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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

MAR 11 2005

Magalie Roman Salas, Secretary (8 copies)
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

Re: Comments, Modified Terms and Conditions, and Modified Prescription for the *Upper North Fork Feather River Project*, No. 2105

Dear Secretary Salas:

Enclosed for filing in the above-referenced proceeding is an original and eight copies of the National Marine Fisheries Service's comments, modified terms and conditions, and modified prescriptions for the Upper North Fork Feather River Project, No. 2105, submitted pursuant to Sections 10(a), 10(j) and 18 of the Federal Power Act and in accordance with the Mandatory Conditions Review Process, together with a certificate of service. If you have any questions regarding these documents, please contact Mr. Eric Theiss at (916) 930-3613.

Sincerely,

Rodney R. McInnis
Regional Administrator

Enclosures

The National Marine Fisheries Service's Comments, Modified Terms and Conditions, and Modified Prescriptions for the Upper North Fork Feather River Project, No. 2105

Introduction

The National Marine Fisheries Service (NOAA Fisheries Service), pursuant to Section 18 of the Federal Power Act (FPA), 16 U.S.C. 811, and the Mandatory Conditions Review Process (MCRP; signed January 2001)[1] hereby submits modified prescriptions for the safe and effective passage of anadromous fish, and modified recommendations for terms and conditions that are necessary and appropriate to provide adequate protection, mitigation and enhancement of anadromous fish resources while accommodating the prescribed fishways, at the Upper North Fork Feather River Project, Federal Energy Regulatory Commission (FERC) No. 2105 (Project) (see Appendix C).

NOAA Fisheries Service received comments and pertinent new information from a variety of sources during the year since it filed its preliminary terms and conditions and preliminary section 18 fishway prescription (dated November 26, 2003).[2] Some comments pertaining to these issues were received outside of the Mandatory Conditions Review Process comment period; however, NOAA Fisheries Service will address those which were received by December 20, 2004.

NOAA Fisheries Service has made requests for fish passage studies to the Pacific Gas and Electric Company (Applicant), but these have not been undertaken.[3] However, during the intervening year since our preliminary prescription was filed and distributed, important new information has been developed or become available primarily through the Oroville (FERC No.2100) process which demonstrates that anadromous fish passage to certain reaches of the North Fork Feather River is necessary, appropriate and feasible (see Tables 1 and 2). NOAA Fisheries Service, therefore, modifies its prescription, incorporating the best available scientific and technical information, implementing passage of Central Valley spring-run Chinook salmon (*Oncorhynchus tshawytscha)* and Central Valley steelhead (*Oncorhynchus mykiss*) to the Seneca Reach of the North Fork

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[1] Policy for Review of Mandatory Conditions Developed by the Departments of the Interior and Commerce in the Context of Hydropower Licensing (Signed January 19, 2001). Available on NOAA Fisheries Service' website at http://www.nmfs.noaa.gov/habitat/habitatprotection/pdf/FINAL%20MCR.pdf

[2] Correspondence is available electronically at http://elibrary.ferc.gov under one or more FERC project numbers

[3] Please refer to letters dated July 26, 2002; December 20, 2002; February 21, 2003, June 19, 2003, October 21, 2004, and October 22, 2004 for the Upper North Fork Feather River Project, March 12, 2003, for the Poe (FERC No. 2107) Project, and October 11, 2001, December 5, 2002; July 12, 2002; and May 28, 2003; for the Feather River (Oroville) Project (FERC No. 2100).

Feather River. Passage will also be implemented at Yellow Creek, above the Belden Powerhouse, in a phased approach.

Passage will help provide for the protection, conservation, and enhancement of several native anadromous species for which NOAA Fisheries Service is responsible. As is provided in greater detail under the heading *Description of Habitat* below, passage to the Seneca Reach and Yellow Creek will provide more than 15 additional miles of suitable habitat for anadromous fishes. Other actions in the Feather River watershed may provide a modest increase in habitat, but none can approximate the increase in quantity and quality of habitat as would be provided by passage to the Seneca Reach and Yellow Creek. The lack of fish passage has altered the genotype of Central Valley spring-run Chinook salmon due to hybridization with Central Valley fall-run Chinook salmon, and has also likely caused alterations in Central Valley steelhead.

NOAA Fisheries Service intends to include upstream fish passage in its prescription for the Oroville project (FERC No. P-2100), preferably in coordination with a settlement agreement. These fish will be released in the Project area, in the Seneca Reach of the North Fork Feather River, in Yellow Creek, and perhaps other locations. The provisions of this prescription will provide suitable habitat for both spawning and juvenile rearing. Thereafter, the Licensee will collect juvenile and kelt outmigrants, transporting them downstream to suitable locations for release.

Factors considered in prescribing fishways

Thriving populations of *O. mykiss* in these above-mentioned reaches of the North Fork Feather River provide strong evidence that the reintroduction of anadromy will be successful, as is discussed in greater detail under the heading "Description of Habitat" below. Additional flow as a result of the Project relicensing's settlement agreement will provide for additional habitat to support anadromous fish populations. Feasible fish passage technologies can be implemented in targeted reaches, avoiding the need for much more expensive devices at several other FERC projects.

NOAA Fisheries Service is actively participating in the Oroville (FERC No. 2100) relicensing process, and anticipates that a preliminary prescription will be issued in October of 2005. NOAA Fisheries Service is also participating in the Poe (FERC No. 2107) relicensing process, and intends to file a separate but coordinated fishway prescription for that project that will allow anadromous fish to utilize upstream habitats which are presently blocked by the Oroville, Big Bend, and Poe dams. NOAA Fisheries Service intends to coordinate these and other potential reintroductions in the South Feather (FERC No. 2088) and DeSabla-Centerville (FERC No. 803) relicensing proceedings. These prescriptions will work in concert with the prescription for the Project No 2105 (Appendix C), and provide for the upstream transport of anadromous fishes into the Seneca Reach and Yellow Creek.

The Project, together with certain FERC projects listed above, presently blocks passage for *O. tshawytscha* and *O. mykiss*. Both of these anadromous species are currently listed

as threatened under the Endangered Species Act (ESA; see 64 FR 50394 and 63 FR13347).

The California Advisory Committee on Salmon and Steelhead Trout was created in 1983 to develop a strategy for the conservation and restoration of salmon and steelhead resources in California. The Salmon, Steelhead Trout, and Anadromous Fisheries Program Act of 1988 was signed by the Governor of California to implement the advisory committee's recommendations, which included doubling the natural production of salmon and steelhead as of 1988. The Steelhead Restoration and Management Plan for California (CDFG 1996) summarized this Act as follows:

> Proper salmon and steelhead resource management requires maintaining adequate levels of natural, as compared to hatchery, spawning and rearing. Reliance upon hatchery production of salmon and steelhead is at or near the maximum percentage that it should occupy in the mix of natural and artificial hatchery production in the State. If both hatchery production and natural production are feasible alternatives for increasing salmon and steelhead numbers in specific situations, preference shall be given to natural production.

Central Valley spring-run Chinook salmon and Central Valley steelhead have been nearly eliminated on several Central Valley rivers. On the Feather River, these species have been heavily impacted by dam construction; however, populations still exist and require further protection. NOAA Fisheries Service concurs with the findings of this Committee, and with the Act and Plan that natural production should be given preference over hatchery production. Because fish passage is feasible for the Feather River, we hereby prescribe fish passage to protect, mitigate and enhance the natural production of these species.

The North Fork Feather was once considered "one of the nation's top five blue ribbon rainbow trout fisheries" (Cal Trout 2005). Fisherman from as far away as San Francisco once boarded a special train known as the "Rainbow Special", to fish and enjoy the anadromous salmonids of the Feather River (CSPA 2005).

In determining that passage at the Project is necessary and appropriate at this time, NOAA Fisheries Service has taken into account substantial evidence developed in connection with this relicensing proceeding and in connection with our concurrent participation in the pending relicensing proceeding for the Oroville project (referenced above). NOAA Fisheries Service has concurrent jurisdiction to prescribe fishways at both projects, and has considered that the roughly concurrent timing of these relicensing proceedings allows for simultaneous development of fishway prescriptions. Anadromous fish passage can be implemented at several projects concurrently and in a coordinated manner, is feasible and will provide substantial resource benefits. Passage for the listed Central Valley spring-run Chinook salmon and Central Valley steelhead is consistent with the public interest and NOAA Fisheries Service's stated resource goals and objectives (see Appendix A). NOAA Fisheries Service asserts that fish passage to the

Seneca Reach and Yellow Creek will bring substantial benefits to the ecology of these Project area environments, while avoiding impacts to the generation of power.

NOAA Fisheries Service also has considered that implementation of anadromous fish passage at the Upper North Fork Feather River Project, in coordination with fishways to be prescribed and implemented at the Oroville Project, may require that the Licensee obtain the legal right to access areas and facilities that are currently located outside the Project boundary, including areas or facilities that may be located within the boundary of another FERC-licensed project. NOAA Fisheries Service considered that provision for such access may be necessary for the purposes of coordinated implementation of its fishway prescriptions, and required by FERC pursuant to 18 CFR § 4.41(h) as well as Standard License article 5 (Form L-5), either by means of a modification to the existing Project boundaries, or by means of the acquisition by the licensee of use and occupancy rights other than fee title, including rights acquired by easement or lease.[4] In conjunction with this prescription, NOAA Fisheries Service recommends that FERC require the Applicant to acquire legal right to access areas and facilities as may be necessary to implement this prescription in cooperation with other FERC-licensed projects in the Feather River watershed, and in the coordinated manner described herein.

Accordingly, evidence supporting NOAA Fisheries Service present intent to prescribe fishways at the downstream Oroville project will be filed in support of this prescription for Project No. 2105 as well. NOAA Fisheries Service has engaged in discussions with the "Fish Passage Focus Group" within the Oroville relicensing process. The Applicant has been invited to attend these discussions, and has recently attended one meeting. However, NOAA Fisheries Service does not find that completing this process is necessary prior to issuing a prescription and recommendations for this Project. It finds that implementing the screening system as prescribed here at present is most efficacious and protective of our trust resources, given the continued presence of FERC projects in the Feather River. This initiative has led to the consideration of many important issues, however, including the current prescription. Please see Figure 1, and discussion elsewhere in this prescription of the "Final Submittal for Alternatives Report for Fish Passage, Cougar Lake WTC Project" (USACE 2000), which is of substantial importance in this decision.

Because this prescription is a mandatory condition which FERC will include in its licensing action, and this action is expected to affect species of Chinook salmon and steelhead listed under the Endangered Species Act, NOAA Fisheries Service requests that FERC initiate formal consultation pursuant to Section 7 of the Endangered Species Act (16 U.S.C. 1536). The Project is expected to affect these fishes by altering flows, temperatures, gravel recruitment, forage production, and riparian cover, and by blocking access to spawning, rearing and holding habitats.

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[4] The FERC licensing regulations provide, at 18 CFR § 4.41(h)(2), that "The [project] boundary must enclose only those lands necessary for operation and maintenance of the project *and for other project purposes*, such as recreation, shoreline control, *or protection of environmental resources*." (emphasis supplied).

NOAA Fisheries Service asserts that reintroduction according to this modified fishway prescription and associated modified recommendations will result in minimal negative social or economic consequences (e.g. minor changes in angling opportunities, potential disruption of in-river mining activities), and that any adverse impact will be more than offset by substantial socioeconomic and environmental benefits. Reintroduction will have positive attributes such as:

- the creation of stable sub-populations of species listed under the ESA
- utilization of cold-water winter habitat which is not practical to recreate in current Feather River anadromous waters
    - for Feather River spring-run Chinook salmon, the conservation of a stream-type life history genotype (delayed emigration to the ocean), providing for enhanced year-class stability
    - for Feather River steelhead, the conservation of a genotype which is now largely influenced by hatchery production, excessive over-summering temperatures below the Thermalito Outlet (FERC No. 2100), and extremely high competition for forage (SP-F10: CDWR 2004)
- return of Native American, culturally important species to their native rivers.
- increase in forage for terrestrial species, including bald eagle (*Haliaeetus leucocephalus*)
- the Seneca Reach of the North Fork Feather River and Yellow Creek would not be affected[5] by a controversial proposed thermal curtain which is currently being studied within the P-2105 and P-1962 processes.
- large amounts of water are currently released from the Oroville dam (FERC No. 2100) and other projects in the Central Valley for the purpose of maintaining listed species populations. Fish passage provides an opportunity to use water more efficiently.
- society and governments generally consider that salmon are worth considerable investment, for example, the Rocky Reach (FERC No. 2145) project license includes a downstream fish passage device costing $112 million (The Olympian, 2003)
- The reintroduction of species and improvements in the stability of salmon populations is important to commercial and recreational fishing interests [6]

Meyer Resources Inc. (1988) conducted an analysis of the economic benefits that would result from doubling California's salmon and steelhead stocks as legislated. The Steelhead Restoration and Management Plan for California (1996) estimates that the net annual economic benefit would for the Sacramento and San Joaquin rivers would be $101.4 million (Table 2). A large portion of this benefit could be assigned to the Feather River, given its 1843 status as "tributary to the Sacramento and still richer in salmon" (Van Sicklen 1945, as quoted in Yoshiyama et al. 2001).

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[5] Although these flows are not currently envisioned as being beneficial, some of the water temperature projections for 600 cfs releases in Appendix E2-H of the License Application exceed preferred salmonid temperatures.

[6] Please refer to the December 3, 2004 letter from the Pacific Coast Federation of Fishermen's Associations regarding the impact of FERC projects P-2100, P-2107, P-1962, P-2105, and P-2088.

Fish passage balances favorably with other Project-related benefits. The Steelhead Restoration and Management Plan for California (1996) states that the restoration of access to historic habitat should receive the highest priority for funding. While Project revenues and generation related benefits are well able to accommodate the cost of the prescribed measures to protect, mitigate and enhance anadromous fishery resources, the license application (LA) indicates that Project facilities have been fully amortized, and the Applicant's net annual benefits in today's dollars will be $1.2 billion over a 30-year License term.[7] In its 2001 report to Congress, FERC collected and interpreted data on the factors effecting the costs and timing of relicensing. The cost of protection, mitigation and enhancement including measures for Sections 4e and 18 in projects greater than 100,000 kw averages $689/kw (FERC 2001). The installed capacity of the Upper North Fork Feather River Project is 392,800 kw. Therefore, based upon FERC's analysis of relicensing costs, a natural resource mitigation budget of $270,639,200 for this Project would be consistent with the mitigation costs FERC has required at other recent relicensing proceedings. NOAA Fisheries Service proposes measures that are far less costly than this figure.

In its preliminary prescription, NOAA Fisheries Service provided for fish ladders and screens at Butt Valley and Belden dams, which would have been significantly more costly for the Licensee than the facilities currently prescribed. However, based on comments that NOAA Fisheries Service received on that preliminary prescription and information developed during the relicensing proceeding for P-2100, NOAA Fisheries Service has modified its prescription to accomplish the goal of safe, timely, and effective fish passage in a more cost-effective manner.

NOAA Fisheries Service has been an active participant in this relicensing, and has been consistent about its interests in assessing the potential for fish passage studies. For additional detail on these matters, please refer to the study requests which NOAA Fisheries Service has previously presented.[3] In support of these requests, NOAA Fisheries Service also gave a presentation to the Project relicensing group (2105LG) during the earlier settlement negotiations. However, as mentioned above, the Applicant has not performed the requested studies.

As presented in our letter dated July 26, 2002, NOAA Fisheries Service's goals and objectives include passage of anadromous fish to appropriate habitats in the Feather River watershed (see also Appendix A). Passage will help to provide for the protection, conservation, enhancement and recovery of several native anadromous species for which NOAA Fisheries Service is responsible. NOAA Fisheries Service therefore intends to include upstream fish passage in its prescription for P-2100, preferably in coordination with a settlement agreement. These fish will be released in the Project area, in the Seneca Reach of the North Fork Feather River, and in Yellow Creek. The provisions of this prescription will provide suitable habitat for spawning and juvenile fish rearing.

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[7] A review by Francort et al. (1994) found that the cost of fish passage/protection at 16 hydroelectric projects ranged from 0.04 to 8.7 mills/kWh. The value of the energy produced by the Project in today's dollars is 63.84 mills/kWh.

Thereafter, the Applicant will collect juvenile and kelt outmigrants, transporting them downstream to suitable locations for release.

Description of Habitat

NOAA Fisheries Service finds that the Seneca Reach of the North Fork Feather River and Yellow Creek are both suitable habitats for anadromous fishes. Both of these areas were known to have supported these fishes or were likely to have supported them (Yoshiyama et al. 2001), and both currently support salmonids.

Appendix E3.1-1 of the License Application (LA; PG&E 2002) provides detail on the population of salmonids and other species in the Seneca Reach. In particular, Figures 61 and 62 demonstrate that healthy populations of *O. mykiss* are present. Only the area immediately below Canyon Dam indicated low productivity for these fish; however, this is normal for most dams because of the near-absence of suitable macroinvertebrate forage emanating from the outlet.

Because the LA demonstrates that this reach clearly supports a healthy *O. mykiss* population, further elaboration on habitat will not be reiterated here. Although depth requirements are slightly greater for steelhead than for rainbow trout, a NOAA Fisheries Service survey of the reach on August 26 and 27, 2004 demonstrated that sufficient depth of flow was available for these fishes. Additional flow is anticipated which will improve conditions for these fish.

In its survey, NOAA Fisheries Service also found several suitable holding locations for Central Valley spring-run Chinook salmon. Although some were located above Salmon Falls, the lower section appears to be more suitable for the re-introduction of this species.

The Applicant's January 28, 2004 letter assesses habitat in the Seneca Reach up to Salmon Falls. NOAA Fisheries Service considers that the Applicant is responsible for the passage impediment created by reduced flows at the historically surmountable Salmon Falls (Yoshiyama et al. 2001). Fish can be planted at several access points above and below Salmon Falls and trap-and-haul fish passage readily reduces the impact of this partial barrier. Although the Applicant considers that only the lower 7.3 miles is viable, approximately 11 miles is the accessible length of the Seneca Reach. For the lower 7.3 miles, the Applicant states:

> Based on these assumptions, the available adequately sized gravel patches used by steelhead for both in and out of water is 172 pairs in the Seneca Reach and 80 pairs in lower Butt Creek. The available adequately sized gravel patches used by Chinook salmon both in and out of water is 96 pairs in the Seneca Reach and 11 pairs in lower Butt Creek Reach.

Although the 172 pair estimate is only for the lower portion of Seneca Reach, this is roughly the entire natural production of Central Valley steelhead currently in the Feather River (SP-F10: CDWR 2004). Even if only the lower portion of the Seneca Reach were

considered, the passage of 718 anadromous fish into one reach of the upper Feather River would contribute to the recovery of these species. With the addition of other reaches, populations would be further enhanced. The estimates above assumed a flow of 35 cfs; however, the Project settlement agreement stipulates base flows of up to 150 cfs. This will significantly increase habitat availability.

The Project limits gravel transport through the Seneca Reach, therefore, it will be necessary for additional gravel to be added here. Because the Applicant's January 28, 2004 letter indicates that gravel is a limiting factor, additional gravel will provide further benefits to these populations. Gravel management is a component of the settlement agreement for the relicensing.

Mining interests operate in the Seneca Reach and in Yellow Creek. In a letter dated June 19, 2003, NOAA Fisheries Service requested that the mining impacts be treated in the following manner:

> The reduction of flow to the Seneca Reach enables mining operations to occur, whereas they would otherwise be impeded by the unregulated flow. This constitutes a connected action and an indirect impact. At a recent site visit, NOAA personnel observed pits dug into the flood plain (hydrologically connected to the river), which could be used for the treatment of mining products with chemicals which adversely affect fisheries and their ecosystems (or perhaps effect public health). The Applicant should evaluate these impacts and provide direct or offsetting mitigation or enhancement of these mining operations through conservation easements and the purchase and rehabilitation of these sites.

Because these actions may affect listed salmonids in the future, FERC and the Applicant should adequately address these impacts. This and/or other actions recommended by NOAA Fisheries Service are intended to accommodate the successful passage of these species.

Yellow Creek is designated by the California Department of Fish and Game as a Wild Trout stream, and contains a variety of salmonids including rainbow trout and brown trout. Yoshiyama et al. 2001 indicates that it was likely anadromous, as it is evident that spawning gravel is abundant and no passage barriers are present in the lower section. A NOAA Fisheries Service survey on September 15, 2003 indicated that several hundred anadromous fishes could reside in just the lower section.

Yellow Creek was found to be very productive in certain reaches (350 fish per 100 m, or 5,631 fish per mile: Pacific Gas and Electric Company 1985). In the lower section of the creek (approximately 4.1 miles), there are no barriers to migration above 4 ft. in height. Substantial information about the quality of Yellow Creek as a salmonid stream is presented in Pacific Gas and Electric Company 1985. (please refer to that document for further details).

Yellow Creek has excellent habitat for Central Valley steelhead trout. Restoring these fish to their native habitat is congruent with its designation as a Wild Trout stream.

Central Valley Steelhead/Rainbow Trout Interactions

Rainbow trout are currently present in the Seneca Reach and in Yellow Creek. Passage is prescribed for the Seneca Reach within three years of license issuance, and in a phased approach, passage for Yellow Creek is prescribed within 10 years of license issuance (Appendix C). This will allow for an orderly approach to implementation of these measures.

The genotype of rainbow trout may be different from Central Valley steelhead to some degree. Historically, little or no morphological or genetic difference would be expected to have been present between the resident and anadromous forms of *O. mykiss* in anadromous waters such as the Seneca Reach and Yellow Creek. Studies of steelhead in the Deschutes basin in Oregon State (Zimmerman and Reeves 1997, 2000a, and 2000b) indicated that the forms rarely overlap in time and space. The spawning times of rainbow trout and steelhead would overlap in the Seneca Reach and Yellow Creek to some degree however, because both rainbow trout and steelhead have protracted spawning seasons that overlap in other Central Valley streams, often extending from December through May (Howard Brown, NOAA Fisheries Service, personal communication).

Residency and anadromy in *O. mykiss* are plastic traits which have allowed this species to take advantage of transient passage opportunities (McEwan 2001). After the construction of dams, an anadromous life history would be only marginally successful at best, therefore, it is presumed that *O. mykiss* currently found in these reaches are more adapted to the resident form. It is unlikely that a trait which has shown success for millions of years would completely disappear over a few generations, however. Therefore, some percentage of these juveniles are assumed to be presently exhibiting anadromy, albeit unsuccessfully for the most part.[8]

Although Central Valley steelhead are iteroparous, some adults will likely die after spawning, not returning to the downstream screen for collection and transport. These carcasses will have positive ecosystems affects for the progeny of both the resident and anadromous forms.

Interactions Between Anadromous Fishes and Other Species

Central Valley spring-run Chinook salmon are semelparous, and through the decomposition of carcasses, the production of benthic macroinvertebrates will be enhanced for the benefit of all species. Carcasses will also provide direct forage for many other species of fishes, mammals, reptiles and birds.

[8] If survival through the Feather River's turbines is possible, there may be the chance that these fish will emigrate to the ocean. If they are recovered later in a hatchery they may be selected for, and their progeny unknowingly stocked back into the stream reach that the adult came from.

Introduced brown trout (*Salmo trutta*) and brook trout (*Salvelinus fontinalis*) are present in the upper Feather River watershed. Interactions with these species (e.g. predation, competition) are not expected to be beneficial to *O. mykiss*, but neither are they currently detrimental to their survival as a population. However, wild juvenile spring Chinook salmon did not adversely affect the growth of wild rainbow trout in high-elevation tributaries (McMichael and Pearsons 1998).

Although adult salmon and steelhead may predate some of the amphibians in the Seneca Reach or Yellow Creek, the anadromous fish species under consideration for reintroduction were historically sympatric with the native aquatic fauna. Thus, it is not anticipated that these fishes would have any substantially negative effect on native aquatic fauna. Conversely, salmonid carcasses will have a positive effect on ecosystem function and enhance ecosystem values.

Additional habitat supplied as part of the Project settlement agreement will create a niche which can be filled by anadromous fishes. This will provide an opportunity for resident fishes to continue occupying the shallower water habitat in much the same way that they currently do. Total biomass of fish in the stream would likely be greater with multiple species than with only one species, because a wider variety of habitats may be used by the various species (Behnke 1992).

The Applicant has raised concerns regarding the effects of passage on resident fish populations in the upper watershed. However, resident brown and rainbow trout populations in these reaches are not listed as threatened or endangered under the California state or Federal Endangered Species Acts, as are populations of Central Valley steelhead and Central Valley spring-run Chinook salmon. Passage of Central Valley steelhead and Central Valley spring-run Chinook salmon will help to provide for the protection, and enhancement of these species and help to restore the historical balance of these listed species with the current resident populations. The presence of the Project contributes to dis-equilibrium in the ecology of the Seneca Reach and Yellow Creek, whereas passage will help to restore a natural equilibrium.

Description of Practical Fish Passage Facilities

NOAA Fisheries Service anticipates that its prescription and/or settlement agreement with stakeholders in the lower Feather River will provide for necessary minor modifications to Oroville project facilities (FERC No. 2100), making practical the safe, timely and effective passage of these fish into the upper watershed. As mentioned above, trap-and-haul fish passage facilities are efficient and cost-effective. Tanks can be designed for both upstream and downstream transport.

Adult fish will be collected from the fish ladder at the Feather River Fish Hatchery and directed to temporary holding facilities. Fish will be placed into appropriately designed tanks via water-to-water transfer, then transported upstream to release facilities. Fish will be released again via water-to-water transfer. Adult fishes will hold in available pools or undercut banks as available and spawn when appropriate. Central Valley steelhead may

migrate downstream after spawning and be collected at the facility downstream and transported, or expire naturally in the reach similar to Central Valley spring-run Chinook salmon.

Juvenile fishes will rear in this habitat until ready to emigrate. These fishes will be collected at the facility downstream, tagged so that they can later be identified, then released in the lower river.

Several types of downstream collection facilities are feasible. For example, Figure 1 (USACE 2000) shows a screen designed as an alternative for fish passage above Cougar Lake (Willamette River watershed, Oregon state). This 1,200 cfs system is of the approximate size needed to collect emigrants at the bottom of the Seneca Reach and Yellow Creek. The estimated cost before contingency and escalation is $4.65 M (USACE 2000) . The design includes provision for upstream passage of adults, which could selectively allow adults in the Belden Forebay to ascend to the Seneca Reach, if desired.

Roads are not available in the narrow canyon at the bottom of the Seneca Reach; however, it would be possible to bring heavy equipment onto the site via construction barge. The Caribou powerhouses would need to be shut down only temporarily. Access may need to be constructed from the parking area or from the Belden Powerhouse, near the mouth of Yellow Creek.

Fish collected in the screens can be directed into a pipe and carried via gravity to the temporary holding and tagging facility in the powerhouse areas. Adult rainbow trout or brown trout could be screened for disease then released into the Belden Forebay, or transported upstream again for release higher in the Seneca Reach. A similar system could operate on Yellow Creek.

Comprehensive Plans and Fisheries Legislation

Appendix E, section 2, provides a synopsis of a number of different comprehensive plans, and legislation which call for or are consistent with fish passage on the Feather River. These plans and legislation should be considered in FERC's determination of the consistency of fish passage to comprehensive plans.

Coordination with Feather River FERC Projects

The Oroville (P-2100) project licensing is considering the development of an Ecological Committee as a forum to present and discuss issues of concern. If it is implemented, this would be an appropriate venue for the discussion and review of fish passage monitoring reports. However, even if it is not implemented, direct communication between resource agencies, other licensees as necessary, and FERC or the Applicant would allow necessary coordination.

Responses to comments received pursuant to the MCRP

The Applicant asserts in its January 28, 2004 letter that anadromous fish must be present in the Project before studies can be performed; however, the basis for this prerequisite was not provided. Although the Applicant recommends that we defer our prescriptive authority to a future date pursuant to a reservation of our section 18 authority that would require us to initiate a future re-opener proceeding before FERC, NOAA Fisheries Service asserts that there is substantial basis supporting our decision to prescribe fishways at this time, including evidence suggesting that delay in the implementation of these measures for the benefit of species threatened with extinction will only diminish their likelihood of survival and recovery.

In its January 28, 2004 letter, the Applicant provides a list of uncertainties regarding transportation, temperature, and poaching; however, during the past two years since these concerns were raised, neither studies nor other forms of evidentiary support for the gravity of these presumed uncertainties have been developed or provided by the Applicant.

With regard to trap-and-haul fish passage, NOAA Fisheries Service has clearly stated its interest in the exploration of this methodology in comments on the Application for License, dated December 20, 2002. FERC projects such as Baker River (P-2150) have successfully used similar trap-and-haul methodologies for decades. Currently, the upstream and downstream collection survival for adults and juveniles (including passage through all screens and transport vehicles) is set at 98% as a threshold, and 99.5% as a goal (Nicholas Verretto, Puget Sound Energy, personal communication). These high passage numbers would not be possible if the technology were uncertain, as the Applicant claims.

Transporting salmonids is a common practice, and the California Department of Fish and Game has even developed a design to safely transport catchable-sized trout (not much smaller than Central Valley Steelhead) in small, 150-gallon tanks (Bell 1986). The Office of Technology Assessment (OTA 1995) asserts that a 10-year-old program on the Susquehanna River for transporting American shad (*Alosa sapidissima*, a species much more sensitive to handling than most salmonids) is considered successful and and is supported by state and federal resource agencies.

Trap-and-haul fish passage to many productive habitats in the Feather River could have been implemented early in the development of hydropower. Fifty years ago however, hatcheries were assumed to be a preferable method for protection, mitigation and enhancement (PM&E) of anadromous fishes. Today, the decline of natural populations of salmon and steelhead has been associated with the effects of artificial propagation (Lichatowich 1999, Brannon et al. 1999). The National Academy of Sciences (1996) summarizes our current understanding of this issue:

> It is now clear from synthesis of experience and from consideration of well-established biological knowledge that hatcheries have had demographic,

> ecological, and genetic impacts on wild salmon populations and have caused problems related to the behavior, health, and physiology of hatchery fish.

The re-evaluation of dam impacts and PM&E measures at intervals is appropriate and a foundational premise of the FPA, therefore it is appropriate to improve these measures as science improves. Because screening technology has improved, it is practical to place screens within river channels (USACE 2000), and implementing passage for the Seneca Reach and Yellow Creek is considered technically feasible.

For both the Seneca Reach and Yellow Creek, trail and road access is limited to a few short sections. The potential for poaching is therefore limited and is less than many reaches where listed species are currently present.

The cost of fish passage measures is of concern to NOAA Fisheries Service; however, the estimates available for upstream and downstream facilities appears to be reasonable (see the section below entitled *Description of Practical Fish Passage Facilities*). Under the Federal Power Act, FERC Licensed dam owners bear a proportional responsibility for protecting, mitigating and enhancing impacts to these fishes. Dams account for a loss of roughly 95% of the original spawning habitat in the Central Valley (Yoshiyama et. al 2001):

> Salmon originally ascended a considerable distance in the Feather River system, particularly the spring run which spawned in the higher streams and headwaters. They went ... up along the entire length of the North Fork Feather River through the area now covered by Lake Almanor and into the surrounding tributary stream (>4,200 ft. elev.). Early correspondence sent to the DFG state that large number of spring-run fish ("in the thousands") entered the North Fork... Flows from the many springs that fed the Lake Almanor area (formerly "Big Meadows"), together with stream-flows from farther up the North Fork, undoubtedly were sufficient for salmon to have ascended through the lakebed area and up the North Fork another six miles or more (J. Nelson, personal communication, see "Notes"). In a newspaper article more than a century ago, a Dr. J.H.C. Bonte wrote of salmon angling: "They are caught with hook and bait now along the Sacramento river above Knight's Landing, and in the Feather River not far below Lassen's Peak... Young salmon are frequently caught in Big Meadows, Plumas county, and older ones weighing eight and ten pounds, are also taken though not very often." (Sacramento Union, 24 December 1881).

The Applicant has constructed dams without fish ladders or screens in known historic habitats of anadromous fishes. To our knowledge, the only protection, mitigation or enhancement measures were fish water releases of approximately 5% of the lowest known historic flow and partial maintenance of a pre-existing fish ladder on Big Bend dam.

Dams and diversions are the single biggest cause of fish declines in California (Moyle and Williams 1990). The Sierra Nevada Ecosystem Project, an extensive investigation chartered by the United States Congress, makes the following conclusions:

> In streams on the west side of the Sierra Nevada, most fish assemblages lost major components, mainly chinook salmon and other anadromous fishes, following the construction of dams in the nineteenth and early twentieth centuries... The disruption of these communities is continuing...In terms of numbers and biomass, they were among the most abundant fish in the streams. They were consequently a major source of energy for stream ecosystems, a major food for the Native Americans, and, after the Euro-American invasion in the nineteenth century, a mainstay of commercial fisheries. In recent years, their continuing decline has been a source of major conflict among various interest groups... (UC Davis 1996)

There is clearly a need for anadromous fisheries mitigation beyond the status quo. Data developed within this process, and other data presented herein, demonstrate that fish passage is a viable option for the Feather River, and will provide substantial benefits toward recovery of two listed species. Applicant-owned projects are contiguous with the Oroville project (FERC No. 2100), which is currently negotiating fish passage plans for its settlement agreement.

Although the Applicant's comments on the DEIS fall outside of our original MCRP comment deadline, they will be nevertheless be addressed here. The Applicant has stated that reports from the Oroville (FERC No. 2100) process provided an extensive review and analysis of fish passage (SP-F15; CDWR 2004). NOAA Fisheries Service disagrees, and although our agency was involved in many meetings in an effort to produce a collaborative document, this study has a number of omissions, flaws and limitations.. These include a limitation in scope to below any of the Applicant's projects on the North Fork Feather River, and the study of only one fish passage system, where more than three are likely feasible. NOAA Fisheries Service has attempted to correct these problems in an appropriate manner but has been unsuccessful. The Applicant unfortunately submitted a very early draft of the fish passage model output (dated January 7, 2004) instead of the values and assumptions from June 14, 2004 as stated in its letter.[9]

If read carefully however, the data within the SP-F15 document, and particularly the model, are *very strongly in favor of fish passage*. The Applicant indicates that the adult return to adult passed ratio is 0.56:1, but does not elaborate on the meaning of "expected results". In fact, the model uses a range of best case to worst case scenarios. By adjusting just one of the very sensitive assumptions within the model (Juvenile Release to Adult Capture, Stream %) by a small amount according to Odenweller 2004, the ratio

[9] NOAA Fisheries Service has been assured that the version of SP-F15 Task 4 posted as on the Oroville (FERC No. 2100) relicensing website (http://orovillerelicensing.water.ca.gov/wg_aqua_terrest.html) is not in fact the final version. The final model, with output specified by the Licensee, is being posted as this prescription is being written.

mentioned above becomes 1.72:1 (Table 2), which makes fish passage feasible and changes the conclusions of the report.

The SP-F15 document further concludes that passage is feasible using an in-stream screen similar to the design in USACE 2000. This design is offered in this fishway prescription as a practical method of passage in the Seneca Reach and Yellow Creek. The utility of this design was fully realized after the submission of our preliminary prescription (November 26, 2003).

The Applicant's January 28, 2004 letter supports the position that there is adequate gravel for a population of Central Valley steelhead in the Seneca Reach, which is nearly the size of the current population in the lower river. Despite that support, the letter states that the Applicant believes the prescription to be premature and lacking in evidentiary support. NOAA Fisheries Service has provided substantial evidence to support our prescription for fish passage at this time without deferring our prescriptive authority to a future date, pursuant to a reservation of our section 18 authority that would require us to initiate a future re-opener proceeding before FERC. In addition, as NOAA Fisheries Service has previously provided in this prescription, NOAA Fisheries Service has requested fish passage studies early in the process. These requests were made verbally, by letter, and as a Powerpoint slide presentation on October 17, 2003. These communications made it clear that "NOAA wants the studies conducted to evaluate habitat and potential passage structures."[10] However, during the study and information gathering phase of relicensing, the Applicant did not agree to provide this information, therefore it is inconsistent with FERC's relicensing regulations that a claim should be made for further evidentiary support at this time.[11]

The Applicant asserts that the appropriate trigger for fish passage studies would be the presence of fish within the Project area. Because of the relatively high level of hydro

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[10] Project 2105 License Group (2105LG) Draft Meeting Summary – October 17, 2003.

[11] The Code of Federal Regulations (CFR) at 18 CFR 16.8(b)(4) direct interested resource agencies to provide a potential applicant with written comments. The NOAA Fisheries Service has identified studies that are necessary to assess the environmental and social consequences of the proposed relicensing. Under 18 CFR each interested resource agency and Indian tribe must provide a potential applicant with written comments:

i) identifying its determination of necessary studies to be performed or information to be provided by the potential applicant;

ii) identifying the basis for its determination;

iii) discussing its understanding of the resource issues and its goals and objectives of these resources;

iv) explaining why each study methodology recommended by it is more appropriate than other available methodology alternatives, including those identified by the potential applicant pursuant to paragraph (b) (1) (vi) of this section;

v) documenting that the use of each study methodology recommended is a generally accepted practice; and

vi) explaining how the studies and information requested will be useful to the agency or Indian tribe in furthering its resource goals and objectives.

development, trap-and-haul fish passage is the most feasible alternative for providing fish passage on the Feather River. Accordingly, consideration should be made for the potential that fish can be brought to virtually anywhere within the system. In fact, one of the perceived benefits of trap-and-truck operations over volitional passage (fish ladders) is the ability to bypass less viable areas in favor of higher-quality habitat. In this way, habitats degraded by hydro development such as large reservoirs, unscreened diversions, and water quality/quantity impaired reaches can be avoided. Without proper coordination between projects however, fish transported to the Project via trap-and-haul or their progeny could be entrained in Applicant-owned facilities. Therefore, the presence of fish within the Project is an inappropriate trigger. A trigger with such a high bar would place fish passage in a perpetual "Catch-22" scenario, so that resource agencies either have to prescribe unreasonable fish passage systems or forego measures which are protective of species.

The Oroville (P-2100) project currently blocks passage on the Feather River, and if fish are to be passed upstream on the South Fork or North Fork, fish must be able to pass Ponderosa dam (P-2088 project) or Big Bend dam (soon to be part of the P-2107 project) at the upper end of Lake Oroville. Similarly, in the "Catch-22" process outlined for fish passage by the Applicant, passage could never be implemented since there is insufficient habitat for them between Lake Oroville and the next upstream dam. Because anadromous fish are not present at these upstream projects, the applicant believes that studies should not be performed, and anadromous fish should never be passed upstream.

If the Applicant's conditions for fish passage (disclosed very late in the licensing process) cannot be met until fish are present in the Project area, and the agencies cannot pass fish into suitable habitat in a step-wise fashion due to the location of suitable habitats, the agencies' authority to implement passage is restricted beyond that which has been provided by law or technical feasibility. This scenario does not provide for a balance between resources, nor does it provide equal consideration between licensing purposes. Clearly, trap-and-haul methodologies provide a reasonable method of passing fish into upper projects, while greatly reducing or eliminating the expense of less effective fish protective measures at lower projects.

Further, the Applicant's position that fish passage cannot be prescribed until and unless passage is achieved at all downstream facilities has no basis in the Federal Power Act. In the Federal Water Power Act of 1920 (FWPA),[12] Congress granted FERC exclusive authority to license non-Federal projects determined by the FERC to be "best adapted to a comprehensive scheme for improvement and utilization" of a **river basin** (emphasis added) for navigation, water power development, and other beneficial public uses. The FWPA was re-enacted in 1935 as Part I of the FPA.

Section 10(a)(1)[13] of the FPA establishes the comprehensive development standard which each project must meet to be licensed. A licensed project shall be:

[12] 41 Stat. 1063 (1920)

[13] 16 U.S.C. § 803(a)(1)

> ...best adapted to a comprehensive plan for improving or developing a waterway or waterways for the use or benefit of interstate or foreign commerce, for the improvement and utilization of waterpower development, for the adequate protection mitigation and enhancement of fish and wildlife (including related spawning grounds and habitat), and for other beneficial public uses, including irrigation, flood control, water supply, and recreational or other purposes....

Pursuant to this standard, the Commission must explore all issues relevant to the public interest. Typical (and sometimes competing) uses for a waterway include power generation, irrigation, flood control, navigation, fish and wildlife, municipal water supply, and recreation. In the Electric Consumers Protection Act (ECPA) of 1986,[14] Congress amended Section 4(e) to require the Commission to give equal consideration to developmental and non-developmental values. In addition, FERC is mandated to ensure that any license issued is consistent with existing "Comprehensive Plans". FERC has numerous Comprehensive Plans on file that speak to the issue passage for anadromous fish in the Central Valley. Appendix E (enclosed) provides a list of Comprehensive Plans and Legislation which are relevant to a watershed approach for fish passage on the Feather River.

It is implicit that in order to provide for "protection, mitigate of damage to, and enhancement of fish and wildlife.....," FERC must first evaluate environmental impacts. The FPA clearly distinguishes between the project boundaries and the environment affected by the project (action area). For instance, FERC's relicensing regulations at 18 CFR 16.8(b)(i) require that the applicant provide detailed maps of the project boundaries, and at 16.8(b)(iv) the applicant must additionally provide an identification of the environment affected, or to be affected, and proposed mitigation. FERC wouldn't make these separate requirements of a description of the affected environment if it was the same as the project boundaries.

Further, in FERC's regulations stipulating what must be included in a license application, at 18 CFR 4.41(f)(3), FERC requires information on fish and wildlife "in the vicinity of *the proposed project*", *not just the project boundaries*. In 18 CFR 4.41*(f)(3)(i)*, FERC requires a description of resources in the "proposed project area and its vicinity" and requires mitigation for impacts on fish and wildlife. Thus, FERC clearly distinguishes between the project area and the vicinity for purposes of considering impacts on natural resources.

Regulations governing the preparation of the license application require the inclusion of an Exhibit E. FERC's guidance on what must be in Exhibit E includes a summary of the resource agencies' views on resource needs in the project vicinity and region. This further confirms the absolute requirement to collect information on resources affected beyond the project boundaries. From a purely scientific basis, by its very nature, a dam could affect resources well beyond project boundaries. If the project is affecting the

[14]P.L. 99-495, 100 Stat. 1243 (Oct. 16, 1986) (codified at 16 U.S.C. § § 71a, *et seq.*)

environment upstream or downstream of the actual project boundaries, it would be arbitrary to consider and mitigate only for impacts occurring within the project boundaries. Further, FERC has the authority to collectively formulate and impose PM&E measures on more than one license at a time. On past occasions where public resource and licensing decisions overlapped within a shared watershed, FERC has collectively evaluated impacts and imposed PM&E measures on multiple project licenses within the watershed. For instance, in the Ohio River proceedings, FERC collectively evaluated direct, indirect, and cumulative impacts (including water quality and fish passage) and imposed PM&E measures for over a dozen different project licenses. Such actions may be necessary for FERC to meet the comprehensive development and balancing standards of the FPA.[15]

NOAA Fisheries Service has modified its preliminary prescription to eliminate passage to Butt Creek above Butt Valley Reservoir. Therefore, the Applicant's concerns in its January 28, 2004 letter (numbered 1 to 13) for this reach will not be analyzed here. The Applicant's broader concerns are addressed elsewhere in this prescription.

In its comments on the preliminary prescription received at FERC on January 30, 2004, the State Water Contractors (SWC) mentions trap-and-haul fish passage as being an option for the Feather River, but speculates about one of the other potential fish passage options that have been discussed within the Oroville (FERC No. 2100) process. The letter does not substantiate much of its terminology, but it is clear that the SWC is opposed to fish passage on the Feather River. Below is our response to each of the points mentioned.

1. Although specifics are not given, the SWC's comments appear to focus on the implementation of a floating surface collector[16] (FSC) which is not necessary for fish passage to occur on the North Fork Feather River. Regardless, large FSC's are being prescribed and operated at the Baker River (FERC No. 2150) and Rocky Reach (FERC No. 2145) projects. Both of these installations were considered feasible, and are in fact now considered successful. An appropriate design for an FSC would accommodate the natural forces and debris loads to be encountered. Predation opportunities are minimized by the temperature and turbidity of the water in which migrants emigrate, and the location of the device near the tributary input. It is reasonable to err on the side of the fish (be conservative) in situations where full and complete information has not been provided; however, the current state of fisheries science is clear that the measures prescribed by NOAA Fisheries Service for this project are feasible and reasonable.
2. NOAA Fisheries Service is concerned with reducing costs and maximizing efficiency. The cost for the surface collector at Rocky Reach (FERC No. 2145)

[15] Also see See Platte River Whooping Crane Critical Habitat Maintenance Trust v. FERC, 962 F.2d 27, 34 (D.C. Cir. 1992) (holding that "FERC was not required to first determine extent to which first power district[licensee], rather than second power district [licensee] was responsible for alleged harm to birds... prior to imposing...flow conditions [on first licensee]).

[16] Please refer to "Technical Assistance Concerning the Feasibility and Benefits of Providing Fish Passage and FERC Licensed Hydroelectric Facilities on the Feather River" and its cover letter, available at http://elibrary.ferc.gov/idmws/search/intermediate.asp?link_desc=yes&slcfilelist=10280767:0

was $112 M; however, the initial cost estimate for the Feather River is approximately one-tenth of that. The value of the power and water is likely far greater for the Feather River; however, and the cost of fish passage is only a small fraction of that value.

3. NOAA Fisheries Service asserts that its goals and objectives are appropriate, and fish passage is addressed specifically in our July 26, 2002 letter, and elsewhere. Passage would provide more and better habitat for anadromous fishes, and constitutes a reasonable protection, mitigation and enhancement measure.
4. Scientific publications are replete with articles describing hatchery effects and the controversy surrounding hatcheries. A recent article in a widely distributed publication states "The decline of natural populations of salmon and steelhead has been associated with the effects of artificial propagation", and goes on to list more than 120 references (Brannon et al. 2004). The SP-F9 report (CDWR 2004) also describes negative effects to wild fish that are likely occurring as a result of current anadromous fish mitigation practices on the Feather River.
5. NOAA Fisheries Service considers that it would be feasible to implement fish passage according to published criteria without any experimentation. The enclosed prescription includes provisions for specifics to be developed by the Applicant and NOAA Fisheries Service primarily. However, we encourage other stakeholders to participate in the process as it is discussed with the Feather River Ecological Committee.
6. The life histories of anadromous fishes are complex, and many factors influence their survival. Establishing a self-sustaining run of anadromous fish in the Seneca Reach and in Yellow Creek is feasible however, considering that the mortality will likely be limited to transportation and tagging effects. The institution of passage via trap-and-haul at Oroville is a way to provide a meaningful biological trigger. Please also see comments elsewhere in this prescription regarding triggers and "Catch-22" scenarios.
7. Please see comments regarding Yoshiyama et al. 2001, especially the quotation provided in this prescription, regarding support for NOAA Fisheries Service's statement that anadromous fishes were a significant part of the ecosystem before construction of project features and associated projects on the North Fork Feather River.

Although these comments provide a list of concerns which should and can be addressed, no mitigation for the restoration of salmonids are offered. NOAA Fisheries Service considers that it would not be a responsible course of action to simply forego the opportunity to implement passage on the basis that one or more licensees have not provided the requested studies.

NOAA Fisheries Service's November 26, 2003 preliminary prescription includes two triggers for the implementation of its prescription: notification that fish passage will commence into the Project, and the implementation of passage at one or more dams below the project area. In its January 28, 2004 letter, the Applicant mentions only one of these triggers but suggests that it is inappropriate. In its DEIS, FERC similarly suggests that these triggers are inappropriate. FERC provides an alternate trigger, that fish

passage facilities must be constructed and operational at all downstream dams. FERC does not include a definition of facilities, but its proposal appears to exclude the possibility of trap-and-haul fish passage, which is a well-established methodology. In common usage however, a dam is considered to have passage if fish are collected at some point below it and transferred to some point above it. To address these issues and to provide for a date certain for the implementation of fish passage to the Project, NOAA Fisheries Service has modified its fish passage prescription.

NOAA Fisheries Service has received a letter from Terry L. Erlewine, General Manager of the SWC, on December 20, 2004. These comments are largely centered on a December 2, 2004 meeting in which several fish pathologists discussed fish passage on the Feather River. (Because the Applicant filed confidential meeting notes from this meeting with its letter dated December 20, 2004, and SWC refers to these confidential discussions, NOAA Fisheries Service must address them here.) The letter highlights comments from a representative of the US Geological Survey's Western Fisheries Research Center in Seattle, WA, who questioned whether a fish passage program would be worth the disease risk. However, the comments highlighted in the letter are conclusory statements, and the letter provides no evidence to support the conclusions and no discussion during the December 2, 2004, meeting. Therefore, the letter gives unsupported weight to these conclusory comments. In addition, these comments do not recognize that the predominantly resident populations in these reaches are not listed as threatened or endangered under the ESA as are populations of Central Valley steelhead and Central Valley spring-run Chinook salmon. Passage of Central Valley steelhead and Central Valley spring-run Chinook salmon will help to provide for the protection, conservation, and enhancement, of these listed species with the current resident fish populations. Please refer to Appendix B, which investigates these disease concerns much more thoroughly and discusses the viable methods to address these concerns.

Concerns regarding the Feather River Fish Hatchery (FRFH) are mis-characterized in this letter. The pathologists who participated in the December 2, 2004, meeting, did not concur with the Applicant that epizootics are likely to occur in the hatchery if Chinook salmon are planted in the watershed above Oroville dam. Chinook are now being planted in Lake Almanor without this level of concern, and a similar program of passing the progeny of anadromous adults into reaches just below Lake Almanor can also be instituted. Regardless, the risk of transmission into FRFH would be substantially diminished by the installation of a water disinfection system.

The SWC asserts that the water demand of the hatchery is 100 cfs and this makes pre-filtration problematic. However, the untreated demand of the hatchery is 40 cfs (Montgomery Watson Harza 2004). The SWC also state that a $30 million expenditure is necessary for fish passage, however an ultraviolet-only system was estimated at $3.3 million including filtration (Montgomery Watson Harza 2004).[17] NOAA Fisheries Service has received a rough estimate of $500,000 for equipment only (Water

[17] NOAA Fisheries Service is expecting a substantial down-revision of this estimate according to more recent estimate.

Management Technologies, Inc. 2004), which would provide filtration and ultraviolet disinfection at 10 times the bench top lab test requirement (Timmons et al. 2002).

The SWC does not provide a balanced interpretation of the SP-F15 conclusions. The model referred to is extremely sensitive in at least one particular variable (Juvenile Release to Adult Capture, Stream %), and adjusting this parameter only slightly yields a net gain for a fish passage program. Regardless, this parameter deals with losses below Oroville dam, therefore it predicts that anadromy will be unsuccessful regardless of fish passage. However this conclusion is clearly incorrect, as witnessed by the many salmonids below Oroville dam. If the model were correct these fish would also have been extirpated long ago. Please see comments above on this subject and Tables 1 and 2.

The Applicant also submitted supplemental comments to NOAA Fisheries Service on December 20, 2004. However, NOAA Fisheries Service is unable to find the basis for many of these comments. Although the length of the Seneca Reach is approximately 11 miles, the Applicant discounts the potential for anadromous fish to pass above Seneca Falls, either through scheduled pulse flow releases or direct trap-and-haul passage to existing access points below Canyon Dam. The Applicant does not acknowledge that flows will be increased according to the settlement agreement for this Project, so that the base flow will be increased as much as 400%. A NOAA Fisheries Service survey in the summer of 2004 indicated that many hundreds of pairs of Central Valley steelhead per mile could reside in the Seneca Reach, given adequate spawning gravel. NOAA Fisheries Service is recommending gravel enhancements, and the settlement agreement stipulates a gravel management initiative and pulse flows to distribute the gravel. The potential for anadromous fisheries reintroduction is therefore greater than the Applicant asserts.

NOAA Fisheries Service acknowledges and appreciates the successes on Butte Creek, and the potential for success on Battle Creek. However, a comparison of sheer numbers of fish does not address the basis of the viable salmonid population concept (Department of Commerce 2000), in which a number of isolated populations are important for the survival of the species as a whole. The Applicant's efforts provide a hedge against extinction, but massive fish kills are possible. Recent, large-scale fish kills in Butte Creek highlight the value of establishing additional populations as a hedge against catastrophic events. Butte Creek is also very near the valley floor, and predominantly produces ocean-type and not stream-type salmon.

In some anadromous reaches of Butte Creek, summer flows approximate those that will occur in the Seneca Reach under the Project settlement agreement, and in Yellow Creek. This provides evidence that not only Central Valley steelhead, but also Central Valley spring-run Chinook salmon, will do exceedingly well in these streams.

The Applicant uses terms such as "devastating effects" with regard to disease concerns, while the biologists at the December 2, 2004 meeting to which the Applicant refers agreed there will be no "catastrophic die-off", and "we're not going to see dead animals. Diseases don't work that way. Not huge die-offs." NOAA Fisheries Service

acknowledges that some disease transmission may occur; however, we anticipate that effects will be marginal and controllable.

Infectious haematopoietic necrosis (IHN) was likely endemic to the upper Feather River long before dams went in, therefore the bell has been "unrung" in this instance. The option of passing certified disease-free fish is not addressed by the Applicant, and comparatively little concern appears to be given by the Applicant with regard to the Inland Chinook Program operating in Lake Almanor (analogous to a trap-and-truck operation from the hatchery to the upper watershed), although these fish are also potential carriers of IHN. Please refer to Appendix B for a more thorough treatment of this issue.

The reintroduction of anadromous fish in these reaches will coincide with increased habitat in the form of additional base flows and spawning gravel. The Applicant makes the argument that the reintroduced salmon would compete with the resident trout, but also asserts that it is an enthusiastic participant in anadromous fishery restoration projects and is interested in other locations where restoration can be successful. NOAA Fisheries Service considers that it would be extremely challenging to find any habitat, especially historically anadromous habitat, that is not being utilized by trout. Preventing anadromous fish from ever competing in this way would likely preclude fish passage everywhere.

NOAA Fisheries Service does not concur with the Applicant's assertions that fish passage is infeasible because of the lack of access. We would like to point out that there is a paved road extending very near the proposed fish passage facility location, with an expansive flat area just downstream, as described in the section entitled *Description of Practical Fish Passage Facilities* above. The Applicant's standard for access would preclude the construction of many of its facilities: for example, many of its power tunnels are dug through miles of rock..

Conclusion

NOAA Fisheries Service is confident that these feasible fish passage measures will provide for a balanced use of Project resources, while providing substantial benefits toward recovery of listed anadromous fish species. Please refer to the attached appendices, which describes additional information that has helped NOAA Fisheries Service come to the conclusion that fish passage for the Project is necessary, appropriate and feasible. NOAA Fisheries Service intends to use its authorities now and in the future to provide for a maximum of coordination between resource agencies, FERC licensees, local governments and other stakeholders in its efforts to recover these species.

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Table 1. Output of SP-PTS model (CDWR 2004) as modified to nullify fish passage components. The expected "Adult Return to Adult Passed Ratio" of 0.74 demonstrates that the model does not predict any Chinook survival in the Feather River, with or without passage above Oroville dam.

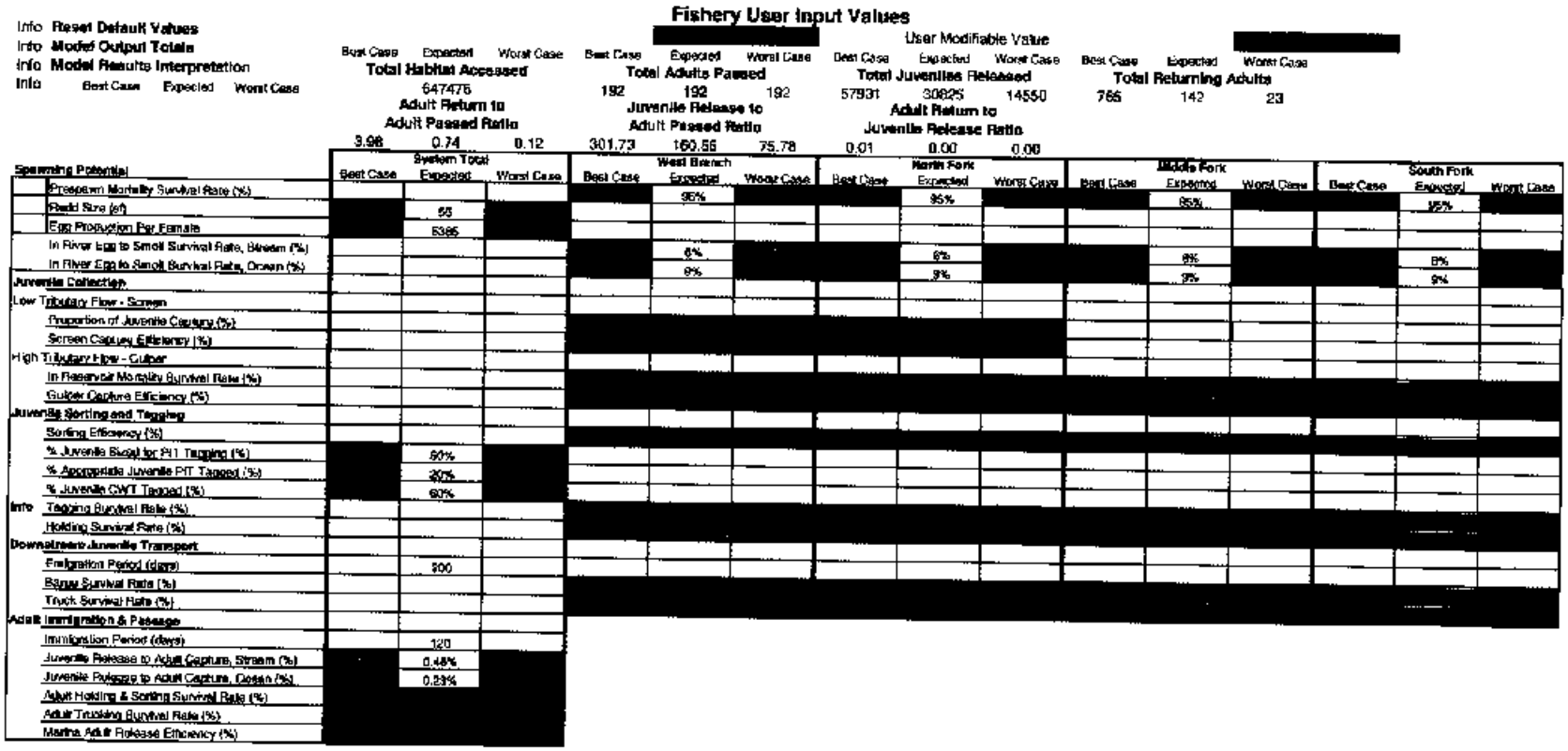

Table 2. Output of SP-F15 model (CDWR 2004) as modified to include output from Mass Balance model (Odenweller 2004), which demonstrates that fish passage on the Feather River is more heavily influenced by factors below Oroville dam than above Oroville dam. The expected "Adult Return to Adult Passed Ratio" indicates that fish passage would be successful.

[redacted]

Fishery User Input Values

Info **Reset Default Values**
Info **Model Output Totals**
Info **Model Results Interpretation**
Info Best Case Expected Worst Case

User Modifiable Value

Best Case	Expected	Worst Case	Best Case	Expected	Worst Case	Best Case	Expected	Worst Case	Best Case	Expected	Worst Case
Total Habitat Accessed			**Total Adults Passed**			**Total Juveniles Released**			**Total Returning Adults**		
	647476		192	192	192	60341	23520	14550	797	331	23
Adult Return to Adult Passed Ratio			**Juvenile Release to Adult Passed Ratio**			**Adult Return to Juvenile Release Ratio**					
4.15	1.72	0.12	314.29	122.50	75.76	0.01	0.01	0.00			

Spawning Potential	System Total Best Case	System Total Expected	System Total Worst Case	West Branch Best Case	West Branch Expected	West Branch Worst Case	North Fork Best Case	North Fork Expected	North Fork Worst Case	Middle Fork Best Case	Middle Fork Expected	Middle Fork Worst Case	South Fork Best Case	South Fork Expected	South Fork Worst Case
Prespawn Mortality Survival Rate (%)				[redacted]	95%		[redacted]	95%			95%		[redacted]	95%	
Redd Size (sf)	[redacted]	68	[redacted]												
Egg Production Per Female		5365													
In River Egg to Smolt Survival Rate, Stream (%)				[redacted]	6%	[redacted]	[redacted]	0%	[redacted]	[redacted]	6%	[redacted]	[redacted]	6%	[redacted]
In River Egg to Smolt Survival Rate, Ocean (%)					9%			9%			9%			9%	
Juvenile Collection															
Low Tributary Flow - Screen															
Proportion of Juvenile Capture (%)				[redacted]	95%	[redacted]	[redacted]	95%	[redacted]						
Screen Capture Efficiency (%)					95%			95%							
High Tributary Flow - Gulper															
In Reservoir Mortality Survival Rate (%)				[redacted]	91%	[redacted]	[redacted]	91%	[redacted]	[redacted]	91%	[redacted]	[redacted]	91%	[redacted]
Gulper Capture Efficiency (%)					50%			50%			50%			50%	
Juvenile Sorting and Tagging															
Sorting Efficiency (%)				[redacted]	95%	[redacted]	[redacted]	95%	[redacted]	[redacted]	95%	[redacted]	[redacted]	95%	[redacted]
% Juvenile Sized for PIT Tagging (%)	[redacted]	50%	[redacted]												
% Appropriate Juvenile PIT Tagged (%)		20%													
% Juvenile CWT Tagged (%)		50%													
Info Tagging Survival Rate (%)				[redacted]	97%	[redacted]	[redacted]	97%	[redacted]	[redacted]	97%	[redacted]	[redacted]	97%	[redacted]
Holding Survival Rate (%)					97%			97%			97%			97%	
Downstream Juvenile Transport															
Emigration Period (days)		200													
Barge Survival Rate (%)				[redacted]	95%	[redacted]	[redacted]	95%	[redacted]	[redacted]	95%	[redacted]	[redacted]	95%	[redacted]
Truck Survival Rate (%)					98%			98%			98%			98%	
Adult Immigration & Passage															
Immigration Period (days)		120													
Juvenile Release to Adult Capture, Stream (%)	[redacted]		[redacted]												
Juvenile Release to Adult Capture, Ocean (%)	[redacted]	0.23%	[redacted]												
Adult Holding & Spawn Survival Rate (%)	[redacted]	97%	[redacted]												
Adult Trucking Survival Rate (%)	[redacted]	98%	[redacted]												
Marina Adult Release Efficiency (%)	[redacted]	50%	[redacted]												

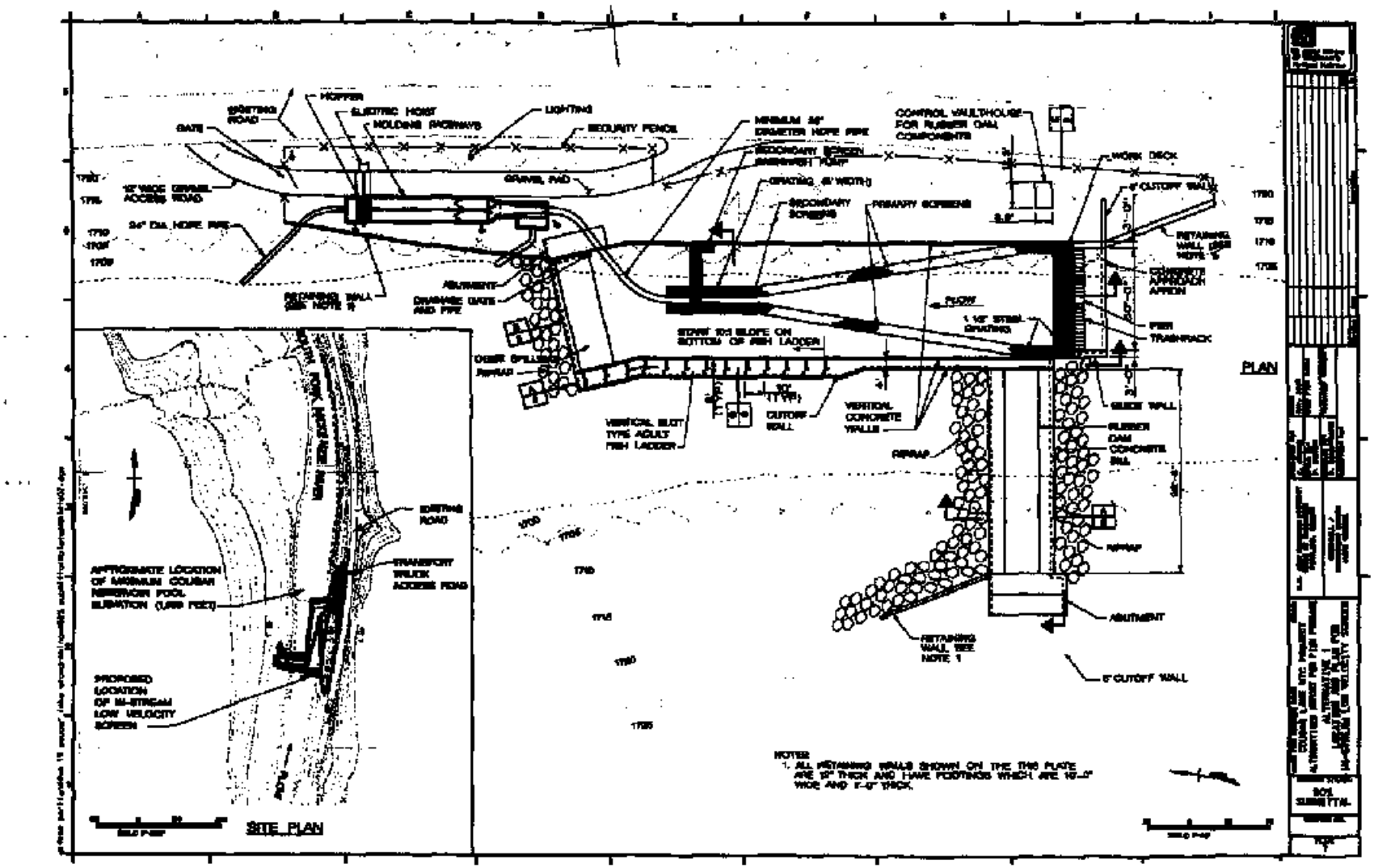

Figure 1. Screen design suitable for implementation in the Project area.

APPENDIX A

RESOURCE GOALS AND OBJECTIVES

The FERC's Licensing Regulations direct resource agencies to list the resource management goals and objectives to serve as the basis for study recommendations and subsequent prescriptions and recommendations for Project protection, mitigation, and enhancement measures (PM&E) to be incorporated into the new License.

Resource Goals

1. Protect, conserve, enhance, and recover native anadromous salmonids and their habitats by providing access to historic habitats and by restoring fully functioning habitat conditions.

2. Identify and implement measures to protect, mitigate or minimize direct, indirect, and cumulative impacts to, and enhance native anadromous salmonid resources, including related spawning, rearing, and migration habitats and adjoining riparian habitats.

Resource Objectives

1. Flows - Implement scheduled flows in the Feather River and regulated tributaries to the benefit of native anadromous salmonids and their habitats. This includes providing a range or schedule of flows necessary to: a) optimize suitable habitat; b) stabilize flows during spawning and incubation of ingravel forms; c) maintain flows necessary to facilitate the efficient migration of spawning adults; and the safe and timely emigration of smolts and kelts, and movement of rearing juveniles between feeding and sheltering areas; d) maintain flows necessary to ensure redd placement in viable areas; and e) maintain flows necessary for channel forming processes, riparian habitat protection, and maintenance movement of forage communities. This also includes impacts of flood control, irrigation or other project structures or operations that act to displace individuals or their forage or destabilizes, scours, or degrades physical, chemical, or biological *quality of habitat*.

2. Water Quality - Modify project structures or operations necessary to mitigate direct, indirect, or cumulative water temperature and quality impacts associated with project structures and operations or enhance water temperature and quality conditions in salmonid habitat.

3. Water Availability - Coordinate operations with other projects, programs, or initiatives and/or use water transfers, water exchanges, water purchases, or other forms of agreements to maximize potential benefits to anadromous salmonids from limited water supplies.

4. Fish Passage - Passage to historic spawning, rearing, and migration habitats within or near the project as necessary to complete their life cycles and utilize seasonal habitats

necessary to contribute to the recovery of Central Valley spring-run Chinook salmon, Central Valley steelhead, and other species of concern. Access into the Project may include passive or active structures or devices which provide upstream and/or downstream passage. Passage within or near the Project boundary may include modifications to project facilities and operations necessary to ensure the safe, timely, and efficient passage of upstream migrating adults, downstream passage of emigrating juveniles, and passage necessary for juveniles to access habitat necessary for the seasonal movement of rearing juveniles to feeding and shelter habitats.

5. Channel Maintenance - Implement flow regimes and non-flow related measures necessary to mitigate and minimize direct, indirect, and cumulative impacts of project facilities and operations on sediment movement and deposition, river geometry, and channel characteristics. This includes impacts on stream competence, capacity, flood plain conductivity, bank stability and extent, duration, and repetition of high flow events. In addition, this includes impacts to habitat diversity and complexity such as pool riffle sequencing and instream cover.

6. Hatchery Operations - Minimize and mitigate the impact of hatchery facilities and/or operations on native, wild anadromous salmonids. This includes the direct, indirect, and cumulative impacts of hatchery product on anadromous salmonids and the direct, indirect, and cumulative impacts of hatchery facilities and operations on salmonids and their habitats.

7. Predation - Minimize and mitigate the impact of Project structures or operations that either have in the past or continue to introduce predators, create suitable habitat for predators, harbor predators, or are conducive to the predation of native anadromous salmonids.

8. Riparian Habitat - Protect, mitigate or minimize direct, indirect, and cumulative impacts to, and enhance riparian habitat and habitat functions necessary to mitigate and minimize direct, indirect, and cumulative impacts of project facilities and operations.

9. Flow Ramping - Modify project structures or operations necessary to minimize impacts of flow fluctuations associated with increases of decreases in project discharges.

10. Coordination - In developing alternatives for relicensing, include a full range of alternatives for modifying project and non-project structures and operations to the benefit of anadromous salmonids and their habitats, while minimizing conflicts with operational requirements and other beneficial uses. This includes developing alternatives for greater coordination with other stakeholders and water development projects to ensure that, at a minimum, project structures and operations are consistent with on-going and future restoration efforts and potentially enhance these efforts.

APPENDIX B

ASSESSMENT OF THE RISK OF DISEASE TRANSMISSION VIA ANADROMOUS FISH PASSAGE ON THE FEATHER RIVER

When considering reintroduction, a question arises as to whether anadromous fishes may bring disease to other fish or wildlife populations in the watershed which may not have a similar amount of immunity.

The Oroville project (FERC No. 2100) investigated diseases common in anadromous fishes and concluded that two are of primary concern: *Ceratomyxa shasta* and infectious hematopoietic necrosis virus (IHN). The report also mentions that whirling disease (*Myxobolus cerebralis*) also exists in the upper Feather River drainage, therefore it will also be considered here. Reproduced below are findings from the SP-F2 report for the Oroville (FERC No. 2100) relicensing (CDWR 2004), which provides an overview of these diseases. Additional comments are provided by Dr. James Winton, US Geological Survey, Dr. Ronald Hedrick, UC Davis, and Dr. Scott Foott, US Fish and Wildlife Service:

Infectious Hematopoietic necrosis virus (IHN):

- IHN is endemic to western portions of North America
- Chinook and steelhead/rainbow trout can contract the virus
- Eggs taken from adults with a high prevalence of IHN are generally free of virus, and fish captured over a three year period from a population which had a high prevalence of IHN virus did not become infected when held to sexual maturity in pathogen-free water. However, juveniles which experienced an IHN epidemic exhibited the virus as adults (Amend 1975).
- Studies on wild sockeye suggested that fish did not have latent infection but become re-infected by horizontal or waterborne transmission
- Generally, sensitivity to the virus is inversely proportional to fish size and degree of sexual maturity
- The virus is abundant in the sexual fluids and mucus shed into water during both wild and hatchery spawning of diseased fish
- Virulence is favored by water temperatures less than 59°F, however the Coleman National Fish Hatchery has experienced chronic IHN mortality in juvenile Chinook at temperatures above 59
- IHN type II is known to be especially virulent, but it is not known whether salmonids in the upper watershed (e.g. trout, Chinook, or kokanee (*Oncorhynchus nerka*)) have been exposed to this type. A lack of resistance could mean that the disease might be more strongly expressed in the watershed, however some resistance could moderate expression.
- Experiments provide evidence that an isolate from Serogroup 1 and one from Serogroup 3 have equal or greater virulence for rainbow trout than for Chinook salmon (Hedrick 2004)

Ceratomyxa. shasta:

- *C. shasta* is prevalent in Lake Oroville
- Mortality generally occurs when water temperatures exceed 50°F, however fish can become infected at temperatures as low as 39°F
- Salmonids that are native to rivers where *C. shasta* naturally occurs have developed varying degrees of resistance through natural selection
- Natural transmission occurs when susceptible salmonids come into contact with the waterborne actinosporean stage following its release from the polychaete worm
- Neither direct horizontal (fish to fish) nor vertical (fish to progeny via the egg) transmissions have been documented in laboratory testing

Whirling Disease (*Myxobolus cerebralis*)

- The parasite has a two-host life cycle involving a salmonid and the aquatic oligochaete *Tubifex tubifex*, which is the only tubificid that has been identified as being susceptible
- Whirling disease cannot be transmitted vertically from adult fish to eggs
- An outbreak of whirling disease can occur after stocking with infected fish or transferring fish from one location to another where the infection has not yet occurred, provided the appropriate oligochaete host is present in the environment and becomes infected as a result of the introduction of the infected fish
- Juvenile and adult salmonids are susceptible to infection, but the severity of infection decreases with age
- *M. cerebalis* is present in several watersheds in California including the North and South Forks of the Feather River
- No adverse effects on naturally spawning salmon or trout populations have been observed in California, however hatchery populations have been severely impacted

To the knowledge of NOAA Fisheries Service, Project documents which discuss disease are limited to a document provided by the Applicant in response to additional information request No. 16. This review states that *C. shasta* and whirling disease are probably widespread throughout the North Fork Feather River, and suggests that fish stocking may have contributed to their spread. It also states that rainbow trout are resistant to *C. shasta*, however many stocks of rainbow and steelhead are highly susceptible. The Applicant states that IHN has not been found in the North Fork Feather, however very little testing has been done.

In the Applicant's comments dated January 28, 2004, *Saprolegnia ferax* is mentioned as a disease which could potentially be transmitted between hatchery-reared rainbow trout and western toad embryos. Kiesecker et al. 2001 suggests that the introduction of exotic species has played a substantial role in the spread of this pathogen. Anadromous fishes were a part of the ecosystem of the upper Feather River and amphibians have likely evolved to meet such a disease threat, and could have continued via stocking practices, therefore, it seems unlikely that this should be considered an effect peculiar to

anadromous fish passage. NOAA Fisheries Service considers that the risk of transmission from steelhead (which have been in saltwater or brackish water environments for one year or more) would not be comparable to the risk of transmission from hatchery-reared exotic trout. However, NOAA Fisheries Service will consider this factor carefully in the monitoring plan to be submitted by the Applicant and apply all reasonable measures to limit the spread of this disease.

Feather River salmonids have similarly been exposed to many diseases and have a history of adaptation to them. These stocks have been exposed through anadromy (before dam construction, and while a ladder was in operation at Big Bend dam) and through fish planting. Although natural stocks of Chinook salmon would have disappeared shortly after dam closure, the descendants of Central Valley steelhead could still be residing in the upper reaches of the North Fork.

The following locations will be considered for their exposure to disease: the North Fork Feather River, Lake Oroville and diversion pool, FRFH, and the Feather River below Lake Oroville. Diseases could pass from the lower river into the populations of resident trout in the Seneca Reach and Yellow Creek via fish passage. NOAA Fisheries Service considers that the densities and habitat in which these stocks reside are not conducive to the degree of amplification possible in the lake/hatchery/river system currently present at Oroville. Some wild fish may see negative effects, but it is generally understood that these fishes will not be affected at the population level and it would be difficult to find a single dead fish (Fish Passage Focus Group Meeting Notes, CDWR 2004).

The fish passage program being prescribed will transport fish to very specific bodies of water, therefore the potential for disease transmission will be limited. At the bottom of both of these reaches, a fine mesh fish screen will collect all fish during all but the most extreme flood flows. During these events it may be possible for fish to escape and enter areas of potential disease amplification such as the Feather River Fish Hatchery (FRFH), but due to the volumes of water involved, the potential for turbine entrainment, and the distance that a diseased fish would have to travel, the chance of this occurring is remote.

Although diseases can be transmitted through low-density populations, amplification of disease in high-density populations is of highest concern. Anglers could transport fish from anadromous to non-anadromous bodies of water. However it is unlikely that any fish, let alone sufficient numbers of diseased fish, could travel in this way from the difficult-to-access Seneca Reach or Yellow Creek to known areas of disease amplification. Generally it would be easier to collect fish from other locations such as the lower Feather River, therefore the potential for this kind of activity would essentially be unchanged by fish passage.

Some of the juveniles or kelts from the upper Feather River may be transported downstream to the lower Feather River in a diseased state, however juveniles reared in the lower Feather River have a substantially greater potential for disease transmission. Due to crowding, rearing juveniles in the lower Feather river (whether above or below a potential future resistance-board weir) will be in closer proximity to diseased adults than

juveniles in the upper Feather River. Juveniles reared in the upper river are therefore of much lower threat than are individuals in the lower river.

Disease particles shed from an adult could pass though the screen at the bottom of the Seneca Reach or Yellow Creek and pass down to Lake Oroville, which is intended to maintain a put-and-grow cold water salmonid fishery. Currently, the California Department of Water Resources (CDWR) intends to stock a strain of coho (*O. kisutch*) which is resistant to IHN. If this stocking continues, the potential for IHN amplification in Lake Oroville is reduced.

Infected fish can shed millions of virus particles per hour. Free and Foott (1998) found that healthy salmon do not show a virus-induced mortality when cohabited with salmon exhibiting symptoms of acute disease. Hedrick (2004) found that relatively high concentrations of virus are needed to induce early mortality, however epithelial infections which could cause delayed mortality were present at lower concentrations.

It is possible that a disease particle shed from an adult would make its way through the Belden Reach, Rocky Reach, Cresta Reach, Poe Reach, Lake Oroville, and approximately four miles of the Oroville diversion pool to be entrained in the intake for FRFH. Particles have limited viability outside of an organism, and would be diluted by up to 1.141×10^{15} gallons of water in Lake Oroville. Because the distance from the North Fork Feather River to the intake at Oroville dam is approximately 20 miles, a very small percentage of these particles would be taken into the intake. The particle could then be carried through the diversion pool (capacity 16,900 cfs), to the FRFH intake (capacity 100 cfs), into the unsterilized raceways (usage approximately 45 cfs, or approx. 0.3% of the diversion pool capacity), then successfully infect a fish. It is difficult to estimate the potential for this to occur, but as the volumes of water and residence time in the lake are examined, it appears unlikely that this pathway would carry a sufficient amount of virus to threaten any lower river populations.

Although other salmonids reside in the North Fork below these reaches, these populations are depressed by summer water temperatures, which are an effect of the Project. The populations which are closest to Lake Oroville experience the warmest water. There is therefore less likelihood that fish between the upper Feather River and Lake Oroville could harbor disease, and serve as an intermediary to pass the disease on to fish in the lower Feather.

The Oroville licensing process (FERC No. 2100) is currently finalizing studies on additional water disinfection systems for the FRFH. Interim results are clear that disinfection can be accomplished effectively at reasonable costs (Terry McCarthy, Water Management Technologies, Inc., and Edwin Cryer, Montgomery Watson Harza, Inc., personal communication). NOAA Fisheries Service intends to use its authorities to implement effective water disinfection at FRFH in the Oroville relicensing process (FERC No. 2100). Terms, conditions and a Section 18 fishway prescription will likely be presented to FERC in less than six months. The timing of FERC licenses in the Feather River provides the opportunity to coordinate environmental protection measures as

envisioned in the Interagency Task Force reports developed by FERC and NOAA Fisheries Service as well as other agencies.

The risk to the in-river populations of salmonids below Oroville dam does not appear to be significant when compared with the current situation. A hypothetical Central Valley spring-run Chinook salmon carrying IHN would either be passed upstream as it arrives at the top of the fish ladder, or be prevented from passage upstream by the Fish Barrier Dam to hold in the lower river. Because studies suggest that the ability to induce productive virus infections occurs only during the last 2-3 weeks of life (Hedrick 2004), far less virus would be shed in the water during passage than in later stages. If a diseased adult fish were passed upstream, it would be in closest proximity to other salmonids while in a less infective state, therefore there is a reduced possibility that other fish transported with it would become infected.

The available evidence indicates that inducing disease is much more difficult than causing an infection (Free and Foott 1998, Hedrick 2004). Transportation stresses fish, which may create the conditions needed for an infection to progress to disease, but it is not known whether transporting non-gravid adult fish in the manner described could induce both infection and a disease state. This can be tested experimentally however, and if it is found that disease is induced in transported fish the program could be altered to pass progeny.

If the adult fish were to remain in the lower river, we estimate that chances are relatively high that neighboring fish would be infected in the crowded holding conditions present, especially below the fish barrier dam. The fish passed into less dense conditions upstream would have a lower probability of infecting large numbers of other fish in the upstream reaches. Shed virus could infect other salmonids between the upper and lower river, however as stated above there are fewer susceptible salmonids than in the lower river. The conclusions of Hedrick (2004) are congruent with these assertions:

> Factors such as high host densities must contribute to the epidemic mortality observed in hatchery outbreaks. Other environmental factors or stressors encountered by outmigrant Chinook salmon may be sufficient to cause young salmon to undergo virus-induced mortality but this is difficult to assess. In the laboratory, IHNV was not easily transmitted from infected Chinook salmon to cohabitant rainbow trout and similar results have been obtained in trials with Chinook to Chinook salmon fry by others. These results suggest that fish harboring IHNV infections as outmigrant juveniles, particularly when they are not clinically ill, may not represent a major source of virus that would infect other salmonids they might encounter in the river (e.g. resident salmonids such as steelhead or rainbow trout).

Passing fish upstream would reduce the likelihood of effects to lower Feather River populations. Although Central Valley steelhead enter the river in a more gravid state than Central Valley spring-run Chinook salmon, the principle is the same and we would expect a similar reduction in the potential for disease transmission.

In addition, it is likely that the total amount of exposure to disease in the lower Feather River will be reduced due to the addition of a resistance-board weir and new side-channel habitat. These measures would have the effect of reducing crowding for Central Valley – spring-run Chinook salmon and Central Valley steelhead. Because these fish would not be exposed to the large numbers of Central Valley fall-run Chinook salmon, there is substantially less likelihood that a disease particle carried from the upper North Fork will successfully bring a fish into a disease state (not just sub-clinical infection of the outer tissues). Because fish passage will also reduce crowding in the lower Feather River, NOAA Fisheries Service anticipates that the disease burden will be improved for listed species as a whole.

Brown trout (an introduced species) are less susceptible to IHN than are rainbow trout, therefore we anticipate that fish passage will not affect the character of Yellow Creek as a Wild Trout Stream. All fish are valuable, however the codification of the Federal and state endangered species acts and other legislation demonstrates that some fish are considered to be at greater risk than others. This legislation provides for additional requirements for the protection and recovery of these species. Salmonids resident in the North Fork Feather River below Lake Almanor appear to predominantly come from hatchery stocks or have been interbreeding with stocked fish, and these resident brown and rainbow trout are not listed as threatened or endangered with the resulting requirements for protection and recovery. Therefore there are fewer requirements related to protection of these resident fish than for listed species in this watershed. For example, none of the hydropower projects on the North Fork Feather are screened so as to prevent harm to these resident stocks, however efforts to screen intakes in anadromous waters are given a high priority.

If a disease impact on the Feather River does occur, an outbreak in the population of stocked salmonids in Lake Oroville is the most probable. Juveniles have a low propensity for disease expression at this life stage, however those individuals that become infected and escape the fishery may become gravid and diseased, and express virus. Impacts to FRFH would then seem possible, however the use of a disinfection system and the stocking of IHN-resistant coho would substantially reduce this potential. NOAA Fisheries Service considers that the risk to salmonid populations in the lower Feather River would be far less than what these fish have already been exposed to, or would be exposed to via imported coho (e.g. Bacterial Kidney Disease).

However, disease monitoring has been included as part of the prescription, and if sufficient evidence is collected that demonstrates a more realistic probability of an impact, the passage program may be altered to provide for the transportation of eggs or fry. For example, all juvenile Central Valley spring-run Chinook salmon which are collected in the upper Feather River could be coded-wire tagged before their release in the lower river. Current practice is to Floy® tag the returning adults and return them to the lower river for later identification. The Floy® tagged adults would be stripped, with their gametes held in separate containers. The coded-wire tag from each individual can

then be read in a matter of minutes, so that the gametes from one particular reach could be spawned together.

Because Central Valley steelhead smolts emigrate at a size adequate for the use of Passive Integrated Transponder tags, these can be read efficiently in the hatchery without harm to the adult upon its return. The kelts can then be released back into the lower river, and the gametes spawned and reared in the hatchery similar to Chinook under disease-free conditions. The eggs or juveniles can then be given a clean disease certification and released in the upper river. Because of the low population size of Central Valley steelhead in the Feather River, all of the returning adults not slated for hatchery production could alternatively be transported upstream to available habitat, anticipating that other reaches in the West Branch and North Fork Feather River watersheds are opened to passage. NOAA Fisheries Service considers these options practicable but less preferable than passage of adults upstream, due to the potential for long-term genetic selection effects. If this strategy is utilized, then the disease risk to Feather River stocks appears to be only slightly elevated from the present condition. As with the program in general, consultation between fisheries agencies and stakeholders will determine the most appropriate strategy.

With the installation of an effective water treatment system at FRFH, the most likely effect appears to be transmission to resident trout in the Seneca Reach and Yellow Creek because of their proximity to anadromous fishes. Fish in the Belden Reach could also become exposed, however this reach is heavily fished and summer temperatures depress their abundance. Population sizes decrease going downstream, especially below the confluence of the East Branch which brings additional warm water to the NFFR.

In Lake Oroville, a cold-water fishery of FRFH-reared Chinook salmon has caused epizootics. If an epizootic were to develop in Lake Oroville it would be considered serious and is therefore the primary concern. However, recurrence of an epizootic as a result of fish passage does not appear likely because it appears to rely on the continuity of diseased spawning adults throughout the North Fork and Lake Oroville. The window of propagation is mainly limited to the fall in Lake Oroville.

CONCLUSIONS

To gauge the relative risk of anadromous fish passage, a comparison can be made between passage and the stocking practices above and near Oroville dam. The following observations indicate that fish passage will not cause epizootics in the lower Feather River watershed, which is of primary concern:

- Stocking of IHN-susceptible Chinook salmon and brown trout into Lake Oroville has been practiced without serious incident for much of the history of FRFH. Epizootics occurred after stocking a high level of Chinook in the reservoir. This indicates that the potential disease load from a fish passage program would not cause an epizootic if it were lower than that produced by these stocking levels.

- A water disinfection system at will have positive ecosystem benefits which extend beyond fish passage, and is currently envisioned to be part of NOAA Fisheries Service recommendations for the Oroville (FERC No. 2100) license conditions. With the addition of such a system, the potential for future epizootics is greatly diminished.
- The CDWR is pursuing a cold water fishery for Lake Oroville and has performed a risk assessment for the importation of Domsea® coho into California, but has not found that disease importation is a factor which cannot be prevented through its testing procedures. California has not experienced major epizootics of Bacterial Kidney Disease, and the control options are limited. The implications of a BKD outbreak at FRFH would be much more serious than an outbreak of IHN, therefore, the risk of passage is of less consequence than the risk of the importation program.
- If necessary, the passage of disease-free progeny is a feasible option that will further diminish the potential for epizootics.

With the installation of an effective water disinfection system at FRFH, there appears to be a very low degree of risk to salmonid populations in the lower Feather River, and fish passage could provide for transportation of disease-free progeny, if sufficient evidence is collected that demonstrates a more realistic probability of an impact.

IHN appears to be of primary concern due to repeated disease outbreaks at FRFH, however the impacts of the fish hatchery should not be equated with the impacts of a fish passage program. Naturally spawned fish are less susceptible to IHN than hatchery fish, and fish in natural habitats are less susceptible to disease than fish crowded in sub-optimal habitats below the dam. The risks of IHN transmission can be managed in a reintroduction effort, but to address the underlying cause of IHN amplification, management efforts should focus on the FRFH. IHN is endemic to the system and may continue to occur with or without fish passage above Oroville dam, however the addition of a water disinfection system will reduce the incidence of disease overall.

Because FRFH has a history of disease outbreaks, and because mechanical failures or other anthropogenic impacts could occur in the lower Feather River, populations above the dam should be established to avoid catastrophic losses to the populations of Central Valley spring-run Chinook salmon and Central Valley steelhead as have occurred in the Klamath River and Butte Creek in recent years. Natural production decreases the likelihood of new strains developing, which may otherwise have effects on population effects extending beyond the Feather River.

The program should be undertaken carefully and in all possible coordination with appropriate agencies and stakeholders in the Feather River watershed. This coordination can be accomplished in the time specified by the accompanying prescription. Although a passage program could be initiated using the progeny of anadromous fishes, the passage of adults should be thoroughly considered for its genetic benefits, and the gradual introduction of adults in combination with disease monitoring could be part of a phased approach.

It appears unlikely that there will be substantial mortality from this program, and an effect may not ever be detectable. The potential benefits from this program will be much more obvious however, and can contribute to the recovery and de-listing of anadromous fish in the Central Valley. The risk to the Feather River is minimal, and potential adverse impacts do not equate with the far greater benefits of an anadromous fish passage program.

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APPENDIX C

MODIFIED SECTION 10(j) TERMS AND CONDITIONS

Introduction

Because of new and pertinent information presented as part of FERC relicensings on the Feather River, NOAA Fisheries Service hereby modifies its recommended 10(j) Terms and Conditions to accommodate its prescription. This modification was anticipated as part of our letter dated November 26, 2003.

The Licensee shall implement measures to ensure that anadromous fish spawning, holding, and rearing habitat are adequately protected and enhanced as determined to be sufficient by NOAA Fisheries Service.

The following terms and conditions should be considered to operate in concert with the abovementioned goals and objectives. Upon the implementation of anadromous fish passage to the North Fork Feather River, and/or the implementation of anadromous fisheries protection devices in the Project area (see below), NOAA Fisheries Service may recommend that further terms and conditions be applied.

Gravel Enhancement

Within one year of license issuance, the Licensee shall provide a plan to NOAA Fisheries Service which determines the appropriate amount of gravel necessary to provide for the Seneca Reach to be fully seeded with anadromous fish at the flows detailed in the Project settlement agreement as well as provisions for monitoring and maintaining that amount of gravel. Upon approval of the plan by NOAA Fisheries Service and within three years of license issuance, the Licensee shall commence placing gravel within the Seneca Reach in accordance with the plan.

Mining Impacts

The Licensee shall partially offset impacts to anadromous fish caused by the inundation of habitats and minimize adverse impacts to the safe, timely and effective passage of anadromous fishes, by providing suitable compensation from active mining interests in the Seneca Reach or Yellow Creek through conservation easements and the purchase and rehabilitation of sites used for mining operations. Within one year of license issuance, the licensee shall provide such a plan to NOAA Fisheries Service that encompasses its Resource Goals and Objectives in the abovementioned manner. Upon approval of the plan by NOAA Fisheries Service, this plan shall be implemented within three years of license issuance.

MODIFIED SECTION 18 FISHWAY PRESCRIPTION

Purpose

This Fishway Prescription is designed to provide an appropriate balance between hydropower and the environmental resources of the North Fork Feather River. The Project operates in close coordination with other hydropower projects owned by the Applicant in and near this watershed, which otherwise would not have sufficient storage to operate. Anadromous fishes were undoubtedly a significant part of the ecosystem (Yoshiyama et al. 2001, Gresh et al. 2000) before the construction of Project features and the associated projects of the North Fork Feather. Central Valley spring-run Chinook salmon and Central Valley steelhead, both listed as Threatened under the Endangered Species Act, once utilized this habitat.

The following prescription should be considered to operate in concert with the above mentioned goals and objectives. Particularly important for this prescription are the impacts to anadromous fishes from the Applicant's Poe Project (P-2107), Rock Creek-Cresta Project (P-1962), and Upper North Fork Feather River Project (P-2105). The Feather River project (or Oroville; P-2100) currently blocks the passage of anadromous fish into the upper watershed. This prescription will help to provide for an equitable distribution of fish passage protections, mitigations, and enhancements among the FERC licensees in the Feather River watershed.

Generally, the P-2100 project will be responsible to provide upstream trap-and-haul fish passage to specific reaches in the upper watershed. The number of fish passed upstream will be based upon the amount of available habitat in the targeted reaches. These numbers will be adjusted according to monitoring results and the best judgment of NOAA Fisheries Service and other agencies.

The Licensee shall provide necessary structures to receive the upstream migrants at prescribed reaches, monitor their success, collection of downstream migrants in a suitable location such as at the downstream ends of the Seneca Reach and Yellow Creek, and transport these fish down to a suitable location in the lower river for release.

In separate but coordinated proceedings, the Licensee will also provide protection, mitigation and enhancement measures for its P-2107 project, and other projects as necessary. Provision is made to distribute transportation costs between licensees, however due to the minimal but balanced nature of these costs, this may not be necessary.

Description

Within 1 year of license issuance, the Licensee shall submit to NOAA Fisheries Service designs for appropriate anadromous fish release sites. Designs approved by NOAA Fisheries Service shall be implemented within three years of license issuance. These sites shall be capable of receiving adult anadromous fishes from other licensees in the Feather River watershed. These fishes shall be released in a safe, timely and effective manner via water-to-water transfer. The Licensee shall provide monitoring of adult and juvenile fishes, and their interactions with fish and wildlife resources, including monitoring of diseases, and shall submit an annual report to appropriate resource agencies and local governance. The Licensee shall respond effectively to maintenance requests made by NOAA Fisheries Service concerning these facilities.

Within one year of license issuance, the Licensee shall submit design drawings for approval by NOAA Fisheries Service, in order to construct and operate a screening device at or above the intake for Belden Powerhouse. This screen shall meet NOAA Fisheries Service's specifications stipulated in "Fish Screening Criteria for Anadromous Salmonids" (Appendix D) e.g. specifications for approach and sweeping velocities, screening material quality, automatic cleaning mechanisms, bypass entrance, bypass conduit, and bypass outfall. The Licensee shall also include provisions for transportation of these fishes to appropriate temporary holding facilities at or near the screening device. These facilities shall enable the Licensee to mark or tag these fishes for later unique identification if necessary, and transfer them in a safe, timely and effective manner to transport vehicles and thence to the lower river. Within three years of license issuance, or a later date if determined by NOAA Fisheries Service to be necessary for integration with fish passage efforts for P-2100, the Licensee shall complete the implementation of the approved plans. The Licensee shall be responsible for the threshold of 98%, and target of 99.5%, for survival of emigrating fishes from collection to release into appropriate habitats. Upon approval by NOAA Fisheries Service, exceptions to these standards may be granted during periods of exceptionally high flow, or in the case of flow releases necessary to protect human life or property. NOAA Fisheries Service reserves the authority to modify this prescription as needed in order to accomplish the goal of safe, timely, and effective upstream and downstream fish passage in a more practicable manner than that stipulated above. The Licensee shall respond effectively and in a timely manner to maintenance requests made by NOAA Fisheries Service for these facilities.

Within five years of license issuance, the Licensee shall submit design drawings for approval by NOAA Fisheries Service, in order to construct and operate a screening device above the Belden Powerhouse on Yellow Creek. This screen shall meet NOAA Fisheries Service's specifications stipulated in "Fish Screening Criteria for Anadromous Salmonids" (Appendix D) e.g. specifications for approach and sweeping velocities, screening material quality, automatic cleaning mechanisms, bypass entrance, bypass conduit, and bypass outfall. The Licensee shall also include provisions for transportation of these fishes to appropriate temporary holding facilities at or near the screening device. These facilities shall enable the Licensee to mark or tag these fishes for later unique

identification if necessary, and transfer them in a safe, timely and effective manner to transport vehicles and thence to the lower river. Within ten years of license issuance, or a later date if determined by NOAA Fisheries Service to be necessary for integration with fish passage efforts for P-2100, the Licensee shall complete the implementation of the approved plans. The Licensee shall be responsible for the threshold of 98%, and target of 99.5%, for survival of emigrating fishes from collection to release into appropriate habitats. Upon approval by NOAA Fisheries Service, exceptions to these standards may be granted during periods of exceptionally high flow, or in the case of flow releases necessary to protect human life or property. NOAA Fisheries Service reserves the authority to modify this prescription as needed in order to accomplish the goal of safe, timely, and effective upstream and downstream fish passage in a more practicable manner than that stipulated above. The Licensee shall respond effectively and in a timely manner to maintenance requests made by NOAA Fisheries Service for these facilities.

The fishways prescribed shall be evaluated and monitored in order to meet the criteria specified by NOAA Fisheries Service in "Fish Screening Criteria for Anadromous Salmonids" and other NOAA Fisheries Service's specifications as necessary to provide for the safe, timely, and effective passage of anadromous fishes. The Licensee shall provide for tests to assess the efficiency of passage at each of the devices stipulated.

Within one year of license issuance, the Licensee shall submit a plan to NOAA Fisheries Service by which the Licensee shall monitor the safe, timely and effective passage of fishes to these habitats, and potential effects of this protection, mitigation and enhancement measure upon the environment. Upon approval of the plan by NOAA Fisheries Service and within three years of license issuance, or a later date if determined by NOAA Fisheries Service to be necessary for integration with fish passage efforts for P-2100, the Licensee shall commence implementation of this plan. The Licensee shall thereafter submit an annual report to the Federal Energy Regulatory Commission, NOAA Fisheries Service, the US Forest Service, the US Fish and Wildlife Service, the California Department of Fish and Game, the California State Water Resources Control Board, the County of Plumas, and coordination bodies such as the Feather River Ecological Committee.

Coordination

The Licensee shall, with all due diligence, coordinate with NOAA Fisheries Service, other appropriate public agencies, and other FERC licensees within the Feather River watershed, in order to provide for the protection, mitigation, and enhancement of anadromous fisheries resources. This coordination shall include, but not be limited to, regular and reasonable attendance at meetings such as the multi-agency Ecological Committee currently being developed in the Oroville relicensing process (FERC No. 2100), or other such similar initiatives which are created for the purpose of gathering information or making decisions with regard to ecological processes in the Feather River watershed. The Licensee shall provide its knowledgeable staff and consultants as necessary for these coordination activities.

Upon receipt of request from NOAA Fisheries Service, the Licensee shall provide an estimate of its trap-and-haul fish passage transportation costs to facilitate comparison with cost estimates from all licensees participating in the fish passage program. If necessary, the Licensee shall provide funds to equitably balance transportation costs among all licensees.

Reservation of Authority

In addition to the abovementioned stipulations to be added as conditions for the license currently under consideration, NOAA Fisheries Service reserves the authority to re-open this license in order to more fully elucidate and clarify the needs for anadromous fishes. Pursuant to section 18 of the Federal Power Act, as amended, the Secretary of the Department of Commerce, as delegated to the NOAA Fisheries Service, exercises its authority under section 18 by reserving the authority to prescribe the construction, operation, and maintenance of such fishways deemed necessary, including measures to evaluate the need for fishways, and to determine, ensure, or improve the effectiveness of such fishways. This reservation includes the authority to prescribe fishways for fish species to be managed, enhanced, protected, or restored during the term of the license.

Appendix D

Fish Screening Criteria For Anadromous Salmonids

Appendix E

INDEX TO THE ADMINISTRATIVE RECORD FOR PRESCRIPTIONS SUBMITTED BY THE NATIONAL MARINE FISHERIES SERVICE FOR THE DEPARTMENT OF COMMERCE

This is the Index for the Administrative Record for the Prescriptions for Fishways submitted by the National Marine Fisheries Service for the Department of Commerce (Department). This Administrative Record supports the Department's Prescription for Fishways made pursuant to Section 18 of the Federal Power Act, and submitted to the Federal Energy Regulatory Commission (Commission) with the Department' Prescription for fishways for the Upper North Fork Feather River Project, Project No. 2105-089, Plumas County, California. The Department intends to file the documents, referenced herein, with the Commission on or before May 30, 2005.

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(a) CALFED Bay-Delta Program Programmatic Record of Decision (2000) (http://calwater.ca.gov/Archives/GeneralArchive/RecordOfDecision2000.shtml)

Identifies Ecosystem Restoration actions which include modifying or eliminating fish passage barriers, and targeting research to design and prioritize restoration actions. Includes a milestone providing for the unimpeded upstream and downstream passage for salmon and steelhead on Sacramento River Basin tributaries. Supported by the Department of Water Resources, Department of Fish and Game, State Water Resources Control Board, Fish and Wildlife Service, Forest Service and National Marine Fisheries Service among others.

State of California

(a) Salmon, Steelhead Trout, and Anadromous Fisheries Program Act (California Fish and Game Code Sections 6900 et seq.)

In 1988, the State legislature passed the Salmon, Steelhead Trout, and Anadromous Fisheries Restoration Act (Chapter 1545/88/Senate Bill 2261), which established the long-term goal of doubling anadromous fish populations from their 1988 abundance levels by the end of the century. This Act precipitated several plans for restoring Central Valley anadromous fisheries populations and their habitat: the Central Valley Salmon and Steelhead Restoration and Enhancement Plan, and Restoring Central Valley Streams. In general, these planning documents have outlined efforts to restore Chinook salmon populations, and have assumed that steelhead populations would secondarily benefit from the restoration measures. Restoration activities currently being implemented as a result of these plans and this Act include: a pilot pumping project to improve fish passage at Red Bluff Diversion Dam, installing water temperature control devices at Shasta dam and Whiskeytown reservoir, correcting fish passage problems on several Sacramento River tributaries, and acquiring riparian woodland areas along Butte Creek and the Sacramento River.

As part of the Salmon, Steelhead Trout, and Anadromous Fisheries Program, the Steelhead Management and Restoration project was also established in 1991. The CDFG has produced a draft plan which outlines management activities for the restoration and maintenance of California's steelhead populations. In the Central Valley, the CDFG's focus for steelhead restoration is on recovering wild populations, and restoring hatchery-maintained runs. As an example, the draft plan outlines measures for the Sacramento River include correcting fish passage and screening problems.

(b) The Keene-Nielsen Fisheries Restoration Act of 1985 (California Fish and Game Code Sections 2760 et seq.)

This Act states that California intends to "make reasonable efforts to prevent further declines in fish and wildlife, and intends to restore fish and wildlife to historic levels where possible. Just over 15 million dollars were initially authorized in approved legislation, however, only 11.25 million dollars were actually appropriated between 1985 and 1987. The Act was reworded through 1990 legislation to closely tie expenditures from this account to projects called for under the Salmon, Steelhead Trout, and Anadromous Fisheries Program Act of 1988; however, the legislation provided no funding to the Keene-Nelson account, nor have the budgets of subsequent governors.

(c) California Fish and Game Commission's Steelhead Rainbow Trout Policy (http://www.fgc.ca.gov/html/compolcy.html)

The policy recognizes the need to protect genetic integrity and habitat of all stocks and places management emphasis on natural stocks. The policy declares: Management of steelhead will be directed towards protection and maintenance of populations and genetic integrity of all identifiable stocks; rescued juvenile steelhead must be returned to their natal stream and rescue will only be allowed when fish can be held until habitat conditions improve; restoration and acquisition plans will be developed and implemented to safeguard critical habitats such as estuaries, lagoons, and spawning and rearing areas; securing necessary instream flows; existing steelhead habitat shall not be diminished further without offsetting mitigation of equal or greater long-term habitat benefits; sport fishing for adult and juvenile steelhead will only be permitted where CDFG has determined that harvest will not harm existing wild populations; and resident fish will not be planted in drainages of steelhead waters if CDFG has determined that it will interfere with steelhead populations.

(d) Senate Bill 1086

The State of California passed Senate Bill 1086 in 1986, calling for a management plan to protect, restore, and enhance the fish and riparian habitat and associated wildlife of the upper Sacramento River. In response to this legislation, the Resources Agency of California prepared the Upper Sacramento River Fishery and Riparian Habitat Management Plan. This plan recommends a variety of habitat restoration measures, including improving spawning gravel, water quality, and passage at dams and diversions. Senate Bill 1086 appropriated $250,000 to prepare this management plan and to develop an inventory of riparian lands.

(e) Trout and Steelhead Conservation and Management Planning Act of 1979 (California Fish and Game Code Sections 1725 et seq.)

This Act declares that it is a policy of the State to establish and maintain wild trout and steelhead stocks in suitable waters of the state and establish angling regulations designed to maintain wild trout and steelhead through natural production.

(f) Fish and Game Commission Water Policy (http://www.fgc.ca.gov/html/compolcy.html)

It is the policy of the CFGC that the quantity and quality of the waters of the state should be apportioned and maintained to produce and sustain the maximum numbers of fish and wildlife. It requires that CDFG review and comment on proposed water development projects and applications for use, and recommends and seeks adoption of proposals necessary or appropriate for the protection and enhancement of fish and wildlife and their habitats. The primary habitat objective is the maintenance of natural conditions in state waters, the adaption of impounded waters for fish and wildlife purposes, and the creation of new waters or areas which will support fish and wildlife, provided that such new waters enhance fish and wildlife.

(g) Cooperatively Operated Rearing Programs for Salmon and Steelhead Policies (http://www.fgc.ca.gov/html/compolcy.html)

The CFGC policy on Cooperatively Operated Rearing Programs states that the bulk of the State's salmon and steelhead resources shall be produced naturally and that the State's goals of maintaining and increasing natural production take precedence over the goals of cooperatively operated rearing programs.

(h) Salmon and Steelhead Stock Management Policy (see, e.g., CDFG, Status Review of California coho salmon North of San Francisco, Report to the California Fish and Game Commission (2002), http://www.dfg.ca.gov/nafwb/pubs.html)

It is the policy of CDFG to maintain the genetic integrity of all identifiable stocks of salmon and steelhead in California. Each salmon and steelhead stream shall be evaluated by CDFG and the stocks classified according to their probable genetic source and degree of integrity.

(i) California Fish and Game Code 1385 et. seq.

Also known as the California Riparian Habitat Conservation Act, established this program to protect, preserve, and restore riparian habitat throughout California through acquisition of interests and rights in land and waters.

(j) California Fish and Game Code 2786(e)

Under the California Wildlife Protection Act of 1990 (CWPA), CDFG code section 2786(e) stipulates that funds allocated under CWPA may be used for acquisition, restoration, or enhancement of aquatic habitat for spawning and rearing of anadromous salmonids and trout resources.

(k) California Fish and Game Code 6900 et. seq.

It is the policy of the State to significantly increase the natural production of salmon and steelhead, and existing natural salmon and steelhead habitat is not to be diminished further without offsetting impacts of lost habitat.

(l) California Water Code 1243

Declares that the use of water for preservation and enhancement of fish and wildlife resources is a beneficial use. Requires the State Water Resources Control Board (SWRCB) to notify CDFG of any application for permit to appropriate water.

(m) California Water Code 1707

This law passed by the California Legislature and signed by the Governor in 1991 authorizes a water right owner to petition the SWRCB for a change for purposes of preserving or enhancing wetlands, habitat, fish, and wildlife. It authorizes the SWRCB to approve the petition, regardless of whether the proposed use involves a diversion of water. Generally, the law allows for an existing water right to be left in the stream to benefit fish and wildlife, instead of being diverted for consumptive, or out-of-stream uses.

(n) Association of California Water Agencies

The Association of California Water Agencies have prepared and submitted to NOAA Fisheries Service a list of participants' (individual agencies) ongoing restoration efforts for anadromous salmonids in watersheds located throughout the state. These are a host of voluntary and mandatory efforts to restore salmonids and their habitat. As an example, the Carmel River Captive Steelhead Broodstock project is the only cooperative spawning and rearing facility in California operated solely for genetic conservation of a native steelhead stock. This program was necessary to guarantee the survival of the Carmel River steelhead population and to speed its recovery. Another captive breeding facility has been proposed for Fillmore Hatchery on the Santa Clara river. Other activities include: fish rescues, gravel replacement, population monitoring, correcting fish passage problems, changes in water drafting and conveyance schedules, and public education outreach.

(o) The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region
(http://www.swrcb.ca.gov/rwqcb5/available_documents/basin_plans/bsnplnab.pdf)

This Basin Plan designates cold water habitat for the North Fork Feather River. Recent presentations made by the Pacific Gas and Electric Company with regard to the Rock Creek- Cresta (FERC No.1962) and Upper North Fork Feather River (FERC No. 2105) indicate that maintaining water temperature at 20° C or below is achievable under most conditions with the temperature control device proposed for Lake Almanor.

(p) CDFG, Restoring Central Valley Streams – A Plan for Action (1993) (http://www.dfg.ca.gov/nafwb/pubs.html)

Presents a multi-species approach to restoration of anadromous fish populations in the Central Valley.

(q) CDFG, Steelhead Restoration and Management Plan for California (1996) (http://www.dfg.ca.gov/nafwb/pubs.html)

The Steelhead Plan identifies the life history requirements and needs of an important element of Central Valley anadromous fish ecosystems. The need to quickly develop and implement a statewide steelhead restoration plan was heightened by the precipitous decline of California's naturally spawning steelhead populations.

US Government

(a) Central Valley Project Improvement Act (CVPIA) (*Pub. L. 102-575, title* XXXIV, Oct. 30, 1992, 106 Stat. 4706)

The CVPIA was signed into law on October 30, 1992. The CVPIA amends the authorization of the Department of Interior's CVP to give fish and wildlife protection, restoration, and mitigation projects equal priority with irrigation and domestic water uses. The CVPIA also makes fish and wildlife enhancement equal in importance to power generation. The CVPIA identifies several specific measures to meet these new priorities and sets a broad goal of sustaining natural populations of anadromous fishes in Central Valley rivers and streams. Specific provisions of the CVPIA that potentially benefit steelhead (and which have already been initiated) include: dedication of 800,000 acre-feet of CVPIA yield for fish and wildlife; release of pulsed flows to increase survival of migrating anadromous fish; and installation of fish screens at water diversions. The CVPIA also places limitations on water contracting and establishes a restoration fund of 50 million dollars annually. More specifically, the CVPIA requires the Secretary of the Interior to develop and implement "a program which makes all reasonable efforts to ensure that, by the year 2002, the natural production of anadromous fish in Central Valley rivers and streams will be sustainable, on a long term basis, at levels not less than twice the average levels attained during the period of 1967-1991" (section 3406[b][1]).

This program is in progress and is known as the Anadromous Fish Restoration Program (AFRP). A coalition of fish experts from the Federal and State agencies, private industry and academia (AFRP Core Group) has developed a working plan for restoring salmon and steelhead in the Central Valley. The working plan provides a platform upon which the participating agencies and public will build a final plan. Actions are recommended for each watershed. They cover a broad spectrum of habitat restoration activities, such as improving instream flows, maintaining adequate water temperatures, correcting fish passage problems at dams and diversions, and restoring spawning gravel and riparian habitat. The population abundance goal for steelhead is 13,000 adults per year spawning upstream from the Red Bluff Diversion Dam in the Sacramento River. Because there is

insufficient data of steelhead in other streams and rivers in the Central Valley, it has so far been impossible to set numeric restoration goals for these other streams. Further details on the recommended actions may be found in the Working Paper on Restoration Needs: Habitat Restoration Actions to Double Natural Production of Anadromous Fish in the Central Valley of California.

(b) Feather River Relicensings

NOAA Fisheries Service is requesting a coordinated passage investigation to be undertaken by the Oroville (FERC No. 2100), Poe (FERC No. 2107), Upper North Fork Feather River (FERC No. 2105), DeSabla-Centerville (FERC No. 803), and South Feather (FERC No. 2088) relicensings.

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Secretary Magalie Roman Salas	)	
Federal Energy Regulatory Commission	)	Project No. 2105-000
Upper North Fork Feather River Project	)	
California	)	

Certificate of Service

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding.

Dated at Santa Rosa, CA this 28th day of February, 2005.

Andrea Berry, Administrative Assistant

Service List