# APPENDIX E4

Applicable WFA EIR Mitigation Measures

**Impact Before Mitigation** 

**Potential Mitigation Measures** 

Significance After Mitigation

#### WATER QUALITY (Section 4.4)

4.4-1: Seasonal Changes to Water Quality in Folsom Reservoir. Lake Natoma, and the Lower American River. Implementation of the WFP would directly result in seasonal reductions in Folsom Reservoir storage and Lower American River flows during most years, but would have little effect on the volume of water maintained in Lake Natoma. Volume reductions in Folsom Reservoir and the Lower American River would be expected to alter water temperatures and could increase concentrations/levels of nutrients, pathogens, TDS, TOC, turbidity, and/or priority pollutants due to reduced dilution capacity. With the exception of water temperature (see Section 4.5.3, Fisheries Resources and Aquatic Habitat, for a discussion of temperature impacts to these waterbodies), program-level assessment indicated that any direct impacts to water quality in these waterbodies resulting from seasonal reductions in Folsom Reservoir storage and/or Lower American River flows would be less than significant. No mitigation measures are required.

No mitigation measure are required.

less-than-significant

4.4-2: Seasonal Changes to Sacramento River and Delta Water Quality. Implementation of the WFP would result in seasonal reductions in Shasta Reservoir storage and Sacramento River flow during some years. Such hydrologic changes would be expected to cause seasonal elevations in river water temperatures in some years, and could increase concentrations/levels of nutrients, pathogens, TDS, TOC, turbidity, and/or priority pollutants in the Sacramento River due to reduced dilution capacity. Reduced river flows would reduce Delta inflow which, if sufficiently large, could alter various water quality parameters in portions of the Delta. With the possible exception of water temperature (see Section 4.5, Fisheries Resources and Aquatic Habitat, for a discussion of temperature impacts to the Sacramento River), program-level assessments indicated that any direct impacts to Sacramento River or Delta

Changes to Sacramento River and Delta water quality would be an Indirect impact of increased urban development facilitated, in part, by the additional diversions of surface and groundwater defined in the WFP. Water quality mitigation measures will be developed for specific projects as they occur in the future. Responsibility for this mitigation lies with the land use planning authorities and individual project proponents, and is beyond the Water Forum's control. Water quality mitigation anticipated to occur with planned growth is addressed in the Sacramento County and other regional General Plans. In addition, the Sacramento County Regional Sanitation District, which operates the SRWTP, is currently updating its Sacramento Regional Wastewater Treatment

potentially significant

#### **Impact Before Mitigation**

#### **Potential Mitigation Measures**

Significance After Mitigation

water quality, resulting from seasonal reductions in Sacramento River flow associated with the WFP, would be potentially significant.

Plan Master Plan, and plans to update this document every 5 years in the future.

## FISHERIES RESOURCES and AQUATIC HABITAT (Section 4.5)

4.5-1: Impacts to Folsom Reservoir's Coldwater Fisheries. Additional diversions from Folsom Reservoir under the WFP would reduce reservoir storage by 10% or more, relative to the Base Condition, infrequently during the period April through August and occasionally during the period September through November. However, anticipated reductions in reservoir storage would not be expected to adversely affect the reservoir's coldwater fisheries because: 1) coldwater habitat would remain available within the reservoir during all months of all years; 2) physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations; and 3) anticipated seasonal reductions in storage would not be expected to adversely affect the primary prey species utilized by coldwater fishes. This would be a

4.5-2: Impacts to Folsom Reservoir's Warmwater Fisheries. Additional diversions from Folsom Reservoir under the WFP would frequently reduce reservoir storage (and thus water levels) during the critical spawning and rearing period (i.e., March through September), which could reduce the availability of littoral (nearshore) habitat containing vegetation. Modeling output indicates that long-term average reductions in littoral habitat availability of up to 34% could occur in September. Average reductions in littoral habitat availability of this magnitude could result in increased predation on young-of-the-year warmwater fishes, thereby reducing initial year-class strength of warmwater fishes in many years. Unless willows and other nearshore vegetation

No mitigation measures are required.

less-than-significant

Through plantings and related activities, encourage existing willow and other terrestrial vegetative communities to become established at lower reservoir elevations. Doing so would provide greater availability of physical structure for warmwater fish spawning and rearing in the future when spring reservoir elevations are lower than under current conditions.

Artificial habitat structures (e.g., artificial synthetic structures, submerged brush and debris, fish cribs, etc.) would provide structure in littoral habitats used by warmwater fishes for spawning and early lifestage rearing. Because the majority

potentially significant

less-than-significant impact.

#### **Impact Before Mitigation**

#### **Potential Mitigation Measures**

Significance After Mitigation

become established at lower reservoir elevations in the future in response to seasonal reductions in water levels, population declines for largemouth bass and other warmwater species could be expected to occur. Reduced littoral habitat availability would be a potentially significant impact to Folsom Reservoir warmwater fisheries.

of the reservoir's warmwater fishes spawn in shallow water habitats (i.e., generally less than 10 feet deep), artificial structures would be placed at reservoir elevations that would likely be used by these fishes for spawning and rearing. The location and number of artificial structures placed within the reservoir would increase in proportion to the loss of littoral habitat over time. Implementing habitat structures would help minimize the effects to Folsom Reservoir's warmwater fisheries that would be expected to result from increased diversions and resultant reduced water surface elevations in Folsom Reservoir.

While acknowledging operational constraints due to flood control, power production and diversions, work cooperatively with USBR operators to minimize the frequency with which reservoir elevation changes potentially resulting in nest flooding/dewatering events would occur. Monthly/weekly rates of reservoir elevation change will be documented. This information will be compared to timing and average depth of spawning for key nest-building warmwater species in Folsom Reservoir to estimate probabilities of nest flooding/dewatering events.

This measure will be implemented to the degree reasonable and feasible based on its integration into the Habitat Management Program.

Place artificial structures in the reservoir to compensate for loss of littoral habitats containing natural structure (e.g., inundated willows). The abundance of representative warmwater species will be monitored periodically through creel surveys and/or through catch-per-unit effort (CPUE) rates for tournament anglers to determine the extent to which warmwater fish utilize the structures. The extent to which

**Impact Before Mitigation** 

#### **Potential Mitigation Measures**

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this mitigation is to be implemented will be based on the results of these surveys. Frequency and timing of potential nest flooding/dewatering events that facilitate meeting current and future warmwater fish management goals will be determined by CDFG reservoir biologists. More specific performance criteria will be developed in the Habitat Management Program Plan.

All three activities described above would, to the degree reasonable and feasible, be implemented, monitored, and maintained throughout the effective period of the Water Forum Agreement

**4.5-3:** Impacts to The Warmwater and Coldwater Fisheries of Lake Natoma. Operations of Folsom Dam and Reservoir under the WFP would have minimal, if any, impact to Lake Natoma's seasonal storage, rates of elevation fluctuation, or temperature. Any changes to these lake parameters that could occur under the WFP would be expected to be minor and, therefore, would not adversely affect the lake's warmwater or coldwater fisheries. This would be a less-than-significant impact.

No mitigation measures are required.

less-than-significant

4.5-4: Temperature Impacts to Nimbus Fish Hatchery Operations and Fish Production. Operations of Folsom Dam and Reservoir under the WFP would generally have little effect on May temperatures below Nimbus Dam, and would typically result in equivalent or colder temperatures during the June through September period, relative to the Base Condition. Improved water temperatures would result from a Folsom Dam urban water intake structure temperature control device, and optimal coldwater pool management. On a long-term basis, the frequent and substantial temperature reductions that would occur during the June through September period (when hatchery temperatures reach seasonal highs annually) would more than offset the less frequent adverse

No mitigation measures are required.

#### **Impact Before Mitigation**

### **Potential Mitigation Measures**

Significance After Mitigation

impacts that would occur in some years. This would potentially benefit hatchery operations and resultant fish production in most years. Overall, this would be a less-than-significant impact.

4.5-5: Fall-run Chinook Salmon. Operations of Folsom Dam and Reservoir under the WFP would result in periods of reduced flows in the lower American River during the October through December spawning period, when flows under the Base Condition would be 2,500 cfs or less. Further flow reductions occurring at already low flow levels could result in increased redd superimposition and eventual lower year-class strength. Improved water temperatures (resulting from a Folsom Dam urban water intake structure temperature control device and optimal coldwater pool management) and improved early life-stage survival, will benefit chinook salmon spawning success, as well as other life-stages. However, because of the broad, programmatic nature of the WFP, the extent to which these actions (combined with other future actions such as spawning gravel management, revised flow ramping rate criteria, etc.) will interact to counterbalance flow reductions is uncertain, as is the manner in which these actions will be implemented, managed, and coordinated. Consequently, the overall effects of the WFP on chinook salmon year-class strength also is uncertain, and therefore, is considered to represent a potentially significant impact.

The following actions would be implemented as part of the HME, which will be adopted as an integral component of the Water Forum Agreement.

a) <u>Dry Year Flow Augmentation</u>. The Water Forum Successor Effort and the USBR would work together with Placer County Water Agency (PCWA) and the USFWS to augment Lower American River flows, particularly during the spawning period during years when impacts would occur. This measure would be implemented (within the constraints of water availability) during dry and critically dry years. The primary source of water for augmenting flows would be the purchase of American River water from upstream reservoirs operated by PCWA.

b) Flow Fluctuation Criteria. Develop and implement flow fluctuation (i.e., ramping) criteria for the operation of Folsom and Nimbus dams that would reduce the frequency with which rapid flow fluctuations occur in the river. Reducing the occurrence of large, rapid flow reductions would help to minimize losses of chinook salmon due to redd dewatering (fall and winter) and fry and juvenile stranding (winter and spring), especially during periods of low flow. Flow fluctuation criteria would contribute to improving spawning and incubation success, which, in turn, would lead to an overall increase in annual production of chinook salmon. This action would off-set, in part, potential flow-related impacts to chinook salmon.

potentially significant

**Impact Before Mitigation** 

**Potential Mitigation Measures** 

Significance After Mitigation

- c) Wetland/Slough Complex Restoration/Maintenance. Restore wetland/slough complexes occurring within habitat transitional zones between river channels, shoreline, and upland habitats. Restoration would involve grading areas for the appropriate elevations and hydrology, as well as planting appropriate vegetation, to achieve desired habitat characteristics. Because wetland/slough complexes are used by juvenile chinook salmon for rearing prior to emigration, restoration and maintenance of these complexes would increase the quantity, and possibly the quality, of rearing habitat available to juvenile chinook salmon. Thus, this action could improve juvenile rearing success prior to emigration, thereby contributing to an overall increase in annual production of chinook salmon. This action would off-set, in part, potential temperature-related impacts to juvenile steelhead.
- d) Instream Cover (woody debris). Most large woody debris has been, and continues to be, removed from the Lower American River by the U.S. Army Corps of Engineers to reduce potential hazards to recreationists. Discontinuation of this action in select reaches of the river would allow woody debris to accumulate. Instream woody cover is important for juvenile chinook salmon rearing as it provides structure that can be utilized to escape fish and avian predators. It also provides microhabitats with reduced current velocities where juvenile chinook salmon can feed more effectively. Increasing the amount of instream woody debris at specific sites could improve juvenile rearing success prior to emigration, thereby contributing to an overall increase in annual production. This action would off-set, in part, potential flow-related impacts to juvenile chinook salmon.

**Impact Before Mitigation** 

**Potential Mitigation Measures** 

Significance After Mitigation

- e) Shaded Riverine Aquatic Habitat Protection/Management. SRA habitat can be restored along the Lower American River by constructing terraces along shorelines and planting terraces with appropriate herbaceous and woody vegetation. SRA habitat provides feeding and holding areas, escape cover, and local temperature refugia for juvenile chinook salmon. Development and implementation of a shaded riverine aquatic habitat protection/management program would facilitate improving rearing habitat. Thus, protecting and restoring SRA habitat could improve juvenile rearing success, thereby contributing to an overall increase in annual production. This action would off-set, in part, potential flow-related impacts to juvenile chinook salmon.
- f) Spawning Habitat Management/Maintenance. Improve spawning habitat in the Lower American River by breaking up and redistributing coarse subsurface deposits and reducing compaction and embeddedness which reduces gravel permeability. Development and implementation of a gravel management program for the Lower American River would facilitate improving spawning habitat for chinook salmon and reducing the deterioration of existing spawning gravel. This habitat improvement would be expected to increase the amount of available spawning habitat, thereby contributing to higher overall spawning and incubation success, and therefore chinook salmon production, annually. This action would off-set, in part, flow-related impacts to juvenile chinook salmon.

Performance Criteria:

a) <u>Dry Year Flow Augmentation</u>. Increase flows particularly during the period during dry and critically dry years to the maximum extent feasible, relative to non-augmented conditions. To assess whether flow augmentation is reducing

**Impact Before Mitigation** 

**Potential Mitigation Measures** 

Significance After Mitigation

flow-related impacts, flows would be monitored in the Lower American River.

- b) Flow Fluctuation Criteria. Reduce the frequency of large, rapid flow-reduction events throughout the year, particularly during the fall spawning and incubation period.
- c) Wetland/Slough Complex Restoration/Maintenance. Increase the amount of wetland/slough complex habitat in the Lower American River that is used by early life stages of chinook salmon for rearing prior to emigration.
- d) Instream Cover (woody debris). Increase the amount of woody debris within areas of the Lower American River channel that is used by early life stages of chinook salmon for rearing prior to emigration.
- e) <u>Shaded Riverine Aquatic Habitat Protection/Management</u>. Protect existing, and increase to the extent feasible, the amount of shaded riverine aquatic habitat within the Lower American River.
- f) <u>Spawning Habitat Management</u>. Restore armored gravels to conditions that will encourage chinook salmon to use restored areas for spawning.

#### Timing:

a) <u>Dry Year Flow Augmentation</u>. Flow augmentation would occur during the spawning period October through December, during dry and critically dry years. This measure would be implemented, as necessary, throughout the effective period of the Water Forum Agreement.

#### **Impact Before Mitigation**

#### **Potential Mitigation Measures**

Significance After Mitigation

- b) Flow Fluctuation Criteria. Flow fluctuation criteria would be developed and implemented for the effective period of the Water Forum Agreement.
- c) Wetland/Slough Complex Restoration/Maintenance. Wetland/Slough complex restoration/management would be conducted throughout the effective period of the Water Forum Agreement, as warranted by the success of initial projects to be initiated during the first two years of the Agreement.
- d) <u>Instream Cover (woody debris)</u>. Instream cover (woody debris) would be allowed to accumulate in the Lower American River throughout the effective period of the Water Forum Agreement.
- e) <u>Shaded Riverine Aquatic Habitat Protection/Management.</u> Shaded riverine aquatic habitat protection/management would be conducted throughout the effective period of the Water Forum Agreement, as warranted by the success of initial projects to be implemented within the first two years of the Agreement.
- f) <u>Spawning Habitat Management</u>. Spawning habitat management would be conducted throughout the effective period of the Water Forum Agreement.

4.5-6: Lower American River Steelhead. Operations of Folsom Dam and Reservoir under the WFP would, on a long-term average basis, measurably reduce river temperatures during all months of the June through September rearing period. Reductions in the 69-year average temperature at Watt Avenue of 0.5-F would occur during June, August, and September, with a reduction of 0.8-F expected during July. This would provide significant thermal

No mitigation measures are required.

**Impact Before Mitigation** 

**Potential Mitigation Measures** 

Significance After Mitigation

benefits to steelhead over-summering in the Lower American River during most years. Conversely, flow reductions of 20% or greater, when flows under the Base Condition would be at or below the maximum AFRP requirement for the month, would occur approximately 4% to 33% of the time during one or more months of the April through September period. Such flow reductions could reduce the quantity and/or quality of juvenile rearing habitat in some of these years. Because steelhead in the Lower American River are believed to be more limited by over-summering temperatures than flows, the frequent and substantial temperature reductions would be expected to offset the flow reductions, on a long-term basis. Consequently, the combined temperature and flow changes under the WFP would not be expected to adversely affect the long-term population trends of steelhead in the Lower American River. This would be a less-than-significant impact.

4.5-7: Flow- and Temperature-Related Impacts to Splittail (February through May). Operations of Folsom Dam and Reservoir under the WFP would typically reduce, to some degree, the amount of riparian vegetation inundated between RM 8 and 9 (which serves as an index for the lower portion of the river) under the Base Condition. However, with few exceptions, substantial amounts of inundated riparian vegetation would remain under the WFP in years when such habitat would occur under the Base Condition. In addition, flow changes under the WFP would have little effect on the availability of in-channel spawning habitat availability, or the amount of potential spawning habitat available from the mouth up to RM 5 - the reach of the river influenced by Sacramento River stage. Also, the frequency with which suitable temperatures for splittail spawning below Watt Avenue would not change substantially under the WFP, relative to the Base Condition. Given the uncertainty as to the magnitude and extent of splittail spawning in the Lower American River, and the actual amount of potential spawning habitat a specific flow rates

The following actions would be implemented as part of the HME, which will be adopted as an integral component of the Water Forum Agreement.

a) Wetland/Slough Complex Restoration/Maintenance. Restore wetland/slough complexes occurring within habitat transitional zones between river channels, shoreline, and upland habitats. Restoration would involve grading areas for the appropriate elevations and hydrology, as well as planting appropriate vegetation, to achieve desired habitat characteristics. Because wetland/slough complexes are used by splittail for spawning, restoration and maintenance of these complexes would increase the quantity, and possibly the quality, of spawning habitat available to splittail. Wetland/slough complex restoration/maintenance would reduce flow-related impacts to splittail spawning.

potentially significant

#### **Impact Before Mitigation**

## Potential Mitigation Measures

**Significance After Mitigation** 

throughout the river, the effects of flow reductions from the February through May period also are uncertain and, therefore, represent a potentially significant impact.

#### b) Shaded Riverine Aquatic Habitat

Protection/Management. SRA habitat can be restored along the Lower American River by constructing terraces along shorelines and planting terraces with appropriate herbaceous and woody vegetation. SRA habitat provides spawning and rearing areas for splittail. Development and implementation of a shaded riverine aquatic habitat protection/management program would facilitate increasing splittail spawning and rearing habitat availability within the Lower American River. Thus, protecting and restoring SRA habitat could improve splittail spawning and juvenile rearing success, thereby contributing to an overall increase in annual production of splittail. This action would off-set, in part, potential flow-related impacts to splittail.

c) Flow Fluctuation Criteria. Develop and implement flow fluctuation (i.e., ramping) criteria for the operation of Folsom and Nimbus dams that would reduce the frequency with which rapid flow fluctuations occur in the river. Reducing the occurrence of large, rapid flow reductions would help to minimize losses of splittail due to fry and juvenile stranding during the February through May period. Flow fluctuation criteria would contribute to improving early life-stage rearing success, thereby contributing to an overall increase in annual production of splittail. This action would off-set, in part, potential flow-related impacts to splittail.

#### Performance Criteria:

a) Wetland/Slough Complex Restoration/Maintenance. Increase the amount of wetland/slough complex habitat in the Lower American River that is used by splittail for spawning and rearing.

## Impact Before Mitigation

### **Potential Mitigation Measures**

Significance After Mitigation

- b) <u>Shaded Riverine Aquatic Habitat Protection/Management.</u> Protect existing, and increase to the extent feasible, the amount of shaded riverine aquatic habitat within the Lower American River.
- c) Flow Fluctuation Criteria. Develop and implement flow fluctuation (i.e., ramping) criteria for the operation of Folsom and Nimbus dams that would reduce the frequency with which rapid flow fluctuations occur in the river. Reducing the occurrence of large, rapid flow reductions would help to minimize losses of splittail due to fry and juvenile stranding during the February through May period. Flow fluctuation criteria would contribute to improving early life-stage rearing success, thereby contributing to an overall increase in annual production of splittail. This action would off-set, in part, potential flow-related impacts to splittail.

No mitigation measures are required.

less-than-significant

4.5-8: Flow- and Temperature-Related Impacts to American Shad (May and June). Operations of Folsom Dam and Reservoir under the WFP would increase the frequency with which mean monthly flows at the mouth would be below the target attraction flow of 3,000 cfs by 3% in May and 4% in June. Because American shad spawn opportunistically where suitable conditions are found, potentially attracting fewer adult spawners into the Lower American River in a few years would not be expected to adversely impact annual American shad production within the Sacramento River system. Flow reductions under the WFP in May and June could reduce the number of adult shad attracted into the river during some years. Because annual production of American shad within the Sacramento River system would not be affected, and because direct impacts to the Lower American River sport fishery would be less than substantial in most years, any flow-related impacts to American shad are considered to be less than significant. In addition, because the frequency with which suitable

**Impact Before Mitigation** 

**Potential Mitigation Measures** 

Significance After Mitigation

temperatures for American shad spawning would not differ substantially between the WFP and the Base Condition, and because river temperatures under the WFP would nearly always remain suitable for American shad rearing, temperature-related impacts to American shad also are considered to be less than significant. Overall, this would be a less-than-significant impact.

4.5-9: Flow- and Temperature-Related Impacts to the Striped Bass Sport Fishery (May and June). Operations of Folsom Dam and Reservoir under the WFP would increase the frequency with which mean monthly flows at the mouth would be below the target flow of 1,500 cfs by 1% in May and 10% in June. Because flows at the mouth that are believed to be sufficient to maintain the striped bass fishery would be met or exceeded in most years during both May and June, and because substantial changes in the strength of the striped bass fishery would not be expected to occur in all years when mean May and/or June flows fall below 1,500 cfs, flow-related impacts to the striped bass fishery that could potentially occur under the WFP are considered to be less than significant. In addition, because the frequency with which suitable temperatures for juvenile striped bass rearing in the Lower American River would differ little between the WFP and the Base Condition during May and June, temperature-related impacts to juvenile striped bass rearing are also considered to be less than significant.

4.5-10: Impacts to Shasta Reservoir's Coldwater Fisheries. Hydrologic conditions with the WFP would not result in substantial reductions in reservoir storage throughout the April through November period of the year. Because changes to Shasta Reservoir storage would not be substantial, because physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations within the reservoir, and because anticipated changes in seasonal storage would not be expected to result in substantial adverse effects on the primary prey base utilized

No mitigation measures are required.

less-than-significant

No mitigation measures are required.

## **Impact Before Mitigation**

### Potential Mitigation Measures

Significance After Mitigation

by the reservoir's coldwater fish populations, seasonal reductions in storage expected to occur under WFP would have less-than-significant impacts to Shasta Reservoir's coldwater fisheries.

4.5-11: Impacts to Trinity Reservoir's Coldwater Fisheries.

Hydrologic conditions with the WFP would not result in substantial reductions in reservoir storage throughout the April through November period of the year. Because changes to Trinity Reservoir storage would not be substantial, because physical habitat availability is not believed to be among the primary factors limiting coldwater fish populations within the reservoir, and because anticipated changes in seasonal storage would not be expected to result in substantial adverse effects on the primary prey base utilized by the reservoir's coldwater fish populations, seasonal reductions in storage expected to occur under WFP would have less-than-significant impacts to Trinity Reservoir's coldwater

4.5-12: Impacts to Shasta Reservoir's Warmwater Fisheries.

Seasonal changes in reservoir surface elevation under the WFP could result in substantial reductions in reservoir littoral habitat availability in a few years during the period March through September. However, seasonal changes in reservoir surface elevation under the WFP would generally not result in substantial reductions in long-term average reservoir littoral habitat availability during the period March through September (which are the primary spawning and initial rearing months for the reservoir's warmwater fishes of management concern). Thus, these reductions would not be of sufficient magnitude to substantially reduce long-term, average initial year-class strength of the warmwater fish populations of management concern. Consequently, seasonal reductions in littoral habitat availability would constitute a less-than-significant impact to Shasta Reservoir's warmwater

No mitigation measures are required.

less-than-significant

No mitigation measures are required.

less-than-significant

Summary of Project Impacts

**Impact Before Mitigation** 

**Potential Mitigation Measures** 

Significance After Mitigation

Fisheries. Because the frequency with which potential nest dewatering events could occur in Shasta Reservoir under the WFP would not change during any month of the March through July warmwater fish spawning period, impacts to warmwater fish nesting success under the WFP are considered to be less than significant Overall, this would constitute a less-than-significant impact.

4.5-13: Impacts to Trinity Reservoir's Warmwater Fisheries. Under the WFP, substantial reductions in littoral habitat availability would occur infrequently throughout the March through September period. Similarly, the potential for nest dewatering events to occur in Trinity Reservoir would not change under the WFP during the March through July spawning period. Thus, additional surface water diversions under the WFP would result in less-than-significant impacts to the spawning and initial rearing success of Trinity Reservoir's nest-building, warmwater fishes. Based on these findings, implementation of the WFP would result in less-than-significant impacts to Trinity Reservoir

4.5-14: Impacts to Keswick Reservoir Fisheries. Hydrologic conditions with the WFP would have little, if any, effect on seasonal storage, elevation, and temperature of Keswick Reservoir. Any minor changes in storage, elevation, or temperature that could occur would constitute a less-than-significant impact to Keswick Reservoir fishery resources.

4.5-15: Flow-Related Impacts to Sacramento River Fisheries. Flow reductions of more than 20% would not occur during any month under the WFP, relative to the Base Condition. Measurable reductions in the 70-year average flows released from Keswick Dam would not occur during any month of the year. In addition, flows released from Keswick Dam would never be below the 3,250 cfs minimum stipulated in the NMFS Biological Opinion for

No mitigation measures are required.

less-than-significant

No mitigation measures are required.

less-than-significant

No mitigation measures are required.

less-than-significant

warmwater fisheries.

#### **Impact Before Mitigation**

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Significance After Mitigation

winter-run chinook salmon during the period October through March under the WFP. These findings indicate that flow changes below Keswick Dam that would occur under the WFP would result in less-than-significant impacts to upper Sacramento River fisheries resources. Under the WFP, substantial reductions in lower Sacramento River Flows at Freeport would occur infrequently during all months of the year. Consequently, any flow-related impacts to lower Sacramento River fisheries or migrating anadromous fishes that could occur under WFP are considered to be less than significant. Overall, this constitutes a less-than-significant impact.

4.5-16: Temperature-Related Impacts to Sacramento River Fisheries Resources. Hydrologic conditions with the WFP would not result in substantial changes to the 69-year average temperature at Keswick Dam or Bend Bridge for any month of the year. Their would also be no change in the number of years exceeding 56 • F at Keswick Dam under the WFP during the April through September period. Conversely, increases in water temperatures would result in temperatures at Bend Bridge to exceed 56. F in one additional year during September. However, there would be no change in winter-run chinook salmon early lifestage survival during this year. In addition, their would be no substantial decreases in annual early lifestage survival of fall-run, late fall-run, winter-run, or spring-run chinook salmon in any individual year under the WFP, relative to that under the Base Condition. Therefore, the temperature changes that would occur would not be expected to result in substantial adverse impacts to chinook salmon, or other fish species using the upper Sacramento River. Temperatures in the lower Sacramento River would not be expected to change substantially under the WFP. The number of years that mean monthly temperatures at this location would exceed 56 F, 60 F, and 70 F would be similar under the WFP and the Base Condition during the period March through November.

No mitigation measures are required.

#### **Impact Before Mitigation**

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Thus, potential impacts to fish species within the lower Sacramento River would be considered less than significant. Overall, this would be considered a less-than-significant impact.

**4.5-17: Delta Fish Populations.** Under the WFP, substantial reductions in Delta outflow would occur infrequently during the February through June period. Likewise, under the WFP, substantial upstream shifts in the mean monthly position of X2 also would occur infrequently during this period. Finally, Delta export to inflow ratios under the WFP would not exceed the maximum export limits for either the February through June (35% of Delta inflow) or the July through January periods (65% of Delta inflow). Overall this is considered to be a less-than-significant impact to Delta fish populations.

No mitigation measures are required.

less-than-significant

#### FLOOD CONTROL (Section 4.6)

## 4.6-1: Ability to Meet Flood Control Diagrams of CVP/SWP

Reservoirs. The USBR is obligated to meet the flood control diagram for Folsom and Shasta reservoirs and the Department of Water Resources (DWR) has the similar responsibility for Oroville Reservoir. Any reduction in the ability of either the USBR or DWR to meet their flood control obligations for these reservoirs would constitute a significant impact. Since implementation of the Water Forum Proposal would increase water diversions from Folsom Reservoir, thereby allowing Folsom Reservoir to start the flood control season with less water in storage than under existing conditions, and since the integrated nature of CVP/SWP operations would also result in lowered reservoir storage in Shasta and Oroville reservoirs, none of the flood control diagrams for these reservoirs would be compromised. This is considered to represent a less-than-significant impact.

No mitigation measures are required.