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Cc:	Stoddard, Jeffrey@Wildlife
Subject:	RE: Review of the Draft Environmental Impact Report for the Lower Klamath Project License Surrender, Federal Energy Regulatory Commission Project No. 14803, State Clearinghouse Number 2016122047, Siskiyou County
Date:	Thursday, February 21, 2019 5:26:01 PM
Attachments:	CEQA-2019-0003_SIS_SWRCB DEIR Comment Letter 2.21.2019_FINAL.pdf FERC_WaterBoard_Klamath401_NOP_2017_final1_30_17.pdf AR measures memo to SWRCB 11.8.18_FINAL.PDF 401 cert letter to SWRCB.PDF

Please see letter and attachments. All distribution done electronically.
Thank you,

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February 21, 2019

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Division of Water Rights – Water Quality Certification Program
P.O. Box 2000
Sacramento, CA 95812-2000

Subject: Review of the Draft Environmental Impact Report for the Lower Klamath Project License Surrender, Federal Energy Regulatory Commission Project No. 14803, State Clearinghouse Number 2016122047, Siskiyou County

Dear Ms. Siebal:

The California Department of Fish and Wildlife (Department) appreciates the opportunity to comment on the Draft Environmental Impact Report (DEIR) for the Lower Klamath Project License Surrender (Project). The proposed Project consists of the decommissioning and removal of the J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate dams and associated facilities located on the Klamath River. The Project implements portions of the Klamath Hydroelectric Settlement Agreement (KHSA), as amended. The Department is a signatory to the KHSA and has been actively participating in matters related to the Project since December 2000.

The Department provided a letter to the State Water Resources Control Board (SWRCB) on the Notice of Preparation for the subject DEIR on February 1, 2017. In addition, the Department provided a letter to the SWRCB regarding our support of the draft 401 water quality certification on June 26, 2018, and the aquatic resource measures as described in the Definite Plan on November 9, 2018. We hereby incorporate the comments provided in those letters by reference. The Department worked closely with the Klamath River Renewal Corporation (KRRC) on the development of the restoration plan, the terrestrial resource measures, and the aquatic resources measures as they are presented in the Definite Plan and we support their implementation. Department personnel have reviewed the DEIR and offer the following comments.

KRRC proposes to remove three dams in California and one in Oregon to create a free-flowing Klamath River in the Hydroelectric Reach and provide for volitional fish passage in accordance with the terms of the KHSA. Currently, the Klamath Hydroelectric Project is causing irreparable harm to the State's fish and wildlife resources. The dams alter the flow of the river, block fish passage, and create poor water quality conditions that cause toxic algal blooms, low dissolved oxygen (DO), and high-water temperatures. The dams also contribute to conditions that foster fish disease and result in high juvenile salmon mortality in the Klamath River.
The Project, if approved and implemented, will return the Klamath River in the Hydroelectric Reach to natural riverine conditions resulting in improved water quality

and a more natural range of water temperatures. The Project will benefit anadromous fish populations by increasing access to historical habitat, restoring mainstem and tributary habitat, and improving biological and physical factors that heavily influence fish populations (e.g., flow conditions, sediment and bedload transport, water quality, fish disease, toxic algal blooms, and water temperature).

The Department supports the establishment of a free-flowing Klamath River and volitional fish passage through implementation of the proposed Project, specifically as it relates to the recovery and conservation of fish and wildlife resources. Although we recognize that the SWRCB's analysis indicates that the Project will result in short-term significant and unavoidable impacts, these impacts would largely be limited to the time frame of direct dam deconstruction actions and sediment release.

The short-term aquatic effects of the Project will primarily occur from the release of sediment during reservoir drawdown. These effects include high concentrations of suspended sediment, bedload mobilization and deposition, and low DO levels, all of which are well described in the DEIR. It is the Department's position that the measures proposed to minimize impacts to aquatic resources from these short-term effects are adequate.

The short-term effects of the Project on terrestrial resources will primarily occur due to construction related activities and noise-levels. Again, it is the Departments position that these effects will be adequately off-set by the measures proposed. We concur with the list of short-term effects identified in the DEIR and summarized on page ES-12.

The long-term benefits of the Project will ultimately outweigh the short-term impacts. The Department concurs with the list of the long-term benefits of the proposed Project provided in the DEIR starting on page ES-9. The Project would significantly improve Klamath River water temperatures and DO conditions, reduce algal toxins, reduce the incidence of fish disease in juvenile salmon, restore historical anadromous fish habitat, and eliminate fish passage barriers. In addition, the Project would result in long-term beneficial effects to terrestrial resources. Some of those benefits include, increased wildlife movement opportunities, and increased distribution of riparian habitat, which, in turn, will lead to beneficial effects on willow flycatcher (*Empidonax traillii*), a species listed as threatened under the California Endangered Species Act. We provide greater detail regarding the long-term benefits of dam removal below.

There has been an increase in dam removal projects over the last five years (O'Conner et al. 2015) and studies have demonstrated the following benefits: the successful establishment of self-sustaining populations of salmonids in previously inaccessible habitat (Anderson et al. 2015), and the proportion of returning fish born in upstream reaches increasing over time (Engle et al. 2013; Hatten et al. 2015; Allen et al. 2016). On the Elwha River, the total escapement of Chinook Salmon (*Oncorhynchus tshawytscha*) (4,243 adults) approximately doubled over the 20-year average immediately following dam removal and, after the Savage Rapids Dam was removed

from the Rogue River (2009), salmonid redds were documented within the bounds of the former reservoir in one year, and over twice that many redds were identified within the former reservoir in two years (ODFW 2011). Recent dam removal efforts show that the rivers are healing very quickly, and fish are instinctively repopulating historic habitat. In a comprehensive synthesis of dam removal literature prepared by O'Conner et al. (2015) they state that a major finding of dam removal research is that rivers are resilient with many responding quickly to dam removal by trending towards their pre-dam states.

There are a number of peer-reviewed scientific and engineering studies that document the Project's benefits. The following documents more thoroughly discuss the Project's long-term benefits:

- Klamath Dam Removal Overview Report for the Secretary of the Interior- an assessment of science and technical information (March 2013)
- Definite Plan for the Lower Klamath Project (Appendix I and Appendix J) (June 2018)
- The Joint Preliminary Biological Opinion on the Proposed Removal of Four Dams on the Klamath River, Conducted by: National Marine Fisheries Service and Fish and Wildlife Service Region 8 (November 2012).
- Klamath Facilities Removal Environmental Impact Statement/ Environmental Impact Report (EIS/EIR). (The Department and the Bureau of Reclamation were co-leads, 2012)
- Summary of Findings Informing the Secretarial Statement of Support (A transmittal to FERC from the Department of the Interior 2016)
- Preliminary Comments and Recommendations on PacifiCorp's Application for New Major License, Klamath River Hydroelectric Project, FERC No 2082, Klamath and Siskiyou Counties (a letter prepared by CDFW and submitted to FERC on March 27, 2006)

In general, the Department concurs with all the benefits to natural resources from dam removal identified in the above referenced documents. Although this letter highlights some of the benefits identified in those documents, we want to emphasize that our silence as to any natural resource benefits described in any of the above identified documents should not be interpreted as a rejection or disagreement with any such benefits. We have drawn from the above listed documents to prepare the following section of this letter.

Access to Historical Habitat

The construction of PacifiCorp's hydroelectric dams on the Klamath River has blocked fish passage to the upper basin for nearly 100 years. The lack of fish passage at the hydroelectric facilities has resulted, and continues to result, in direct adverse impacts on anadromous fish resources of the Klamath Basin. Long-term declines of Klamath Basin fisheries have been estimated at 92 percent to 96 percent for wild fall-run Chinook Salmon, 98 percent for spring-run Chinook Salmon, 67 percent for steelhead trout

(*O. mykiss*) (since 1960), 52 percent to 95 percent for Coho Salmon (*O. kisutch*), and 98 percent for Pacific Lamprey (*Lampetra tridentata*) (Overview Report). The research suggests that salmonids will benefit from a host of ecological improvements resulting from dam removal including access to miles of spawning and rearing habitat upstream from Iron Gate Dam. It is estimated that the Project will result in access to 76 miles of habitat for Coho Salmon, 300 miles for Chinook Salmon (Huntington 2004), and 420 miles for steelhead (Huntington 2004; 2006). In addition, recolonization of previously inaccessible reaches of the river will also restore the flow of marine-derived nutrients to upstream portions of the watershed resulting in an overall boost to ecosystem nutrient budgets and productivity (Tonra et al. 2015).

Water Quality and Water Temperature

The long-term benefits of dam removal include overall increases in DO concentrations. The reach of the Klamath River downstream of Iron Gate Dam is predicted to have a DO level increase of 3 to 4 mg/L during the summer and late fall (PacifiCorp 2005), which will reduce stresses to juvenile salmonids rearing in the mainstem.

In the long-term, it is anticipated that water temperatures downstream of the Iron Gate Dam site will be 2°C to 10°C lower during August through December and 2°C to 5°C higher during January through March than under the existing conditions. The generally warmer spring temperatures and cooler summer and fall temperatures are likely to benefit salmonid species. In addition, the more natural diurnal water temperature variation will be more synchronous with historical migration and spawning periods for salmon species. Benefits associated with increased spring water temperatures include increased growth rates for juveniles (Dunne et al. 2011) which has been shown to increase ocean survival (Bilton et al. 1982, Henderson and Cass 1991, Lum 2003, Jokikokko et al. 2006, Muir et al. 2006).

Hydrograph

Increased (i.e., natural) flow variability in the Klamath River mainstem will increase the effectiveness of environmental cues and better enable juvenile salmonids to adapt to changes in flow. Juveniles make localized movements in response to changes in environmental conditions at temporal scales of hours to months. Increased flow variability therefore is expected to increase the likelihood of juvenile survival due to their redistribution to suitable refugia sites upstream or downstream when they detect changes in flow.

Disease

Outmigrating juvenile salmonids within the Lower Klamath River Basin currently experience significant mortality from infectious disease, with recent estimates of disease-related mortality in downstream migrants as high as 90 percent, in specific areas for specific times (CDFW 2006). The Project will restore flows in the Klamath

River that create channel bed scour. This bed scour will result in habitat disturbance of the polychaete worm that hosts *Ceratonova shasta* (FERC 2007), a myxosporean parasite that infects salmonids and can lead to mortality. In the long-term, reducing polychaete habitat will likely lead to an increase in the abundance of salmonids by increasing outmigration survival, particularly for juvenile Coho Salmon (FERC 2007).

Nuisance Algae

The Project will eliminate the habitat for the toxic blue-green algae (Dunne et al 2011, Hamilton et al. 2011). Blue-green algae thrives in stagnant water and is intolerant of turbulent water. The elimination of the reservoirs will result in an immediate and long-term reduction in toxic algal blooms which will improve long-term water quality (pH and DO) in the mainstem Klamath River.

Sediment and Debris Transport

The Project will result in a more natural sediment transport regime (Reclamation 2011, Hamilton et al. 2011, USDOI and CDFG 2012), which will increase the complexity in the channel bed. It is anticipated that these changes will enhance spawning, incubation, and rearing habitat for salmonids and reduce fish disease prevalence in the Klamath River. Increased delivery rate of debris will result in large wood deposition which has also been shown to increase salmonid abundance, survival, and production (Keeley et al. 1996, Solazzi et al. 2000, Roni and Quinn 2001, Whiteway et al. 2010, White et al. 2011).

Climate change

Based on the climate change model prediction of increasing water temperatures in the Klamath River watershed, access to the cold-water tributaries in the Hydroelectric Reach will improve salmonid population resilience and increase the probability of long-term persistence. The National Research Council (2004) wrote, "*For salmonids, the most important potential changes [in the Klamath River aquatic environment due to climate change] include altered timing of snowmelt, lower base flows, and additional warming of water in summer.*" Access to spring-fed tributaries of the Klamath River in the Hydroelectric Reach will provide important refugia for salmonids as the climate continues to change.

In sum, the improved mainstem aquatic habitat conditions that will result from implementation of the Project (e.g., increased DO concentrations, increased flow variability, more natural water temperature patterns, decreases in disease, and increased gravel and large wood recruitment) and increased spatial distribution of habitat for native fishery resources are expected to improve ecosystem function and the survival of all fishery resources in the Klamath River in the long-term.

We look forward to working closely with KRRC and the SWRCB on an adaptive management and monitoring program for the Project. There are a number of plans that

will require coordination with and approval from the Department prior to Project implementation including:

1. Water Quality Monitoring Plan
2. Fish Presence Monitoring Plan
3. Tributary Mainstem Connectivity Plan
4. Spawning Habitat Availability Report and Plan
5. Juvenile Salmonid Rescue and Relocation Plan
6. Hatchery Operations and Maintenance Plan
7. Restoration Plan
8. Recreation Facilities Plan
9. Hydropower Operations Plan

In closing, we would like to emphasize that the Department is committed to building and maintaining partnerships that achieve comprehensive and collaborative solutions to fisheries restoration and recovery in the Klamath River watershed. The Department will continue to coordinate with agricultural and water user communities, Tribes, Siskiyou County, our fish agency partners, commercial fishing interests, and conservation groups, to achieve that end. The Department continues to look for solutions to difficult natural resource issues by staying engaged with various stakeholders in the Klamath River Basin. Ultimately, the Department is interested in the long-term success of these holistic efforts beyond just dam removal.

If you have any questions regarding our comments please do not hesitate to contact Caitlin Bean, Senior Environmental Scientist (Specialist), at (530) 841-2562 or Caitlin.Bean@wildlife.ca.gov.

Sincerely,

Signed for Regional Manager
Jeffrey Stoddard X

Tina Bartlett
Regional Manager

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CHARLTON H. BONHAM, Director

February 1, 2017

Parker Thaler
State Water Resources Control Board
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P.O. Box 2000
Sacramento, CA 95812-2000

Subject: Notice of Preparation for an Environmental Impact Report for the Proposed Lower Klamath Project License Surrender State Clearinghouse Number 201622047

Dear Mr. Thaler:

In response to the December 22, 2017 Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the proposed Lower Klamath Project (LKP) License Surrender (Project) distributed by the State Water Resources Control Board (State Board), the California Department of Fish and Wildlife (Department) respectfully submits the following comments.

General Comments

The Department offers the following comments and recommendations on the Project in our role as the State's trustee for fish and wildlife resources. Pursuant to Fish and Game Code (FGC) section 1802, the Department has jurisdiction over the conservation, protection, and management of California's fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of those species.

The State Board previously released a NOP on November 30, 2015 of an EIR for the Klamath Hydroelectric Project Relicensing. The Department provided comments for that NOP on January 29, 2016 (Attachment 1). The Department understands that this is a new NOP and the EIR will be prepared to support the Klamath River Renewal Corporation's (KRRC) application to remove sufficient portions of the Iron Gate, Copco No. 2, Copco No. 1, and J.C. Boyle dam developments to create a free flowing Klamath River and provide for volitional fish passage. The hydroelectric facilities and associated structures will either be removed or decommissioned in place.

The Department was the California Environmental Quality Act (CEQA) Lead Agency for the 2012 Klamath Facilities Removal Environmental Impact Statement/Environmental Impact Report (2012 Klamath EIS/EIR, Department of Interior 2012). The 2012 Klamath EIS/EIR's alternatives included Alternative 2 (Full Facilities Removal of Four Dams) and Alternative 3 (Partial Facilities Removal of Four Dams). The Department recommends the State Board include alternatives similar to these two in your EIR. As a signatory to the Klamath Hydroelectric Settlement Agreement (KHSA), the Department remains supportive of either alternative (i.e. Partial Facilities Removal of Four Dams and Full Facilities Removal of Four Dams).

The Department is not aware of any new information to suggest any new or increased significant environmental impacts would occur beyond those identified in the 2012 Klamath EIS/EIR. The Department also believes the analysis in the 2012 Klamath EIS/EIR adequately addressed environmental impacts related to facilities removal.

Detailed Plan

The Detailed Plan was developed as part of the KHSA and describes the reservoir drawdowns, deconstruction activities, and the restoration of affected areas. The Department recommends the State Board use the Detailed Plan, and any updates to it, in the State Board's analyses and Alternatives.

Hatchery Operations

The NOP correctly identifies that substantially new information has been developed under the KHSA process including the development of the 2012 Klamath EIS/EIR. We understand the State Board will use the information developed as part of their analysis. The Department recommends the State Board specifically include the requirements developed in the KHSA for hatchery operations in their evaluation of any EIR alternative that includes dam removal.

Conclusion

The Department appreciates the opportunity to provide comments on this important and historic project. We support the State Board's efforts to analyze and mitigate impacts to water quality and fish and wildlife resources through the 401 Certification process. If you have any questions concerning these comments, please contact Senior Environmental Scientist Specialist, Matt Myers at (530) 225-3846 or matt.myers@wildlife.ca.gov.

Sincerely,

Neil Manji
Regional Manager

Attachment 1

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References:

Department of the Interior. 2012. *Klamath Facilities Removal Final Environmental Impact Statement/Environmental Impact Report*

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January 29, 2016

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Subject: Notice of Preparation for an Environmental Impact Report for the Klamath Hydroelectric Project Relicensing State Clearinghouse Number 2015122002

Dear Mr. Thaler:

The California Department of Fish and Wildlife (Department) has reviewed the Notice of Preparation (NOP) of an environmental impact report (EIR) for the Klamath Hydroelectric Project Relicensing (Project), which would involve modifications and the continued operation of the hydroelectric facilities (State Clearinghouse Number 2015122002). The Department appreciates this opportunity to comment on the above-referenced Project relative to impacts to biological resources.

The Department must begin this comment letter, however, acknowledging certain developments. In February 2010, the Governor of California and the Department signed the Klamath Hydroelectric Settlement Agreement (KHSA) and the Klamath Basin Restoration Agreement (KBRA). The KHSA lays out a process for removal of four PacifiCorp dams (J.C. Boyle, Copco 1, Copco 2, and Iron Gate) on the Klamath River to serve the public's interest and restore depressed fisheries in the Klamath River watershed. The KHSA and two related agreements – the Klamath Basin Restoration Agreement (KBRA) and the Upper Klamath Basin Comprehensive Agreement (UKBCA) – were developed to resolve long-standing resources challenges in the basin comprehensively and collaboratively.

The Department is a signatory to the KHSA and remains committed to working with those parties to maintain the benefits of that agreement. The Department also remains committed to achieving a comprehensive and collaborative resolution with Tribes, the power company, conservation groups, commercial fishing interests, and agricultural and water user communities.

The Department provides comments in this letter because the Board's process requires us to do so. However, the comments that the Department provides in this letter should be viewed against our preference for continued resolution of problems through collaboration. In the event that the relicensing proceeding for this Project continues, and given that the Board requests comments under that scenario pursuant to the NOP, the Department submits comments responsive to that scenario.

The Department offers the following comments and recommendations on the Project in our role as the State's trustee for fish and wildlife resources and as a Responsible Agency under the California Environmental Quality Act (CEQA), California Public Resources Code section 21000 et seq. Pursuant to Fish and Game Code (FGC) section 1802, the Department has jurisdiction over the conservation, protection, and management of California's fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of those species.

The Department's primary concerns involving the Project include impacts to salmonids due to: (1) inadequate fish passage up and downstream, (2) inadequate flow regimes, and (3) degraded water quality conditions.

The Department has been actively participating in the relicensing process for the Project since December 2000 when we received PacifiCorp's *"First Stage Consultation Document"* and we continue to participate to date. The Department filed a Federal Power Act (FPA) section 10(j) (16 U.S.C. § 803(j)) on March 27, 2006.[1]

The Department was also the CEQA Lead Agency for Klamath Facilities Removal Environmental Impact Statement/ Environmental Impact Report (Klamath EIS/EIR) that analyzed the potential impacts to the environment from removing the four PacifiCorp dams as contemplated in the KHSA. Finally, the Department is responsible for the management and operation of the Iron Gate Hatchery, which provides mitigation for the Project located just below Iron Gate Dam. The production goals that drive Iron Gate Hatchery operations are only intended to mitigate for the loss of habitat between Iron Gate Dam and Copco 2 dam (FERC, 1963).

Authority

The following policies and State statutes regarding water, fish, and terrestrial resources guide the Department's authorities and should be considered in the EIR.

- The California Fish and Game Commission's policy on water provides: *"The quantity and quality of the waters of the state should be apportioned and maintained respectively so as to produce and sustain maximum numbers of fish and wildlife."*

- The California Endangered Species Act (CESA), FGC section 2080 et seq., establishes the policy of the State to conserve and restore any threatened or endangered species and their habitat. Coho salmon were listed as threatened pursuant to CESA in 2006. PacifiCorp does not currently have State coverage for the

[1]Section 10(j) of the FPA requires the Commission to include in any license fish and wildlife measures for the protection, mitigation of damages to, and enhancement of fish and wildlife resources potentially affected by the Project based on recommendations from the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, and state fish and wildlife agencies.

take of State-threatened coho salmon due to their operations from the State of California. CESA sections 2080.1 and 2081 describe the processes for an entity to receive take coverage under CESA.

- FGC section 5515 states that fully protected fish may not be taken or possessed at any time. Shortnose sucker (*Chasmistes brevirostris*) and Lost River sucker (*Catostomus luxatus*) are fully protected fish species that occur in the Klamath River watershed and are impacted by the Project.

- FGC section 5901 states that it is unlawful to construct or maintain in any stream any device or contrivance that prevents, impedes, or tends to prevent or impede, the passing of fish up and down stream.

- FGC section 5931 requires the owner of a dam to furnish a suitable fishway in consultation with the Department where the Fish and Game Commission determines that the dam does not allow free passage for fish.

- FGC section 5937 reads, in part: *"The owner of any dam shall allow sufficient water at all times to pass through a fishway, or in the absence of a fishway, allow sufficient water to pass over, around or through the dam, to keep in good condition any fish that may be planted or exist below the dam."* FGC section 45 defines "fish" as *"wild fish, mollusks, crustaceans, invertebrates, or amphibians, including any part, spawn or ova thereof."*

- FGC section 5980 et seq. requires installation of screens approved by the Department on all conduits to hydropower facilities if, in the opinion of the Department, such a screen is necessary to prevent fish from passing into the conduit. This section specifically notes that conduits to power devices *"tend to destroy fish in a greater degree"* than other conduits.

- The Salmon, Steelhead Trout, and Anadromous Fisheries Program Act (Act) (FGC § 6900 et seq.) requires the Department to undertake major efforts to restore the State's salmon, steelhead trout, and anadromous fisheries. Specifically, the Act directs the Department to develop a plan and program to double the current natural production of salmon and steelhead trout resources in the State (FGC § 6902, subd. (a)), and to consult with public agencies whose policies or decisions affect the goals of such a program to determine if there are feasible means for those public agencies to assist the Department in achieving the goals of the program (FGC § 6920, subd. (b)). The waters and lands impacted by the Project represent major components in the Department's efforts to maintain and restore anadromous fish populations in accordance with the Act.

- The Act also provides: *"Reliance on hatchery production of salmon and steelhead trout in California is at or near the maximum percentage that it should occupy in the mix of natural and artificial hatchery production in the State. Hatchery production may be an appropriate means of protecting and increasing salmon and steelhead in specific situations; however, when both are feasible alternatives, preference shall be given to natural production."* (FGC § 6901, subd. (f))

Project Description and Scoping

The NOP provides the project title as "Klamath Hydroelectric Project Relicensing," along with a description of project location, objectives and existing facilities, but does not provide a detailed description of the Project the State Water Resources Control Board (State Board) is proposing to analyze in the EIR. The NOP states the EIR will evaluate potential impacts of proposed modifications and continued operation of the Project to water quality and other resources within California as compared to the environmental baseline. Since the Federal Energy Regulatory Commission (FERC) chose and analyzed the Staff Alternative, it is one potential alternative that could be analyzed as the CEQA project. Regardless of which alternative is the CEQA project, the Department recommends the EIR provide a clearly defined project description from which to analyze impacts.

To enable the Department to adequately review and comment on the EIR, we recommend the following scoping information be included:

1. A complete assessment of the flora and fauna within and adjacent to the Project area should be conducted, with particular emphasis upon identifying special-status species that may be impacted by the project including fully-protected, rare, threatened, and endangered species. This assessment should also address locally unique species, rare natural communities, and wetlands. The assessment area for the Project should be large enough to encompass areas potentially subject to both direct and indirect Project effects. Both the Project footprint and the assessment area (if different) should be clearly defined and mapped in the EIR.

2. A thorough discussion of direct, indirect, and cumulative impacts expected to adversely affect biological resources with specific measures to offset such impacts should be included.

3. Mitigation measures for adverse Project-related impacts to sensitive plants, animals, and habitats should be developed and thoroughly discussed. Mitigation measures should first emphasize avoidance and reduction of Project impacts. For unavoidable impacts, compensatory mitigation measures should be identified.

Geographic Scope

The Project's boundary includes approximately 20 miles of the Klamath River within the State starting at the Oregon-California border and continuing downstream to Iron Gate Dam. This stretch of the Klamath River includes a 6-mile riverine reach upstream of Copco reservoir which is designated as a wild trout area and managed under the Department's Wild Trout Program. It also includes three reservoirs, Copco 1 and 2 and Iron Gate, as well as approximately 1.5 miles of Fall Creek, a tributary just upstream of Iron Gate reservoir. Iron Gate Dam serves as the lower limit of the FERC boundary and the upper limit of the anadromous fishery on the mainstem Klamath River. However, the Project affects temperature downstream to the confluence of the Salmon River, about 124 miles downstream of Iron Gate Dam. The FERC Final Environmental Impact Statement (FERC EIS, FERC 2007) concludes that the Project modifies the temperature regime downstream of Iron Gate Dam in a manner that at times adversely affects salmon.

Upstream of the California section, the current Project boundary includes approximately 50 miles of the Klamath River in the State of Oregon. The Oregon section starts at Link River Dam in Klamath Falls and continues down to the Oregon/California border. Although this portion of the Project falls outside of California, ecological processes do not segregate along jurisdictional boundaries. The Project blocks access for anadromous fish to over 400 miles of habitat upstream from Iron Gate Dam, well beyond the Project's upstream most dam. We recommend that an evaluation of Project components in Oregon that affect resources within California be conducted in the EIR.

The Project features and operations affect the Klamath River fish and wildlife resources at a fundamental level. The Project alters basic ecological processes such as fluvial geomorphology and hydrology while fragmenting and degrading aquatic and terrestrial habitats. The anadromous fishery resources of the Klamath River have undergone a major decline during the past century. Estimates from the commercial fishing industry place the current salmon and steelhead populations in the Klamath River at eight percent or less of their historic abundance (Institute of Fisheries Resources 2004). Degradation of habitat and the subsequent decline in fisheries resources has led to the listing of coho salmon under both the federal Endangered Species Act and CESA, as well as curtailment of fisheries along the Pacific Coast from the Columbia River to south of San Francisco to protect Klamath Basin origin Chinook salmon. In 1999, the Pacific Fishery Management Council identified the mainstem Klamath River and its tributaries from its mouth to Iron Gate Dam as essential fish habitat for Chinook and coho salmon.

Many different land and water management activities have contributed to the decline of the Klamath River fishery and habitat. Construction of the Project stands out as one of the most direct and detrimental activities. Completion in 1918 of Copco 1 dam

blocked access to hundreds of miles of anadromous habitat including primary Chinook and steelhead spawning and rearing grounds upstream. Impassable Project facilities also block access to thermal refugia. Completion in 1962 of the lowermost dam (Iron Gate) blocked access to known thermal refugia remaining in tributaries and mainstem springs. Subsequent to this final phase of Project construction, the spring-run Chinook population downstream of the dam underwent serious decline. Today, the mouth of the Salmon River (over 130 miles downstream of Iron Gate Dam) marks the upper limit of a remnant spring-run population in the Klamath River. The lack of fish passage at Project facilities is a direct, unequivocally adverse impact of the Project on the anadromous fish resources of the Klamath Basin.

Analyses indicate Project facilities and operations have shifted the timing of two critical and interrelated phenomena—water temperature and disease transmission. These shifts in temperature and disease risk below Iron Gate Dam occur at vulnerable life stages for out-migrating juveniles and spawning adults. These disruptions of natural cycles exacerbate already challenging conditions for Klamath River resources and compound Project impacts on the downstream fishery.

Water Quality and Instream Flow

In addition to altering Klamath River flow regimes, the Project contributes to the degradation of water quality in the Klamath River. Preliminary water quality modeling results indicate that Project dams such as Keno, J.C. Boyle, Copco No. 1 and Iron Gate impact water quality by slowing and storing water, increasing retention time and solar exposure, and shifting thermal regimes and nutrient cycling. The Project facilities and operations exacerbate already significantly impaired water quality conditions in the Klamath River.

The Project's continual degradation of water quality, specifically high water temperatures, in the Klamath River impacts fishery resources. The extension of high water temperatures into August and September due to Project dams likely postpones spawning migration, delaying spawning and egg development. In addition, elevated water temperatures in August and September increase adult mortality through stress and crowding (Schreck and Li, 1991; Matthews and Berg, 1997).

Cyanobacteria, also known as blue-green algae, are a family of single-celled algae. Cyanobacteria proliferate in water bodies such as ponds, lakes, reservoirs, and slow-moving streams that lack vertical mixing and when the water is warm and nutrients are available. They generally occur in areas of poor water quality. Many cyanobacteria species produce a group of toxins known as microcystins, some of which are toxic. The species most commonly associated with microcystin production is *Microcystis aeruginosa*. Upon ingestion, toxic microcystins are actively absorbed by fish, birds, and mammals. Microcystins primarily affect the liver, causing minor to widespread damage, depending on the amount of toxin absorbed. Microcystins have

been measured in several water bodies in California, including the Klamath River and its reservoirs.

Fish and wildlife mortalities have been linked to microcystin poisoning. Pets and livestock have died after drinking water contaminated with microcystins. In the *"Revised Recovery Plan for the Lost River Sucker and Shortnose Sucker,"* the U.S. Fish and Wildlife Service identifies microcystin as an algal toxin that affects the liver of these species and is one of the factors in the suckers decline (USFWS 2012). A wild roe deer in Norway was necropsied and the cause of death was acute cyanobacterial hepatotoxicosis (Handeland, K. and O. Ostensvik 2010). In 2014, the California Animal Health and Food Safety Laboratory necropsied a black-tailed deer from Siskiyou County and cause of death was microcystins (Shirkey et al. 2015).

Restoration of flows to more natural conditions will help to improve water quality conditions in each reach. Sufficient water should be released from each of the Project facilities and operations in order to:

1. Provide a flow regime of sufficient quantity to allow native aquatic and riparian species to establish and flourish within the Project.

2. Provide a flow regime to support a diverse native coldwater fishery in good condition, and with controlled flow transitions that avoid stranding, stressing, or displacement of native aquatic species.

3. Provide safe, timely and effective up and downstream passage for native fish at Project facilities that meets or exceeds relevant federal and State criteria.

4. Provide water of sufficient quantity and quality within and downstream of the Project to meet or exceed the North Coast Regional Water Quality Control Board Basin Plan (2001) (Plan) water quality objectives including temperature. The temperature objective reads, in part: *"At no time or place shall the temperature of any cold water be increased by more than 5°F above natural receiving water temperature. . ."* (Plan, p. 3-4).

5. Provide water of sufficient quantity and quality within and downstream of the Project to mitigate for Project impacts contributing to the incidence of fish disease in the mainstem Klamath River.

6. Establish a geomorphically functional stream channel above and below Project diversions.

The Project facilities and operations exacerbate already significantly impaired water quality conditions in the Klamath River. Even with fish passage, the project affects aquatic and

riparian habitat due to modified or reduced flow regimes. The State Board should analyze impacts and propose mitigation. Restoration of flows to more natural conditions will help to improve water quality conditions and aquatic and riparian habitat in and downstream of the Project.

Fish Passage

Existing Project operations and facilities drastically disrupt native anadromous and resident fish migration. The Project completely precludes the passage of anadromous species above Iron Gate Dam at River Mile 190. The three Project dams in California on the mainstem Klamath River lack any passage facilities and block access to more than 400 miles of migration, spawning, and rearing habitat for native salmon, steelhead, and Pacific lamprey (Hamilton et al. 2005 and Huntington 2004 and 2006). The Department recommends that the State Board's Alternatives should either evaluate dam removal or an Alternative that includes mandatory conditions to provide fish passage facilities. Although fish ladders would allow for fish passage, they would also require continual maintenance, and outmigration success of juveniles is unknown. Alternatives which require dam removal would provide 100 percent passage; therefore, the Department prefers dam removal as an alternative to fish passage to address existing effects on fish migration.

Beyond precluding the restoration of anadromy, the Project facilities also disrupt seasonal migration patterns of resident salmonids. These facilities also diminish access to refugia and spawning habitats important for all native fish. This fragmentation is compounded by potentially lethal entrainment risks including risks to Lost River and Shortnose suckers, which are fully protected under FGC section 5515. The California facilities lack screens and other exclusionary devices to prevent entrainment and mortality to resident fish. The J.C. Boyle facility does have a screen, but it is inadequate and does not conform to current fishway criteria. Therefore, any alternative which contemplates the continued operation of the J.C. Boyle facility should update fishway criteria in consultation with the Department.

Disease

Disease of fish and fish-kills in the lower Klamath River downstream from the Project are a serious management concern. Fish disease among anadromous fish has increased in recent years in both adults and outmigrating juveniles in the lower Klamath River (Williamson and Foott 1998; Foott et al. 1999, 2002, 2003, Nichols and Foott 2005). The primary pathogens implicated in the disease outbreaks and fish-kills are the myxozoan parasites *Ceratomyxa shasta* and *Parvicapsulum minibicornis* (Williamson and Foott 1998; Foott et al. 1999; Foott et al. 2002; Foott et al. 2003).

The life cycles of the parasites endemic to the lower Klamath River are complex and require development in both a vertebrate and invertebrate host. For *C. shasta* the invertebrate host is the freshwater polychaete *Manayunkia speciosa* (Bartholomew et al. 1997). Fish become infected by contact with actinospores that are produced within *Manayunkia*. Following fish mortality, myxospores are released into the water where they are then taken up by the polychaete. The invertebrate host for *P. minibicornis* has not yet been identified, but new information suggests that its host may also be *Manayunkia*.

Algal buildup on substrate in the Klamath River is believed to increase the suitability of habitat for *Manayunkia* (Stocking and Bartholomew 2004). By increasing the number of myxozoan spores in the water column, the algal buildup contributes to higher infection rates. Project operations reduce the magnitude and duration of peak flows below Iron Gate Dam, exacerbating algal buildup and provide stable habitat for the polychaetes downstream of the Project (McKinney et al. 1999).

Beyond creating suitable conditions for the polychaetes, the Project contributes to higher water temperatures, further increasing the suitability for algal growth and disease risk in fish.

Outmigrating juvenile salmonids within the Lower Klamath River Basin experience significant mortality from infectious disease, with recent estimates of disease-related mortality in downstream migrants as high as 90 percent (Scott Foott, USFWS, personal communication). In the spring months of March through May, juvenile salmonids need temperatures above 10 to 13 degrees Celsius for optimal growth (EPA, 2003). The Project significantly delays the onset of these temperatures in the spring, slowing salmonid juvenile growth rates. By slowing juvenile growth rates, juvenile outmigration is likely delayed, subjecting juvenile Chinook to higher disease risk conditions. Outmigration of juvenile fall-run Chinook salmon would, under a more natural thermal regime occur before the summer months, in part, to avoid warmer temperatures. In the late summer and fall, the return of cooler water temperatures would more closely mimic natural daily and seasonal conditions favorable for rearing, migration, spawning, and incubation for anadromous salmonids, particularly fall-run Chinook salmon.

Bedload Transport

Project dams have diminished bedload sediment transport and gravel recruitment in the Hydroelectric Reach and downstream of Iron Gate Dam. Quantitative modeling and multiple studies indicate that dam removal would improve stream-bed mobility and gravel transport, creating better salmonid spawning and rearing areas, and decreasing juvenile salmon disease. The FERC EIS analyzed bed mobility for each reach using with- and without-project hydrology. Those results indicate that, except for the Link River and Keno reaches,

the project consistently increases the estimated discharge required to mobilize the bed. Project operations reduce the frequency of bed-mobilizing events from roughly an annual or semi-annual basis to about two times less frequent. This indicates that, without project operations, spawning gravels would be more frequently mobilized, flushed, and replenished from upstream. In the river reaches immediately downstream of Iron Gate Dam, results indicate that the bed is only mobilized on average every 4 to 9 years. More-frequent seasonal high flow events would refresh spawning gravels and disperse sediment across the channel (and potentially onto the floodplain, depending on the magnitude of the flow), benefiting aquatic and riparian habitats (FERC, 2007). The EIR should include analysis of bedload and spawning gravel transport under each alternative.

Hatchery Operations

The NOP correctly identifies that substantially new information has been developed under the KHSA process including the development of an environmental review document evaluating the impacts of dam removal (Klamath Facilities Removal Final Environmental Impact Statement/Environmental Impact Report, December 2012, State Clearinghouse No. 2010062060). We understand the State Board will use the information developed as part of their analysis. The Department recommends the State Board specifically include the requirements developed during the KHSA process for hatchery operations in their evaluation of any EIR alternative that includes dam removal. The hatchery and other artificial propagation can be utilized and contribute to the overall restoration efforts in the Klamath Basin.

Alternatives Analysis

The NOP notes the State Board staff has determined the FERC EIS does not fully comply with the requirements of CEQA, and therefore has determined it is necessary to prepare a separate EIR in conformance with CEQA Guidelines. The Department also agrees with the State Board staff regarding the FERC EIS that alternatives analyzed in the EIR should include mandatory conditions provided by the Department and the U.S. Departments of the Interior and Commerce.

The State Board's NOP mentions a possible range of alternatives (Alternatives) for consideration. In addition to the No Project Alternative, alternatives may include but are not limited to:

- PacifiCorp's Project as proposed in its August 2014 water quality certification application, updated with mandatory conditions;
- the FERC staff alternative with mandatory conditions;
- removal of the three mainstem Project facilities in California;

- removal of some or all of the California mainstem dams; and

- implementation of the KHSA measures to the extent that they affect California's environmental resources.

The Department supports the evaluation of these Alternatives. Specifically, the Department supports the State Board addition of the mandatory conditions to both PacifiCorp's Project proposal and the FERC staff alternative.

The FERC EIS identifies numerous, significant positive effects of decommissioning two or four Project facilities. These benefits include water quality improvements below Iron Gate Dam, restoration of historical anadromous fish habitat, elimination of fish passage barriers, and net annual power benefits when compared to installation of fishways. Negative and uncertain effects of dam removal regarding anadromous fish are described as generally short term and manageable. Indeed; from the analysis provided in the FERC EIS, dam removal appears to be the most beneficial course of action with regards to most significant issues.

To alleviate any concerns that may exist related to the economic costs of decommissioning and loss of power generation, the State Board should consider a report by the California Energy Commission (CEC), *"PacifiCorp's Klamath Hydroelectric Project: Transmittal of Economic and Energy Information from the California Energy Commission to Assist Public Utilities Commissions in Identifying the Least-Cost Project Alternative for Ratepayers."* The CEC provided this information to FERC and the California and Oregon public utility commissions to assist development of options that provide optimum benefits to ratepayers at lowest cost. Specifically, the CEC recommended:

> *"Based on the scientific, energy and economic evidence provided in this letter, the FERC proceeding administrative record, and in our reports, Energy Commission staff recommends that the California Public Utilities Commission authorize cost recovery only for the decommissioning scenario, which is the least-cost, environmentally superior project option for the Klamath Hydro Project."*

In light of the high cost and low benefit ratio presented in the FERC EIS and detailed in the CEC report, it appears that any issues related to high economic costs of decommissioning and loss of power generation would be less compared to the continued operation of the Project.

The Department would also like to clarify that although the Klamath EIS/EIR identifies Partial Facilities Removal of Four Dams as the environmentally superior alternative, the Department also supports the Four Dam Removal alternative. Although retirement of

Copco 1 and Iron Gate or four dam removal alternatives would have the most short-term significant and unavoidable impacts, these impacts would largely be limited to the time frame of direct dam deconstruction actions and sediment release (see Klamath EIS/EIR). Dam removal alternatives would significantly improve water temperature, dissolved oxygen, and algal toxins for aquatic resources, and reduce the incidence of fish disease in juvenile salmon.

The State Board should analyze the effects of reservoir stratification on dissolved oxygen and water temperature for alternatives that maintain reservoirs, and any mitigation options. The analysis for the Klamath River Total Maximum Daily Load (North Coast Regional Water Quality Control Board 2010), determined Iron Gate and Copco reservoirs have significant impacts on dissolved oxygen and temperature, and there are no depths at which salmonids could be supported. No mitigations were identified in the FERC EIS to address this issue.

In summary, the Department determined Alternative 3 (Partial Facilities Removal of Four Dams) to be the environmentally superior alternative among all the alternatives because it provides many of the long-term beneficial environmental effects while reducing some of the short-term significant effects of the Proposed Action. Still, the Department remains supportive of the Department EIS/EIR Proposed Action: Alternative 2 (Full Facilities Removal of Four Dams) because it would also result in the most long-term beneficial environmental effects.

Conclusion

The Klamath Hydroelectric Project is causing irreparable harm to the State's fish and wildlife resources. The State Board should use information presented in the FERC EIS and Klamath EIS/EIR. Based on current information and analysis, the Department's position is that dam removal alternatives are superior for conservation of fish and wildlife resources.

The Department appreciates the opportunity to provide comments on the NOP. If you have any questions concerning these comments, please contact Senior Environmental Scientist (Specialist) Matt Myers at (530) 225-3846 or matt.myers@wildlife.ca.gov.

Sincerely,

Neil Manji
Regional Manager

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State of California
Department of Fish and Wildlife

Memorandum

Date: June 26, 2018

To: Michelle Siebal
State Water Resources Control Board
Division of Water Rights
Water Quality Certification Program
P.O. Box 2000
Sacramento, CA 95812

From: **Neil Manji,** Regional Manager
Northern Region

Subject: **Klamath River Renewal Corporation Lower Klamath Project Draft Water Quality Certification for Federal Permit or License (Federal Energy Regulatory Commission Project No. 14803) Klamath River, Siskiyou County**

The California Department of Fish and Wildlife (Department) considers the implementation of the Lower Klamath Project the single most important project necessary to improve water quality conditions in the Lower Klamath River. In addition, the project is critical for restoring anadromous fish populations in the Klamath River watershed. We have reviewed the subject document, and we are in support of the conditions as proposed.

Based on our review of the Draft Water Quality Certification the Klamath River Renewal Corporation will be required to submit a number of plans to the State Water Resources Control Board prior to implementing the project, and in most cases, no later than six months following the issuance of a license surrender order by the Federal Energy Regulatory Commission (FERC).

A number of the plans require coordination with the Department, and possibly our project partners, during their development. We list below the plans that require coordination with the Department. Deadlines for plans not due within six months of the FERC surrender order are identified in parentheses:

1. Water Quality Monitoring Plan
2. Fish Presence Monitoring Plan (due 24 months following FERC Order)
3. Tributary-Mainstem Connectivity Plan
4. Spawning Habitat Availability Report and Plan (due no later than December 31 of the year drawdown is completed)
5. Juvenile Salmonid Rescue and Relocation Plan

6. Hatcheries Management and Operations Plan

7. Restoration Plan

8. Amphibian and Reptile Rescue and Relocation Plan (due three months following FERC Order)

9. Recreation Facilities Plan

10. Hydropower Operations Plan (due 24 months following FERC Order)

We appreciate the opportunity to review and comment on the documents listed above and we support the adoption of the draft Water Quality Certification as proposed. If you have any questions regarding our comments please contact Caitlin Bean Senior Environmental Scientist (Specialist) at (530) 841-2562 or caitlin.bean@wildlife.ca.gov.

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State of California
Department of Fish and Wildlife

Memorandum

Date: November 9, 2018

To: Erin Ragazzi
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P.O. Box 100
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From: **Curt Babcock**
Acting Regional Manager, Region 1

Subject: **Klamath River Renewal Corporation, Definite Plan for the Lower Klamath Project, Appendix I – Aquatic Resources Measures, June 2018 (and addendum dated October 10, 2018)**

The Department of Fish and Wildlife (Department) is the State's trustee for fish and wildlife resources and provides this information for the purposes of California Environmental Quality Act (CEQA) compliance related to the Environmental Impact Report (EIR) being prepared by the State Water Resources Control Board (SWRCB) for the "Lower Klamath Project" (Federal Energy Regulatory Commission (FERC) Project No. 14803). The Lower Klamath Project is located along the Klamath River, in Siskiyou County, California, and in Klamath County, Oregon. The Klamath River Renewal Corporation (KRRC) is proposing to remove sufficient portions of the Iron Gate, Copco No. 2, Copco No. 1, and J.C. Boyle dams to create a free-flowing Klamath River and provide for volitional fish passage in the Klamath River. The purpose of this memo is to provide the SWRCB with the Department's review of the document titled, "Definite Plan for the Lower Klamath Project, Appendix I – Aquatic Resources Measures" (June 2018). However, first we would like to provide the context for this review.

In 2012, the Department was the co-lead agency with the Bureau of Reclamation (BOR), on development of the "Klamath Facilities Removal Environmental Impact Statement/ Environmental Impact Report (EIS/EIR)." The EIS/EIR was developed in accordance with the requirements of the National Environmental Policy Act (NEPA) and CEQA to analyze the potential impacts to the environment from removing four PacifiCorp Dams (J.C. Boyle, Copco 1, Copco 2, and Iron Gate) on the Klamath River pursuant to the Klamath Hydroelectric Settlement Agreement (KHSA). The Department never certified the EIR.

It is our understanding that the 2012 EIS/EIR is one of the information sources for the EIR being prepared by the SWRCB for the Lower Klamath Project. However, since the time that the Department's EIS/EIR was prepared there have been significant new developments related to dam removal science (section 2 of Appendix I). Several large dam removal projects have occurred since 2012 and research findings have informed new understandings related to the short-term effects of dam removal and the potential benefits of various measures to offset those effects. Therefore, the Department determined that it would be necessary to revisit and reevaluate some of the impact analyses and mitigation measures identified in the 2012 EIS/EIR.

In order to facilitate expert input on the potential revisions to the 2012 EIS/EIR aquatic resources (AR) mitigation measures, KRRC convened the Aquatic Technical Work Group (ATWG) comprised of agency and tribal fisheries biologists. The ATWG met during the spring and summer of 2017 to review the 2012 EIS/EIR AR impact analyses and mitigation measures and to provide relevant new information that was utilized by KRRC in preparing Appendix I. The Department was pleased to participate in the ATWG group and worked closely with KRRC in refining the recommended revisions to the 2012 AR impact analyses and mitigation measures. This memo documents the Department's recommendation to the SWRCB that the AR measures, provided in Appendix I (and one addendum), and as updated based on the Draft Water Quality Certification for KRRC's Lower Klamath Project, prepared by SWRCB (June 7, 2018), be utilized for the Lower Klamath Project.

In the short-term, implementation of the Lower Klamath Project will impact the aquatic biological community. However, long-term benefits of the project will ultimately outweigh these short-term impacts. Based on the climate change prediction of increasing water temperatures in the Klamath River watershed, access to the cold-water tributaries in the Hydroelectric Reach will improve salmonid population resilience and increase the probability of long-term persistence. The National Research Council (2004) wrote, "For salmonids, the most important potential changes [in the Klamath River aquatic environment due to climate change] include altered timing of snowmelt, lower base flows, and additional warming of water in summer." Access to spring-fed tributaries of the Klamath River in the Hydroelectric Reach will provide important refugia for salmonids as the climate continues to change.

CDFW previously determined in its 2012 Final EIR, removing sufficient portions of the Iron Gate, Copco No. 2, Copco No. 1, and J.C. Boyle dams to create a free-flowing Klamath River and provide for volitional fish passage in the Klamath River would optimize the efficiency of fish migration to and from the Upper Klamath Basin as well as through the entire Hydroelectric Reach (see also table ES-6 in the 2012 EIS/EIR). The entire Klamath River from Keno Dam to the Pacific Ocean would become a well-connected, free-flowing river and would provide access to historic anadromous fish habitat in the Hydroelectric Reach. Removal would also maximize the recruitment of gravel within and below the Hydroelectric Reach, which would benefit fish spawning. Additionally, dam removal would create a more mobile streambed. A more mobile streambed is anticipated to reduce the

occurrence of juvenile salmonid fish disease and will create better conditions for fish migration, rearing, and spawning. The aquatic impacts from dam decommissioning will primarily occur due to the release of reservoir sediment during the reservoir drawdown.

There are seven AR measures from the 2012 EIS/EIR that were evaluated by KRRC and the ATWG. In light of new information, each measure was revised to some degree. The updated AR measures are proposed to be implemented as part of the Lower Klamath Project. We have excerpted the summaries of the seven revised measures directly from Appendix I and provide our comments about the revised measure directly below each excerpt.

> **"Mainstem Spawning** – KRRC will develop and implement a monitoring and adaptive management plan to offset reservoir drawdown effects on mainstem spawning of anadromous salmonids and Pacific lamprey. Tributary-Klamath River confluences in the Hydroelectric Reach (i.e., the Klamath River and tributaries from Iron Gate Dam [river mile (RM) 193.1] to the upstream extent of J.C. Boyle Reservoir [RM 234.1]) and in the Iron Gate Dam to Cottonwood Creek (RM 185.1) reach will be monitored by KRRC for 2 years following the start of reservoir drawdown to ensure fish passage between tributaries and the Klamath River. KRRC-led monitoring of the four tributary confluences in the Hydroelectric Reach will occur from April 1 in the year of reservoir drawdown through March 31 in the year that is two years post-drawdown. KRRC-led monitoring of the five tributary confluences in the 8-mile reach from Iron Gate Dam to Cottonwood Creek will occur from January 1 of the year of reservoir drawdown, through December 31 in the year following the drawdown year. Tributary confluences in both reaches will be monitored by KRRC at variable frequencies depending on the season and the drawdown year. Monitoring will also be triggered in response to a 5-year or greater flow event on the Klamath River at the USGS Klamath River Below Iron Gate Dam CA gage (#11516530). KRRC and the ATWG will also convene periodically during the 2-year monitoring period to review monitoring frequency to ensure volitional passage is maintained between the Klamath River and select tributaries. If present, confluence obstructions will be actively removed by KRRC during the 2-year monitoring period to ensure volitional passage for adult Chinook salmon, coho salmon, steelhead, and Pacific lamprey.
>
> KRRC will also complete a spawning habitat evaluation on the Klamath River and four tributaries in the Hydroelectric Reach. If spawning habitat post-reservoir drawdown does not meet target metrics, KRRC will convene with ATWG to determine appropriate spawning gravel augmentation locations and methods on the mainstem Klamath River in the Hydroelectric Reach. If tributary spawning gravel habitat is less than the target values following reservoir drawdown, KRRC and the ATWG will convene to prioritize additional habitat restoration actions (e.g., gravel augmentation, gravel retention treatments) that KRRC will undertake to increase the amount of tributary habitat available to compensate for the loss of steelhead redds."

The Department supports implementation of the revised measure for offsetting temporary drawdown effects on spawning habitat as described here, and updated in the Draft Water Quality Certification, and we support the inclusion of the revised measure in the Lower Klamath Project. The original measure from the 2012 EIS/EIR included trapping and hauling adult salmonids. For reasons that are well documented in Appendix I (section 3.2.4), with which the Department agrees, this approach is

problematic (e.g., lack of feasibility of trapping during high flows, handling mortality, potential genetic and disease effects of relocated fish on wild populations, and disruption of adult Coho Salmon migration to spawning tributaries).

> **"Outmigrating Juveniles** – Three actions are planned to offset reservoir drawdown effects on outmigrating juvenile anadromous salmonids and Pacific lamprey. First, a sampling, salvage, and relocation effort will be completed to relocate juvenile salmonids, particularly yearling coho salmon, from the Klamath River between Iron Gate Dam and the Trinity River confluence during the fall prior to reservoir drawdown.
>
> Secondly, an adaptive management plan will be developed to assess and restore tributary-mainstem connectivity in the Hydroelectric Reach and the 8-mile reach from Iron Gate Dam downstream to Cottonwood Creek (same task as described above). Monitoring of the of the four tributary confluences in the Hydroelectric Reach will occur from April 1 in the year of reservoir drawdown through March 31 in the year that is two years post-drawdown. Monitoring of the five tributary confluences in the 8-mile reach from Iron Gate Dam to Cottonwood Creek will occur from January 1 of the year of reservoir drawdown, through December 31 in the year following the drawdown year. Tributary confluences in both reaches will be monitored at variable frequencies depending on the season and the drawdown year (see section 4.1.2). Monitoring will also be triggered in response to a 10-year or greater flow event on the Klamath River at the USGS Klamath River Below Iron Gate Dam CA gage (#11516530). The ATWG will also convene periodically during the 2-year monitoring period to review monitoring frequency to ensure volitional passage is maintained between the Klamath River and select tributaries. If present, confluence obstructions will be actively removed during the 2-year evaluation period to ensure volitional passage for juvenile Chinook salmon, coho salmon, steelhead, and Pacific lamprey.
>
> The third component of AR-2 will include monitoring water quality conditions at 13 key tributary confluences. The ATWG will convene when tributary water temperatures reach 17°C (7-day average of the daily maximum values) and Klamath River suspended sediment concentration exceeds 1,000 mg/L. If tributary water temperature trigger of 19°C (7-day average of the daily maximum values) and Klamath River suspended sediment concentration trigger of 1,000 mg/L (7-day sustained daily maximum) are met, a salvage effort will be evaluated. Based on ATWG guidance, a multi-day salvage effort for juvenile fish may be conducted at the Shasta and Scott rivers and single day salvage efforts at each other tributary confluence area by a 4-person crew and 2 transport trucks. Salvage effort will be coordinated with the ATWG and will reflect water quality conditions in the tributary confluences, outmigrating juvenile salmonid numbers, and other environmental conditions as necessary."

The Department supports implementation of the revised measure for outmigrating juvenile salmonids as described here, and updated in the Draft Water Quality Certification, and we support the inclusion of the revised measure in the Lower Klamath Project. The original measure from the 2012 EIS/EIR included trapping and hauling juvenile salmonids from 13 key tributaries downstream from Iron Gate Dam. For reasons that are well documented in Appendix I (section 4.2.4), with which the Department agrees, this approach is problematic (e.g. lack of feasibility of trapping,

cost, safety during winter flow conditions, handling mortality, potential insufficient juvenile imprinting followed by elevated stray rates associated with future adult return).

> **"Fall Pulse Flows** – Increasing flows during the fall prior to reservoir drawdown was intended to promote Chinook salmon and coho salmon migration into spawning tributaries to reduce the effect of reservoir drawdown on spawning grounds. Due to water availability uncertainty and typical fall flows, the use of fall pulse flows would likely be ineffective in reducing the effects of suspended sediment on migrating and spawning salmon, steelhead, and green sturgeon."

The Department is in agreement with the proposal to not include the fall pulse flows measure from the 2012 EIS/EIR analysis. This measure was intended to assist anadromous species in migrating upstream and/or downstream in the mainstem Klamath River. However, there is information that suggests that this effort would not significantly assist fish species in their migration. In addition, it is possible that the water in the reservoirs may be better used to assure that the instream flows are as high as possible during reservoir drawdown to better mobilize and transport sediment. This information is well summarized in Appendix I (section 5.1.4). For these reasons, the Department supports not including this measure in the Lower Klamath Project.

> **"Iron Gate Fish Hatchery** – To reduce the number of hatchery-reared juvenile coho salmon exposed to high suspended sediment levels, coho salmon will be released from Iron Gate Hatchery (CDFW) into the Klamath River later than the typical release schedule. Water quality monitoring stations established by KRRC prior to reservoir drawdown will be used by KRRC to determine when conditions in the mainstem Klamath River are suitable for the release of hatchery-reared coho salmon."

The Department is in agreement with the revised Iron Gate Hatchery measure and supports the inclusion of the revised measure for the Lower Klamath Project. The original mitigation measure in the 2012 EIS/EIR included a provision to truck juvenile salmonids from Iron Gate Hatchery downstream. For reasons that are well documented in Appendix I (section 6.1.4), with which the Department agrees, this approach is problematic (e.g. adverse impacts due to juvenile stress and mortality associated with trucking and increased stray rates of returning adults due to insufficient juvenile imprinting). If it is determined that water quality conditions are such that a delayed release of juvenile Coho Salmon would improve survival rates, then the Department will wait until water quality conditions improve prior to releasing the smolts from Iron Gate Hatchery.

> **"Pacific Lamprey** – The 3-km reach of the Klamath River downstream from Iron Gate Dam was proposed for Pacific lamprey ammocoete salvage and relocation in the 2012 EIS/R. Recent surveys have found very low ammocoete abundances between Iron Gate Dam (RM 192.9) and the Shasta River confluence (RM 179.3). Based on the assessment completed by KRRC and reviewed by ATWG, project effects to Pacific lamprey ammocoetes in the 3 km reach downstream from Iron Gate Dam are anticipated to be minimal, and therefore, no action is recommended for Pacific lamprey ammocoetes."

The Department is in agreement with the KRRC's recommendation to not have any protective measures for Pacific Lamprey. For reasons that are well documented in Appendix I (section 7.1.4), with which the Department agrees, relocating Pacific Lamprey from the proposed salvage reach (2 miles downstream from Iron Gate Dam) is unnecessary and translocation could have negative consequences (e.g. potential impacts of relocated ammocoetes on existing populations, minimal impacts to the species due to a geographically-widespread interbreeding population and limited site fidelity, and previous sampling efforts conducted by the Karuk Tribe and United States Fish and Wildlife Service in this reach found very few or no ammocoetes). For these reasons, the Department supports not including this measure in the Lower Klamath Project.

> **"Suckers**– The Project will result in lethal effects to Lost River and shortnose suckers inhabiting the Klamath River reservoirs. Since the two sucker species are lake-type suckers, suckers inhabiting the Hydroelectric Reach reservoirs will not persist following the Project. KRRC will conduct an adaptive management plan that includes sampling, salvage, and relocation of Lost River and shortnose suckers in the Hydroelectric Reach reservoirs. KRRC will translocate suckers to appropriate recipient waterbodies that will ensure the translocated suckers, which are of unknown genetic composition, will not mix with Lost River and shortnose sucker recovery populations in Upper Klamath Lake. KRRC will salvage and relocate up to a maximum of 3,000 suckers to the receiving waters. During the course of these actions, KRRC does not anticipated that the entire populations of suckers residing in the Hydroelectric Reach reservoirs will be recovered."

The Department supports implementation of the revised sucker measure. For reasons that are well documented in Appendix I (section 8.2.4), with which the Department agrees, the previously proposed approach to minimize impacts to listed sucker species is problematic (e.g. genetic integrity of suckers in the Hydroelectric Reach is unknown, limited relocation site availability, the requirement to salvage Klamath Small-scale Suckers, and the feasibility and benefit of the proposed telemetry study). We support the inclusion of the revised sucker approach in the Lower Klamath Project.

On September 20, 2018, Governor Brown signed into legislation (AB 2640), a statute that will allow the Department to authorize the "take" of the two sucker species. The new statute permits the Department to authorize the take or possession of the Lost River Sucker and Shortnose Sucker resulting from impacts attributable to or otherwise related specifically to the decommissioning and removal of the Iron Gate Dam, the Copco 1 Dam, the Copco 2 Dam, or the J.C. Boyle Dam, each located on the Klamath River, consistent with the Klamath Hydroelectric Settlement Agreement, if the conditions below are met. The Department preliminarily believes that implementation of the revised sucker measures could achieve the required conditions, however the Department will consider the matter more closely upon KRRC's request to the Department prior to issuing any authorization. The three conditions for sucker "take" authorization in the new statute are as follows:

1. The Department finds the authorized take will not jeopardize the continued existence of the Lost River sucker or Shortnose Sucker.

2. The impacts of the authorized take are minimized.

3. The take authorization requires Department approval of a sampling, salvage, and relocation plan to be implemented and that describes the measures necessary to minimize the take of adult Lost River Sucker and Shortnose Sucker associated with the Department's authorization. The plan shall provide for a sampling effort, the results of which will provide information used to make decisions and to implement the plan while utilizing the principles of adaptive management.

> **"Freshwater Mussels** Freshwater mussels located in the 8-mile long reach from Iron Gate Dam downstream to the Cottonwood Creek confluence, are anticipated to experience high mortality due to suspended sediment concentrations and bedload deposition. The KRRC will prepare a reconnaissance, salvage, and translocation plan for up to 20,000 mussels located in the deposition reach. During the course of these actions, KRRC does not anticipate that the entire population of mussels residing below Iron Gate Dam will be recovered."

The Department supports implementation of the revised freshwater mussel measure (including the addendum dated October 10, 2018). For reasons that are well documented in Appendix I (section 9.2.4), with which the Department agrees, the previously proposed approach to offsetting effects of reservoir drawdown on mussels is problematic (e.g. translocation success rates and concerns about disease transmission). In spite of limited success of mussel translocation efforts documented in the literature, we support the inclusion of the revised freshwater mussel measure in the Lower Klamath Project because the benefits of successful translocation would outweigh any negative effects of the approach and due to concerns about limited success, the effort has been scaled back and a habitat assessment of the translocation site has been added as a critical step to relocation.

Impacts to two other special status fish species that were analyzed in the previous EIR are worth mentioning here: Eulachon and Spring-run Chinook Salmon. These species were not analyzed by the ATWG; however, the Department provides the following for your consideration.

Eulachon is a small anadromous fish species that spawns in gravel riffles, rarely more than eight miles from the coast, and rears in the estuary environment. On March 18, 2010, NOAA - Fisheries listed the southern distinct population segment (DPS) of Eulachon as threatened under the Federal Endangered Species Act (NOAA Fisheries Service 2010b). Adult Eulachon presence was documented in low numbers in the lower portion of the Klamath River during spawning surveys conducted by Yurok fisheries biologists from 2011 to 2013. While the Lower Klamath Project will release dam-stored sediment downstream, the suspended sediment concentrations

in the lowest reach of the river are expected to be similar to those encountered about one in ten years under existing conditions. Therefore, similar to our previous impact analysis, it is the Department's position that based on the short duration of poor water quality in the estuary during reservoir draw down, the Lower Klamath Project will have less than significant effects on Eulachon in the short and long term.

Spring-run Chinook Salmon are considered to be at less than ten percent of their historic population levels in the Klamath River. They have been petitioned for listing under both the State and Federal Endangered Species Acts. NOAA Fisheries is expected to determine whether the Upper Klamath-Trinity River Spring-run Chinook warrants listing in November of 2018. The Department is currently in the process of reviewing the listing petition submitted to the Fish and Game Commission (FGC) on July 16, 2018 and will be presenting a recommendation to the FGC regarding whether or not the petition warrants a formal review at the next FGC meeting. If it is determined that a formal review is appropriate, the species will be elevated to candidate status for the year during which the review would occur.

Much of the historic spawning and rearing habitat for Spring-run Chinook Salmon was blocked by the construction of dams on both the Klamath River and in the Trinity River basin. Currently, Spring-run Chinook Salmon are only known to spawn in the Trinity River watershed and the Salmon River. Historically, they were known to spawn above Klamath Lake in the Williamson, Sprague, and Wood Rivers. Under existing conditions an estimated 420 miles of historic spawning and rearing habitat for Spring-run Chinook Salmon is blocked.

While some migrating adults and/or rearing or migrating juveniles in the mainstem may be exposed to poor water quality temporarily during dam decommissioning, because most spawning occurs in the Salmon and Trinity Rivers, the magnitude of exposure would be limited by dilution from tributaries entering the mainstem Klamath River downstream of Iron Gate Dam. In addition, data suggests that Spring-run Chinook Salmon appear less vulnerable to suspended sediment impacts than other Klamath River salmon populations (2012 EIS/EIR). Based on the potential for a minimal reduction in the abundance of one year class, it is the Department's position that the Lower Klamath Project would have less than significant effects on Spring-run Chinook Salmon in the short term and based on the increased habitat availability and improved habitat quality in the long term, it is our position that the overall project will be beneficial to Spring-run Chinook Salmon.

While it was the Department's intention to focus this memo in providing the SWRCB with feedback regarding our position on the AR provisions described in Appendix I, we want to briefly touch on two additional species that are not addressed in Appendix I: foothill yellow legged frog and western pond turtle. Since the preparation of the 2012 EIS/EIR, foothill yellow legged frog has been proposed for listing pursuant to the California Endangered Species Act and is currently considered a candidate species. In addition, western pond turtle is a California Species-of-Special-Concern, has been

proposed for listing under the Federal Endangered Species Act, and is currently undergoing a status review. The SWRCB EIR for the Lower Klamath Project should include a description of the potential impacts and mitigation measures for both species. The Department has been coordinating closely with KRRC consultants in the "Klamath Terrestrial Resources Team" and supports the approaches for off-setting impacts to these two species that have been developed by the team.

Thank you for the opportunity to provide you with input on Appendix I. We are very pleased that the SWRCB continues to progress in the preparation of the Lower Klamath Project EIR and the Department looks forward to the release of the document. If you have any questions or concerns regarding our comments, please contact Caitlin Bean, Senior Environmental Specialist (Scientist) with Yreka Fisheries, at (530) 841-2562 or Caitlin.Bean@wildlife.ca.gov.

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