

COVER SHEET

**FEDERAL ENERGY REGULATORY COMMISSION
FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR THE OROVILLE FACILITIES PROJECT
Docket No. P-2100-052**

**Section 5
Staff's Conclusions
Pages 359 to 398
FEIS**

5.0 STAFF'S CONCLUSIONS

5.1 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Section 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located. When we review a proposed project, we equally consider the environmental, recreational, fish and wildlife, and other non-developmental values of the project, as well as power and developmental values. Accordingly, any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses.

This section contains the basis for and a summary of our recommendations to the Commission for relicensing the Oroville Facilities. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review and evaluation of the Proposed Action and the No-action Alternative, we select the Staff Alternative (the Proposed Action as modified by staff), as the preferred alternative. We recommend this option because (1) issuance of a new hydropower license by the Commission would allow DWR to operate the project as an economically beneficial and dependable source of electrical energy for the State Water Project; (2) the 762-MW project would eliminate the need for an equivalent amount of fossil-fueled derived energy and capacity, which helps conserve these nonrenewable resources and limits atmospheric pollution; (3) the public benefits of this alternative would exceed those of the No-action Alternative; and (4) the recommended measures would protect and enhance fish, wildlife, and cultural resources and would improve socioeconomic conditions and recreational opportunities at the project. We also recommend that many of the plans and specific measures for implementation be filed with the Commission for approval. This would allow Commission staff to monitor compliance with the conditions of the license and review the result of many of the studies and measures to be implemented by DWR.

We recommend that most of the terms of the Settlement Agreement¹⁰² be made conditions of the license to be issued for the Oroville Facilities, although we do not recommend the following:

- Providing funding associated with the July 4th fireworks displays at Lake Oroville (part of Proposed Article 127, *Recreation Management Plan*)

The measure to provide funding for fireworks does not appear to have a clear project nexus. In addition, we do not analyze the proposed 50-year license term because the Commission will address this license term in any order issued for the project.

Some minor revisions we recommend to the terms of the Settlement Agreement include increasing monitoring activities or accelerating the implementation schedules. We also recommend that the proposed Recreation Management Plan be revised to include the development of trail maintenance standards, completion of a trail condition inventory before recommending any changes to existing trail use, and inclusion of trail users in the recreational monitoring program. Staff's revised and additional recommended measures are described below in section 5.1.1, *Staff Alternative*.

By letter dated March 29, 2006, the Forest Service filed preliminary terms and conditions, under section 4(e) of the FPA. Because the preliminary terms and conditions are consistent with some of the provisions of the Settlement Agreement, we discuss them in the context of our discussions of the Settlement Agreement measures throughout this EIS. We recommend including all preliminary section 4(e) conditions provided by the Forest Service.

¹⁰² The Settlement Agreement is available on the Commission's web site from the eLibrary feature at <http://www.ferc.gov/docs-filing/elibrary.asp>. Accession number 20060330-0215.

5.1.1 Staff Alternative (DWR's Proposal with Staff Modifications)

We evaluate numerous recommendations in the resource sections of this EIS and given the environmental benefits, we recommend including the following measures that DWR proposes in any license issued by the Commission for the project. The measures we recommend incorporate both minor and substantive changes to the proposed license articles (noted in italics).

1. Establish and convene an Ecological Committee to provide consultation, review (e.g., plans and monitoring reports), and advice for specific programs. (Proposed Article A100)
2. Coordinate implementation of and reporting on various aquatic and terrestrial programs in the Feather River. (Proposed Article A101)
3. Supplement gravel in the Feather River to increase suitable spawning habitat for Chinook salmon and steelhead. Monitor at least 10 of the 15 riffles every 5 years *on a rotating basis or after a high flow event. Develop a common definition of median size ranges of gravels to benefit Chinook salmon and steelhead.* (Proposed Article A102)
4. Modify Moe's Ditch, Hatchery Ditch, and five additional channels to improve spawning and rearing habitat primarily for steelhead and secondarily Chinook salmon. (Proposed Article A103)
5. Place LWD, boulders or other structures in the Feather River to create additional cover, edge, and channel complexity for salmonid rearing habitat. (Proposed Article A104)
6. Install 1 fish monitoring weir and 1 fish segregation weir to decrease genetic introgression between spring- and fall-run Chinook salmon and dedicate spawning habitat for spring-run Chinook salmon. (Proposed Article A105)
7. Identify potential actions and implement a phased program to enhance the riparian corridor and connect the Feather River to its floodplain, including how flood/pulse flows may contribute to floodplain values and benefit fish and wildlife species. *DWR's evaluation of potential actions should include the potential for flood/pulse flows to increase the risk of IHN transmission. Delineate specific on-the-ground actions, or provide a quantified benchmark by which success and compliance of the measures can be assessed.* (Proposed Article A106)
8. Develop and implement a Feather River Fish Hatchery Improvement Program that describes hatchery operations, disease management, genetics, fish tagging and reporting practices. (Proposed Article A107)
9. Meet specified water temperature objectives at the fish hatchery according to a two-phase approach. A set of water temperature objectives would be targets up until 10 years after license issuance or completion of facility modifications, after which they would become license requirements. Alternative water temperature objectives at least as restrictive as DWR's proposal could be developed as part of this program *and submitted to the Commission for approval.* (Proposed Article A107)
10. Install a water supply disinfection system at the fish hatchery if fish are passed upstream of the fish barrier dam. (Proposed Article A107)
11. Maintain at least 700 cfs in the low flow channel except from September 9 to March 31 when the requirement is 800 cfs to provide suitable conditions for spawning anadromous fish. *Obtain Commission approval prior to implementing any modification to instream flows.* (Proposed Article A108)

12. Maintain minimum instream flows in the high flow channel based on water year types (Proposed Article A108)
 - At or greater than 55 percent of normal runoff:
 - October 1 to March 31—1,700 cfs; and
 - April 1 to September 30—1,000 cfs.
 - At less than 55 percent of normal runoff:
 - October 1 to the end of February—1,200 cfs; and
 - March 1 to September 30—1,000 cfs.
13. Meet specified water temperature objectives in the low flow and high flow channels according to a two-phase approach. A set of water temperature objectives would be targets up until 10 years after license issuance or completion of facility modifications after which they would become license requirements. Alternative water temperature objectives that are at least as restrictive as DWR's proposal could be developed as part of this program *and submitted to the Commission for approval.* (Proposed Article A108)
14. Investigate and report on the feasibility of, including a recommended alternative and schedule for, modifying a valve at Oroville dam to provide water that improves water temperature for spawning, egg incubation rearing and holding habitat for anadromous fish. Implement facility modifications as approved by the Commission. (Proposed Article A108)
15. Install and monitor habitat structures in Lake Oroville to provide warmwater fish habitat. (Proposed Article A110)
16. Develop a cold water fishery improvement program that includes stocking 170,000 yearling salmon or equivalent, per year, and other management elements. (Proposed Article A111)
17. Develop a comprehensive water quality monitoring program to monitor organic and inorganic constituent and physical parameter levels that may affect beneficial uses for surface waters of the project. (Proposed Article A112)
18. Monitor bacteria levels at 8 public swimming areas and provide public notice and/or education, as appropriate. (Proposed Article A113)
19. Provide public education regarding the risk of consuming fish from project waters that may contain elevated levels of metals. (Proposed Article A114)
20. Develop a management plan for the OWA that sets management objectives for recreational use and managing terrestrial and aquatic resources. *Include Butte County as a consulted party.* (Proposed Article A115)
21. Implement conservation measures (e.g., restrict public access on land and waters) and prepare bald eagle management plans for newly located nests and update the existing plans. (Proposed Article A118)
22. Implement conservation measures (e.g., restrict means of access, pesticide use) to protect vernal pool invertebrate habitat, giant garter snake, valley elderberry longhorn beetle and red-legged frog. (Proposed Article A117, A119, A120, and A121)
23. Construct four additional brood ponds for waterfowl and giant garter snake habitat. Recharge and maintain water elevations in the new and existing brood ponds, at specified intervals, to protect these species from predation. (Proposed Article A122)

24. Provide 60 to 70 acres of upland food for upland game birds and wintering waterfowl within the Thermalito afterbay portion of the OWA. (Proposed Article A123)
25. Manage 240 acres for waterfowl nest cover within the Thermalito afterbay portion of the OWA. (Proposed Article A124)
26. Install and maintain 100 wildlife nesting boxes in the OWA. (Proposed Article A125)
27. Develop an invasive plant management plan to reduce the populations of harmful plants. Include identification of locations, treatment methods, monitoring and reporting. (Proposed Article A126)
28. Implement the Recreation Monitoring Plan, *as modified by staff (see staff measure 31)*. (Proposed Article A127)
29. Continue to operate and maintain the following existing recreational developments (see section 3.3.6, *Recreational Resources*, for detailed descriptions) (Proposed Article A127):
 - Lake Oroville—developments at Lime Saddle, Goat Ranch, Bloomer Hill, Foreman Creek, Nelson Bar, Dark Canyon, Vinton Gulch, Craig Saddle, Lake Oroville scenic overlook, Enterprise, Stringtown, Loafer Creek, Bidwell Canyon, Spillway, Oroville dam, Lake Oroville Visitor Center (including interpretation and education program), floating campsites and restrooms.
 - Thermalito Complex—North Thermalito forebay, Thermalito diversion pool, South Thermalito forebay, Feather River day-use area, Feather River Fish Hatchery, Monument Hill, Thermalito afterbay, Wilbur Road, Larkin Road, and OWA unimproved boat launches.
 - Trails—90 miles of trails including the Dan Beebe, Roy Rodgers, Brad B. Freeman, Loafer Creek Loop, Potter’s Ravine, and Wyk Island trails.
30. Provide recreation improvements at Lake Oroville and Thermalito diversion pool within 10 years of license issuance as summarized in section 2.2.3 (table 6). *Include reconstruction of the boat-in campgrounds (Bloomer, Goat Ranch, and Craig Saddle) within the first 10-years of the license.* (Proposed Article A127)
31. *Include in the Recreation Management Plan a provision to (1) establish standards for maintaining developed recreation facilities, including trails; (2) conduct a trail condition inventory using the established standards developed for project trails prior to recommending changes, if necessary, to any trail use designation ; (3) monitor and report on trail condition throughout the license term; (4) expand the recreation monitoring program to include non-trail users to detect latent demand and unmet user needs related to trails; and (5) finalize the draft Comprehensive Non-Motorized Trails Program and include a detailed implementation schedule, after completion of a trail condition inventory, visitor use surveys, collection of trail use data and proposed feasibility investigations.* (revision to Proposed Article A127)
32. Revise and resubmit the draft HPMP for Commission approval. *Provide rationale for proposing to evaluate only 20 percent of the sites, provide for evaluating all sites within the fluctuation zone. Modify the appended table of archaeological and historic resources.*¹⁰³ (revision to Proposed Article A128)

¹⁰³ Include columns (1) indicating the site management recommendations and resource evaluation (National Register) status, and (2) a timetable for the completing resource evaluations.

33. *Close Foreman Creek to recreational use until DWR develops a plan to protect cultural resources and install recreational facilities. Develop the plan within 6 months of license issuance.* (revision to Proposed Article A129)
34. Continue to operate the project in accordance with rules and regulations of the Corps flood control purposes. (Proposed Article A130)
35. Plant vegetation to screen the project storage area below Oroville dam. (Proposed Article A132)

In addition to the applicant-proposed project-related environmental measures listed above, we recommend including the following staff-recommended environmental measures in any license issued for the project:

36. Prepare a fuel management plan for National Forest System lands within the project boundary.
37. Develop a plan to continue reseedling, as necessary, the downstream face of Oroville dam.
38. Prepare a biological evaluation of the effects of any proposed project construction activities on Forest Service special status species or their habitat.
39. Develop a threatened and endangered species implementation plan that would describe how DWR would comply with its proposed conservation measures and the terms and conditions contained in the FWS's biological opinion.

5.1.2 Rationale for Staff Recommendations

This section describes the rationale for some of our recommendations on measures that we conclude should be included as conditions of any license issued for the project as well as any measures that we do not recommend as license conditions. This section is arranged by major resource topic, and within each topic we provide our rationale for recommending or not recommending specific measures. In general, even though we recommend settlement measures with specific dollar limitations (i.e., Riparian and Floodplain Improvement Program), it is important for all entities involved to know that we consider the licensees' obligation is to complete the measures required by license articles, in the absence of authorization from the Commission to the contrary. Dollar figures agreed to by the parties are not absolute limitations.

5.1.2.1 Geology and Soils

The goal of the Settlement Agreement measures related to this resource area are intended to enhance the riparian corridor and reconnect the Feather River to its floodplain to improve terrestrial and anadromous fish habitat. We discuss the DWR's proposed Lower Feather River Habitat Improvement Plan and Riparian and Floodplain Improvement Program in this section.

Lower Feather River Habitat Improvement Plan (Proposed Article A101)

DWR proposes to develop and file a plan with the Commission that includes an overall strategy for implementing, monitoring and reporting on multiple resource programs that would be implemented in the Feather River.

Altered flows in the Feather River have reduced riparian vegetation, and restricted natural geomorphologic processes resulting in degraded channel conditions that directly affect aquatic and

terrestrial habitat availability and suitability. There are nine different programs¹⁰⁴ where projects would be implemented within and adjacent to the Feather River channel to achieve improved habitat conditions.

We recommend including this plan because it would provide the following benefits: (1) a framework to ensure actions under nine different programs are scheduled and implemented in an interdisciplinary and synergistic manner within the Feather River, (2) take advantage of economies of scale for monitoring efforts (e.g., avoid individual resource monitoring efforts, where practical), and (3) provide one consolidated report for many measures. The greatest improvement would occur if efforts under the nine programs were coordinated and monitoring results were evaluated in a comprehensive manner to ensure that actions under one program are not creating unintended effects on another program. We note that this consolidated report, including recommended changes, would be provided to the Commission once every 5 years for information only and we consider this is appropriate since the specific proposed measures covered by this plan specify that DWR would secure Commission approval, as required, before implementing any changes to a project plan or operation.

We estimate the total annualized cost of this measure would be about \$2,900. This is a reasonable cost to ensure that nine different programs are coordinated to provide overall habitat benefits in the Feather River.

Riparian and Floodplain Improvement Program (Proposed Article A106)

DWR proposes to initiate a 4-phase program to connect portions of the Feather River to its floodplain within the OWA. DWR proposes to do a screening level analysis of potential projects, evaluate alternative projects, and implement two selected projects within 8 and 25 years, respectively, of license issuance.

The Feather River floodplain provides an important interface where riparian vegetation provides habitat for aquatic and terrestrial species. Based on our review of DWR's study results we determined the Oroville Facilities disrupt natural geomorphic processes involving the floodplain by blocking sediment transport and altering flows,¹⁰⁵ which has negatively affected riparian vegetation along the Feather River and in the OWA. Dredger piles cover about 615 acres and these areas are all located within the floodplain of the Feather River and provide significant gravel resources for projects throughout the surrounding area in the county, including the Oroville Facilities. We also note that study conclusions repeatedly note the positive role of bankfull flows in creating conditions conducive for cottonwood recruitment, maintaining channel complexity, recruiting LWD, and enhancing spawning and rearing habitat.

We recommend including this program because DWR would investigate potential actions and implement projects, including implementing flood/pulse flows, to encourage geomorphic processes that are not occurring at the present time. Activities undertaken as part of this program would enhance the Feather River riparian corridor by providing conditions where riparian vegetation could thrive and improve fish habitat by creating high flow refugia for juvenile salmonids. DWR's evaluation of potential actions should include the potential for flood/pulse flows to increase the risk of transmitting the fish disease IHN.

¹⁰⁴ These programs include: (1) Gravel Supplementation and Improvement Program; (2) Channel Improvement Program; (3) Structural Habitat Supplementation and Improvement Program; (4) Fish Weir Program; (5) Riparian and Floodplain Improvement Program; (6) Feather River Fish Hatchery Improvement Program; (7) Comprehensive Water Quality Monitoring Program; (8) Oroville Wildlife Area Management Plan; and (9) Instream Flow and Temperature Improvement for Anadromous Fish.

¹⁰⁵ The project has changed high flow frequency, altered peak flows, decreased winter flows, increased summer flows, and changed ramping rates.

We conclude that the degraded riparian corridor (e.g., steep, cobble banks that inhibit vegetation establishment and narrow riparian corridor width), lack of cover, and lack of connection between the Feather River and its floodplain contribute to low habitat suitability. In the draft EIS, we recommended that DWR implement 50 percent of selected projects within 10 years of license issuance and the remaining within 12 years. Based on the draft EIS comments, we now agree with DWR that more time is needed, through an adaptive management approach, to gain a full understanding of the relationship of the selected projects with all components of the Lower River Habitat Improvement Program to ensure the selected projects' long-term success. Therefore, we recommend the plan for a four-phase program to enhance riparian and other floodplain habitats as outlined in proposed article A106. However, we note that current floodplain conditions could remain degraded in the short-term because, even after the measure is carried out, there would be a lag time between project implementation and the time required for riparian vegetation to mature. We also recommend DWR delineate specific, on-the-ground actions, or provide a quantified benchmark by which success and compliance of the measure can be assessed.

We estimate the total annualized cost of DWR's proposed measure would be about \$269,100 and would improve the riparian corridor once the measures are in place.

Recommendations of Others

The Anglers Committee et al. recommend DWR study the effects of silt deposition and remove silt from locations in Lake Oroville. Based on bathymetric mapping and estimated rate of sediment deposition we determined that about 470 acre-feet of sediment would accumulate annually in the reservoir. Given that Oroville Reservoir has approximately 3.5 million acre-feet of useable storage, an annual average displacement of 470 acre-feet of water would result in a de-minimus reduction in production.

As reservoir elevations decrease, the former riverbed re-emerges. While the character of that riverbed is oftentimes heavily altered by the sediment deposited on it during times of inundation, there is no feasible way to alleviate this phenomenon. Further, as the river migrates through the deposited sediment it sorts the sediment, establishing an equilibrium channel for the sediment load and discharge available at that time. Based on this information we determined that there are no perceptible adverse effects on navigation resulting from silt deposition.

Even if silt removal could be accomplished economically, the potential exists that removal could increase the incidence of IHN and other fish diseases by releasing pathogens stored in the sediments.

Considering the minimal beneficial effects silt removal would have on power production and navigation and the potential adverse effects on fisheries, we do not recommend including this measure in the project license.

5.1.2.2 Water Quality

The goal of the Settlement Agreement measures related to this resource area are intended to protect and improve water quality at the project and provide for public safety by collecting water quality data and using it to inform decisions to implement management actions. We discuss the DWR's proposed Comprehensive Water Quality Monitoring Program (Proposed Article A112), Monitoring Bacteria Levels and Public Education (Proposed Article A113) and Public Education Regarding Risks of Fish Consumption (Proposed Article A114) in this section.

These proposed measures relate to investigating and responding to water quality issues. DWR proposes to develop a program consisting of plans to monitor water chemistry, fish tissue, petroleum product concentrations, water temperatures, bioassays, and aquatic macroinvertebrate monitoring (Proposed Article 111). DWR also proposes monitoring and reporting on bacteria at recreation sites and, if necessary, providing public education and posting notices of unsafe conditions (Proposed Article 113).

Finally, DWR proposes to provide public education regarding the risks of consuming fish taken from project waters (Proposed Article 114).

Water quality at the project waters is influenced by project operations (e.g., releases, water level management) and project recreational use. Our review of DWR's water quality data, detailed in section 3.3.2.2, *Water Quality*, indicates that project waters typically comply with the applicable federal and state standards for most water quality parameters. However, several water samples exceeded the Basin Plan objectives in Lake Oroville and in the Feather River downstream of the dam. Additionally, results from the DWR fish tissue sampling study indicate that metal concentrations in tissue samples are occasionally elevated based on comparison to recommended guidelines from various regulatory agencies. DWR study results from the summer recreation site monitoring effort revealed that several recreation sites in Lake Oroville and the Thermalito Complex had elevated bacteria densities requiring occasional beach closures.

Although other water quality parameters appear to be within acceptable levels, it would be reasonable to implement a water quality monitoring program that includes the parameters that relate to the designated beneficial uses of the project waters because DWR proposes to develop new recreational facilities, modify existing facilities, change the minimum instream flows, possibly modify a river outlet, and institute water temperature objectives at the fish hatchery, low flow and high flow channels. These actions could potentially affect water quality. A comprehensive water quality monitoring plan would provide information to detect future problems that may develop over the term of the license. This information would be used to determine whether the project is a contributing factor to any future decrease in water quality and any appropriate future measures that should be taken. We recommend including these water quality monitoring measures in the project license in order to provide DWR and the Ecological Committee with sufficient data to adaptively manage project-related operations and programs to protect water quality for public health and beneficial uses.

We estimate the total annualized cost of these measures would be about \$249,600. Considering the importance of public health and safety, this would be a reasonable cost to monitor water quality at the project.

Recommendations of Others

We do not recommend any additional measures to address the Anglers Committee et al. concern for elevated bacteria levels at the Bedrock Park swimming area. We determined this condition is caused by the dike, constructed by the Feather River Recreation District, that isolates this area from the flowing water of the Feather River and is therefore not an effect of the project. The dike was installed by the Feather River Parks and Recreation Department to create the swimming area. Water enters the swimming area from the downstream end, but the dike blocks the swimming area from the flowing action of the river.

We do not include Butte County's recommendation that DWR investigate options to circulate water at Thermalito forebay to improve water quality at the swimming area. Public safety concerns related to water quality would be addressed by implementing the proposed programs: Comprehensive Water Quality Monitoring Program (Proposed Article A112), Monitoring Bacteria Levels and Public Education (Proposed Article A113), and Public Education Regarding Risks of Fish Consumption (Proposed Article A114). Water quality data would provide the basis for taking management actions to prevent public exposure to elevated bacteria and/or heavy metal levels.

5.1.2.3 Aquatic Resources

The primary purpose of the aquatic measures is to increase populations of ESA-listed species, spring-run Chinook salmon and steelhead, in the Feather River. These measures are particularly important because the Feather River is designated critical habitat for these species. We determined that many factors affect anadromous fish populations including, available and suitable habitat, competition for

spawning habitat, genetic introgression, disease, and pre-spawn mortality. Individual and overlapping measures are included to address these effects. Secondly the measures provide for improving warm and cold water fish populations at Lake Oroville, which has a recreationally important fishery. In this section we discuss DWR's proposed Gravel Supplementation and Improvement Program (Proposed Article A102), Channel Improvement Program (Proposed Article A103), Fish Weir Program (Proposed Article A105), Feather River Fish Hatchery Improvement Program (Proposed Article A107), Flow/Temperature to Support Anadromous Fish (Proposed Article A108), Lake Oroville Warm Water Fishery Habitat Improvement Program (Proposed Article A110), and Lake Oroville Cold Water Fishery Improvement Program (Proposed Article A111).

Gravel Supplementation and Improvement Program (Proposed Article A102)

DWR proposes to develop and file a plan to manage gravel in the Feather River throughout the term of the license. Actions under this program would include placing gravel, replacing, or rehabilitating existing riffle habitat, monitoring, and developing a gravel budget.

Based on our review of DWR's study results we determined that spawning habitat has deteriorated because of a lack of suitable spawning gravel. Measures under this program are intended to increase and enhance suitable spawning habitat for anadromous fish. Gravel supplementation in the low flow and high flow channels would increase and enhance anadromous spawning habitat and ensure that it remains suitable and available over the term of the license. As proposed, placing a minimum of 8,300 cubic yards of gravel over 5 years would improve habitat over the current conditions. As proposed, the Licensee would randomly monitor and maintain a minimum of 10 of the 15 riffles at 5-year intervals. In the draft EIS, we recommended that, if certain criteria were not met, DWR should monitor and assess all 15 riffles. However, based on comments on the draft EIS, we now understand that DWR is proposing to randomly monitor at least 10 of the 15 riffles on a rotating basis, which addresses our concern regarding monitoring of all sites.

Gravel retention and transport will be water year and site specific (e.g., side channels versus the main channel). Therefore, we recommend that DWR monitor the sites if a high flow event occurs in addition to the proposed schedule.¹⁰⁶ We also recommend that a common definition of the "median size range" of optimum spawning gravel for Chinook and steelhead be developed in consultation with FWS, DFG, and NMFS (as is proposed for the stockpiling of spawning gravel under this article). These modifications would ensure that the program creates and maintains additional spawning habitat that provide timely and continuous anadromous fish benefits.

Gravel supplementation may take place in both channels; however, DWR proposes to prepare a gravel budget for only the low flow channel. We expect gravel would be retained in the high flow channel, but gravel retention in the low flow channel is less certain because it is somewhat more confined than the high-flow channel. Accordingly, the Proposed Action would provide a sufficient level of detail to enable decision-makers to make informed decisions about gravel supplementation and site rehabilitation frequency.

We estimate the total annualized cost of DWR's proposed measure, and this measure as modified by staff, would be about \$800,800. Gravel supplementation in the high and low flow channels and the associated benefits to populations of Chinook salmon and steelhead are worth this additional cost.

Channel Improvement Program (Proposed Article A103)

DWR proposes to develop a plan to improve at least 3,260 linear feet of side channels for spawning and rearing anadromous fish habitat within 10 years of license issuance.

¹⁰⁶ The 5-year monitoring period would restart if a high flow event were to occur.

Anadromous fish returning to spawn in the Feather River drainage currently cannot reach spawning habitat above the fish barrier dam and Oroville dam. Recent observations indicate steelhead are using existing side channels as primary spawning and rearing areas. We recommend including this measure primarily because it would create channels for steelhead where base flows and other environmental conditions improve existing habitat and secondarily because it would also improve habitat for spring run Chinook salmon.

We estimate the total annualized cost of this measure would be about \$302,800. We consider the cost of this measure to be worth the benefits that would accrue to anadromous fish, including endangered species, resulting from providing enhanced spawning habitat.

Structural Habitat Supplementation and Improvement Program (Proposed Article A104)

DWR proposes to develop a plan to provide additional salmonid rearing habitat in the Feather River by creating and maintaining additional cover, edge, and channel complexity with LWD and boulders and placing other objects in the channel.

We determined the Oroville dam prevents LWD from reaching the Feather River resulting in a lack of channel complexity and shortage of cover for fish rearing. The proposed measure would enhance fish habitat by placing structures that would cause localized scour (forming pools used by holding adult salmonids); create complex channel hydraulics associated with sediment sorting and deposition; and create juvenile velocity refugia in their lee during flood events.

Boulders would provide similar hydraulic function and provide much of the same benefits of LWD; however, the river downstream of the fish barrier dam does not appear to have historically contained boulders as hydraulic elements and they do not fit the river's stream type through much of this area. DWR should take the physical characteristics of individual stream reaches into account when developing the specific projects under this program.

We estimate the total annualized cost of DWR's proposed measure would be about \$318,400. This would be a reasonable cost to enhance structural habitat for fish species.

Fish Weir Program (Proposed Article A105)

DWR proposes to initiate a two-phase program for the installation and operation of two fish weirs in the low flow channel in the Feather River. During Phase 1, the first weir would be installed to provide a single monitored point in the river channel that fish would need to pass through in their attempt to travel upstream and would be used to monitor abundance of and run timing for Chinook salmon and steelhead. Phase 2 of the program includes installing a second weir, which would consist of a physical barrier that could be operated to block or redirect upstream fish passage, as needed, to spatially separate spring-run and fall-run Chinook salmon in the low flow channel. The second weir would create a dedicated spawning preserve to protect spring-run Chinook salmon and would possibly include an egg-taking station to collect fall-run Chinook salmon eggs for use in the Feather River Fish Hatchery. Measures under this proposed article are intended to address the effects of the project on spring-run Chinook salmon that include interbreeding, redd superimposition and pre-spawning mortality.

Spring-run Chinook salmon, a federally and state-listed threatened species, are negatively affected by the project because the project dam blocks passage causing them to share spawning habitat with fall-run Chinook salmon. We recommend including this proposed article in the project license because implementation of the Fish Weir Program would reduce the potential for continued genetic introgression between spring-run and fall-run Chinook salmon and reduce egg and alevin mortality from redd superimposition by dedicating adequate spawning habitat in the low flow channel for spring-run Chinook salmon. It is appropriate to take a phased approach to the implementation of these

enhancements measures recognizing the lack of existing fish population data and the importance of determining the best location for the Phase 2 weir. However, we conclude the existing competition for spawning habitat and associated genetic introgression and mortality support the need to complete enhancement projects sooner than 8 years from license issuance, as proposed, to achieve the intended benefits. We recommend installing the first weir within 3 years, as proposed, and the second weir within 6 years of license issuance. We find this would allow sufficient time to collect and analyze data and determine the proper location for, design and install the second weir. Water quality-related effects could occur during the building of the weirs. We recommend best management practices be carried out to minimize these potential effects.

We estimate the total annualized cost of DWR's proposed measure would be about \$248,400. We consider the cost associated with this measure to be commensurate with the benefits to be derived from maintaining genetic integrity of spring-run Chinook salmon.

Feather River Fish Hatchery Improvement Program (Proposed Article A107)

DWR proposes to establish and implement a program to continue operating the Feather River Fish Hatchery in cooperation with DFG to produce anadromous salmonids. The program establishes hatchery water temperature objectives, and addresses hatchery production and monitoring, genetics, disease management and facility operation and maintenance.

The Oroville Facilities block access to spawning and rearing habitat for anadromous fish thereby reducing productivity. Additionally, although the existing water temperature objectives have allowed the hatchery to meet production goals, we note that IHN outbreaks at the Feather River resulted in significant mortality at the Feather River Fish Hatchery, and in 1998, 2000, 2001, and 2002; several million juvenile Chinook salmon died or had to be destroyed because of IHN. DFG attributed the source of the disease to Lake Oroville salmonids contaminating the water that enters the hatchery. The outbreaks prompted DFG to halt stocking Chinook salmon and brown trout in Lake Oroville because of their susceptibility to IHN.

We recommend including this proposed measure in the project license because, the new temperature requirements would provide water that is cooler than that currently provided to the hatchery, which would reduce risk of some diseases (e.g. ceratomyxosis) and produce healthy fish for stocking (recreational angling) and releasing (simulating natural production). We recognize, however, that warmer water temperatures at the hatchery annex are used to control IHN outbreaks.

Non-native coho salmon were recently stocked in Lake Oroville in an effort to meet stocking goals because they are less susceptible to diseases. Although we expressed some reservation in the draft EIS about stocking non-native coho salmon, we understand the circumstances relating to fish diseases that lead to this decision, but note if fish diseases are controlled in the future, DWR stocking objectives should return to stocking native salmonids in Lake Oroville. We find the need to produce healthy hatchery fish that can enhance anadromous fish populations and provide the appropriate species for stocking in Lake Oroville, which has an important recreational fishery, support the \$739,800 estimated annualized cost associated with this part of the proposed measure.

The proposed article also includes a contingency for installation of a water sterilization system if future conditions allow fish passage above the fish hatchery. Recognizing the devastating effects of disease outbreaks at the hatchery that could occur as a result of fish passing upstream into the hatchery water supply, the estimated annualized cost for this part of the proposed measure, \$566,100, is commensurate with the protection it would provide.

Although we recommend including this proposed article in the project license, we find the text is, in some cases, unclear, unstructured, or more appropriately included in the plan that the parties would develop to implement the Feather River Fish Hatchery Improvement Program. For example, it is unclear how a "methodology evaluates" a release and what would happen to the remaining 75 percent of the fall-

run production that is not released (see Proposed Article A107.3(c)(9), *Feather River Fish Hatchery Improvement Program*).

Flow/Temperature to Support Anadromous Fish (Proposed Article A108)

DWR proposes to release a minimum instream flow of 800 cfs in the low flow channel during anadromous spawning season (September 9 through March 31) and 700 cfs for the remainder of the year. Flows in the high flow channel would remain unchanged from the current license requirements. This proposed article establishes temperature objectives for the low flow and high flow channels and initiates an investigation of potential facility modifications to provide cooler water to the Feather River to benefit anadromous fish.

We determined that the existing flow regime causes warmer water and low flows, in the Feather River. These conditions reduce the quality and quantity of anadromous fish habitat for spawning, egg incubation, rearing, and holding. The water temperature objectives in the proposed article meet the terms of the NMFS Biological Opinion (October 2004) that specify mean daily water temperatures not exceed 65°F from June 1 to September 30 in the low flow channel at Robinson Riffle. The increase in minimum flow, curtailing pumpback operation, drawing flow release from lower reservoir elevation and/or other facility modifications included in the proposed measure would result in even lower water temperatures (58 to 63°F) in the Feather River thereby reducing a known stressor of anadromous fish. In terms of the quantity of habitat, the proposed flows maximize the weighted usable area for Chinook salmon and steelhead spawning (see figure 17).

We understand there are actions included in the proposed measure to investigate options to overcome the operational challenges that result from blending water with dynamic temperatures from the low flow channel and Thermalito afterbay and the time delay between action implementation and water temperature change in the high flow channel. DWR has proposed a reasonable time frame for investigating, reporting, and possibly modifying facilities to allow operational flexibility that would ensure release of colder water in the Feather River. We note that even if DWR does not modify their facilities, the lower water temperatures would become requirements thereby helping to ensure that colder water temperatures would exist in the Feather River.

Despite uncertainties related to the Proposed Action and climatic conditions, staff expects that overall, water in Thermalito afterbay (where irrigation withdrawals are made) would be the same or slightly warmer than what currently exists and would, therefore, not increase adverse affects on rice farmers.

We recommend including this proposed article in the project license because this program would improve habitat suitability in terms of lower water temperatures and providing the maximum weighted usable area for anadromous fish in the low flow and high flow channels.¹⁰⁷ We note that the measure would allow DWR to implement different minimum instream flows, without Commission approval, if DWR receives a notice from the fish and wildlife agencies that such flows substantially meet the needs of anadromous fish. We recommend including a provision for the Commission to approve any changes to the minimum instream flows. This recommendation is necessary to make the article consistent with the Commission's authority to approve operational changes of the project. We also recommend that if temperature objectives are not met, DWR submit a report to the Commission outlining what actions were taken and why temperature objectives were not met.

There are substantial costs associated with Proposed Articles A107 and A108 and we view these measures collectively in order to assess their combined benefits. Each of these measures responds to an

¹⁰⁷ The current minimum instream flows provide less than the maximum weighted usable area (see figure 15).

overall need to comply with the ESA by protecting or enhancing populations of and habitat for spring-run Chinook salmon and steelhead. Accordingly, implementation of the enhancement measures at the Feather River, which is designated critical habitat for these species, as opposed to other locations where these species are found, would create the greatest benefit for these threatened species. As a whole, these measures would work synergistically to increase the abundance of threatened fish species. Hatchery operation measures increase the number and physical condition of fish whereas the flow and temperature measures as well as the channel and habitat measures increase the amount and quality of available habitat to threatened spring-run and steelhead for spawning, rearing and holding. Habitat improvements for these species would also benefit other aquatic species, including green sturgeon and lamprey.

We estimate the total annualized cost of DWR's Proposed Articles A107 and A108 would be about \$1,305,900 and \$2,427,700, respectively. Furthermore, these measures would reduce generation by 43,500 MWh relative to the No-action Alternative, and this would reduce power benefits by about \$1,480,000, although the annual cost of pump back energy would drop by about \$35,000. We consider the benefits of increasing anadromous fish populations and improving critical habitat for threatened aquatic species to be worth these costs.

Lake Oroville Warm Water Fishery Habitat Improvement Program (Proposed Article A110)

Under this proposed article DWR would continue the existing program to create and maintain habitat structures for increasing warmwater fish populations (e.g., black bass, channel catfish) in Lake Oroville.

The project creates suitable habitat for warmwater fish with abundant angling opportunities, particularly in Lake Oroville. We recommend including this proposed measure in the project license. DWR's studies indicate warmwater fish species are self-sustaining and DWR's past implementation efforts appear to have been effective. We note that this proposed article supports part of a DFG-stated objective¹⁰⁸ by protecting fish and providing for compatible recreational use. We also note that DWR's studies indicate important socioeconomic and recreational benefits associated with warmwater angling in Lake Oroville. These benefits provide substantial rationale to justify our recommendation to include this proposed measure in the project license.

We estimate the total annualized cost of DWR's proposed measure would be about \$40,000¹⁰⁹. We consider the cost of this measure to be reasonable in light of with the benefits that would continue to accrue to the important warm water fishery in Lake Oroville.

Lake Oroville Cold Water Fishery Improvement Program (Proposed Article A111)

Under this proposed article DWR proposes to continue the existing program, with improvements,¹¹⁰ to stock approximately 170,000 yearling salmon, or their equivalent, in Lake Oroville and develop a coldwater fisheries management plan.

¹⁰⁸ The entire objective states, "Protect and restore fish and wildlife resources and their associated habitats within the Project boundary, while providing for compatible recreation."

¹⁰⁹ This cost appears in cost for the No-action Alternative because it is an ongoing program that would continue.

¹¹⁰ DWR states the proposed action is an improvement over the existing similar program, however we cannot discern the difference based on the description of the program as presented in the Settlement Agreement and final license application.

The project creates coldwater fish habitat in Lake Oroville; but a shortage of suitable spawning habitat and high fishing pressure limit “natural” populations to levels below angler expectations. The current stocking program provides important recreational angling opportunities that support tourism and provide economic benefit to the local community. We conclude there would be insufficient populations of naturally reproducing coldwater fish to provide recreational benefits at Lake Oroville and economic benefits to the local communities if the lake were not stocked. We also recognize the dynamic nature of hatchery management and agree that this program should include an opportunity to make changes to the program based on new information. Consequently, we recommend including this proposed article in the project license.

We estimate the total annualized cost of DWR’s proposed measure would be about \$75,000¹¹¹. We consider the cost of this measure to be reasonable in light of the benefits that would accrue to the important coldwater fishery in Lake Oroville.

5.1.2.4 Terrestrial Resources

The purpose of the terrestrial measures is primarily to protect special status species and their habitat and secondarily to enhance habitat for other terrestrial species. In this section we discuss DWR’s proposed Oroville Wildlife Management Plan (Proposed Article A115), Protection of Vernal Pools (Proposed Article A117), Minimization of Disturbance to Nesting Bald Eagles (Proposed Article A118), Protection of Giant Garter Snake (Proposed Article A119), Protection of Valley Elderberry Longhorn Beetle (Proposed Article A120), Protection of Red-Legged Frogs (Proposed Article A121) and Construction and Recharge of Brood Ponds (Proposed Article A122).

Oroville Wildlife Area Management Plan (Proposed Article A115)

DWR proposes to develop a plan to manage the OWA in accordance with identified wildlife and recreation management goals while minimizing current and future conflicts between wildlife management and recreational use. The management plan would establish management objectives, include monitoring and reporting, identify agency management and funding responsibilities and allow for periodic plan revisions. Butte County recommends that it be included as a consulting party in developing this plan.

Based on DWR’s study results we determine the 11,000-acre OWA contains important habitat for waterfowl, special-status plants and wildlife, and a wide-variety of other species and that water level fluctuations, recreational use, and maintenance activities have the potential to affect OWA vegetation and wildlife. Overlapping land management jurisdictions for the OWA have resulted in poor management of this area due to conflicting land management objectives. While DWR’s has ultimate responsibility for managing project lands, we recognize that DFG also has an interest in managing the state’s fish and wildlife resources. We recommend including this proposed article in the project license because it would make clear DWR’s responsibility to protect resources on project lands, provide adequate recreational access to project lands, develop a set of consistent management objectives for this area in coordination and consultation with DFG, and identify roles and responsibilities for area management. We note that Butte County’s recommendation is a matter beyond the scope of the EIS and will be addressed in any license order for the project.

Butte County also recommends that it be included as a consulting party in the development of the OWA Management Plan. Since the management would be located in Butte County and has the potential to affect issues important to the County, it would be better to address these issues early in the planning process. Therefore, we recommend that Butte County be included as a consulted party on the management plan.

¹¹¹ This cost appears in cost for the No-action Alternative because it is an ongoing program that would continue.

We estimate the total annualized cost of DWR's proposed measure would be about \$723,400. The environmental and recreational benefits that would be provided by this plan would be worth the cost.

Oroville Wildlife Area Access (Proposed Article A116)

Under this measure DWR proposes to allow reasonable access to the OWA for hunting and fishing. We recognize the importance of retaining public access to the OWA and recommend that DWR provide reasonable access to project lands for recreational purposes. Additionally, any concerns regarding public access could be addressed in the OWA Management Plan (Proposed Article A115).

Protection of Vernal Pools (Proposed Article A117), Minimization of Disturbance to Nesting Bald Eagles (Proposed Article A118), Protection of Giant Garter Snake (Proposed Article A119), Protection of Valley Elderberry Longhorn Beetle (Proposed Article A120), Protection of Red-Legged Frogs (Proposed Article A121) and Construction and Recharge of Brood Ponds (Proposed Article A122)

We recommend including these proposed articles in the project license because these measures would reduce (1) water level fluctuations in brood ponds, (2) human disturbance to special status species and their habitat, and (3) unmanaged OHV use on project lands. The required measures would also establish appropriate project facility maintenance practices (e.g., pest control) that would avoid effects to special status species and their habitat. DWR's studies indicated that each of these activities contributes to reducing the quantity or quality of terrestrial habitat and it would be appropriate to include measures to minimize project-related effects of these activities on individual species and their habitat.

In addition, we also recommend DWR develop a threatened and endangered species implementation plan, in consultation with FWS and DFG, within 1 year of license issuance to describe how DWR would comply with its proposed measures to protect threatened and endangered species and terms and conditions contained within FWS's April 9, 2007, biological opinion.

We estimate the total annualized cost of these measures would be about \$183,400. We conclude that the benefits that would accrue from protecting and improving populations of and habitat for special status species would be worth the cost.

Provision of Upland Food for Nesting Waterfowl (Proposed Article A123), Provision of Nest Cover for Upland Waterfowl (Proposed Article A124) and Installation of Wildlife Nesting Boxes (Proposed Article A125)

DWR proposes to plant and manage cover/forage crops and install wildlife boxes for nesting. Waterfowl nest and brood in the wetland margins and require emergent wetland cover that is close to aquatic habitat. Grebes' nests float on top of the water in shallow water areas. DWR's study results indicate project operations cause water level fluctuations up to 12 feet to occur on a weekly basis in the Thermalito afterbay. Sudden or periodic increases in water levels can flood waterfowl nests resulting in the loss of eggs and forcing nesting hens to rebuild their nests in upland locations. Although the fluctuations expose mudflats which provide habitat to a variety of migratory shorebirds, nesting and brooding waterfowl and nesting grebes can be negatively affected. The existing upland nesting habitat has less nesting cover than what exists within the wetland margin, resulting in increased predation of nesting waterfowl that have been forced to use this habitat because of flooding. We recognize that project operations will continue to cause water fluctuations at the Thermalito afterbay that will, in turn, affect habitat availability and suitability for waterfowl. We recommend including these three proposed articles in the project license to enhance suitable habitat for waterfowl at Thermalito afterbay.

We estimate the total annualized cost of DWR's proposed measure would be about \$88,700. This would be a reasonable cost to improve waterfowl habitat.

Invasive Plant Management (Proposed Article A126 and Forest Service 4(e) Condition No. 18)

DWR proposes to develop an invasive plant management plan to manage and reduce target noxious non-native and native plant species within the project boundary.

A total of 219 species of non-native plants, not all of which are classified as noxious or invasive weeds, were identified within the project boundary during surveys conducted in 2002 and 2003. Thirty-nine of these species are target species identified as noxious or invasive plants by the California Department of Food and Agriculture, CIPC, and the Plumas National Forest. Although noxious and invasive weed species are found throughout the project boundary, they are most concentrated in the OWA. We determined that fluctuating water levels in the Thermalito Complex, Lake Oroville and in the low flow channel promote proliferation of noxious plant species along the wetland margins, river banks, and adjacent floodplain. Project maintenance activities also contribute to this condition by spreading invasive species seeds on maintenance vehicles and equipment in the upland and wetland/riparian areas of the project.

Butte County recommends that the plan include additional treatment areas designated by the county agricultural commissioner for aquatic plants that originate within the project boundaries and then invade downstream irrigation canals and agricultural lands that are outside of the project boundaries. They also recommend that they be included in the list of consulted parties in developing the plan.

We recommend including DWR's proposed measure in the project license because it would arrest the spread of invasive plant species caused by the project and infested locations within the project boundary would be renegotiated with appropriate native vegetation. Additionally, one of the goals of the proposed invasive species plan is to eradicate and/or control invasive and noxious species to reduce the number of seeds and/or plants that are flushed into downstream irrigation canals, the Feather River channel, and ultimately the San Francisco Bay delta that have the potential to invade other sensitive resources and habitats as well as downstream agricultural lands. As such, the proposed invasive species plan appears to satisfy Butte County's recommendation to add treatment areas. Review by the Ecological Committee would include a public comment opportunity that Butte County could use to provide their input to plan development.

We estimate the total annualized cost of DWR's proposed measure would be about \$122,000. This amount would be reasonable to locate and control invasive weeds within this agriculturally based region and to prevent their spread.

5.1.2.5 Recreation

Recreation Management Plan (Proposed Article 127)

DWR proposes to implement a project recreation management plan that includes constructing, reconstructing operating and maintaining recreation facilities, and implementing a comprehensive trails program.

The Oroville Facilities create settings for reservoir-, river- and land-based activities providing 3 reservoirs, 17 campgrounds, 5 day-use areas, 16 boat ramps, 90 miles of trails and interpretive and information centers at a visitor center and the fish hatchery. Developed overnight capacity includes more than 400 family campsites and group overnight capacity for 273 people-at-one-time. Recreational use is at or approaching the capacity of some of the developed recreation facilities.

The excellent fishery at Lake Oroville, one of the largest reservoirs in the state, draws anglers from throughout the region. Downstream of Oroville dam, the Feather River is also popular for angling during annual salmon and steelhead runs. Lake Oroville and other project facilities receive considerable local use throughout the year and any of the project recreation areas are within a few minutes drive of the

city of Oroville. Lake Oroville is also the closest reservoir for other Butte County residents living in Paradise and Chico. Over one-half of those surveyed in DWR's studies were Butte County residents. Most of the recreational activity occurs at Lake Oroville where DWR estimated annual recreational use at more than 1.6 million recreation-days with more than 900,000 recreation-days attributed to the main project reservoir, Lake Oroville where boating and angling accounted for more than 411,000 recreation-days. Recreational use is projected to be more than 2.2 million recreation-days by 2020. Project lands and water also provide settings for hiking, bicycling, hunting, equestrian use, sightseeing, and whitewater boating.

The above information demonstrates the importance of recreational resources associated with the project. Additionally, most of the comments filed with the Commission in this proceeding related to recreational resources. Accordingly, DWR has proposed an extensive Recreation Management Plan that sets forth the DWR's plan to manage recreational resources at the project. We recognize that DWR developed this plan and reached consensus on the content of the Recreation Management Plan in collaboration with many affected agencies, NGOs, and individuals. As evidenced by the many Commission filings, there are entities that disagree with the Recreation Management Plan content, and we gave particular attention to these matters in addition to public health and safety as we analyzed the content of the Recreation Management Plan.

As proposed, DWR would provide operation and maintenance of new and existing developed recreation facilities; construct new facilities to increase developed capacity, solve site specific problems (e.g., extending boat ramps) and provide accessible opportunities; and conduct monitoring, including reporting to the Recreation Advisory Committee and the Commission. We evaluated the Recreation Management Plan, and we recommend approval and implementation of the plan subject to staff revisions. We explain the recommended changes and the basis for these modifications in the following text.

Foreman Creek

DWR plans to develop additional facilities at Foreman Creek as provided in Proposed Article 129, *Improve and Redirect Recreation Usage to Specific Areas at Foreman Creek*. We recommend revising the development proposed in the Recreation Management Plan to reflect our recommendations listed in section 5.1.2.7, *Cultural Resources*, for Proposed Article A129. Our revision would not entail any additional cost.

Proposed Recreation Facilities and Improvements at Lake Oroville (Within 10 Years of License Issuance)

As proposed, the recreation improvements and actions scheduled for completion within the first 10 years at Lake Oroville would reduce identified environmental, health and safety concerns, improve access to project waters, increase accessibility, and respond to the need for additional day and overnight developed capacity. For the most part, DWR's prioritization seems to accurately reflect: (1) facility and site condition survey results; (2) the need for providing adequate access to project lands and waters;¹¹² (3) the need to meet the existing and future recreational demand; (4) the need to accommodate existing and potential types of project-related recreational uses at the project; (5) a commitment to provide accessible recreational opportunities; and (6) a demonstrated nexus between the proposed development and the project. DWR would improve boat launches; install restrooms; and construct new trails, campgrounds, and day-use areas (see table 48 in section 3.3.6.2, *Recreational Resources, Environmental Effects*). However, we note that none of the existing facilities are scheduled for replacement or refurbishment during this 10-year time frame. Specifically, during our 2005 staff site visit we observed

¹¹² Specifically, many boat launches would be improved (e.g., resurfaced, additional boarding docks) and boat ramps extended to accommodate access at low reservoir levels.

erosion, deteriorating infrastructure, non-functioning water distributions systems and areas that could be improved to reduce wildland fire potential at the Bloomer, Goat Ranch and Craig Saddle boat-in campgrounds. We recommend including these facilities in the first 10-year planning cycle to arrest ongoing effects on natural resources and provide safe and suitable project recreational facilities for the public.

Trail Condition Inventory

DWR did not report on the condition of project trails in its application and monitoring trail condition during the license term is not a component of the proposed Recreation Management Plan.¹¹³ However, DWR did file a 2-year progress report on January 27, 2007, that provides detailed information on trail conditions. We recommend including a monitoring program in the plan because it would ensure project trails are not contributing sediment to project waters and they are suitable for their designated uses (e.g., sufficient trail width and clearing). DWR proposes to change trail designations and we consider this information is essential prior to making such changes as well as for monitoring purposes. The Recreation Management Plan should provide for subsequent trail condition inventories similar to reporting on visitor use and capacity. The Comprehensive Water Quality Monitoring Program would require monitoring trails for erosion and it may be efficient to collect information for both programs at the same time.

Trail and Developed Recreational Facility Standards

The executive summary of the Recreation Management Plan states that the Recreation and Operations Program in section 7.2, "...discusses general facility and use area maintenance standards to be used"; however, we cannot find any such standards or reference thereto provided anywhere in the Recreation Management Plan.¹¹⁴

We recommend DWR review and update the existing project trail maintenance standards, as necessary, and include these standards in the Recreation Management Plan. We make this recommendation for the following reasons. First, the trail maintenance standards should be explicitly apparent with an identified connection to the project trails. Second, if the trails are being maintained to the standards we found reference to, these standards are more than 10 years old and, according to the DPR, are currently being updated. Accordingly, it would be an appropriate time to update the standards to reflect state-of-the-art trail maintenance principles. Third, we consider that changing the designations creates a need to monitor trails for proper maintenance to ensure they remain suitable for their designated use and these standards would provide a basis for monitoring.

Similarly, we could not find maintenance standards for developed recreation facilities (e.g., campgrounds, day-use areas, boat launches, and education and interpretive centers) and believe these standards are necessary for informational and monitoring purposes. We recommend DWR locate, review, update, these standards, as necessary and incorporate or append them to the Recreation Management Plan.

Monitoring Trail Use

We recognize changing use patterns in the future may create the need to adjust trail use designations. Surveying the existing trail users would provide information about existing use, needs, and user conflicts. However, this methodology would not capture unmet demand and reveal the reasons why

¹¹³ The Recreation monitoring indicators and standards listed in table 7.3-1 of the Recreation Management Plan include monitoring trail *use* but do not include monitoring trail *conditions*.

¹¹⁴ We found reference to trail standards in the record of DWR's 2001 application to amend the project license and we presume these are the standards being used to maintain project trails.

some potential users may not be using the project trails. We recommend the recreation monitoring effort be expanded to include surveys of potential trail users (e.g., user groups or organizations, mail back surveys) to provide this information for adaptively managing recreational resources.

Fourth of July Fireworks

Under the Recreation Management Plan operation and maintenance program, DWR proposes to provide \$210,000 annually to support the Fourth of July fireworks display at Lake Oroville. In section 3.3.6, *Recreational Resources*, we determined there is not an identified effect of the project that creates a need for this costly measure. We recommend removing this program from the Recreation Management Plan. However, we recognize the value of this event to the local community and DWR may choose to continue to support this effort outside of the project license.

We estimate the total annualized cost of DWR's proposed Recreation Management Plan and, as modified by staff, would be about \$4,404,600 and \$4,201,800, respectively. The need to provide safe and accessible facilities for project-related recreational activities and access to project lands and waters justify the estimated cost to develop and implement the Recreation Management Plan.

Recommendations of Others

Recreation Development and Accessibility—Butte County recommends that DWR: (1) provide reasonable swimming facilities at the project, (2) develop water skiing facilities, and (3) consider the feasibility and socioeconomic impacts of a whitewater park to offset the loss of whitewater opportunities at the project due to development of the project.

Anglers Committee et al. recommend that DWR: (1) develop a plan to provide sandy beaches at the Oroville Facilities campgrounds located adjacent to a reservoir to address public safety and provide obstacle-free wading opportunities, (2) prepare a plan addressing accessibility pursuant to the ADA for all public facilities at the Oroville Facilities, (3) modify all facilities available to the public to be ADA accessible including restrooms, campgrounds, day-use areas, parking areas, boat ramps, and boat piers, (4) maintain an ADA-compliant daily shuttle service at the Lime Saddle marina and Spillway boat ramps (service between the parking areas and ramps), (5) prepare a detailed recreation plan addressing short term and long term recreation planning needs and submit it to the Commission, and (6) comply with the needs of the community of Oroville when funding recreational facilities in the future.

We determined that under the Recreation Management Plan DWR would investigate additional beach and swim area improvements and, incorporate ADA compliance measures when improving, and expanding recreation facilities. Accessibility is included in DWR's proposal to upgrade several trails to meet ADA accessibility standards for slope and surface, which would result in approximately 12 miles of ADA accessible trails within the project boundary. In addition all new facility construction proposed in the Recreation Management Plan would be ADA-compliant. Therefore, we conclude that the Recreation Management Plan adequately addresses both Butte County and Anglers Committee et al. recommendations relative to recreation development, accessibility, and swimming areas.

We do not recommend including a water-skiing facility as Butte County recommends. Providing this type of facility is not necessary in order for visitors to water ski on the reservoir. We do not find that the need for this facility corresponds to any identified need regarding public access or recreational use related to the project.

We do not recommend mitigating for any effects associated with whitewater boating opportunities affected by the original project as Butte County recommends.

And finally, we find that the Anglers Committee et al. recommendation to consider the needs of the Oroville community in managing recreational resources at the project would be addressed through the

opportunity for community input to recreation management through the Ecological Committee, Recreation Advisory Committee, and License Coordination Unit.

Recreational Access—The Anglers Committee et al. recommend that if DWR continues to charge launch fees to boaters, it should hold annual public meetings to develop and finalize the boating fee schedule and that the fees should be approved by the Commission. The Anglers Committee et al. recommend that any documents supporting DWR’s fee schedule at the Spillway and Lime Saddle boat launches should be provided to the public. Butte County also expresses its concerns with the current user fees at Lake Oroville and recommends DWR consider the benefits it derives from the project when calculating user fees on project lands.

The Anglers Committee et al. also assert that DWR has a duty and responsibility to protect boaters from navigation and public safety problems at Lake Oroville, such as floating debris. They recommend that DWR prepare and implement a management plan for removing dangerous debris from the reservoir and that DWR be held liable for harm and damage to private boats and equipment by securing a bond of one billion dollars or a feasible amount for the entire recreation season.

DWR proposes to continue removing floating debris on Lake Oroville, which incorporates part of the Anglers Committee et al. recommendation. We do not recommend that DWR be required to secure a bond for liability because they propose to continue removing debris from the reservoir surface. Boaters using the lake must assume a reasonable amount of risk normally associated with this recreational activity.

We do not recommend including any measures that relate to user fees at the project because the Commission’s regulations state in 18 CFR §2.7 that the “Commission will not object to licensees and operators of recreational facilities within the boundaries of a project, charging reasonable fees to users of such facilities in order to help defray the cost of constructing, operating, and maintaining such facilities.” DWR’s current practices related to charging user fees (indirectly collected through DPR) are consistent with this regulation. The reasonableness of the fees charged is not within the scope of this analysis and not a decision that will be made during this relicensing proceeding. We also note that there are developed recreation facilities at the project that do not have user fees.

Recreation Monitoring—Butte County recommends that DWR conduct comprehensive recreational use surveys every 5 years beginning October 1, 2007. Butte County recommends that DWR develop a plan for conducting recreational use surveys in consultation with the Recreation Advisory Committee and that in its surveys DWR use a sample size twice the size as the one used in its 2002-2003 recreation surveys.¹¹⁵ Butte County also contends that even though the description of monitoring protocols and standards (triggers) is comprehensive and the carrying capacity standards are well defined, the monitoring and trigger provisions are hopelessly vague, providing so many management options that it seems highly unlikely that new facilities would be built when existing recreation facilities become overcrowded.

Whereas Butte County recommends visitor surveys every 5 years, the Recreation Management Plan indicates visitor surveys would be conducted every 10 to 12 years. We find that DWR’s proposed survey frequency is adequate because DWR would collect and report other user information on a biennial and 6-year frequency (see table 7.3-1 of the Recreation Management Plan). This interim information would provide a basis for determining trends in the level of recreation use and facility conditions and any recreational use effects on natural resources. Considering visitor surveys are not the only source of information that informs recreation management decisions, surveying visitors once every 10 to 12 years would be sufficient and this information would be reported in every other Form 80 filed with the Commission. Periodic assessment reports on the results of recreation monitoring would allow the

¹¹⁵ DWR conducted 2,583 onsite surveys and collected 1,071 mailback surveys (2002 to 2003).

Commission to review the condition and use of the proposed recreation facilities as they are planned or as modifications are required over the license term.

Regarding Butte County's assertion that the monitoring and trigger mechanisms are vague, we recommend modifying the Recreation Management Plan to clearly identify, and update, as necessary, maintenance standards for developed recreation facilities, including trails and incorporate these into the Recreation Management Plan (see *Trail and Developed Recreational Facility Standards* above). These would provide a consistent well-defined basis for monitoring facility condition. In addition, the Recreation Management Plan includes an interactive approach to decision-making that incorporates feedback mechanisms to evaluate actions and incorporate new information as it becomes available.

Recreation Management Plan Revisions—Butte County recommends DWR institute additional opportunities for review and comment and receiving recommendations from others when periodically updating the Recreation Management Plan. The Anglers Committee et al. recommend that DWR not file any proposed recreation amendments with the Commission until they have been reviewed by and agreed upon by the public.

We note that DWR would consult with the Recreation Advisory Committee in determining the frequency for updating the Recreation Management Plan. Any additional details of participant involvement outlined in other recommendations will be addressed in any license order for the project.

Site-specific Recreation Developments—Butte County states that the facility upgrades DWR proposes at Lake Oroville are not designed to accommodate current and realistic projections of recreation demand during the new license term but will only allow DWR to comply with ADA. Butte County recommends DWR construct more facilities such as campgrounds and marinas and should provide more docking/moorage and improve the facilities and services offered at the Bidwell Canyon and Lime Saddle marinas.

DWR's proposal to expand capacity at boat launches and parking areas, and campgrounds where use levels are at or approaching capacity adequately addresses Butte County's concerns. DWR has proposed increasing capacity at each of these types of facilities throughout the project. Therefore we don't recommend adoption of Butte County's recommendations.

We recognize there may be a shortage of boat moorings, docks, and storage at commercial marinas at Lake Oroville. However, while they facilitate the public's use of project waters, they are not necessary to provide public access to project waters. We do not find that the need for this facility corresponds to any identified issue or concern regarding public access or recreational use related to the project.

George Weir, Vicki Hittson-Weir, and Pathfinder Quarter Horses et al. recommend that DWR purchase land and provide various improvements (e.g., multiple events center, Potter's Ravine Marina) and funding (a detailed description of this recommendation is provided in section 3.3.6.2 *Environmental Effects, Trails and Trail Management*). However, Pathfinder Quarter Horses et al. did not clarify how the multiple-event center would address or resolve specific project effects. Consequently, we do not recommend including this measure because we did not find sufficient information to determine that a multiple-use events center has a nexus to the project or if it would be located within the project boundary. Similarly, we cannot determine how the 83-acre equestrian park is linked to the project or how this facility would address or resolve specific project effects.

We do not recommend developing a marina at Potters Ravine because only 35 to 38 percent of the respondents to DWR's recreation surveys reported the need for additional boat ramps and marinas and over 60 percent thought that the number of marinas at the Oroville Facilities was sufficient. Additionally, we note that DWR implements closures in this area to protect bald eagles during nesting season. The placement of a marina in this location, as Pathfinder Quarter Horses et al. recommend, may conflict with

other resource management objectives. Based on a lack of demonstrated need and potential conflicts with bald eagle management, we do not recommend developing a marina at Potters Ravine.

We determined the site-specific measures recommended at Saddle dam, Loafer Creek, and Lakeland Boulevard are not sufficiently different from DWR's proposal and provisions in the Recreation Management Plan substantially accommodate Pathfinders' recommendations.

We do not recommend including a measure to require DWR to build an Oroville Rim trail because steep slopes are common along the 167 miles of the Lake Oroville shoreline and this condition would probably limit the ability to create a trail or, at a minimum, require substantial site modification to avoid soil erosion. In addition the existing trail use at the project is characterized as low to moderate. Based on difficult site conditions and because the existing and proposed project trails appear to meet current and projected demand, we do not recommend including this measure in the project license.

The Lake Oroville warmwater fishery is currently a self-sustained fishery and the black bass fishery is excellent, both in terms of angler effort and economic effect on the area. Since the bass population is self-sustaining, stocking, as Pathfinders recommends, would be unnecessary. We also find that DWR's proposed warmwater fishery improvement program (Proposed Article A110) would sufficiently improve habitat and catch rates for warmwater fish.

Anglers Committee et al. recommend that DWR construct additional public boat launching facilities in the Feather River downstream of the fish barrier dam and downstream of the Thermalito afterbay outlet and fund trash removal at all public facilities in the OWA.

The Recreation Management Plan includes additional boat launch development at the OWA and appendix B of the Settlement Agreement includes a measure to provide funding to manage the OWA. We therefore conclude that the Anglers Committee et al.'s recommendation is already adequately addressed by DWR's Proposal.

Trails and Trail Management—Individuals, agencies, and organizations filed a multitude of letters both in support of and in opposition to the trail designations in the Recreation Management Plan.¹¹⁶ Most of the opposing commentors are equestrian users and most of the supportive commentors are bicyclists.

In terms of the number of users, DWR's use studies showed that there was low to moderate use on trails throughout much of the year with hikers constituting most (65 to 82 percent) of the existing trail users, with the exception of the Thermalito diversion pool where most users were equestrians followed by bicyclists. At Lake Oroville, equestrians were the second largest user group representing 15 percent of the existing trail use closely followed by bicyclists (11 percent). These data indicate that the existing use of most of the project trails is primarily pedestrian with the remainder of the use attributed to almost equal percentages of equestrian and bicycle use.

Based on DWR's study results, we determined there may be slightly greater existing demand for more bicycle trails than equestrian trails in the project area. Looking into the future, demand for all types of trail use will increase over the term of the license. DWR's studies indicate that hiking will have high demand and both bicycle and equestrian use will have moderate demand.

Currently, there are 2.6 miles of trails available only to hikers, 27.4 miles of trails available only to hikers and equestrians, and 51.4 miles of trails available only to hikers and bicyclists, with some segments of those trails also open to equestrians (see figure 19). About half of the bicycle trails near the Thermalito forebay and Thermalito afterbay are paved and the other half are graveled, whereas unpaved equestrian/hiking trails and bicycle/hiking trails can be found in the hills surrounding the Thermalito diversion pool and Lake Oroville. Under the Proposed Action there would be 2.6 miles of trails available

¹¹⁶ Commenting entities are identified in section 3.3.6.2, *Recreational Resources*.

only to hikers, about 6 miles of trails available to hikers and equestrians, and the remaining 81 miles of trails available to hikers, bicyclists, and equestrians. DWR would also develop approximately 0.5 mile of trail available only to hikers, approximately 5 miles of trail available to hikers and bicyclists, and approximately 5 miles of trails available to hikers, bicyclists, and equestrians. DWR would increase the total amount of trails accessible by all groups and create different route options through trail designation changes and the addition of connector segments. The most notable change would be opening more than 21 miles of trails to bicycle use where it historically has not been allowed. This change would give bicyclists access to more unpaved terrain in the hills, but would result in about a 78 percent reduction in the length of trails where equestrians could ride without expecting bicycle encounters.

Although the intent of DWR's proposed draft Comprehensive Non-Motorized Trails Program is to increase access for all user groups and retain portions for equestrian-only use, it does not allow for continuous access on the project trails for each group. For example, implementation of the program would convert most of the Dan Beebe trail to multiple use, except for the switchback portion in the middle of the trail. This would create a discontinuous route for bicyclists and equestrians who do not want to ride with bicyclists. In effect, equestrians would not have an 'equestrian-only' way to access to this portion of the trail. Creating a parallel trail to provide separate trails for each type of use would eliminate this circumstance. However, as proposed, the parallel trail would be built, if feasible, after the Dan Beebe trail would already have been changed to multiple use. While the Proposed Action would increase access to more miles of trail in absolute terms, increase access to different types of trails, and create more route options, there are several fundamental issues that must be resolved.

Considering our 2004 finding and our conclusion here that there is almost equivalent demand for equestrian and bicycle trails in the project area, we find it is premature to change any trail designations to multiple use as outlined in the draft Comprehensive Non-Motorized Trails Program. The fact that existing trails appeal to bicyclists is not necessarily sufficient rationale for reducing the existing opportunity for a unique recreational experience for equestrians. Because the data DWR collected relative to trail use has several shortcomings (as discussed in section 3.3.6.1 *Affected Environment, 2002–2003 Estimated Annual Use: Trail Use*) that bring into question the foundation of its proposal, we find there are insufficient recreational data on which to base any final decision to change trail designations to multiple use. We make this finding given the concerns of commentors, our 2004 finding that the current recreation plan provides for a unique equestrian experience, the absence of a trail condition inventory, and the apparent existence of trail maintenance problems. However, we recognize existing and projected levels of trail use generally supports increasing access to more trails and that the data provide enough information to form preliminary determinations and trail plans.

We recommend that DWR revise the Recreation Management Plan and the draft Comprehensive Non-Motorized Trails Program to allow for the definition of trail maintenance standards and data collection that reflects existing trail designations. We recommend these revisions include provisions that DWR complete the following assessments: (1) conduct a trail condition inventory relative to the trail maintenance standards within the first year of the license; (2) conduct visitor use surveys (on-site and mail-back, including methodology to focus on multiple use and user conflicts); (3) collect additional trail use data; (4) survey the users who are not using the trails to determine latent demand; (5) complete trail feasibility investigations (as proposed); and (6) use all of this information to make final recommendations regarding a need to change the trail designations within 3 years of license issuance. Survey and trail use data collection should occur within the first 2 years of license issuance and capture data during spring, summer, and fall seasons.

Our recommendations here are consistent with DWR's statement in the draft Comprehensive Non-Motorized Trails Program that "additional trail planning and design assessment is necessary to effectively balance public access and recreational needs or desires with management requirements to ensure appropriate levels of resource protection and public safety." Finally, we recommend that the final Non-Motorized Trails Program outline a more specific, phased implementation schedule. The current

draft Non-Motorized Trails Program includes a draft schedule that states which trail changes will occur in the first 10 years after license issuance and which changes will occur in the second 10 years. Instead, the schedule for trail program implementation should include specific timelines for the assessments listed above, the development of final recommendations, and prioritized trail modification or construction. This schedule should be developed with public input representing the various user groups.

We recognize that this recommendation could eliminate existing access to some equestrian and hiker-only trails and this could decrease opportunities for equestrians who do not want to ride with bicyclists. However, this program can strike a balance between retaining some single use trails and expanding public access to the project for all users. In addition, our recommended modifications would address the safety concerns and future needs for trails at the project that were raised by entities who filed comments in opposition to the proposed trail designations. We consider both DWR's proposal and our staff modification relating to trails and trails management would have approximately equal costs.

5.1.2.6 Land Use and Aesthetics

Screening of Material Storage Area (Proposed Article A132)

DWR proposes to plant appropriate vegetation¹¹⁷ to screen the material storage area below Oroville dam from the public view. We estimate the total annualized cost of this measure is \$89,500. We consider this would be a reasonable cost to reduce the visual effects of the project equipment and support facilities.

5.1.2.7 Cultural Resources

Historic Properties Management Plan (Proposed Article A128 and Forest Service 4(e) Condition No. 16)

DWR proposes to implement the Historic Properties Management Plan for the project.

Project effects on cultural resources include erosion from fluctuating water levels, and project recreational use. We agree that the project license should include this measure to require DWR to implement an HPMP to protect and manage these resources. However, we recommend some changes to the draft HPMP before it is approved by the Commission.

The draft HPMP states that resource evaluations of the 144 ethnographic and ethno-historic locations, a 10-percent sample of the historic-era archaeological sites, and a limited number of prehistoric archaeological sites subject to ongoing project effects are underway, but DWR does not provide a list of the resources to be evaluated nor a timetable for the completion of these evaluations. We also note that DWR proposes to complete formal resource evaluations of about 20 percent of the prehistoric sites located in the APE. We cannot determine if this proposal is adequate because the HPMP does not provide the rationale for not evaluating all of the sites. We recommend DWR provide its rationale for evaluating only 20 percent of the sites and whether this percentage includes the sites in the Lake Oroville fluctuation zone. DWR should also explain the disposition of the remaining 80 percent of the sites that they do not propose to evaluate.

We also recommend the HPMP provide for complete resource evaluations of all the sites within the fluctuation zone because of the potential harm that could occur from shoreline erosion and vandalism.

Finally, we recommend that the list of archaeological and historic resources appended to the draft HPMP include additional columns for: (1) indicating the site management recommendations and resource evaluation (National Register) status and (2) a timetable for the completing resource evaluations.

¹¹⁷ To the extent practical, native plants would be used.

This modification would enable the SHPO, the Commission, and the Forest Service and BLM, for sites on federally managed land, to better understand the resource evaluation program proposed in the HPMP in terms of the priority areas and resources for which evaluations are planned, as well as the reasonableness of the schedule for completion of the evaluations.

Improve and Redirect Recreation Usage to Specific Areas at Foreman Creek (Proposed Article A129)

DWR proposes to develop a plan to protect cultural resources at Foreman Creek while continuing to allow recreational use. The plan would outline measures to restrict usage and develop facility improvements in certain areas at Foreman Creek and justify how continued use could be sustained with specific consultees on the protection of cultural resources.

Foreman Creek has existing developed project recreation facilities. Based on both the archaeological and ethnographic survey results, Foreman Creek is also a locus of Maidu culture and is currently subject to vandalism, looting, and damage from public and recreational use, especially from OHV use. Once cultural materials are removed or damaged they cannot be replaced and the ability to learn from the artifactual context of a site is greatly diminished. Although we desire to maintain the existing developed recreational capacity at the project while planning for and installing improvements, we are uncertain that this would adequately protect or effectively reduce on-going damage to cultural sites of significance to the Maidu Tribe. We recommend closing the site until a detailed site plan for recreation development has been developed. We also recommend DWR develop the plan in consultation with affected Native American Tribes. Tribes would prefer to entirely close the site to public use because of their concern for on-going effects of recreational use on cultural resources. A temporary closure would reduce the ongoing effects of recreational use on cultural resources and provide sufficient time for DWR to prepare the plan to avoid or minimize the effects of continued recreational use. Avoidance is the preferred method to protect cultural resources and the draft HPMP filed by DWR provides for site avoidance and restrictions to public access to protect significant cultural resources. Therefore, we recommend that the plan should be developed within six-months of license issuance. It should demonstrate how cultural resources would be protected with restricted recreation at Foreman Creek, if the development of recreation facilities elsewhere in the vicinity of the site is warranted, or advocate discontinued recreational use at Foreman Creek. We anticipate this action would only cause a minor decrease in developed recreational capacity and a minimal amount of visitor displacement since there is relatively low visitor use at this small recreational site (only 4 percent of recreational use occurs at this location). These effects are minimal considering the importance of protecting irreplaceable cultural resources at Foreman Creek and the effects of existing recreational use on cultural resources in the area as identified in many filings by Native American Tribes.

We estimate the total annualized cost of implementing the HPMP, including the plan for the protection of cultural resources at Foreman Creek, would be \$1,783,900. We consider this to be a reasonable cost to protect historic properties and other culturally significant areas.

5.1.2.8 Socioeconomics

In considering the potential socioeconomic effects of DWR's continuing to operate the Oroville Facilities, we looked at the potential effects on Butte County, the neighboring cities (Oroville, Biggs, Gridley, Chico, and Paradise) and the region. Neither DWR's proposal nor the Staff Alternative includes specific socioeconomic measures. However, our analysis shows that various proposed and staff-recommended measures would affect socioeconomic resources. Operation of the Oroville Facilities as proposed would continue to attract tourist dollars from recreationists; would maintain or increase state agency expenditures from DWR, DFG and DPR; and would continue to support employment related to recreation and O&M activities. In addition, proposed facility modifications, including modifications to improve habitat for anadromous fish and improve recreation facilities, would provide a substantial

number of construction related jobs in addition to the more than 1,000 jobs currently supported. The increase in O&M expenditures would also create other employment opportunities. Recreational facility improvements would likely lead to increased visitation and associated spending, while measures designed to enhance both warm and coldwater fisheries could lead to increased catch rates and an improved recreation experience, which could also lead to increased visitation and spending.

Project socioeconomic effects would not be uniform across all jurisdictions. Because the city of Oroville has more lodging places, eating establishments, and shopping destinations than unincorporated Butte County, most of the sales tax revenue associated with project-related spending (both the spending of recreational visitors to the project and project-related O&M spending) accrues to the city. DWR's analysis, with which we concur, shows that the city of Oroville receives a net fiscal benefit from the project, with project-related tax revenue exceeding project-related expenditures. Similarly, the cities of Biggs, Gridley, Chico, and Paradise are projected to experience a net fiscal benefit. Our analysis shows that the opposite would be true for Butte County, where project operation would likely continue to have a direct negative net fiscal impact. The County's costs are predicted to exceed revenues associated with all three elements of project-related economic activity, including non-residents visiting the Oroville Facilities for recreation, O&M related to the project, and indirect growth attributable to the population supported by visitor spending and related economic activity.

In terms of regional effects, the project would continue to provide flood protection benefits and increased property values in some neighborhoods near Lake Oroville.

Recommendations of Others

Butte County recommends DWR relocate the Emergency Operations Center; provide low cost power to local residents; provide funding for law enforcement, fire and rescue services, health and human services, and road construction and maintenance; make payments in lieu of taxes; and prepare socioeconomic monitoring reports to describe the status and effectiveness of DWR's implementation of these measures.

Emergency Operations Center—We are not convinced that DWR's operation of the power canal or that DWR's operation of the Oroville Facilities during flood events has increased the flood risk for the Emergency Operations Center, which is not in either the 100-year or 500-year floodplain. Even during the 1997 flood, a low probability event, the Emergency Operations Center was not damaged. This low probability, in combination with the fact that the inlet to the Thermalito power canal can be regulated by three radial gates and the fact that the Emergency Operations Center is at a higher elevation than the power canal, suggests that operation of the project helps alleviate downstream flooding and does not increase the flood threat to the Emergency Operations Center.

Low Cost Power—The potential distribution of low cost power is an issue beyond the scope of this EIS.

Cost for County Services—DWR's study results and Butte County's socioeconomic studies presented divergent conclusions. We critiqued the methods used by both parties and did not entirely concur with some of the assumptions and analysis presented by either. Consequently, we used information in both DWR's and Butte County's reports and what we considered to be defensible assumptions to adjust the reports' findings (see section 3.3.10.2, *Environmental Effects, Net Fiscal Effects in Socioeconomics*). Our staff estimate of the net fiscal deficit, -\$573,800 represents about 0.2 percent of the County's total FY 2002-2003 budget, and about 2 percent of the General Fund budget, which covers safety and law enforcement costs.

As we note in the socioeconomic section, this estimate of net fiscal effects does not account for other tax revenue estimates that have been submitted in the record, including a possible net tax revenue increase of \$598,000 associated with the land and developments protected from flooding by the project

(CH2M HILL, 2006) and a positive but unquantified change in tax revenue associated with the increased value of property near Lake Oroville (Harza/EDAW Team and DWR, 2004). Nor does it account for possible indirect benefits related to DWR's planned Supplemental Benefits Fund.¹¹⁸ However, none of these revenue estimates consider County expenditures that could be associated with any of the revenues, and it is not clear that they would have a net positive fiscal effect if both revenues and expenditures were considered.

After considering the costs and benefits that have been quantified, we conclude that the project may impose a negative net fiscal impact on Butte County. This negative net fiscal impact is the result of the County's obligation to provide services to the project and project visitors, including law enforcement, fire and rescue, and road maintenance services, that are not compensated through property taxes, sales taxes, or other payments. Some of the economic benefits that the project provides, that were not quantified in our fiscal analysis, may lessen this negative impact.

Payments in Lieu of Taxes—As a state entity, DWR does not pay state, local, or federal taxes associated with the Oroville Facilities, which an investor-owned utility would be required to pay. Any tax or other payment would help to reimburse the County for the services it provides. However, state and local tax law does not fall under the Commission's jurisdiction, and including payments in lieu of taxes in any project license is an issue beyond the scope of this EIS.

Socioeconomic Monitoring Report—There is no clear indication of why the data or reports are needed. Because Butte County's recommended socioeconomic monitoring report does not identify a specific information need or indicate how such information would be used, we do not recommend including this measure in the project license.

5.1.2.9 Administrative

Ecological Committee (Proposed Article A100)

DWR proposes to establish and convene, within 3 months of license issuance, an Ecological Committee for the purpose of reviewing plans and reports and providing advice to DWR on implementing 13 proposed articles.

The project encompasses numerous types of natural, social, and cultural resources. Several programs are proposed to address the effects of the project on these interrelated resources and each program has monitoring, reporting and evaluation elements, some with adaptive management provisions. We recommend including this measure because an Ecological Committee would be an effective framework for DWR to engage interested parties in reviewing monitoring results and making recommendations related to implementation of certain license articles. This committee would provide a forum for interdisciplinary discussions and integrated approaches to making recommended changes related to adaptive resource management. The list of proposed Ecological Committee members¹¹⁹ includes appropriate key agencies at the federal, state, and local levels while protecting any agency's authority as it may relate to a specific license condition. Since the goal of the committee is to reach consensus on recommendations related to specific articles, there would likely be fewer divergent opinions on recommendations to the Commission. This would streamline Commission approval and avoid delays

¹¹⁸ See appendix B of the Settlement Agreement.

¹¹⁹ With the exception of the Water Board and Regional Board, members are required to be signatories to the Settlement Agreement. We note that not all of the entities listed in the proposed article, including Butte County, have signed the Settlement Agreement and therefore may not be eligible to be Ecological Committee members.

to implementing changes. Benefits would be realized sooner than if the Commission needed to evaluate competing recommendations. Therefore, we recommend the establishment of the Ecological Committee.

We recognize that some parties object to the Ecological Committee membership requirement of being a signatory to the Settlement Agreement. The details of participant involvement will be addressed in any license order for the project. We estimate that the annual cost to establish and implement the Ecological Committee would be \$57,000. This would be a reasonable cost to provide a forum for stakeholders to review and comment on DWR's monitoring efforts and adaptive management actions related to license implementation.

Flood Control (Proposed Article A130)

This proposed article restates DWR's responsibility to operate the project for flood control pursuant to section 204 of the Flood Control Act of 1958 and other applicable law.

We recommend including this proposed article to acknowledge the project will continue to be operated subject to Corps rules and regulations for flood control. We also recommend in any new license articles similar to articles 32 and 50 of the existing license, to require that DWR continue to collaborate with the Corps in implementing a program of operations for the Project in the interest of flood control.

Early Warning System (Proposed Article A131)

This measure requires DWR to develop an Early Warning Plan for Commission approval. We recommend including this measure as part of the project's existing Emergency Action Plan. The licensee should develop the early warning system in consultation with the specified agencies. Upon completion, the licensee should file the proposal with the Commission's Division of Dam Safety and Inspections San Francisco Regional Office, along with documentation of consulted agencies approvals. Upon review, San Francisco Regional Office would direct the licensee to modify the project's Emergency Action Plan to include the new measure, or take other actions as appropriate.

Project Boundary Modifications (Proposed Article A133)

Under this proposed article, DWR proposes to file revised exhibit G maps and a license amendment to show all project works. In accordance with section 4.41(h) of our regulations and/or specific articles in a license, the Commission requires that licensees file updated exhibit G drawings.

Expenditures (Proposed Article A134)

This measure acknowledges that the Commission reserves the right to require the licensee to undertake reasonable actions regardless of cost caps identified in the Settlement Agreement articles.

Procedural Requirements (Proposed Article A135)

Under this measure the Commission would not consider motions from Settlement Agreement signatories to reopen or amend the project license unless they have complied with procedural requirements of the Settlement Agreement.

This matter is not addressed in our recommendations; however, it will be addressed in the license order for the project.

Recommendations of Others

Multiple entities recommended eliminating the requirement to be a signatory to the Settlement Agreement in order to be a Recreation Advisory Committee member. Several other commentors had recommendations relating to public involvement, organizational structure of the Recreation Advisory

Committee and complaint processes. Our analysis focuses on the function of the proposed committees. Issues concerning membership or related organizational processes are not addressed in our recommendations, but will be addressed in the license order for the project.

5.1.3 Forest Service Terms and Conditions

The Forest Service filed 19 preliminary 4(e) conditions for the project. Two preliminary 4(e) conditions that are not standardized license conditions or included in the proposed articles of the Settlement Agreement are discussed below in sections, 5.1.4.2, *Protection of Forest Service Special Status Species*, and 5.1.4.3, *Fuels Management Plan*.

5.1.4 Additional Measures Recommended by Staff

We recommend including the following additional measures not contained in the Settlement Agreement in any license issued for the project.

5.1.4.1 Reseeding Oroville Dam

We recommend DWR develop a plan to continue reseeding the Oroville dam with wildflowers. DWR indicated that seeding the dam face with poppies has not been successful and is more costly than we originally estimated in the draft EIS. The plan should identify planting locations, characterize seasonal presence of the plants, and describe the estimated plant height. The plan should also state that DWR would remove the plants if the Division of Dam Safety Inspections determines this action would be necessary for the purposes of dam safety or inspections. We note that providing a floral cover would continue a practice that DWR initiated as an interim measure during its relicensing effort. We also recommend securing plan approval from the Division of Dam Safety and Inspections, San Francisco Regional Office to address any dam safety concerns before implementation. Although this measure would not provide screening for the dam, it would take advantage of its prominent feature on the landscape by introducing a dimension of interest and scenic beauty that would please those viewing the dam. We find that since the view cannot be screened, it should at least have a pleasing appearance. We recommend the use of self-sustaining plant species and to occasionally supplement bare areas on an as-needed basis to continue providing this benefit. We consider the cost for this measure to be minimal compared to continuing to provide the benefits of a pleasing and interesting view to visitors as well as the local residents.

We estimate the total annualized cost of this measure would be about \$900. We consider the improvements to aesthetic resources to be worth the cost.

5.1.4.2 Protection of Forest Service Special Status Species (Forest Service 4(e) Condition No. 17)

This preliminary 4(e) condition would require that DWR prepare a biological evaluation of the effects of any proposed project construction activities on Forest Service special status species or their habitat.

We recommend including this condition in the project license. Although the Proposed Action does not include construction on National Forest System lands, unforeseen events could occur that result in such a need. This condition provides a contingency that would afford proper protection for special status species if construction were necessary on National Forest System lands. We find it is appropriate to include this measure in the project license considering the agency's statutory authority to protect special status species and any such construction would be directly related to the project.

We do not estimate the total annualized cost of this measure but we find it would be minimal. There is no planned construction under the Proposed Action, and it is unlikely that any such construction would be needed.

5.1.4.3 Fuels Management Plan (Forest Service 4(e) Condition No. 19)

This preliminary 4(e) condition would require a fuel management plan for National Forest System lands within the project boundary.

Although there is minimal National Forest System land within the project boundary we note that its upslope location from the project places these lands at particular risk from fires that may be related to the project. We also note that DWR has agreed to prepare a broader fuels management plan for the project and DWR's actions under this condition would be a minor component of the larger plan. We recommend including this measure because it would reduce the risk associated with potential project-related fires and would require a marginal level of effort to develop this plan as part of the larger plan DWR proposes to develop under Measure B102, *Development of a Fuel Load Management Plan*, of the Settlement Agreement.

We estimate the total annualized cost of this measure would be about \$1,000.

5.2 CUMULATIVE EFFECTS

Geology and Soils

The interruption of natural geomorphic processes that has been occurring in the Feather River watershed beginning with timber harvesting and hydraulic mining activities in 1800s and followed by hydroelectric facility construction within the watershed since the early 1900s would continue under the No-action Alternative. The Oroville Facilities and other upstream hydroelectric dams would continue to cause a sediment deficit in the river. These facilities would also continue to reduce sediment transport, channel migration, and the recruitment of gravel and LWD on portions of the Feather River. The continued deprivation of sediment load in the Feather River from related actions would also result in a reduction in the formation of sediment benches and point bars, which in turn would affect the ability of the channel to capture and retain quantities of LWD. These geomorphic effects would result in incremental reductions to channel complexity downstream of the Oroville Facilities. The most significant reductions in downstream channel complexity (as related to reductions in salmonid holding, spawning, and rearing habitat) are the continued coarsening of the Feather River salmonid spawning beds, homogenization of the channel (decrease in pool depth, and reduction in channel migration and alteration of pool riffle sequences), and reduction of LWD loading. The Oroville Facilities would continue to attenuate peak flows, providing a level of flood protection benefits downstream.

Under the Proposed Action and Staff Alternative, the Gravel Supplementation and Improvement Program (Proposed Article A102), the Channel Improvement Program (Proposed Article A103), the Structural Habitat Supplementation and Improvement Program (Proposed Article A104), and the Riparian and Floodplain Improvement Program (Proposed Article A106) would provide some improvement in the level of channel complexity downstream of the fish barrier dam. Side-channel habitat improvements would provide about 2,500 feet of additional spawning and rearing habitat available to salmonids and some large wood and/or other habitat features (between 50 and 500 elements) would be placed in the river. DWR proposes to place 8,300 cubic yards of gravel in the river to improve spawning habitat and offset the sediment deficit. The increase in minimum flow in the low flow channel would not affect geology, soil, and geomorphologic resources because the increase is still far below the threshold required to cause any geomorphic change, as related to channel migration, scour and sorting of spawning gravels, or recruitment of LWD. There would continue to be an estimated 97 percent reduction in sediment supply from the watershed above Lake Oroville, and a reduction in channel migration, gravel, and LWD

recruitment. The Oroville Facilities would continue to attenuate peak flows, providing a level of flood protection benefits downstream.

Water Resources

Since construction of the Oroville Facilities, and other FERC-licensed projects upstream of the Oroville Facilities, their operations have affected water quantity throughout much of the Feather River Basin. Increasing flows in the low flow channel would slightly increase localized flows in that reach; however, such changes would not be expected to produce a major shift in flows downstream of the Oroville Facilities. Under all the alternatives, we would expect average annual Feather River service area deliveries under existing conditions and year 2020 conditions to remain 994,000 acre-feet, and average annual South Delta deliveries to increase from the existing 3,051,000 acre-feet to 3,247,000 acre-feet in year 2020. Although the annual flows in the Feather River downstream of Thermalito afterbay would remain similar over time, there is a seasonal change in flow distribution with higher flows from May through August and lower flows from September through April under year 2020 conditions relative to existing conditions.

Aquatic Resources

Past and present cumulative effects on aquatic resources in the Feather River Watershed result from hydropower development and operations; irrigation withdrawals; agricultural and urban development; extensive mining activities; recreational use and development; timber harvesting; road building and maintenance; sport and commercial fisheries; and hatchery management.

These actions have caused adverse water quality and aquatic habitat effects, such as increased erosion and sedimentation, chemical and bacterial contamination, decreased floodplain connectivity, decreased riparian zones and LWD recruitment potential, altered peakflows and baseflows, altered sediment transport, wetland and side-channel filling, riprapping to control channel migration, decreased aquatic habitat complexity, creation of migration barriers, changes in anadromous run timing and genetics, decreased MDN and productivity, and non-native fish and noxious/invasive weed introductions (see also Cumulative Effects in section 3.3.1, Soils, Geology, and Paleontological Resources).

The Settlement Agreement includes nine environmental measures to improve coldwater and warmwater fisheries habitats and increase the populations of ESA-listed Chinook salmon and steelhead within the project area. These measures include the formation of an Ecological Committee and development of: a Gravel Supplementation and Improvement Program; Channel Improvement Program; Structural Habitat Supplementation and Improvement Program; Fish Weir Program, Riparian and Floodplain Improvement Program; Feather River Fish Hatchery Improvement Program; Flow/Temperature to Support Anadromous Fish; and a Comprehensive Water Quality Monitoring Program that have been previously discussed. These fisheries conservation measures would reduce the cumulative effects associated with the operation of Oroville Facilities, and benefit all native, coldwater fishes (not just anadromous fishes) by improving the quality of coldwater and warmwater aquatic habitats in the Feather River.

Terrestrial Resources

Riparian communities in the Sacramento Valley have been adversely affected by the development of numerous hydroelectric and reservoir projects, mining, water diversions, channelization, and levee construction. Project facilities and operations contribute to the loss of riparian communities downstream of the project by reducing sediment discharge and floodflows.

Flow management and project maintenance, along with recreational use, land development, agriculture, and fire suppression contribute to the loss of upland plant communities and wetlands and the spread of invasive species. Loss of vegetation would occur, as a result of the proposed aquatic and

recreational measures, as well as non-project related land management, development, and agriculture. Water level fluctuations and project recreational use contribute to the loss of waterfowl and grebe nesting habitat; however, the proposed brood ponds and improved cover and forage habitat, in addition to existing activities by the DFG, would have a beneficial effect on Sacramento Valley waterfowl.

Existing and proposed activities, in addition to management and development of lands adjacent to the project boundary, would also increase the potential for invasive species proliferation. The proposed invasive species plan, however, would result in a cumulative beneficial effect on native plant communities and wildlife because it would manage for, control, and eradicate invasive species, particularly in areas with special-status species and commercially and recreationally important species.

Threatened and Endangered Aquatic Species

The cumulative effects on geomorphic, floodplain, riparian, and aquatic resources listed in sections 3.3.3 *Soils, Geology, and Paleontological Resources*, and 3.3.3, *Aquatic Resources*, have adversely affected and led to ESA-listing of Chinook salmon and steelhead in the Feather River. The Settlement Agreement includes nine environmental measures to improve coldwater fisheries habitat and increase the populations of ESA-listed Chinook salmon and steelhead within the project area. These measures include those identified above under Aquatic Resources.

DWR developed the coldwater fisheries environmental measures in the Proposed Action in cooperation with NMFS and other entities to reduce the cumulative effects associated with the Oroville Facilities and their operation and to improve the quality of coldwater habitat in the Feather River and operations of the Feather River Fish Hatchery. These measures are expected to increase the listed Central Valley Chinook salmon and steelhead populations in the Feather River, and conserve the spring-run of Chinook salmon. However, genetic introgression of hatchery and wild stocks and of spring-run and fall-run Chinook, potential disease transfer between hatchery and wild salmonids, redd superimposition, and pre-spawning mortality would still occur (albeit to a lesser degree than currently occur) due to the intense competition for limited spawning and rearing habitat, hatchery supplementation and other fisheries management practices (e.g., stocking fish from another basin) that are intended to compensate for the loss of high quality, anadromous habitat.

Cultural Resources

The Oroville Facilities is one component in the State Water Project and only one of several other hydroelectric projects in central California that affect prehistoric and historic archaeological resources located along the Feather River and its tributaries. These projects attract recreational use around the reservoirs. The increased recreational use resulting from the availability of large lakes has contributed to the inadvertent or intentional destruction of prehistoric and historic archaeological resources. While continued erosion and recreational use of the Feather River area would be expected to continue to affect prehistoric and historic archaeological resources, the measures included in HPMPs being developed or implemented at the Upper North Fork Feather River Project and the Poe Project, among others, taken in combination with the measures included in the HPMP for the Oroville Facilities would cumulatively reduce the rate of destruction of these cultural resources.

5.3 FISH AND WILDLIFE AGENCY RECOMMENDATIONS

Under provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other

applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

In response to the Commission's Ready for Environmental Analysis notice dated September 12, 2005, Interior (on behalf of FWS) filed Section 10(j) recommendations and Section 18 reservation of authority to prescribe fishways for the project on March 31, 2006. NMFS filed Section 10(j) recommendations and Section 18 reservation of authority on March 29, 2006, and DFG filed Section 10(j) recommendations on March 29, 2006. These agencies are also parties to the Settlement Agreement and, and their recommendations are consistent with DWR's proposed articles.

In their letters, Interior, NMFS, and DFG recommend that the Commission approve the Settlement Agreement and all the provisions thereof. Commission staff is also recommending that most of the provisions of the Settlement Agreement, with minor modifications, be included as terms of any new license. Although we adopt Interior, NMFS, and DFG's recommendations under the Staff Alternative, we note minor modifications to some measures listed below in italics. Our rationale for these modifications is discussed above.

Supplement gravel in the Feather River to benefit spawning habitat for anadromous fish. Monitor at least 10 of the 15 riffles every 5 years *on a rotating basis or after a high flow event. Develop a common definition of median size ranges of gravels to benefit Chinook salmon and steelhead.* (Proposed Article A102)

Identify potential actions and implement a phased program to enhance riparian corridor and connect the Feather River to its floodplain, including how flood/pulse flows may contribute to floodplain values and benefit fish and wildlife species. *DWR's evaluation of potential actions should include the potential for flood/pulse flows to increase the risk of IHN transmission. Delineate specific on-the-ground actions, or provide a quantified benchmark by which success and compliance of the measures can be assessed.* (Proposed Article A106)

Maintain at least 700 cfs in the low flow channel except from September 1 to March 31 when the requirement is 800 cfs to provide suitable conditions for spawning anadromous fish. *Obtain Commission approval prior to implementing any modification to instream flows.* (Proposed Article A108)

Meet specified water temperature objectives in the low flow and high flow channels according to a two-phase approach. A set of water temperature objectives would be targets up until 10 years after license issuance or completion of facility modifications after which they would become license requirements. Alternative water temperature objectives at least as restrictive as DWR's Proposal could be developed as part of this program *and submitted to the Commission for approval.* (Proposed Article A108)

5.4 CONSISTENCY WITH COMPREHENSIVE AND OTHER RESOURCE PLANS

Section 10(a)(2)(A) of the FPA requires the Commission to consider the extent to which a project is consistent with federal and state comprehensive plans for improving, developing, or conserving waterways affected by the project. Under Section 10(a)(2), federal and state agencies filed plans that address various resources in California. Seventeen plans address resources relevant to the Oroville Facilities. We determined there are no conflicts with the proposed project.

1. California Advisory Committee on Salmon and Steelhead Trout. 1988. Restoring the balance: 1988 Annual Report. Sausalito, CA.
2. California Department of Fish and Game, U.S. Fish and Wildlife Service, National Marine Fisheries Service, and Bureau of Reclamation. 1988. Cooperative agreement to implement actions to benefit winter-run Chinook salmon in the Sacramento River basin. Sacramento, CA. May 20. 10 pp. and exhibit.

3. California Department of Fish and Game. 1990. Central Valley salmon and steelhead restoration and enhancement plan. Sacramento, CA. April. 115 pp.
4. California Department of Fish and Game. 1993. Restoring Central Valley streams: a plan for action. Sacramento, CA. November. 129 pp.
5. California Department of Fish and Game. 1996. Steelhead restoration and management plan for California. February. 234 pp.
6. California–The Resources Agency. 1989. Upper Sacramento River fisheries and riparian habitat management plan. Sacramento, CA. January. 158 pp.
7. California Department of Parks and Recreation. 1998. Public opinions and attitudes on outdoor recreation in California. Sacramento, CA. March.
8. California Department of Parks and Recreation. 1994. California outdoor recreation plan–1993. Sacramento, CA. April. 154 pp. and appendices.
9. California Department of Water Resources. 1983. The California water plan: projected use and available water supplies to 2010. Bulletin 160-83. Sacramento, CA. December. 268 pp. and attachments.
10. California Department of Water Resources. 1994. California water plan update. Bulletin 160-93. Sacramento, CA. October. Two volumes and executive summary.
11. State Water Resources Control Board. 1999. Water quality control plans and policies. Adopted as part of the State Comprehensive Plan. Three enclosures.
12. Forest Service. 1988. Plumas National Forest Land and Resource Management Plan. Department of Agriculture, Quincy, CA. August 26. 342 pp. and appendices.
13. Forest Service. 1992. Lassen National Forest Land and Resource Management Plan, including Record of Decision. Department of Agriculture, Susanville, CA. Appendices and maps.
14. Forest Service. 2004. Sierra Nevada forest plan amendment, including final environmental impact statement and Record of Decision. Department of Agriculture, Vallejo, CA. January.
15. Fish and Wildlife Service. California Department of Fish and Game. California Waterfowl Association. Ducks Unlimited. 1990. Central Valley habitat joint venture implementation plan: a component of the North American waterfowl management plan. U.S. Department of the Interior, Portland, OR. February. 102 pp.
16. Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. U.S. Department of the Interior. Environment Canada. May. 19 pp.
17. Fish and Wildlife Service. Undated. Fisheries U.S.A: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, DC. 11 pp.
18. National Park Service. 1982. The nationwide rivers inventory. U.S. Department of the Interior. Washington, DC. January. 432 pp.

5.5 RELATIONSHIP OF LICENSE PROCESS TO LAWS AND POLICIES

5.5.1 Water Quality Certification

Section 401 of the Clean Water Act (33 U.S.C. §1341) requires that a license applicant obtain from the state a certification that project discharges will comply with applicable effluent limitations, or

waiver of certification. Without a 401 certificate, the project cannot be licensed. On October 26, 2005, DWR applied to Water Board for water quality certification for the Oroville Facilities as required by Section 401 of the Clean Water Act. On October 16, 2006, DWR withdrew and re-applied for Water Quality Certification. The Water Board is required to take action within 1 year of the application filing date, which would be October 16, 2007.

5.5.2 Endangered Species Act

Section 7 of the ESA requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or cause the destruction or adverse modification of the critical habitat of such species.

Protected salmonid ESUs that occur in the project area include the federally listed as threatened Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha*), and the Central Valley steelhead (*Oncorhynchus mykiss*). A Distinct Population Segment for the North American green sturgeon (*Acipenser medirostris*) occurs in the project area. The Feather River downstream of the Oroville dam also has been designated as critical habitat for these species. Areas upstream of Oroville dam have not been designated as critical habitat for either species by NMFS.

Although no federally listed plant species have been found in the project boundary during relicensing surveys, potential habitat exists for the following seven species: the endangered Butte County meadowfoam (*Limanthes floccosa* ssp. *Californica*), hairy Orcutt grass (*Orcuttia pilos*), Hartweg's golden sunburst (*Pseudobahia bahiifolia*), and Greene's tuctoria (*Tuctoria greenei*), and the threatened Hoover's spurge (*Chamaesyce hooveri*), slender Orcutt grass (*Orcuttia tenuis*), and Layne's ragwort (*Senecio layneae*). No designated critical habitat for these species occurs in the project area.

FWS, in a letter dated January 28, 2004, identified the following federally listed wildlife species that potentially occur in the project vicinity: the endangered vernal pool tadpole shrimp (*Lepidurus packardii*) and conservancy fairy shrimp (*Branchinecta conservatio*), and the threatened vernal pool fairy shrimp (*Branchinecta lynchi*), bald eagle (*Haliaeetus leucocephalus*), giant garter snake (*Thamnophis couchi gigas*), California red-legged frog (*Rana aurora draytonii*), and valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*). No designated critical habitat for these species occurs in the project area.

Our analysis of project effects on these species are presented in section 3.3.5, *Threatened and Endangered Species*, and our final recommendations are presented in section 5.1, *Comprehensive Development and Recommended Alternative*.

Although the seven discussed listed plant species do not occur in the project boundary, because suitable habitat does exist, we conclude that relicensing the project would be not likely to adversely affect those species. Additionally, we conclude that relicensing the project would be not likely to adversely affect the conservancy fairy shrimp and the California red-legged frog. Suitable habitat for the conservancy fairy shrimp does not exist within the project boundary. Like the listed plant species, the California red-legged frog does not exist within the project boundary, however suitable habitat does occur.

We conclude that relicensing this project with the fish habitat protection and enhancement measures proposed in the Settlement Agreement and recommended under the Staff Alternative would likely have no effect on green sturgeon in the lower Feather River because this species has not been documented in the project area. If future monitoring indicates North American green sturgeon are present in the project area, or the lower Feather River population is being affected by Oroville Facilities and operations, adaptive management strategies would be implemented in consultation with NMFS and DFG, and ESA consultation may need to be reinitiated. We also conclude that relicensing the project would not

be likely to adversely affect delta smelt because it does not occur within the project area, and the project would not affect water quantity downstream.

We conclude that relicensing this project with the fish habitat protection and enhancement measures proposed in the Settlement Agreement and recommended under the Staff Alternative would likely have a beneficial effect on the Central Valley spring-run Chinook salmon and Central Valley steelhead relative to the current conditions. DWR developed the coldwater fisheries conservation measures in the Proposed Action in cooperation with NMFS and other entities to reduce the cumulative effects associated with the Oroville Facilities and its operation and to improve the quality of coldwater habitat in the Feather River and operations of the Feather River Fish Hatchery. These measures are expected to increase the listed Central Valley Chinook salmon and steelhead populations in the Feather River, conserve the spring-run Chinook salmon, and increase the amount of suitable habitat for these species. However, the Oroville Facilities and its operation would continue to decrease the amount of high quality habitat available to these species due to the fish passage barrier that prevents access to tributaries, flow alteration, loss of LWD and spawning gravel recruitment, and decreased floodplain connectivity. As such, we conclude that the project may be likely to adversely affect the Central Valley spring-run Chinook salmon, Central Valley steelhead, and their designated critical habitat below Lake Oroville despite the proposed improvements to baseline conditions.

We conclude that relicensing this project with the terrestrial habitat protection and enhancement measures proposed in the Settlement Agreement and recommended under the Staff Alternative would likely have a beneficial effect on the bald eagle, giant garter snake, California red legged frog, Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, and valley elderberry longhorn beetle. No giant garter snakes were located within the project boundary, however, several aquatic and recreation protection and enhancement measures, such as the channel improvement program, gravel supplementation and improvement program, fish weir program, and development of recreation facilities have the potential to adversely affect giant garter snake habitat. Additionally, terrestrial and recreational resources enhancements, such as the proposed upland habitat enhancements and construction of recreational facilities, could adversely affect bald eagle, vernal pool invertebrate (vernal pool fairy shrimp and vernal pool tadpole shrimp), and valley elderberry longhorn beetle habitat. As such, we conclude that the project may be likely to adversely affect, the bald eagle, giant garter snake, vernal pool fairy shrimp, vernal pool tadpole shrimp, and valley elderberry longhorn beetle.

On October 24, 2006, we requested formal consultation with NMFS based on our findings of “likely to adversely affect” for the Central Valley Chinook spring-run salmon and Central Valley steelhead along with their designated critical habitat. NMFS has not as yet issued its biological opinion.

On October 24, 2006, we requested formal consultation with FWS based on our findings of “likely to adversely affect” for the endangered vernal pool tadpole shrimp and Conservancy shrimp, and the threatened bald eagle, giant garter snake, California red-legged frog, Conservancy fairy shrimp, vernal pool fairy shrimp, vernal pool tadpole shrimp, and valley elderberry longhorn beetle. We also requested concurrence with our finding of “no effect” on the endangered Butte County meadowfoam, hairy Orcutt grass, Hartweg’s golden sunburst, and Greene’s tuctoria, and the threatened Hoover’s surge, slender Orcutt grass, and Layne’s ragwort.

FWS issued its biological opinion on April 9, 2007, finding that the proposed project is not likely to jeopardize the continued existence of any of the federally listed species that could be found in the project area. The biological opinion included incidental take statements for the bald eagle, giant garter snake, vernal pool fairy shrimp, vernal pool tadpole shrimp, and valley elderberry longhorn beetle. The following reasonable and prudent measures to minimize the effect of incidental take are contained within the biological opinion: (1) take in the form of harm, harassment, and mortality of the valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, giant garter snake, and bald eagle during proposed project activities and activities associated with implementing the project shall be

minimized and (2) the effects to the valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, giant garter snake, and bald eagle resulting from habitat modification and temporary and permanent losses and degradation of habitat shall be minimized.

The biological opinion also included the following terms and conditions that would implement the previously described reasonable and prudent measures: (1) DWR should implement the conservation measures described in the draft biological assessment contained in Appendix E of the PDEA; (2) DWR should adhere to the conservation measures described in the biological opinion; (3) DWR should provide proof of purchase to the FWS if habitat compensation credits are purchased; (4) DWR should provide FWS with a habitat management plan for compensation areas if DWR conducts habitat compensation within the project boundary; (5) DWR should include within the habitat management plan measures to be implemented over the term of license period and a list of prohibited activities within the compensation preserve areas; (6) adherence with FWS's statement pursuant to reinitiation of formal consultation; and (7) adherence with the reporting requirements contained in the biological opinion.

Our recommended measures included as part of the staff alternative are consistent with these terms and conditions. We recommend development of a threatened and endangered species implementation plan that would describe how DWR would comply with its proposed conservation measures to protect threatened and endangered species and the terms and conditions contained within FWS's April 9, 2007, biological opinion. The implementation plan would require, in the event of unanticipated adverse effects on the giant garter snake, valley elderberry longhorn beetle, and vernal pool invertebrates, compensation plans to address adverse effects on these species, including a discussion of purchased compensation credits versus onsite habitat conservation, consistent with terms and conditions 3 through 5.

In addition to these terms and conditions, FWS also makes the following conservation recommendations: (1) the Commission should encourage DWR to work with Butte County, Butte County Association of Governments, FWS, city governments, and other stakeholders to implement a multi-species HCP in Butte County to further the conservation of special-status species; (2) the Commission should continue to encourage license applicants to implement resource actions that benefit federally listed species and their habitats to aid in the recovery of federally listed species; and (3) any transmission lines constructed as part of the Oroville Facilities should be constructed in a manner to prevent electrocution to raptor species and existing transmission lines should be modified in a manner to prevent electrocution of raptor species using methods recommended in the Avian Power Line Interaction Committee's Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 (APLIC, 2006). Although we do not specifically include these recommendations in our staff alternative, our recommended measures and policies are consistent with these conservation recommendations. The Commission routinely encourages license applicants to implement measure to benefit federally listed species and their habitats. The parties mentioned in the first conservation recommendation have sufficient incentive to develop a multi-species HCP on their own without Commission intervention. It is up to the affected parties to determine if an HCP is in their best interests. As discussed in section 3.3.5.2, *Environmental Effects on Bald Eagles*, the existing project transmission lines do not pose an electrocution hazard to raptors and no new transmission lines are proposed as part of this relicensing. If unforeseen electrocutions occur or new transmission line construction is proposed in the future, the standard consultation reopener could be invoked at that time to enforce additional measures.

5.5.3 Essential Fish Habitat

Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with the Secretary of Commerce on all actions or proposed actions that are authorized, funded, or undertaken by the agency and that may adversely affect essential fish habitat (EFH). The Pacific Fisheries Management Council has designated EFH for the following federally managed Pacific salmon: Chinook, coho, and Puget Sound pink salmon. Freshwater EFH for these

Pacific salmon includes all streams, lakes, ponds, wetlands, and other waterbodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable artificial (man-made) barriers, and long-standing, naturally impassable barriers. The Feather River downstream of Lake Oroville is EFH for Central Valley spring-run Chinook salmon (PFMC, 1999).

The Proposed Action would result in improved conditions in the Chinook salmon riverine habitat downstream of Lake Oroville over existing conditions due to the LWD and spawning gravel supplementation programs, increased flows, and floodplain improvements. At the same time, the continued regulation of flows, decreased LWD and gravel recruitment, and loss of floodplain connectivity would continue to have adverse effects on Chinook habitat, despite the proposed supplementation and improvements.

Therefore, we conclude that relicensing the project as proposed by the applicants would continue to have an adverse effect on Chinook salmon EFH, but that elements of the Proposed Action would reduce these effects over the existing conditions.

5.5.4 National Historic Preservation Act

Relicensing is considered an undertaking within Section 106 of the National Historic Preservation Act of 1966, as amended (P.L.89-665; 16 U.S.C.470). Section 106 requires that every federal agency “take into account” how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register. As the lead federal agency for issuing a license, the Commission is responsible for ensuring that the licensee will take all necessary steps to “evaluate alternatives or modifications” that “would avoid, minimize, or mitigate any adverse effects on historic properties” for the term of the new license involving the project. The lead agency must also consult with the SHPO(s), as well as with other land management agencies where the undertaking may have an effect, and with Indian tribes who may have cultural affiliations with affected properties involving the undertaking. The overall review process involving Section 106 is administered by the Advisory Council on Historic Preservation, an independent federal agency.

To meet the requirements of Section 106, the Commission will execute a programmatic agreement for the protection of historic properties from the effects of the continued operation of the Oroville Facilities. The terms of the programmatic agreement would ensure that DWR would address and treat all historic properties identified within the project area through an HPMP. The HPMP entails ongoing consultation involving historic properties for the license term.

5.5.5 California Environmental Quality Act

CEQA is the California counterpart to NEPA. CEQA went into effect in 1970 for the purpose of monitoring land development in California through a permitting process. This statute, enacted to protect the health of the environment from current and future development, requires state and local agencies to identify the significant environmental impacts of their actions and to avoid or mitigate those impacts, if feasible. CEQA applies to all discretionary activities proposed to be undertaken or approved by California state and local government agencies, including DWR and the Water Board. Because the Water Board must act on DWR’s request for a water quality certificate for the Oroville Facilities relicensing (see section 5.5.1, *Section 401 of the Clean Water Act—Water Quality Certification*), the Water Board has responsibilities as the lead agency under CEQA.

Under CEQA, an environmental impact report is prepared when the public agency finds substantial evidence that the project may have a significant effect on the environment. An environmental impact report is the public document used to analyze the significant environmental effects of a proposed project, to identify alternatives, and to disclose possible ways to reduce or avoid the possible

environmental damage. CEQA guidelines state that when federal review of a project is also required, state agencies are encouraged to integrate the two processes to the fullest extent possible, which may include a joint environmental impact report/EIS. While this document is not a joint environmental impact report/EIS, the Water Board has the opportunity to use this document, as appropriate, to satisfy its responsibilities under CEQA. As such, we invite the Water Board's comments on this EIS as they may pertain to the agency's use of the final EIS for CEQA purposes.

The content requirements for an environmental impact report under CEQA are similar to the requirements for an EIS, although an environmental impact report must contain two elements not required by NEPA. The first element needed in an environmental impact report not required by NEPA is a discussion of how the proposed project, if implemented, could induce growth. A project can be considered to have a growth-inducing effect if it directly or indirectly fosters economic or population growth or removes obstacles to population growth, strains existing community service facilities to the extent that the construction of new facilities would be needed, or encourages or facilitates other activities that cause significant environmental impacts. We discuss growth-inducing impacts of the Oroville Facilities these effects in section 3.3.10, *Socioeconomic Resources*.

The second element needed in an environmental impact report, but not required by NEPA, is a discussion of a program for monitoring or reporting on mitigation measures that were adopted or made conditions of project approval. The monitoring or reporting program must ensure compliance with mitigation measures during project implementation. The program may also provide information on the effectiveness of mitigation measures. Although discussion of the mitigation reporting or monitoring program can be deferred until the final environmental impact report or, in some cases, after project approval, it is often included in the draft environmental impact report to obtain public review and comment.

In section 5.1, *Comprehensive Development and Recommended Alternative*, we list the mitigation measures and monitoring and reporting requirements we recommend for inclusion in any license issued for the Oroville Facilities. See chapter 3, *Environmental Analysis*, for a review of the analysis of each affected environmental resource and the rationale for each recommended measure. Many of the measures are consistent with the comprehensive Settlement Agreement for the Oroville Facilities that was filed with the Commission by DWR on March 24, 2006 (see section 1.4, *Settlement Agreement*, for more discussion).

This page intentionally left blank.