipment with reduced emissions and limiting idling times. Mitigation measures would be equally effective at reducing short-term construction-related impacts on air quality to a less-than-significant level under either the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative or the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, this alternative would not reduce emissions from recovery and repair of flood events as much as the proposed program. Although pollutant emissions associated with recovery

and repair from flood system failures would be greater under this alternative, these impacts would be infrequent. Emissions from facility O&M would be similar under the two alternatives, although emissions specifically related to removal of woody vegetation would be greater under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative. Construction-related emissions, which would be the greatest emissions source among the mechanisms addressed here, would be anticipated to be higher under the proposed program because the project footprint would be larger. Specifically, under the Achieve SPFC Design Flow Capacities with Strict ETL Compliance Alternative, there would be fewer large projects likely to exceed local air district CEQA thresholds. Given these conditions, the overall impact of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative on air quality would be expected to be less than that of the proposed program. *[Lesser]*

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have lesser air quality impacts than the proposed program is generally based on the fact that there would be more construction emissions under the proposed program, given the larger project footprint. This impact mechanism would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance, because the project footprint and associated construction levels would be similar. The impacts on air quality of an SSIA including strict ETL compliance would be **similar** to the impacts of the SSIA, because even though vegetation removal under the ETL likely would result in some additional air pollutant emissions, the level of those emissions would not likely exceed significance thresholds in most situations.

Biological Resources—Aquatic

The proposed program could result in potentially significant and unavoidable aquatic biological resources impacts, as described in greater detail in Section 3.5, “Biological Resources—Aquatic.” Most impacts on aquatic biological resources are anticipated to be less than significant after mitigation. However, given the scope and nature of the program, there may be situations in which local or temporary effects could not be fully mitigated; if those effects were of a sufficient scale, they could result in potentially significant and unavoidable impacts. The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the benefits to aquatic biological resources from flood risk reduction would compensate, to some degree, for the impacts of the proposed program because the program impacts would generally be minimal, well-planned, and substantially mitigated, while the

adverse habitat impacts from a major flood event would be unplanned and unmitigated, and could be of significant scope.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, environmental effects on aquatic biological resources from O&M (other than vegetation management) would be the same for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

Under the VMS included in the proposed program, woody vegetation on levees would be removed in the vegetation management zone, an area typically extending 15 feet beyond the landside levee toe to 20 feet below the waterside levee crown. Immature trees and woody vegetation in the vegetation management zone that measures less than 4 inches dbh would be removed in an authorized manner as part of levee maintenance. Larger trees and woody vegetation greater than 4 inches dbh would be subject to a long-term LCM plan to be implemented by levee maintenance agencies. These larger trees would be allowed to live out their normal life cycles if they do not pose an unacceptable threat, but would not be replaced in the vegetation management zone after their death or removal. (The LCM plan allows immediate removal of trees that pose an unacceptable threat.)

Under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative, the vegetation management zone would cover an area typically extending from 15 feet beyond the landside levee toe to 15 feet beyond the waterside levee toe. All woody vegetation would be removed as part of levee maintenance, with no LCM element allowing larger-dbh woody vegetation to remain in the management zone for an extended period. Therefore, waterside woody vegetation would be removed over a substantially larger area under this alternative, and all woody vegetation in the vegetation management zone would be removed at a more rapid pace. Adverse effects on aquatic biological resources through losses of SRA habitat, overhead cover, and instream woody material would be

much more severe under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program.

The CVFPP Conservation Strategy, which could have beneficial effects on riparian and SRA habitats in some areas from habitat creation, would be implemented under this alternative. However, with the vegetation management zone extending substantially farther down the levee slope compared to the proposed program (15 feet beyond the waterside levee toe versus 20 feet below the waterside levee crown), opportunities for planting waterside riparian vegetation would be severely limited. It is likely that under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative, sufficient compensatory planting area could not be identified to adequately mitigate impacts on threatened and endangered fish species and projects could not receive authorization under the California Endangered Species Act (CESA) or ESA.

The effects on aquatic biological resources from project-level construction of new facilities and repair and improvement of existing facilities would be less under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program because there would be a smaller construction and land disturbance footprint. As under the proposed program, activities occurring as part of this alternative would require development and implementation of mitigation measures to reduce significant or potentially significant impacts on aquatic biological resources. Examples of such measures include securing applicable State and/or federal permits and implementing permit requirements, completing inventories and replacing SRA habitat, conforming to National Marine Fisheries Service guidelines for pile-driving activities, and replacing lost vegetation and instream woody material. Mitigation measures, where fully implemented, would be equally effective at reducing small-scale and short-term impacts on aquatic biological resources to a less-than-significant level under either the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative or the proposed program. However, as identified above, it is likely that adequately replacing SRA habitat and other waterside vegetation and securing applicable State and/or federal permits could not be regularly completed under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative; therefore, the ability to reduce impacts to a less-than-significant level would be substantially reduced.

Because a much lower overall level of flood protection would be provided under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore,

impacts on aquatic biological resources caused by flooding of urban and agricultural areas, such as contamination of floodwaters and fish stranding after floodwaters recede, would be greater under this alternative.

As described above, impacts of the vegetation management element of system maintenance on aquatic biological resources would be much greater under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program. Construction-related impacts would be similar under the two alternatives. The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, this alternative would not reduce the risk of flood-related impacts on aquatic biological resources as much as the proposed program (although these impacts would be infrequent and episodic). Because this alternative would provide few opportunities for compensatory habitat planting and ecosystem restoration, the benefits to aquatic biological resources from restoration would be substantially limited under this alternative compared to the proposed program. Given these conditions, impacts on aquatic biological resources would be greater under this alternative than under the proposed program. *[Greater]*

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have greater aquatic biological resource impacts than the proposed program is generally based on the decreased flood protection levels provided by that alternative (and resulting risk of damage to aquatic biological resources from a failure of the flood protection system and inundation of developed areas), the additional loss of SRA habitat, and the reduced ability of the alternative to accommodate habitat values. The first of these impact mechanisms would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance (i.e., the comparative flood risks would be similar for each scenario). The effects of the remaining impact mechanisms would be different for the SSIA and an SSIA that includes strict ETL compliance. The impacts on aquatic biological resources of an SSIA including strict ETL compliance would be **greater** than the impacts of the SSIA, given the increased removal of vegetation under the ETL and the substantial limitation of the ability to provide for compensatory habitat planting and ecosystem restoration.

Biological Resources—Terrestrial

The proposed program could result in potentially significant and unavoidable impacts on terrestrial biological resources, as described in greater detail in DPEIR Section 3.6, “Biological Resources—Terrestrial.” Most impacts on terrestrial biological resources are anticipated to be less than significant after mitigation. However, given the scope and nature of the program, there may be situations in which local or temporary effects

could not be fully mitigated; if those effects were of a sufficient scale, they could result in potentially significant and unavoidable impacts. The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the benefits to terrestrial biological resources from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be minimal, well-planned, and substantially mitigated, while the adverse habitat impacts from a major flood event would be unplanned and unmitigated, and could be of significant scope.

The alternatives also vary substantially in the degree to which they would include or accommodate habitat enhancements that go beyond the requirements of applicable regulatory programs.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, environmental effects on terrestrial biological resources from O&M (other than vegetation management) would be the same for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative, woody vegetation on the waterside of levees would be removed over a substantially larger area than under the proposed program, and all woody vegetation in the vegetation management zone would be removed at a more rapid pace. The footprint of woody vegetation removal would be the same on the landside of levees under both alternatives because both the CVFPP VMS and ETL vegetation removal areas extend to 15 feet beyond the landside levee toe. Given the larger waterside vegetation removal footprint and more rapid removal of larger diameter woody riparian vegetation, adverse effects on terrestrial

biological resources through losses of riparian vegetation would be much more severe under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program.

The CVFPP Conservation Strategy, which could have beneficial effects on riparian habitat and associated terrestrial wildlife species from habitat creation, would be implemented under this alternative. However, with the vegetation management zone extending substantially farther down the levee slope than under the proposed program (15 feet beyond the waterside levee toe versus 20 feet below the waterside levee crown), opportunities for planting waterside riparian vegetation would be severely limited. It is likely that under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative, sufficient compensatory planting area could not be identified to adequately mitigate impacts on threatened and endangered terrestrial species associated with waterside riparian vegetation (e.g., riparian brush rabbit) and projects affecting habitat for these species could not receive authorization under the CESA or ESA.

The effects on terrestrial biological resources from project-level construction of new facilities and repair and improvement of existing facilities would be less under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program because there would be a smaller construction and land disturbance footprint. As under the proposed program, activities occurring as part of this alternative would require development and implementation of mitigation measures to reduce significant or potentially significant impacts on terrestrial biological resources. Examples of such measures include conducting biological resources surveys, minimizing and compensating for impacts on critical habitats and sensitive species, and securing applicable State and/or federal permits and implementing permit requirements. Mitigation measures, where fully implemented, would be equally effective at reducing small-scale and short-term impacts on terrestrial biological resources to a less-than-significant level under either the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative or the proposed program. However, as identified above, it is likely that adequately replacing waterside riparian vegetation and securing applicable State and/or federal permits could not be completed under all circumstances under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative; therefore, the ability to reduce impacts to a less-than-significant level would be reduced.

Because a much lower overall level of flood protection would be provided under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program, system failures and associated damage from flooding would occur more frequently and

would be more severe than under the proposed program. Therefore, impacts on terrestrial biological resources caused by flooding of habitat areas would be greater under this alternative.

As described above, impacts of the vegetation management element of system maintenance on terrestrial biological resources would be greater under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program. Construction-related impacts would be similar under the two alternatives. The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, this alternative would not reduce the risk of flood-related impacts on terrestrial biological resources as much as the proposed program (although these impacts would be infrequent and episodic). Because this alternative would provide few opportunities for compensatory habitat planting and ecosystem restoration, the benefits to terrestrial biological resources from restoration would be substantially limited under this alternative compared to the proposed program. Given these conditions, impacts on terrestrial biological resources would be greater under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program. *[Greater]*

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have greater terrestrial biological resource impacts than the proposed program is generally based on the decreased flood protection levels provided by that alternative (and resulting risk of damage to terrestrial biological resources from a failure of the flood protection system and inundation of developed areas), and the reduced ability of the alternative to accommodate habitat values. The first of these impact mechanisms would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance (i.e., the comparative flood risks would be similar for each scenario). The effects of the second impact mechanism would be different for the SSIA and an SSIA that includes strict ETL compliance. The impacts on terrestrial biological resources of an SSIA including strict ETL compliance would be **greater** than the impacts of the SSIA, given the increased removal of vegetation under the ETL and the substantial limitation of the ability to provide for compensatory habitat planting and ecosystem restoration.

Climate Change and Greenhouse Gas Emissions

The proposed program would not result in significant impacts related to climate change and GHG emissions, as described in greater detail in DPEIR Section 3.7, "Climate Change and Greenhouse Gas Emissions." The following analysis compares the anticipated impacts of the Achieve

SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the climate change benefits from flood risk reduction would compensate for the impacts of the proposed program because the avoided GHG emissions from reconstruction following a major flood event are anticipated to be greater than the GHG emissions from construction activities under the proposed program.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program, including reservoir operations and associated hydropower generation; therefore, effects on GHG emissions from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in removal of woody vegetation over a larger waterside area and at a more rapid pace than under the proposed program. The ETL also requires excavation of much of the root structure when a tree is removed, and refilling of the excavated area. There would be no such requirement for trees removed under the VMS. Therefore, because of the larger area of woody vegetation removal under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the more labor-intensive removal methodology, GHG emissions from vegetation management would be greater under this alternative than under the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, emissions of GHGs associated with construction would be less. As described in DPEIR Section

3.7, “Climate Change and Greenhouse Gas Emissions,” impacts of construction-related GHG emissions under the proposed program would be less than significant. The same would be true of construction-related emissions under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative. This alternative would also provide less opportunity for ecosystem restoration activities. Any reduced levels of habitat restoration under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative could also result in reduced opportunities for carbon sequestration from net increases in riparian forest habitat.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, GHG emissions associated with recovery and repair from flood system failures would be greater under this alternative. Although repair and recovery from flood system failures would be infrequent and episodic, GHG emissions associated with these events would be substantial.

As described above, GHG emissions from facility O&M would be similar under the two alternatives, although emissions specifically related to removal of woody vegetation would be greater under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative. Construction-related GHG emissions would be anticipated to be greater under the proposed program because the project footprint would be larger, although the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide less opportunity for carbon sequestration via restoration and creation of riparian forest habitat. The SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in greater GHG emissions from recovery and repair after flood system failures. Given these conditions, the overall impact of the SPFC Design Flow Capacity with Strict ETL Compliance Alternative on GHG emissions would be expected to be greater than that of the proposed program. *[Greater]*

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have greater GHG emissions impacts than the proposed program is generally based on the decreased flood protection levels provided by that alternative (and resulting GHG emissions from recovery and repair after flood system failures). This impact mechanism would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance (i.e., the comparative flood risks would be similar for each scenario). The impacts on GHG emissions of an SSIA including strict ETL compliance would be **similar** to the impacts of the SSIA, because even though vegetation removal under the ETL likely would

result in some additional GHG emissions, the level of those emissions would not likely be substantial relative to the overall GHG emissions benefits of the program.

Cultural and Historic Resources

The proposed program could result in potentially significant and unavoidable impacts on cultural and historic resources, as described in greater detail in DPEIR Section 3.8, “Cultural and Historic Resources.” Most cultural and historic resources impacts are anticipated to be less than significant after mitigation. However, given the nature and scale of the proposed program, there may be situations in which historic properties must be removed or traditional cultural properties would be adversely affected in a way that could not be feasibly mitigated, resulting in potentially significant and unavoidable impacts. The following analysis compares the anticipated impacts of the SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the benefits to cultural and historic resources from flood risk reduction would not be materially different from the impacts of the proposed program. It is assumed that construction would cause a greater level of potentially permanent, adverse change to cultural and/or historic resources.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, effects on cultural and historic resources from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in removal of woody vegetation over a larger waterside area than under the proposed program. The ETL also requires

excavation of much of the root structure when a tree is removed. There would be no such requirement for trees removed under the VMS. Therefore, because of the larger vegetation management disturbance area under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the more ground-disturbing tree removal methodology, there is a greater potential for disturbance of cultural and historic resources from vegetation management under this alternative than under the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, the potential to adversely affect cultural and historic resources during construction (e.g., damage to or destruction of known and unknown historic and prehistoric resources, disturbance of human burials) would be less. As under the proposed program, activities occurring as part of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would require development and implementation of mitigation measures for significant and potentially significant impacts. Examples of such measures include conducting cultural resources studies and avoiding effects on archaeological resources, immediately halting construction if cultural resources are discovered and implementing an emergency discovery plan, capping archaeological sites to protect deposits, and following the Secretary of the Interior's standards for the treatment of historic properties. Mitigation measures would be equally effective at reducing most impacts on cultural resources to a less-than-significant level under either the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative or the proposed program; however, impacts related to damage to or destruction of historic structures and traditional cultural properties may be potentially significant and unavoidable under either this alternative or the proposed program. Still, because of its limited nature and its primary objective of fixing levees in place, the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would be more likely to avoid conditions resulting in significant and unavoidable impacts on cultural and historic resources.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, flooding impacts on cultural resources, primarily historic structures and architectural resources, would be greater under this alternative.

As described above, potential adverse effects on cultural and historic resources from facility O&M would be similar under the two alternatives, although the additional removal of woody vegetation under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in a higher potential for adverse effects from vegetation management activities. Construction-related impacts would be less under this alternative because of the smaller project footprint. Although mitigation measures would be equally effective under either alternative, the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would be more likely to avoid conditions resulting in significant and unavoidable impacts because of the smaller disturbance area and focus on improving existing facilities. There would be greater flood-related impacts under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative; however, these would be infrequent and episodic. Given these conditions, the overall impact of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative on cultural resources is expected to be less than that of the proposed program. [*Lesser*]

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have lesser cultural resources impacts than the proposed program is generally based on the fact that there would be more construction effects on cultural resources under the proposed program, given the larger project footprint. This impact mechanism would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance, because the project footprint and associated construction levels would be similar. The impacts on cultural resources of an SSIA including strict ETL compliance would be **similar** to the impacts of the SSIA, because even though vegetation removal under the ETL likely would result in some additional impacts on cultural resources, the level of those impacts would not likely exceed significance thresholds in most situations.

Energy

The proposed program would not result in significant energy impacts, as described in greater detail in DPEIR Section 3.9, "Energy." The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the benefits to energy resources from flood risk reduction would not be materially different from the impacts of the proposed program. It is not anticipated that reconstruction efforts would involve the inefficient, wasteful, or unnecessary use of energy or cause a substantial reduction in the generation of renewable energy.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, the potential energy impacts caused by levee maintenance (e.g., potential wasteful or inefficient use of petroleum products and electricity) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in removal of woody vegetation over a larger waterside area than under the proposed program. The ETL also requires excavation of much of the root structure when a tree is removed. There would be no such requirement for trees removed under the VMS. Therefore, because of the larger vegetation management disturbance area under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the more ground-disturbing tree removal methodology, there is a greater potential for adverse energy impacts from vegetation management under this alternative than for the proposed program.

Operational energy impacts of the proposed program (i.e., reduced generation of renewable energy because of altered flow releases at hydropower facilities caused by changes in reservoir operations) are not likely to occur under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative. Therefore, operational impacts of this alternative would be less than those of the proposed program.

The potential for energy impacts from project-level construction of new facilities and repair and improvement of existing facilities would be less under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program. This alternative would result in a smaller construction and land disturbance footprint; therefore, the potential for construction activities to result in wasteful or

inefficient use of energy would be less. The impact mechanisms would remain the same under this alternative (e.g., wasteful or inefficient use of petroleum products and electricity). However, the lower level of construction activity would minimize the potential for adverse effects. As under the proposed program, activities occurring as part of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would require development and implementation of mitigation measures for potentially significant impacts. Examples of such measures include using energy-efficient processes and equipment, using equipment exhaust controls, and scheduling activities to reduce energy usage during periods of peak energy demand (as feasible). Mitigation measures would be equally effective at reducing energy impacts to a less-than-significant level under either the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative or the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. However, flood events would have little effect on the wasteful or inefficient use of energy.

As described above, impacts of system maintenance on energy under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would be similar to impacts under the proposed program, with the exception of vegetation management, where the potential for energy impacts would be greater. The potential for operational energy impacts are expected to be less under this alternative. Because fewer and/or smaller components would be constructed, the potential for wasteful or inefficient use of energy caused by construction would be less under this alternative than under the proposed program; however, energy impacts could be equally mitigated under either alternative. Flooding would have little effect on energy resources. Given these conditions, the overall impact of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative on energy is expected to be less than that of the proposed program. [*Lesser*]

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have lesser energy impacts than the proposed program is generally based on the fact that there would be more construction-period use of energy under the proposed program, given the larger project footprint and increased construction levels. This impact mechanism would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance, because the project footprint and associated construction levels would be similar. The impacts on energy

usage of an SSIA including strict ETL compliance would be **similar** to the impacts of the SSIA, because even though vegetation removal under the ETL likely would result in some additional energy usage, the level of those impacts would not likely exceed significance thresholds in most situations.

Geology, Soils, and Seismicity (Including Mineral and Paleontological Resources)

The proposed program generally would not result in significant impacts on geology, soils, and seismicity after mitigation, as described in greater detail in DPEIR Section 3.10, “Geology, Soils, and Seismicity (Including Mineral and Paleontological Resources).” However, it may not be possible to avoid mineral resources or prevent access to locally valuable mineral resources (particularly aggregate materials) when widening floodways and constructing weirs, new bypasses, or setback levees outside the existing footprint or the immediate vicinity of the footprint of existing structures, resulting in potentially significant and unavoidable impacts. The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the benefits to mineral resources from flood risk reduction would not compensate for the impacts of the proposed program because those benefits would generally be short term (i.e., flooded areas are anticipated to recover to preflood conditions as lands dry out and mining can resume), while the mineral resources impacts of the proposed program would generally be permanent.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, effects related to geology, soils, seismicity, and mineral and paleontological resources from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in removal of woody vegetation over a larger waterside area than under the proposed program. The ETL also requires excavation of much of the root structure when a tree is removed. There would be no such requirement for trees removed under the VMS. Therefore, because of the larger vegetation management disturbance area under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the more ground-disturbing tree removal methodology, there is a greater potential for localized erosion and damage to paleontological resources from vegetation management under this alternative than under the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction-related and operational impacts on geology, soils, and seismicity and paleontological and mineral resources would be less. The impact mechanisms would remain the same under this alternative (e.g., localized erosion, damage to or destruction of unique paleontological resources, loss of mineral resources). However, the lower level of construction activity would minimize the potential for adverse effects. As under the proposed program, activities occurring as part of Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would require development and implementation of mitigation measures for potentially significant impacts. Examples of such measures include preparing a paleontological resources assessment, conducting construction worker education, stopping work if paleontological resources are encountered during earth-moving activities, and implementing recovery plans. Mitigation measures would be equally effective at reducing construction impacts to a less-than-significant level under either the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative or the proposed program. However, operational impacts related to loss of mineral resources could be potentially significant and unavoidable under the proposed program, while the smaller project footprint under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would potentially allow for this impact to be reduced to a less-than-significant level.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, system failures and associated flood-related erosion impacts would occur more frequently and would be more severe than under the proposed program. Therefore, the impacts of flooding and postflood repairs on geology, soils, and seismicity would be greater under this alternative.

As described above, impacts of system maintenance on geology, soils, and seismicity under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would be similar to impacts under the proposed program, with the exception of vegetation management, where the potential for impacts would be greater. Construction-related impacts would be less under this alternative because fewer and/or smaller components would be constructed; in addition, a potentially significant and unavoidable impact related to loss of mineral resources identified for the proposed program could potentially be avoided under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative. There would be greater flood-related erosion impacts under this alternative, although these impacts would be infrequent. Given these conditions, and the fact that construction activity and project footprint size are major sources of impacts related to geology, soils, seismicity, and paleontological and mineral resources, the impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative on geology, soils, and seismicity would be less than those of the proposed program. [*Lesser*]

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have lesser impacts on geology, soils, seismicity, and paleontological and mineral resources than the proposed program is generally based on the fact that there would be greater potential effects on access to mineral resources under the proposed program, given the larger project footprint. This impact mechanism would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance, because the project footprint and associated construction levels would be similar. The impacts on geology, soils, and seismicity of an SSIA including strict ETL compliance would be **similar** to the impacts of the SSIA, because even though vegetation removal under the ETL likely would result in some additional impacts, the level of those impacts would not likely exceed significance thresholds in most situations.

Groundwater Resources

The proposed program would not result in significant impacts on groundwater resources after mitigation, as described in greater detail in DPEIR Section 3.11, "Groundwater Resources." The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the benefits to groundwater resources from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be minimal, well-planned, and substantially mitigated, while the adverse

impacts on groundwater resources from a major flood event would be unplanned and unmitigated, and could be of a relatively greater scope.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, effects on groundwater resources from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in removal of woody vegetation over a larger waterside area than under the proposed program. However, removal of additional woody vegetation in this localized area adjacent to existing flood control facilities would have little to no effect on groundwater resources and impacts of vegetation management would be the same as those of the proposed program.

The potential for impacts on groundwater from project-level construction of new facilities and repair and improvement of existing facilities would be less under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program because there would be a smaller construction and land disturbance footprint. The impact mechanisms would remain the same under this alternative (e.g., localized degradation of groundwater quality from construction activities). However, the lower level of construction activity would minimize the potential for adverse effects. As under the proposed program, construction activities occurring as part of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in less-than-significant groundwater effects.

The proposed program's operational impacts on groundwater from modifying reservoir operations would be the same under the Achieve SPFC

Design Flow Capacity with Strict ETL Compliance Alternative because both alternatives include the same reservoir operations proposal. The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would not include a groundwater banking program; therefore, the new opportunities for groundwater recharge created by the proposed program would not occur under this alternative. The proposed program's potentially significant impacts from operating a groundwater banking program would not occur under the Achieve SPFC Design Flow Capacity Alternative, but those impacts would be mitigated to a less-than-significant level under the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, system failures and associated decreases in groundwater quality from contaminated floodwaters would be more frequent.

As described above, impacts on groundwater from system maintenance under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would be similar to impacts under the proposed program. Construction-related impacts would initially be less under this alternative because of a lower level of activity and smaller disturbance footprint; however, groundwater quality impacts from construction would be less than significant under both alternatives. Potential adverse effects on groundwater quality from floods resulting from system failures would be greater under this alternative. Given these conditions, the overall impact of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative on groundwater is expected to be greater than that of the proposed program. *[Greater]*

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have greater groundwater impacts than the proposed program is generally based on the decreased flood protection levels provided by that alternative (and resulting potential adverse effects on groundwater quality from floods). This impact mechanism would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance (i.e., the comparative flood risks would be similar for each scenario). The impacts on groundwater of an SSIA including strict ETL compliance would be **similar** to the impacts of the SSIA because there are no other groundwater-related impact mechanisms that differ between the two scenarios.

Hazards and Hazardous Materials

The proposed program would not result in significant impacts related to hazards and hazardous materials after mitigation, as described in greater

detail in DPEIR Section 3.12, “Hazards and Hazardous Materials.” The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the benefits related to hazards and hazardous materials from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be minimal, well-planned, and substantially mitigated, while the adverse impacts related to hazards and hazardous materials from a major flood event would be unplanned and unmitigated, and could be of significant scope. Specifically, the volumes and toxicity of hazardous materials that could be released into the environment after a major flood event (e.g., pesticides, fuels) would likely be substantially greater than those involved in construction activities under the program. In addition, the program would directly reduce flood risk hazards.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, effects related to hazards and hazardous materials from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in removal of woody vegetation over a larger waterside area than under the proposed program. The ETL also requires excavation of much of the root structure when a tree is removed. There would be no such requirement for trees removed under the VMS. Therefore, because of the larger vegetation management disturbance area under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the more ground-disturbing tree removal methodology, there is a greater potential for construction-related hazardous

materials impacts (e.g., accidental releases from construction equipment, encountering existing contaminated soil) from vegetation management under this alternative than under the proposed program.

The potential for impacts associated with hazards and hazardous materials from project-level construction of new facilities and repair and improvement of existing facilities would be less under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program because there would be a smaller construction and land disturbance footprint. The impact mechanisms would remain the same under this alternative (e.g., potential to encounter existing hazardous materials during construction, accidental spills of hazardous materials during construction). However, the lower level of construction activity would minimize the potential for adverse effects.

As under the proposed program, activities occurring as part of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would require development and implementation of mitigation measures for significant and potentially significant impacts. Examples of such measures include avoiding contact with contaminated areas, locating oil and gas wells and transmission lines and coordinating with owner/operators to avoid conflicts with existing infrastructure, and training construction workers on hazardous materials. Mitigation measures would be equally effective at reducing impacts related to hazards and hazardous materials to a less-than-significant level under either the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative or the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, system failures and associated release and spread of hazardous materials from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, impacts of flooding and postflood repairs related to hazards and hazardous materials would be greater under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative.

As described above, impacts of system maintenance related to hazards and hazardous materials under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would be similar to impacts under the proposed program, with the exception of vegetation management, where the potential for impacts would be greater. Construction-related impacts would be less under this alternative because fewer and/or smaller components would be constructed; however, hazardous materials impacts could be equally mitigated under either alternative. There would be greater flood-related hazardous materials impacts under the Achieve SPFC Design

Flow Capacity with Strict ETL Compliance Alternative. These impacts would be infrequent, but they would be more likely to result in long-term damage to the environment as hazardous materials were released and spread over a wider area. Given these conditions, the overall impact of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative related to hazards and hazardous materials is expected to be greater than that of the proposed program. *[Greater]*

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have greater hazards and hazardous materials impacts than the proposed program is generally based on the decreased flood protection levels provided by that alternative (and resulting damage from hazardous materials releases after flood system failures). This impact mechanism would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance (i.e., the comparative flood risks would be similar for each scenario). The impacts on hazards and hazardous materials of an SSIA including strict ETL compliance would be **similar** to the impacts of the SSIA, because even though hazardous materials would be used during vegetation removal under the ETL, the risks could be equally mitigated under either scenario.

Hydrology

The proposed program would not result in significant hydrology impacts after mitigation, as described in greater detail in DPEIR Section 3.13, "Hydrology." The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the hydrology benefits from flood risk reduction would not compensate for the impacts of the proposed program because those benefits would generally be short term (i.e., flooded areas are anticipated to recover to pre-flood conditions), while many of the impacts of the proposed program would be permanent.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

Hydrologic resources include surface water (hydraulic), water supply, and flood management resources. The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements

such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, effects related to hydrologic resources from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in removal of woody vegetation over a larger waterside area than under the proposed program and more rapid vegetation removal overall. Removal of additional woody vegetation in this localized area could reduce roughness coefficients and allow floodwaters to move more rapidly through an area. It is unknown whether on a case-by-case basis, removing woody vegetation beyond that assumed for the proposed program would have beneficial hydrologic effects by reducing flood stage elevations at and upstream of a particular site; have adverse hydrologic effects by increasing flood stage elevations downstream from a particular site; or have no measurable effect at all.

The potential for impacts on hydrology from project-level construction of new facilities and repair and improvement of existing facilities would be less under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative because there would be a smaller construction and land disturbance footprint. The impact mechanisms would remain the same under this alternative (e.g., increased erosion and siltation, increased flooding caused by project activities or facilities, risk of inundation by seiche). However, the lower level of construction activity would minimize the potential for adverse effects. Construction impacts would be less than significant under both the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, the potential for housing to continue being placed in a 100-year flood zone would be greater under this alternative. In the long term, this alternative would result in greater flood damage to housing and potential loss of life and property. Flooding impacts related to erosion and sedimentation would also be more severe, and would occur over a larger area than under the proposed program.

As described above, impacts of system O&M on hydrology under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would be similar to impacts under the proposed program, with

the exception of vegetation maintenance, where the nature of any changes in impacts is unknown. Construction-related impacts would initially be less under this alternative because less construction activity would take place; however, construction-related hydrology impacts would be less than significant. There would be greater flood-related hydrology impacts under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative. Given these conditions, the overall impact of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative on hydrology is expected to be greater than that of the proposed program.

[Greater]

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have greater hydrology impacts than the proposed program is generally based on the decreased flood protection levels provided by that alternative (and resulting potential adverse effects on hydrology during floods). This impact mechanism would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance (i.e., the comparative flood risks would be similar for each scenario). The impacts on hydrology of an SSIA including strict ETL compliance would be **similar** to the impacts of the SSIA because there are no other hydrology-related impact mechanisms that differ substantially between the two scenarios.

Land Use and Planning

The proposed program generally would not result in significant impacts on land use and planning after mitigation, as described in greater detail in DPEIR Section 3.14, “Land Use and Planning.” However, the potentially significant and unavoidable impacts on agricultural resources described above for Agriculture and Forestry Resources are also considered to reflect similar significant and unavoidable land use impacts of the same nature and scope. The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the land use and planning benefits from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be indirect and result from State law and policies discouraging development in floodplains, while the adverse impacts from a major flood event would be unplanned and unmitigated, could be of significant scope, and could adversely affect land use and planning options for a lengthy period.

However, for the potentially significant and unavoidable impacts on agricultural resources, the comparison generally assumes that the benefits to agricultural resources from flood risk reduction would not compensate

for the impacts of the proposed program because those benefits would generally be short term (i.e., flooded areas are anticipated to recover to pre-flood conditions as lands dry out and farming can resume), while many of the impacts of the proposed program on agricultural resources would be permanent.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, effects related to land use from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in removal of woody vegetation over a larger waterside area than under the proposed program and more rapid vegetation removal overall. However, removal of additional woody vegetation in this localized area adjacent to existing flood control facilities would have little to no effect on land use and impacts from vegetation management would be similar to those for the proposed program.

Both alternatives would trigger implementation of requirements related to the urban level of flood protection; therefore, impacts via this mechanism would be the same for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

The potential for land use impacts from project-level construction of new facilities and repair and improvement of existing facilities would be less under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative because there would be a smaller construction and land disturbance footprint. Neither alternative would create conditions that would physically separate an established community; however, construction under this alternative would be less likely to result in

displacement of some isolated developed uses (e.g., homes, businesses, recreational facilities) because of the smaller cumulative project footprint. With a smaller project footprint, there also would be reduced conversion of agricultural land to a nonagricultural land use. The proposed program also includes a greater amount of habitat restoration and creation, which would result in some level of conversion of existing land uses (including agricultural land uses) to habitat.

As under the proposed program, activities occurring as part of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would require development and implementation of mitigation measures to reduce significant or potentially significant land use impacts. Examples of such measures include providing financial compensation for property losses and relocation assistance for displaced development, and replacing displaced recreational facilities. Mitigation measures would be equally effective at reducing impacts on displaced development and recreational facilities to a less-than-significant level under either the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative or the proposed program. However, it would not be feasible to fully mitigate for the conversion of Important Farmland to another land use under either alternative.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, system failures and associated damage from flooding would occur more frequently and would be more severe than under the proposed program. Therefore, the potential for flood damage to result in the physical division of an established community (e.g., incomplete postflood repairs and recovery resulting in separation of portions of a community) would be greater under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative. The potential for changes in land use or patterns of land use after a flood that would cause a substantial adverse physical environmental effect would also be greater. However, both of these impact mechanisms would require postflood land uses to differ substantially from preflood land uses, which would be unlikely.

Overall, impacts of system O&M on land use under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would be similar to impacts under the proposed program. Significant and unavoidable impacts associated with implementing the urban level of flood protection (i.e., the conversion of agricultural land to urban uses) would also be similar under both alternatives. Construction-related impacts would be less under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative because of the smaller project footprint; however,

land use impacts could be equally mitigated under either alternative. There would be greater potential for flood-related land use impacts under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative; however, for adverse effects to occur, postflood land uses would need to differ substantially from pre-flood land uses, which would be unlikely. Primarily because of the smaller overall project footprint under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the correspondingly lower potential for conversion of agricultural land, the potential for adverse land use impacts is expected to be less under this alternative than under the proposed program. *[Lesser]*

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have lesser land use impacts than the proposed program is generally based on the fact that there would be greater permanent conversions of agricultural lands to nonagricultural uses under the proposed program, both from facility construction and from habitat restoration and creation. This impact mechanism would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance, because the area of converted agricultural lands as part of the program would be similar. The impacts on land use of an SSIA including strict ETL compliance would be **similar** to the impacts of the SSIA because there are no other land use impact mechanisms that differ between the two scenarios.

Noise

The proposed program would not result in significant noise impacts after mitigation, as described in greater detail in DPEIR Section 3.15, "Noise." The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the noise benefits from flood risk reduction would not be materially different from the impacts of the proposed program. It is not anticipated that reconstruction efforts would involve materially different noise impacts from those of the proposed program, and the impacts of the proposed program and reconstruction would both be temporary.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation

management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, noise and vibration effects from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in removal of woody vegetation over a larger waterside area than under the proposed program. The ETL also requires excavation of much of the root structure when a tree is removed. There would be no such requirement for trees removed under the VMS. Therefore, because of the larger vegetation management disturbance area under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the more ground-disturbing tree removal methodology, there would be a greater level of noise and vibration generation from vegetation management under this alternative than under the proposed program. The additional noise would be a single localized occurrence similar to construction noise as trees are cut, wood and branches are removed, the root structure is excavated, and the excavated areas are refilled.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction-related noise and vibration impacts would be less. The impact mechanisms would remain the same under this alternative (e.g., increased noise and vibration generated by construction equipment and by operational features such as water pumps). However, the lower level of construction activity would minimize the potential for adverse effects. As under the proposed program, activities occurring as part of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would require development and implementation of mitigation measures for significant and potentially significant impacts. Examples of such measures include implementing noise- and vibration-reducing construction practices and implementing design techniques to lessen operational noise. Mitigation measures would be equally effective at reducing noise and vibration impacts to a less-than-significant level under either the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative or the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, system failures and associated flood-related cleanup activities would occur more frequently and would be more severe than under the proposed program. Therefore, the impacts of flooding and postflood repairs on noise and vibration would be greater under this alternative.

As described above, noise and vibration generation from system maintenance would be similar under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program, with the exception of vegetation management, where noise generation would be greater. Construction-related noise impacts would be less under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative because fewer and/or smaller components would be constructed; however, noise and vibration impacts could be equally mitigated under either alternative. The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, the potential for flood-related cleanup and repair activities to increase noise and vibration levels would be greater under this alternative. However, these effects would be infrequent and episodic. Therefore, the overall impact of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative related to noise would be similar to that of the proposed program. *[Similar]*

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have similar noise and vibration impacts to those of the proposed program is generally based on the fact that these impacts could be mitigated to a less-than-significant level under either alternative. The impacts on noise and vibration of an SSIA including strict ETL compliance would be **similar** to the impacts of the SSIA because the impacts could be equally mitigated under either scenario.

Population, Employment, and Housing

The proposed program would not result in significant impacts on population, employment, and housing, as described in greater detail in DPEIR Section 3.16, "Population, Employment, and Housing." The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the benefits to population, employment, and housing from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would

generally be minimal, well-planned, and substantially mitigated, while the adverse impacts from a major flood event would be unplanned and unmitigated, and could be of significant scope. Specifically, recovery from a major flood event could take considerable time and full recovery of employment opportunities and housing availability may not occur in some situations.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, effects on population, employment, and housing from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in removal of woody vegetation over a larger waterside area than under the proposed program. The ETL also requires excavation of much of the root structure when a tree is removed. There would be no such requirement for trees removed under the VMS. Removal of additional woody vegetation in this localized area adjacent to existing flood control facilities would have little to no effect on population and housing and impacts from vegetation management would be similar to those for the proposed program. However, because of the larger vegetation management effort under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative, a greater level of job generation to support this activity could occur than under the proposed program. The additional jobs would be temporary, lasting until vegetation removal is complete.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction-related and operational impacts on population, employment, and housing would be less

under this alternative. The impact mechanisms would remain the same (e.g., inducement of substantial population growth, displacement of substantial numbers of people, or inducement of substantial unemployment as a result of project construction, operation, or long-term land use policy changes); however, the lower level of construction activity under this alternative would minimize the potential for adverse effects. As under the proposed program, activities occurring as part of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would likely result in less-than-significant impacts.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, system failures and associated flood-related cleanup activities would occur more frequently and would be more severe than under the proposed program. Therefore, the impacts of flooding and postflood repairs on population, employment, and housing would be greater under this alternative. For example, a greater risk of flooding would have a greater socioeconomic impact related to displacement of residents and property damage from flooding. As population growth continues, an increasing number of people will have insufficient flood protection; thus, over time, this alternative could result in greater socioeconomic impacts on people in both urban and rural areas.

As described above, impacts of system O&M on population, employment, and housing under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would be similar to impacts under the proposed program. The construction-related impacts of both the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program are expected to be less than significant; however, this alternative could have significant population and housing impacts associated with an increased risk of flooding, such as displacing housing and people over time. Thus, the overall impact of Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative on population, employment, and housing is expected to be greater than that of the proposed program. *[Greater]*

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have greater population, employment, and housing impacts than the proposed program is generally based on the decreased flood protection levels provided by that alternative (and resulting displacement of housing and people from floods). This impact mechanism would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance (i.e., the comparative flood risks would be similar for each scenario). The impacts on population, employment, and housing of an SSIA including strict ETL compliance would be **similar** to the impacts of

the SSIA because there are no other impact mechanisms related to population, employment, and housing that differ between the two scenarios.

Public Services

The proposed program would not result in significant impacts on public services, as described in greater detail in DPEIR Section 3.17, “Public Services.” The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the public services benefits from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be minimal, well-planned, and substantially mitigated, while the public services impacts from a major flood event would be unplanned and unmitigated, and could be of significant scope.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, effects on public services from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in removal of woody vegetation over a larger waterside area than under the proposed program. The ETL also requires excavation of much of the root structure when a tree is removed. There would be no such requirement for trees removed under the VMS. Removal of additional woody vegetation in this localized area adjacent to existing flood control facilities would have little to no effect on public services, and

impacts from vegetation management would be similar to those for the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction-related and operational impacts on public services would be less under this alternative. The impact mechanisms would remain the same (e.g., physical effects resulting in the need for new or altered law enforcement or fire protection facilities). However, the lower level of construction activity under this alternative would minimize the potential for adverse effects. Impacts on public services are expected to be less than significant under either the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative or the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, system failures and associated flood-related cleanup activities would occur more frequently and would be more severe than under the proposed program. Therefore, the impacts of flooding and postflood repairs on public services would be greater under this alternative. For example, the scale of the repairs could be larger, depending on the extent or magnitude of flood damage, resulting in greater demand on emergency fire and police services than under the proposed program.

As described above, impacts of system O&M (including vegetation removal) on public services under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would be similar to impacts under the proposed program. The potential for construction-related impacts would be less under this alternative because of the reduced project footprint and disturbance area; however, public services impacts from construction would be less than significant under both alternatives. There would be greater flood-related impacts on public services under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative. Although these impacts would be infrequent, the overall demand for emergency police and fire services under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would be greater than that of the proposed program. Given these conditions, the potential for adverse public services impacts is expected to be greater under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program. *[Greater]*

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have greater public services impacts

than the proposed program is generally based on the decreased flood protection levels provided by that alternative (and resulting potential demand for emergency services from floods). This impact mechanism would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance (i.e., the comparative flood risks would be similar for each scenario). The impacts on public services of an SSIA including strict ETL compliance would be **similar** to the impacts of the SSIA because there are no other public services–related impact mechanisms that differ between the two scenarios.

Recreation

The proposed program would not result in significant recreation impacts after mitigation, as described in greater detail in DPEIR Section 3.18, “Recreation.” The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the recreation benefits from flood risk reduction would not compensate for the impacts of the proposed program because those benefits would generally be short term (i.e., flooded areas are anticipated to recover to pre-flood conditions so that recreational activities can resume, and damaged recreational facilities are reasonably expected to be replaced), while many of the recreation impacts of the proposed program would be permanent.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, effects on public services from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance

Alternative would result in removal of woody vegetation over a larger waterside area than under the proposed program. The ETL also requires excavation of much of the root structure when a tree is removed. There would be no such requirement for trees removed under the VMS. Removal of additional woody vegetation along the waterside levee slopes would increase the severity of Impact REC-5 (NTMA and LTMA), “Decrease in Quality of Terrestrial and Water-Based Recreation as a Result of Removal of Woody Vegetation from Levees,” identified in the DPEIR. This impact would be less than significant under the proposed program because of the retention of lower waterside vegetation under the VMS and the ability to plant additional waterside vegetation as part of ecosystem restoration. However, under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative, such retention and restoration of lower waterside vegetation would be extremely limited, and would not be permitted in many areas. Impact REC-5 (NTMA and LTMA) would likely be significant and unavoidable under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative because of the extent of waterside vegetation losses and the very limited ability to plant new waterside vegetation to compensate for the losses.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction-related and operational impacts on recreation would be less under this alternative than under the proposed program. The impact mechanisms would remain the same under this alternative (e.g., decreased access to recreational facilities, increased boating safety hazards from construction barge traffic), and as under the proposed program, activities occurring as part of this alternative would require development and implementation of mitigation measures for significant and potentially significant impacts. Examples of such measures include avoiding construction activities and staging near recreational facilities, avoiding construction during the high-use recreation season, and maintaining safe boat passage. Because of the more limited scale of activities under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative, it is anticipated that mitigation measures would be effective at reducing construction-related impacts on recreation to a less-than-significant level.

The permanent loss of access to recreational facilities and decreased recreational quality from changes in reservoir operations that would occur under the proposed program would also occur under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative. Therefore, impacts of this alternative related to reservoir operations and recreation would be the same as those of the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, system failures and associated flood-related cleanup activities would occur more frequently and would be more severe than under the proposed program. Therefore, the impacts of flooding and postflood repairs on recreation would be greater under this alternative. For example, system failures and associated postflood cleanup activities could result in temporary loss of access to some recreational facilities, depending on the location and severity of the flood event. Impacts of flooding and postflood repairs on recreation would be greater under this alternative than under the proposed program.

As described above, impacts of system O&M on recreation under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would be similar to impacts under the proposed program, with the exception of vegetation maintenance, where greater losses of waterside woody vegetation could result in significant adverse effects on recreation facilities. The potential for construction-related impacts would be less under this alternative because of the reduced project footprint and disturbance area; however, mitigation measures would reduce all construction-related recreation impacts to a less-than-significant level under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program. There would be greater flood-related recreation impacts under this alternative, but these would be infrequent and episodic. Given these conditions, the overall impact of the Achieve SPFC Design Flow Capacity Alternative on recreation is expected to be greater than that of the proposed program. *[Greater]*

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have greater recreation impacts than the proposed program is generally based on the aesthetics impacts and loss of shade resulting from vegetation removal, and the decreased ability of the alternative to accommodate restoration components with aesthetics and shading benefits. This impact mechanism would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance (i.e., the ability to provide areas accommodating restoration activities with aesthetics and shade benefits would be similar). However, the impacts on aesthetics and shade of an SSIA including strict ETL compliance would be **greater** than the impacts of the SSIA, given the increased removal of vegetation under the ETL and the substantial limitation of the ability to provide for compensatory vegetation providing aesthetics benefits.

Transportation and Traffic

The proposed program generally would not result in significant transportation and traffic impacts after mitigation, as described in greater

detail in DPEIR Section 3.19, “Transportation and Traffic.” However, for very large construction projects involving large amounts of fill requiring transport over public roads, construction traffic impacts could be potentially significant and unavoidable. In addition, some projects could require transportation infrastructure to be removed or disrupted for a substantial period of time without available mitigation, resulting in a potentially significant and unavoidable impact. The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the benefits to transportation and traffic from flood risk reduction would not be materially different from the impacts of the proposed program. It is anticipated that reconstruction efforts would generate construction traffic to a similar degree as the proposed program.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, effects on transportation and traffic from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in removal of woody vegetation over a larger waterside area than under the proposed program. The ETL also requires excavation of much of the root structure when a tree is removed. There would be no such requirement for trees removed under the VMS. Therefore, because of the larger vegetation management disturbance area under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the greater level of effort resulting from the tree removal methodology, a greater volume of traffic would be generated

from vegetation management under this alternative than under the proposed program. The additional traffic would be similar to construction traffic as trees are cut and wood and branches are removed and fill is delivered to refill holes where the root structure has been excavated.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, construction-related traffic generation would be less. The impact mechanisms would remain the same under this alternative (e.g., increased construction traffic, potential to remove or disrupt current transportation infrastructure, decreased level of service on roadways). However, the lower level of construction activity and smaller projects would minimize the potential for adverse effects. As under the proposed program, activities occurring as part of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would require development and implementation of mitigation measures for significant and potentially significant impacts. Examples of such measures include implementing a traffic management plan; providing traffic detour routes; and adding turn lanes, traffic signals, or stop signs. Mitigation measures would be equally effective at reducing impacts on transportation and traffic to a less-than-significant level under either the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative or the proposed program. However, the proposed program could result in significant and unavoidable impacts—namely, short-term construction traffic on large projects and permanent loss of existing roadway infrastructure. Conditions leading to this significant and unavoidable impact (e.g., large projects, floodway expansions leading to permanent losses of transportation infrastructure) are less likely to occur under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, system failures and associated flood-related cleanup activities would occur more frequently and would be more severe than under the proposed program. Therefore, the impacts of flooding and postflood repairs on transportation and traffic, such as a lack of emergency access and blockage of roadways during and immediately after a system failure, would be greater under this alternative. Impacts of flooding and postflood repairs on transportation and traffic would be greater under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative.

As described above, impacts of system O&M on transportation and traffic under the Achieve SPFC Design Flow Capacity with Strict ETL

Compliance Alternative would be similar to impacts under the proposed program, with the exception of vegetation maintenance, where increased removal of waterside woody vegetation would result in increased trip generation during the removal process. Construction-related impacts would be less under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative because of the smaller construction and disturbance footprint. The significant and unavoidable construction traffic impacts of the proposed program could potentially be avoided. The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program. As a result, there would be greater flood-related transportation and traffic impacts under this alternative, but these would be infrequent and episodic. Given these conditions, the overall impact of the Achieve SPFC Design Flow Capacity Alternative on transportation and traffic is expected to be similar to that of the proposed program. *[Similar]*

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have similar transportation and traffic impacts to those of the proposed program is generally based on the fact that these impacts could be mitigated to a less-than-significant level under either alternative. The impacts on transportation and traffic of an SSIA including strict ETL compliance would be **similar** to the impacts of the SSIA because the impacts could be equally mitigated under either scenario.

Utilities and Service Systems

The proposed program would not result in significant impacts on utilities and service systems after mitigation, as described in greater detail in DPEIR Section 3.20, "Utilities and Service Systems." The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the benefits to utilities and service systems from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be minimal, well-planned, and substantially mitigated, while the adverse impacts from a major flood event would be unplanned and unmitigated, and could be of significant scope. Specifically, substantial damage to utilities and service systems could occur as a result of a major flood event, resulting in their unavailability for what could be a lengthy period of time.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, effects on utilities and service systems from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in removal of woody vegetation over a larger waterside area than under the proposed program. The ETL also requires excavation of much of the root structure when a tree is removed. There would be no such requirement for trees removed under the VMS. Therefore, because of the larger vegetation management disturbance area under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the more ground-disturbing tree removal methodology, there is a greater potential for disturbance of existing underground utilities from vegetation management (e.g., disruption of utility services during root excavation) under this alternative than under the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in a smaller construction and land disturbance footprint than the proposed program; therefore, potential impacts on utilities from project-level construction of new facilities and repair and improvement of existing facilities would be less than under the proposed program. The impact mechanisms would remain the same under this alternative (e.g., disruption of utility services during construction and relocation of utilities during operation). However, the lower level of construction activity and operation of fewer and smaller facilities would minimize the potential for adverse effects. As under the proposed program, activities occurring as part of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would require development and implementation of mitigation measures for potentially significant impacts.

Examples of such measures include coordinating with utility providers to avoid damage to existing utility infrastructure, or relocating or flood-proofing such infrastructure. Mitigation measures would be equally effective at reducing impacts on utilities to a less-than-significant level under either the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative or the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, the potential for flood damage to cause service interruptions and generate the need for extensive repairs would be much greater under this alternative than under the proposed program.

As described above, impacts of system O&M on utilities under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would be similar to impacts under the proposed program, with the exception of vegetation maintenance, where increased removal of waterside woody vegetation would result in increased potential for damage to existing underground utilities and associated disruptions to service. Construction-related impacts would be less under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative because of the smaller construction and disturbance footprint; however, utility impacts would be equally mitigated under both alternatives. The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program. As a result, there would be greater flood-related utility impacts under this alternative. These effects would be infrequent, but they would be more likely to result in widespread adverse impacts as utility services were interrupted and utility facilities would require repairs or relocation. Given these conditions, the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have greater overall impacts on utilities and service systems than the proposed program. [*Greater*]

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have greater utilities impacts than the proposed program is generally based on the decreased flood protection levels provided by that alternative (and resulting impacts on utility services and systems after flood system failures). This impact mechanism would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance (i.e., the comparative flood risks would be similar for each scenario). The impacts on utilities of an SSIA including strict ETL compliance would be **similar** to the impacts of the SSIA, because even though vegetation removal under the ETL likely would result in some

additional construction-period impacts on utilities, those impacts could be mitigated to less-than-significant levels under either scenario.

Water Quality

The proposed program would not result in significant impacts on water quality after mitigation, as described in greater detail in DPEIR Section 3.21, “Water Quality.” The following analysis compares the anticipated impacts of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative to those of the proposed program.

The comparison generally assumes that the water quality benefits from flood risk reduction would compensate for the impacts of the proposed program because the program impacts would generally be minimal, well-planned, and substantially mitigated, while the adverse water quality impacts from a major flood event would be unplanned and unmitigated, and could be of significant scope. Specifically, water quality conditions that could be affected after a major flood event (e.g., potential increased constituent loading associated with stormwater runoff and increased sediment loading and turbidity as a result of bank and bed erosion) would likely be substantially greater than those involved in construction activities under the program.

Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would improve existing levees to design capacity. This alternative would primarily fix levees in place, without making major changes to the footprint or operation of those facilities (i.e., no setback levees). The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would implement an O&M regime for vegetation management different than that of the proposed program. Rather than the VMS and associated CVFPP elements such as LCM, vegetation management consistent with strict adherence to the ETL would be implemented under this alternative, with no pursuit of variances from ETL standards. Other elements of O&M would be the same as described in the proposed program; therefore, effects on water quality from O&M (other than from vegetation management) would be similar for the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program.

As described previously, implementing vegetation management under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would result in removal of woody vegetation over a larger waterside area than under the proposed program. The ETL also requires excavation of much of the root structure when a tree is removed. There

would be no such requirement for trees removed under the VMS. Therefore, because of the larger vegetation management disturbance area under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the more ground-disturbing tree removal methodology, there is a greater potential for construction-related water quality impacts (e.g., accidental releases of contaminants from construction equipment) from vegetation management under this alternative than under the proposed program.

Potential water quality impacts from project-level construction of new facilities and repair and improvement of existing facilities would be less under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative than under the proposed program because of the smaller construction and land disturbance footprint. The impact mechanisms (e.g., disturbance of soil leading to erosion of sediment into a waterway; accidental releases of fuels, oils, and other contaminants) would remain the same under this alternative. However, the lower level of construction activity would minimize the potential for adverse effects. Impacts of both the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative and the proposed program would be less than significant.

The proposed program's operational impacts on water quality from modifying reservoir operations and altering floodplain inundation patterns would be the same under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative. Therefore, operational impacts of this alternative would be similar to those of the proposed program.

The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program; as a result, the potential for flood damage to adversely affect water quality would be much greater under this alternative than under the proposed program. Impact mechanisms would include mobilization into the waterway of sediments and hazardous materials during the flood event and accidental spills of hazardous substances during postflood cleanup activities. Therefore, impacts of flooding and postflood repairs on water quality would be greater under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative.

As described above, impacts of system O&M on water quality under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would be similar to impacts under the proposed program, with the exception of vegetation maintenance, where increased removal of waterside woody vegetation would result in increased potential for adverse water quality impacts. Construction-related impacts would be less under

the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative because of the smaller construction and disturbance footprint; however, water quality impacts would be less than significant under both alternatives. The Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would provide a much lower overall level of flood protection than the proposed program. As a result, there would be greater flood-related water quality impacts under this alternative. These effects would be infrequent, but they would be more likely to result in long-term damage as hazardous materials were released and spread in floodwaters over a wider area. Given these conditions, the overall impact of the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative on water quality is expected to be greater than that of the proposed program. *[Greater]*

The conclusion that the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have greater water quality impacts than the proposed program is generally based on the decreased flood protection levels provided by that alternative (and resulting water quality impacts from hazardous materials releases after flood system failures). This impact mechanism would result in similar effects for the SSIA and an SSIA that includes strict ETL compliance (i.e., the comparative flood risks would be similar for each scenario). The impacts on water quality of an SSIA including strict ETL compliance would be **similar** to the impacts of the SSIA, because even though water quality could be affected during vegetation removal under the ETL, the effects could be equally mitigated under either scenario.

5.5.5 Summary Comparison of Alternatives

Table 4-1 provides a summary comparison of the impact levels of the proposed program and the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative. The impact levels listed for the proposed program in Table 4-1 reflect the most substantial environmental effects identified for each environmental resource area.

Under Section 15088.5 of the CEQA Guidelines, a final EIR may need to be recirculated when “significant new information” is added after the publication and public review and comment on the DEIR. The CEQA Guidelines state that “[n]ew information added to an EIR is not ‘significant’ unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project’s proponents have declined to implement.” In particular, significant new information is defined as:

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- (1) A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.
- (2) A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.
- (3) A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the environmental impacts of the project, but the project's proponents decline to adopt it.
- (4) The draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded.

Importantly, CEQA Guidelines Section 15088.5(b) states that “[r]ecirculation is not required where the new information added to the EIR merely clarifies or amplifies or makes insignificant modifications in an adequate EIR.”

The information on the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative amplifies the discussion of alternatives in the DPEIR. However, most importantly, this information does not meet the definition of “significant new information” under CEQA. As discussed above, although the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would reduce construction-related impacts, it would fail to achieve the basic objective of the project by providing a lower level of flood risk reduction than called for under the proposed CVFPP. Furthermore, this alternative would exacerbate the proposed program’s significant and unavoidable impacts on aquatic biological resources, terrestrial biological resources, and climate change and GHG emissions. Biological resources impacts, in particular, would substantially increase as a result of increased removal of woody vegetation required under the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative. Because this alternative would not “clearly lessen the environmental impacts of the project,” its consideration in the FPEIR does not constitute significant new information and does not trigger recirculation under Section 15088.5 of the CEQA Guidelines.

As compared to the SSIA, a scenario involving strict ETL compliance under the SSIA would not decrease any environmental impacts, would increase several others including key potentially significant and unavoidable impacts, and would be infeasible for the reasons described

above. It likewise does not constitute significant new information triggering recirculation.

Table 4-1. Comparison of Impact Levels of the Proposed Program and the Achieve Design Flow Capacity with Strict ETL Compliance Alternative

Environmental Resource	Proposed Program¹	Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative	SSIA with Strict ETL Compliance Scenario
Aesthetics	Less than significant after mitigation	Greater	Greater
Agriculture and Forestry Resources	Potentially Significant and unavoidable	Agriculture: Lesser Forestry: Greater	Agriculture: Greater Forestry: Greater
Air Quality	Potentially significant and unavoidable	Lesser	Similar
Biological Resources—Aquatic	Potentially significant and unavoidable	Greater	Greater
Biological Resources—Terrestrial	Potentially significant and unavoidable	Greater	Greater
Climate Change and Greenhouse Gas Emissions	Less than significant	Greater	Similar
Cultural and Historic Resources	Potentially significant and unavoidable	Lesser	Similar
Energy	Less than significant	Lesser	Similar
Geology, Soils, and Seismicity (Including Mineral and Paleontological Resources)	Potentially significant and unavoidable	Lesser	Similar
Groundwater Resources	Less than significant after mitigation	Greater	Similar
Hazards and Hazardous Materials	Less than significant after mitigation	Greater	Similar
Hydrology	Less than significant after mitigation	Greater	Similar
Land Use and Planning	Significant and unavoidable (agricultural impacts)	Lesser	Similar
Noise	Less than significant after mitigation	Similar	Similar

Table 4-1. Comparison of Impact Levels of the Proposed Program and the Achieve Design Flow Capacity with Strict ETL Compliance Alternative

Environmental Resource	Proposed Program ¹	Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative	SSIA with Strict ETL Compliance Scenario
Population, Employment, and Housing	Less than significant	Greater	Similar
Public Services	Less than significant	Greater	Similar
Recreation	Less than significant after mitigation	Greater	Greater
Transportation and Traffic	Potentially significant and unavoidable	Similar	Similar
Utilities and Service Systems	Less than significant after mitigation	Greater	Similar
Water Quality	Less than significant after mitigation	Greater	Similar
Totals		6 Lesser 2 Similar 13 Greater	0 Lesser 15 Similar 6 Greater

Source: Data compiled by AECOM and MWH in 2012

Key:

ETL = Engineering Technical Letter (U.S. Army Corps of Engineers Engineering Technical Letter 1110-2-571)

SPFC = State Plan of Flood Control
 As shown in Table 4-1, the Achieve SPFC Design Flow Capacity with Strict ETL Compliance Alternative would have a greater level of impact for 12 environmental issue areas, a lesser level of impact for seven environmental issue areas, and impacts similar to the proposed program in two issue areas. Note that agriculture and forestry resources are split into two impact comparisons: agricultural resources (lesser impact) and forestry resources (greater impact).

As also shown in Table 4-1, a scenario involving the SSIA with strict ETL compliance would have a greater level of impact for six environmental issue areas, a lesser level of impact for zero environmental issue areas, and impacts similar to the proposed program in fifteen issue areas. Note that agriculture and forestry resources are split into two impact comparisons: agricultural resources (greater impact) and forestry resources (greater impact).

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