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November 18, 2011

**Via E-Mail to: KlamathSD@usbr.gov**
**and Overnight Delivery**

Ms. Elizabeth Vasquez
U.S. Bureau of Reclamation
2800 Cottage Way
Sacramento, CA 95825

Re: Comments of Hoopa Valley Tribe on DEIS/DEIR for Klamath Facilities Removal

Dear Ms. Vasquez:

The Hoopa Valley Tribe submits the following comments on the Department of the Interior and California Department of Fish and Game's Draft EIS/EIR regarding Klamath Facilities Removal (the "DEIS"). The Tribe has previously submitted comments, dated July 14, 2010, on the Department of Interior's Notice of Intent to Prepare an EIS/EIR (the "Scoping Notice"). The Tribe also submitted extensive comments on the cooperating agency draft of the DEIS dated June 22, 2011. The Tribe incorporates those prior comments by reference, because the DEIS fails to incorporate or adequately address the vast majority of the Tribe's comments.

## Interest of the Hoopa Valley Tribe

Since time immemorial, the fishery resources of the Klamath and Trinity Rivers have been the mainstay of the life and culture of the Hoopa Valley Tribe. The fishery was "not much less necessary to the existence of the Indians than the atmosphere they breathed." *Blake v. Arnett*, 663 F.2d 906, 909 (9th Cir. 1981) (quoting *United States v. Winans*, 198 U.S. 371, 381 (1905)). The salmon fishery is integral to the customs, religion, culture, and economy of the Hoopa Valley Tribe and its members. The lower twelve miles of the Trinity River and a stretch of the Klamath River flow through the Hoopa Valley Reservation.

The federal government established the Hoopa Valley Reservation in 1864. The Hoopa Valley Reservation is located in the heart of the Tribe's aboriginal lands; lands the Tribe has occupied since time immemorial. The Hoopa Valley Tribe has fishing and water rights in the Klamath River with a priority date of 1864, as recognized by the United States in the Memorandum from Solicitor of the Department of the Interior to the Secretary of the Interior (Oct. 4, 1993); and the Memorandum from Regional Solicitor, Pacific Southwest Region to the Regional Director, Bureau of Reclamation, Mid-Pacific Region (July 25, 1995) (collectively, "Solicitors' Opinions"); and by federal courts in, for example, *Parravano v. Babbitt*, 70 F.3d 539 (9th Cir. 1995). Congress has recognized and confirmed, for example in the Central Valley

Project Improvement Act, Public Law 102-575, Section 3406(b)(23) (Oct. 30, 1992), that the United States has a federal trust responsibility to restore and maintain the fishery trust resources of the Hoopa Valley Tribe to specified standards. Those standards are recognized in federal law and have become a legal mandate. The Hoopa Valley Tribe's rights are unique. This is unlike the situation where several tribes signed a single treaty reserving rights in common. While other tribes in the Klamath Basin also have water and fishing rights, our rights are distinct in scope, derive from different authorities, and must be treated separately.

The fish and water resources of the Klamath River Basin have been severely and adversely affected by the federal authorization, construction, and operation of the Klamath Reclamation Project and the Klamath Hydroelectric Project upstream of the Hoopa Valley Reservation. The impacts associated with blocked fish passage, nutrient enrichment, loss of habitat, and inadequate instream flows due to the authorization, construction, and operation of the Klamath Reclamation Project and the Klamath Hydroelectric Project have contributed to the listing of the Southern Oregon/Northern California coast (SONCC) coho salmon and its critical habitat under the Endangered Species Act.

The Tribe has actively participated in all proceedings relating to the re-licensing of the Klamath Hydroelectric Project before the Federal Energy Regulatory Commission (FERC), and proceedings to enforce operation of the Klamath Reclamation Project in compliance with the Endangered Species Act and other applicable law. Protection of the Klamath and Trinity Rivers and the aquatic resources therein is of vital importance to the Hoopa Valley Tribe.

The Tribe participated in settlement negotiations leading to the Klamath Hydroelectric Settlement Agreement (KHSA) and Klamath Basin Restoration Agreement (KBRA). Although the Tribe favors the removal of the dams of the Klamath Hydroelectric Project for the purposes of improving water quality and restoring fish passage on the Klamath River, the Tribe did not sign, and enacted a resolution in opposition to the KHSA. The Tribe opposes the KHSA as drafted because it does not require the removal of any dams, but instead establishes an uncertain planning process that could potentially lead to commencement of dam removal in 2020 subject to the achievement of numerous contingent events that include, but are not limited to: (a) enactment of federal legislation; (b) California voter approval of a $250 million bond package; (c) an affirmative determination by the Secretary of Interior that dam removal is in the public interest; and (d) separate concurrences by the states of California and Oregon that dam removal is in the public interest. To date, none of these contingencies have occurred.

The Tribe also opposes the KHSA because it suspends the FERC re-licensing proceeding, suspends the State of California and Oregon water quality certification proceedings, and permits the licensee PacifiCorp to continue operation of the Klamath Hydroelectric Project on terms of annual licenses until at least 2020. The KHSA also fails to provide for interim license measures that will bring the Project into compliance with current state, federal, tribal environmental laws, or applicable water quality standards, or that will adequately mitigate fishery impacts associated with operation of the Project.

The Tribe also did not sign, and enacted a resolution in opposition to, the KBRA because the KBRA conflicts with tribal sovereignty, violates trust duties owed to the Hoopa Valley Tribe by the United States, subordinates tribal water and fishing rights in favor of junior non-Indian irrigation interests without tribal consent, provides inadequate flows for the protection of tribal trust resources, offers a speculative and unfunded program for fishery restoration and water conservation, encourages unsustainable use of groundwater in the Upper Klamath Basin, fails to abate acute nutrient pollution problems and is not based on best available, peer reviewed science. The Tribe also objects to the linkage of the KHSA and the KBRA.

Here, as in all other proceedings related to protection of the Klamath and Trinity Rivers, the Tribe is committed to ensuring that the United States and its respective departments and agencies fulfill their duties to the Tribe and to the Klamath and Trinity Rivers in accordance with applicable law, including NEPA, the Endangered Species Act, Clean Water Act, Federal Power Act, and the federal government's trust responsibility to the Hoopa Valley Tribe.

## Comments on Draft EIS/EIR

### I. The DEIS Contains An Incomplete Evaluation of Alternatives, Fails to Evaluate the Impacts of the KBRA, and Ultimately Fails to Meet the Purpose of NEPA and CEQA to Facilitate Informed Decision-Making and Public Participation.

The purpose of the NEPA and CEQA environmental review process is two-fold: "First, it places upon [the action] agency the obligation to consider every significant aspect of the environmental impact of a proposed action. Second, it ensures that the agency will inform the public that it has indeed considered environmental concerns in its decision-making process." *Kern v. United States Bureau of Land Management*, 284 F.3d 1062, 1066 (9th Cir. 2002). *See also Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989) (NEPA "ensures that the agency, in reaching its decision, will have available, and will carefully consider, detailed information concerning significant environmental impacts; it also guarantees that the relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process and the implementation of that decision."); *Idaho Sporting Congress v. Thomas*, 137 F.3d 1146, 1149 (9th Cir. 1997) (same); *Columbia Basin Protection Ass'n v. Schlesinger*, 643 F.2d 585, 592 (9th Cir. 1981) ("[T]he preparation of an EIS ensures that other officials, Congress, and the public can evaluate the environmental consequences independently."). Ultimately, an EIS does not satisfy NEPA unless "its form, content, and preparation substantially (1) provide decision-makers with an environmental disclosure sufficiently detailed to aid in the substantive decision whether to proceed with the project in light of its environmental consequences, and (2) make available to the public, information of the proposed project's environmental impacts and encourage participation in the development of that information." *Trout Unlimited v. Morton*, 509 F.2d 1276, 1283 (9th Cir. 1974).

The DEIS here fails to meet the standards set forth above primarily through its failure to adequately disclose and evaluate the impacts associated with the KBRA. As the DEIS confirms, the KBRA is a connected and interdependent action. Yet, the DEIS does not adequately disclose the impacts of the KBRA. Nor does the DEIS consider or evaluate alternatives to the KBRA.

The DEIS misleads the public and the decision-makers to believe that the KBRA is an agreement that will result in fishery protection and environmental restoration. The DEIS continually makes the incorrect statement that the KBRA "limits" irrigation water diversions below levels currently allowed by law. In fact, the KBRA will result in inadequate (and unlawful) flows for fish at critical times of dry water years, will result in a historic termination of the United States responsibilities to Indian tribes in the Klamath basin, will turn Western water law on its head by subordinating senior tribal water rights to junior irrigation interests, and will support otherwise unsustainable consumptive agricultural practices through hundreds of millions of dollars in public subsidies. In addition, the DEIS fails to inform the public and the decision-makers that any benefits that could derive from the KBRA for fish are speculative at best, given the need for congressional authorization and appropriations of funding that are not likely to occur.

The Tribe believes that dam removal is necessary and in the public interest. Improvements in water quality, volitional fish passage, and a free-flowing Klamath River are critical to support the Tribe and the river that runs through its homeland. However, the benefits of dam removal will not be achieved if tied to the KBRA. The proposed action may lead to a river without dams, but with the KBRA it will also lead to a river without sufficient water in the river for fish at critical times of the year. The impacts of the KBRA's guaranteed diversions and associated tribal trust violations will not be evaluated in subsequent NEPA processes. The public, the Governors, the Departmental decision-makers, and Congress need to be made fully aware of the consequences of, and alternatives to, the KBRA. The DEIS fails in that regard.

## II. The Purpose and Need Statement Should Delete Reference to Consistency with the KBRA.

CEQ Regulation 1502.13 requires that an EIS "briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." As stated in the DEIS, the purpose and need statement "is a critical part of the environmental review process because it helps to set the overall direction of an EIS/EIR, identify the range of reasonable alternatives, and focus the scope of analysis." Final Alternatives Report, p. 2-1.

The DEIS describes the purpose of the Proposed Action as follows: "to achieve a free flowing river condition and full volitional fish passage as well as other goals expressed in the KHSA and KBRA." The need is described as: "to advance restoration of the salmonid fisheries in the Klamath Basin consistent with the KHSA and the connected KBRA." The Department should delete the references to consistency with the KHSA and KBRA. This EIS is being prepared to inform the Secretary of the Interior and the Governors of the States of Oregon and California whether "Facilities Removal (i) will advance restoration of the salmonid fisheries of the Klamath Basin, and (ii) is in the public interest, which includes but is not limited to consideration of potential impacts on affected local communities and Tribes." KHSA, Sec. 3.3.1; DEIS, p. ES-2. Consistency with the KBRA is not a factor in the Secretarial Determination or the Governors' concurrence and should not guide the selection of alternatives here.

As the Tribe warned in its July 14 scoping comments, tying the purpose and need of the Proposed Action to KBRA implementation has resulted in an unreasonably narrow, and unlawful, alternatives analysis. As discussed in more detail below, an alternative that removes all four facilities without execution and implementation of the KBRA would achieve the purpose of "a free flowing river condition and full volitional fish passage" and would "advance restoration of the salmonid fisheries" and would be in the public interest. In addition, such an alternative would be feasible. However, by requiring consistency with the KBRA in the purpose and need statement, the Department was unable or unwilling to consider a no-KBRA alternative. *See* Final Alternatives Report, Section 2.3, Chapter 4 (establishing consistency with KBRA as factor for screening alternatives).

## III. The Alternatives Analysis Fails to Comply With Requirements of NEPA and CEQA.

The alternatives analysis is the "heart of the environmental impact statement." 40 C.F.R. § 1502.14. The EIS must "rigorously explore and objectively evaluate all reasonable alternatives," and "devote substantial treatment to each alternative . . . so that reviewers may evaluate their comparative merits," including "reasonable alternatives not within the jurisdiction of the lead agency. 40 C.F.R. § 1502.14(a),(b),(c); *see also* 43 C.F.R § 46.420(c) (defining "range of alternatives").

The CEQ publication "NEPA's Forty Most Asked Questions" confirms that in establishing a reasonable range of alternatives, "the emphasis is on what is 'reasonable' rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative." Question 2a. The CEQ publication adds that "an alternative that is outside the legal jurisdiction of the lead agency must still be analyzed in the EIS if it is reasonable. . . . Alternatives that are outside the scope of what Congress has approved or funded must still be evaluated in the EIS if they are reasonable, because the EIS may serve as the basis for modifying the Congressional approval or funding in light of NEPA's goals and policies." Question 2b.

For the reasons discussed below, the alternatives analysis in the DEIS is deficient:

### A. The Description of the No-Action Alternative Is Inaccurate and Misleading and Does Not Facilitate Informed Decision-Making.

The alternatives analysis in an EIS is required to evaluate a No-Action Alternative. 40 C.F.R. § 1502.14(d). The No-Action Alternative is required to discuss both the existing conditions "as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved." CEQA Guidelines Section 15126.6(e)(2). The DEIS states that "[f]or the purposes of this analysis, the No Action/No Project Alternative will continue current operations with the Four Facilities remaining in place and PacifiCorp operating under the current annual license." DEIS, at ES-21. This is an inaccurate and misleading description of what would happen in the event of no-action, or a negative Secretarial Determination. As a result, the decision-makers and the public have not been presented with an accurate No-Action Alternative to compare with the other alternatives.

In the event of a negative Secretarial Determination or adoption of the "No-Action" alternative the FERC licensing process will resume. All events in the FERC licensing process have been completed except for the completion of the Section 401 water quality certification (which is currently contractually barred from completion under the KHSA). If the KHSA and KBRA terminate, the States would resume the certification process and a new FERC license would issue "in the foreseeable future." Indeed, the California State Water Resources Control Board Resolution No. 2011-0038, adopted August 16, 2011, makes clear that the Water Board expects that the environmental review process here "will facilitate completion of the State Water Board's 401 certification process for the relicensing proceeding should that become necessary because the Secretarial Determination does not occur by April 30, 2012."

The Departments of Interior and Commerce have already prescribed final and binding conditions pursuant to Section 4(e) and 18 of the Federal Power Act (including volitional fishway prescriptions) which must be included in the new license. *Escondido Mut. Water Co. v. La Jolla Band of Mission Indians*, 466 U.S. 765 (1984) (FERC must include the Departments mandatory conditions and prescriptions); *City of Tacoma v. FERC*, 460 F.3d 53 (D.C. Cir. 2006) (same).

It is not correct that the Klamath Hydroelectric Project would continue operating on annual licenses, with no protective terms and conditions, for "the foreseeable future" in the event that the KHSA terminates. The foreseeable No-Action scenario is not perpetual operation of the Klamath Hydroelectric Project under a long-expired license. Instead, the foreseeable No-Action scenario is one in which the Klamath Project is re-licensed, subject to the Departments' mandatory Section 4(e) and 18 conditions and fishway prescriptions, as well as any conditions imposed under the authority of Section 401 of the Clean Water Act for compliance with water quality standards of the States of Oregon and California, and the Hoopa Valley Tribe.

By failing to describe the reasonably foreseeable No-Action scenario, the DEIS artificially makes the proposed action (dam removal plus KBRA implementation) seem more attractive than it really is. A properly framed No-Action alternative would describe issuance of, and project operations under, a FERC license that provided volitional passage and compliance with state and tribal water quality standards. In addition, the KBRA and its guaranteed water diversions and tribal claim waivers would not occur. Thus, the Klamath Reclamation Project would continue to be managed in accordance with existing and future limitations on diversion required by the Endangered Species Act and other applicable law.

The problems associated with the No-Action Alternative, as currently framed, are evident in the discussion of water quality impacts. The evaluation of the No-Action Alternative, in Section 3.2's discussion of water quality repeatedly states that the "continued impoundment of water at the Four Facilities under the No Action/No Project alternative would result in no change from existing conditions." This statement rests on the erroneous premise that the Project would be allowed to continue operating out of compliance with state and tribal water quality standards. In fact, under a properly framed No-Action Alternative, the FERC process would resume and the States of Oregon and California, and the Hoopa Valley Tribe, would impose conditions on continued operation designed to ensure compliance with the applicable standards. Under

existing federal and state law, the Project could not be permitted to continue operating in a manner that violated the applicable water quality standards.

In summary, continued un-mitigated operation of the Klamath Hydroelectric Project is not likely, foreseeable, or reasonable if Facilities Removal fails to occur pursuant to the KHSA process. The No-Action Alternative should be modified to reflect the likely outcome of a resumption of the FERC licensing process.

B. Analysis of the Proposed Action Alternative Is Inadequate Because It Fails to Evaluate the Effects of the KBRA's Guaranteed Minimum Irrigation Diversions on the Fishery.

The Proposed Action is described as Facilities Removal (i.e., decommissioning and removal of Iron Gate Dam, Copco Dams 1 and 2, and J.C. Boyle Dam). The Department considers the KBRA to be connected to the Proposed Action; however, the DEIS and its supporting documents confirm that less water will be available for flows at Iron Gate Dam under the Proposed Action (i.e. Reclamation (2011), pages 6-9 and 6-10; Figure 1) but do not actually evaluate or disclose the adverse consequences to water flow and the fishery that will result from federal execution and implementation of the KBRA. Hydrology modeling in Reclamation (2011) shows that flows under the Proposed Action will be 200 - 400 cfs less than what would otherwise be available under the No Action alternative. Additionally, both the Proposed Action and the No Action alternative fall consistently short of the instream flow recommendations in Hardy et al. (2006), except during extremely wet hydrologic conditions (Figure 2). The DEIS must fully disclose to the decision-makers and to the public that dam removal tied to the KBRA will not achieve the goals of fishery restoration, because there will not be water of sufficient quantity and quality left in the river for the fish at critical times in dry water years.

Both before the KBRA and KHSA were signed, and throughout this NEPA process, the Hoopa Valley Tribe has urged that modeling be completed which compares the water flows needed for fish restoration to those projected to become available under the KBRA. For example, in Additional Modeling and Analytical Work Needed (February 5, 2008), the Hoopa Valley Tribe and others urged modeling "that will achieve modified Hardy II Iron Gate flow targets. . . . [and determine] the Project diversions allowable while meeting April 1 through September 30 Hardy II Iron Gate flow targets." The document further requested "a written procedure for operationalizing the Hardy II flows. . . . intended to help determine the amounts that will be available for diversion in time steps throughout the summer and winter months."

On June 16, 2009, Hoopa Tribal Fisheries Director, Mike Orcutt, wrote to Associate Deputy Secretary of the Interior, Laura Davis, urging the Department "to conduct the additional analyses discussed . . . to illuminate the feasibility of KBRA water management schemes . . . .in advance of final federal decision-making and before KBRA legislation is introduced in Congress." On July 2, 2009, Hoopa Tribal Chairman Leonard E. Masten also wrote to Associate Deputy Secretary of the Interior, Laura Davis, urging completion of modeling and noting that "[s]uch modeling was also requested in the February 5, 2008, list of studies that we previously sent you." In response, Associate Deputy Secretary Laura Davis, on September 11, 2009, reported that work had been done "to identify additional scientific analyses that may better

inform review of the draft KBRA." Ms. Davis referred to the February 5, 2008, request and said "[o]ther issues will be addressed by additional modeling described above." Nevertheless, the DEIS fails to disclose any modeling of implementation of the Hardy II flows recommended for fish restoration and does not examine how such flows could be operationalized to permit continued water diversions for the irrigation project.

The DEIS also misrepresents the facts, unsuccessfully attempting to claim the KBRA will be better for fish. For example, page 3.3-99 references Hetrick et al. (2009), citing that fall-run Chinook under "KBRA type flows showed the greatest benefits in years when production was low." This summary conclusion in Hetrick et al. 2009 is stated in the Anadromous Fish Production section under PRE-DAM results. Modeling results for POST-DAM removal did not state the same result regarding the ratio of benefits to production in low production years (Hetrick et al. 2009).

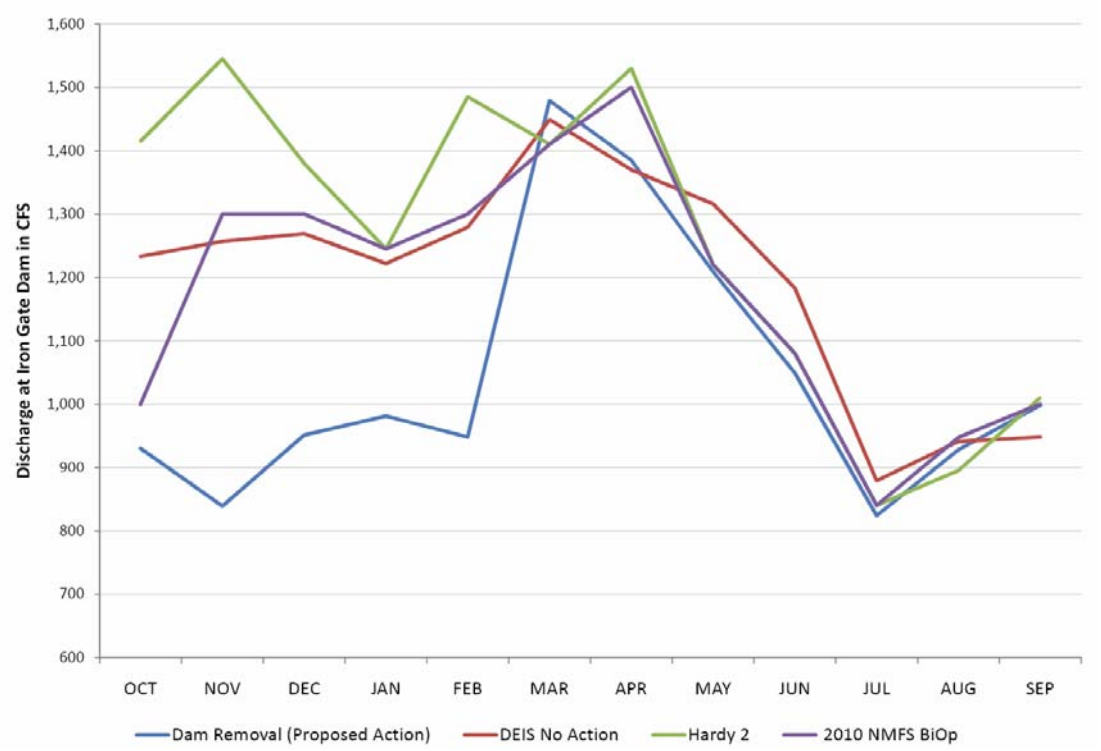


Figure 1. Comparison of 90% exceedance discharge at Iron Gate Dam for the DEIS Proposed Action, DEIS No Action, Hardy et al. (2006) and the NMFS Biological Opinion (2010). Note dry year Proposed Action flows are well below thresholds established in the NMFS Biological Opinion (2010) and Hardy et al. (2006) during most months, and especially during November through February. Chinook fry emerging beginning in December (Hardy et al. 2006) will be affected by insufferably low winter flows.

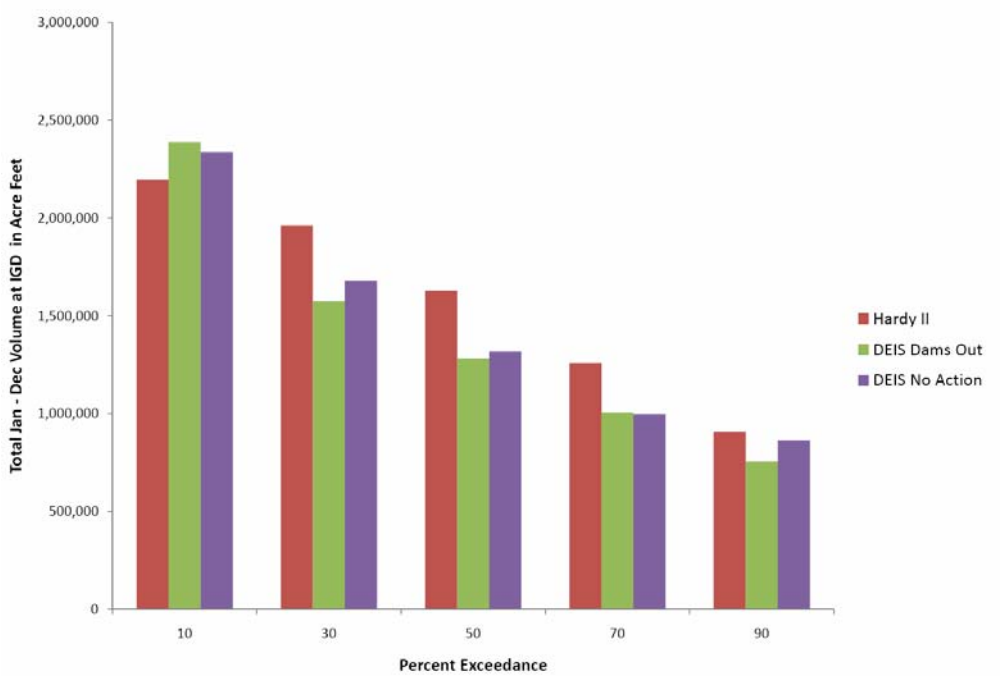


Figure 2. Hardy et al. (2006) Iron Gate Dam instream flow recommendation water volumes compared to both DEIS alternatives. Both the Proposed Action and No Action are well below Hardy et al. (2006) recommendations for instream fisheries needs in all exceedance year types except during extremely wet annual hydrologic conditions.

Throughout the DEIS, the effect of the KBRA Water Diversion "Limitation" is inaccurately described. For example, page ES-19 states that a key outcome of the KBRA is that the Klamath Reclamation Project's water users have agreed to "accept reduced water deliveries." At page 3.7-19, the DEIS states that "the Water Diversions Limitations program (KBRA Section 15.1) would reduce the availability of surface water for irrigation on Reclamation's Klamath Project to 100,000 acre-feet less than the demand in the driest years to protect mainstem flows." Similarly, page 3.8-20 states "Water Diversion Limitations would be implemented during dry years to increase flows for fisheries by reducing Reclamation's Klamath Project Diversion up stream of approximately 100,000 acre-feet."[1] Both of these statements are completely false. Not only is 100,000 acre-feet not reduced from current demand, the DEIS's Proposed Action's modeled water volume falls well below ESA requirements established in the 2010 National Marine Fisheries Service (NMFS) Biological Opinion (Figure 3) for dry water year types, requirements that limit diversions. A comparison of required versus available water volume totals for the January through December time period reveals water volumes established in the 2010 NMFS Biological Opinion would not be met in four out of six water year types (66%). None of the sections referring to the mythical 100,000 acre-feet or any other part of the DEIS,

[1] We find it unusual that the reference to this mysterious 100,000 acre feet water volume savings first appears in an earlier draft of Hetrick, et al. (2009) but is not included in the Final version of the same report.

reveals that the existing legal limitations in the applicable Biological Opinions independently prevent the Project from satisfying irrigation demand in dry years. The analysis of the KBRA flows in the DEIS appears to rely on irrigator water usage from years *prior to* BiOp implementation. The large irrigation diversions noted in the DEIS occurred prior to the BiOp and are illegal now under the ESA. The KBRA would change that by guaranteeing a minimum diversion for irrigators to the detriment, not the benefit, of fish.

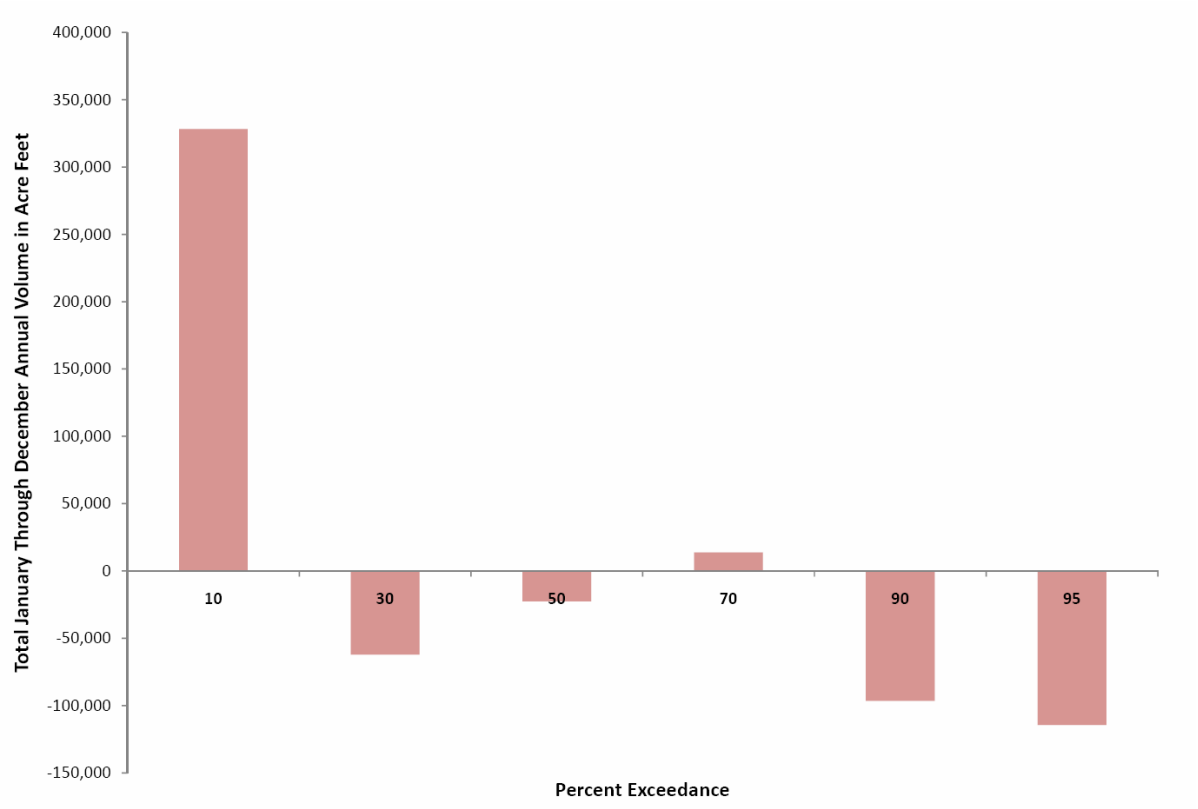


Figure 3. DEIS Proposed Action water volume[2] shortages when compared to volumes required to satisfy the 2010 NMFS Biological Opinion[3] for January through December volumes. Volumes are calculated from Iron Gate Dam releases.

The purported "limitation" on diversions in the KBRA is nothing of the kind and will actually work to negate benefits of dam removal. The purpose of the KBRA is not to limit diversions, but to guarantee a firm minimum amount of water for irrigation diversions that exceeds currently legal levels. Those diversions, which under the KBRA would be 330,000 to

[2] DEIS Proposed Action water volumes were calculated from exceedance tables presented in Appendix F of (Reclamation 2011).

[3] 2010 NMFS Biological Opinion water volumes were calculated from Table 18 of (NMFS 2010).

385,000 acre-feet per year, would trump the in-stream flow needs of fish and other aquatic organisms, especially in drier water years (Figure 4). DEIS hydrology model results indicate that the Proposed Action will result in a buffering of Agricultural Supply water volumes in dry years above what would otherwise be available. Meanwhile, the river suffers a penalty of a volume reduction that violates the 2010 NMFS Biological Opinion (Figure 3). While the DEIS states ESA compliance will continue, it fails to describe *how* this will be achieved given the clear shortage of water volume under the KBRA. The United States would be legally obligated to defend the irrigators' diversion rights against the interests of fish and Indian tribes in the Klamath Basin. The KBRA thus subordinates senior tribal rights to water for fish in favor of junior irrigation interests. In the case of the Hoopa Valley Tribe, this subordination occurs without the Tribe's consent – effectively terminating Interior's trust obligation to the Tribe in this context. The DEIS leaves the wrong impression that the KBRA limits irrigation diversions below the level that can lawfully occur under the existing BiOp.

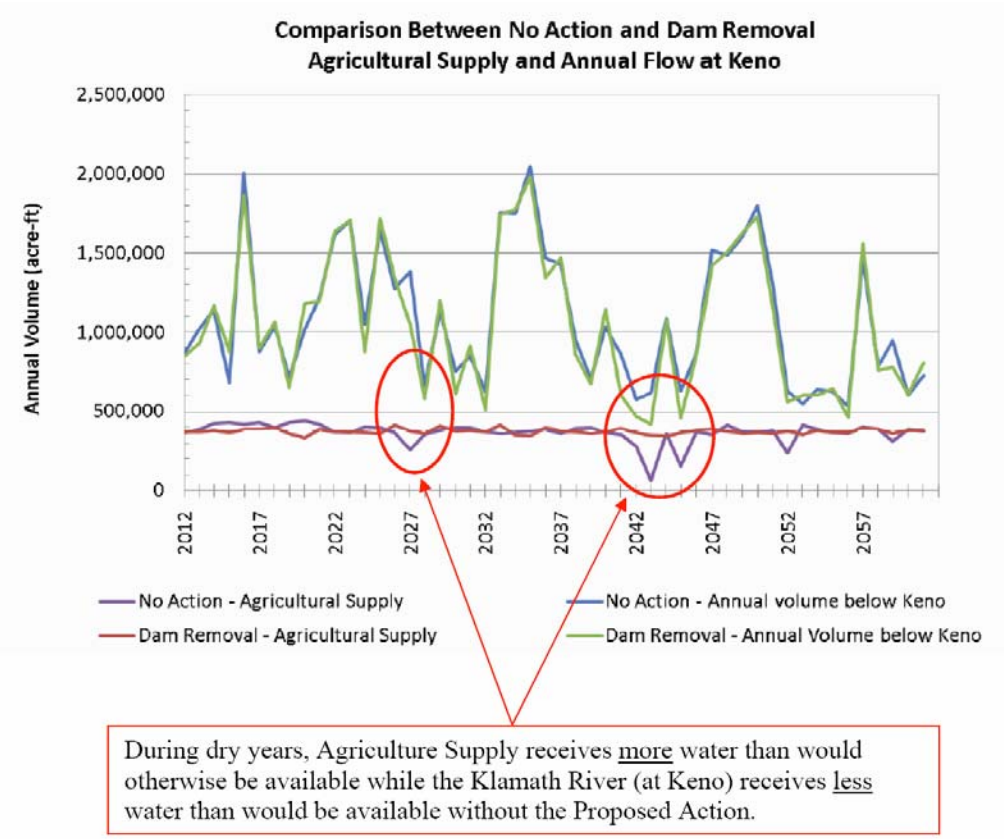


Figure 4. The DEIS Proposed Action favors Agricultural Supply in dry years, providing a guarantee of more water than would be available under the No Action Alternative, which includes the flow requirements established in the 2010 NMFS Biological Opinion. Conversely, the river is penalized by a decrease in available water under the Proposed Action. Adapted from Reclamation (2011), page 6-18. This modeling comparison does not indicate irrigation will be reduced by 100,000 acre feet from current demand, as erroneously represented in the DEIS (i.e. page 3.7-19).

Analysis of the KBRA's guaranteed diversions shows that water flows in the vicinity of Iron Gate Dam would frequently fail to meet the requirements of the NMFS Biological Opinion for protection of salmon in the mainstem Klamath River (Figure 3). The flows in the BiOp are those necessary to avoid placing the fish in jeopardy of extinction. The guaranteed diversion of 330,000 acre-feet for irrigators will, in 66% of water years, leave too little water in the Klamath River to meet the requirements of the Coho Salmon BiOp flow requirements (Figure 3). Flows under the KBRA (Appendix E-5) will fall to below 450 cfs if water years similar to 1992 occur in the next 50 years. During the massive fish die-off in 2002 (in which 70,000 adult salmon died), flows in the river were 750 cfs. (Guillen 2003, CDFG 2004).

The Department cannot avoid analyzing the impacts of the diversion limitations in this EIS. The commitments related to the diversion limitations will become binding once the Secretary of the Interior signs the KBRA. Since the Secretary will be bound to honor the water balance and diversion guarantees prescribed in the KBRA upon signing, there will be no point in the future at which to analyze the effect of the diversion guarantees under NEPA. The Secretary will lack discretion to not honor the diversion guarantees once the necessary conditions are met.

The Department must analyze the effect of the KBRA and its diversion guarantees now. The Department concedes that the KHSA and KBRA are interdependent. The Department cannot tout the benefits of dam removal while ignoring the harm that will result from the associated KBRA. Nor can the Department fail to examine the KBRA water diversion impacts by analyzing the KBRA at a "programmatic" level. Examination of the KBRA at a programmatic level does not excuse the Department from analyzing and disclosing the known impacts associated with the program. The minimum diversions guaranteed by the KBRA are known now, will be non-discretionary once the KBRA is executed, have significant impacts associated with them, and therefore must be evaluated now.

### C. The Alternatives Analysis is Incorrect in Concluding The Proposed Action Will Result in a Positive Geomorphic Effect

Fluvial geomorphic function is critical for habitat creation and maintenance for rearing and spawning anadromous salmonids. Geomorphic function is also essential for naturally functioning physical processes (i.e. bar development, scour) in a dynamic river system. Reclamation (2011) cites the existing condition median bed mobilization flows for Slight and Significant Bed Mobilization flows as 9,800 and 15,900 cfs respectively (Table 1). That is, to significantly mobilize the bed of the Klamath River below Iron Gate Dam, a median flow of 15,900 cfs is required.

Slight Mobilization is defined by Reclamation (2011) as "a small, but measurable, sediment transport rate. Armor layer is only minimally disturbed and there may be flushing of sand to a depth of the $D_{90}$." Reclamation (2011) also defines Significant Mobilization as "many particles are moving and there is a significant sediment transport rate. Sand is mobilized in the interstitial spaces of the bed and to a depth of twice the $D_{90}$. The armor layer is significantly disturbed. Given these definitions, we believe a Significant Mobilization is required in river downstream of Iron Gate Dam to recover geomorphic function and mitigate bed armoring caused by Iron Gate Dam, constructed in 1962. While the geomorphic effect of Iron Gate Dam clearly

extends beyond the first ten miles downstream, Table 1 includes only mobilization flows for the first ten river miles, for discussion purposes.

| Reach | River Mile | Slight Bed Mobilization Flow (cfs) | | | Significant Bed Mobilization Flow (cfs) | | |
|---|---|---|---|---|---|---|---|
| | | Low | Median | High | Low | Median | High |
| Bogus Creek to Willow Creek | 190.33-185.83 | 7,000 | **9,800** | 13,100 | 11,500 | **15,900** | 21,300 |
| Willow Creek to Cottonwood Creek | 185.23-182.95 | 7,700 | 9,800 | 13,100 | 12,500 | 17,200 | 22,900 |
| Cottonwood Creek to Shasta River | 182.95-179.17 | 5,900 | 8,400 | 11,300 | 9,700 | 13,800 | 18,400 |

Table 1. Bed mobilization flow requirements for the ten miles of river below Iron Gate Dam (Bogus Creek to the Shasta River). Mobilization flows reported in Reclamation (2011). River miles reported in Ayers (1999). Median discharge required for the first 4.5 miles downstream of Iron Gate Dam in bold for discussion purposes (see text).

The modeled hydrology for the period between 2011 and 2061 does not meet the flow threshold for a Significant Bed Mobilization flow (15,900 cfs) even once (Figure 5). As a result, the reaches downstream of Iron Gate Dam will suffer in their ability to recover from the harmful effects caused by sediment starvation and bed armoring over the past fifty years. Because neither the Proposed Action nor No Action Alternatives meet the geomorphic needs of the Klamath River downstream of Iron Gate Dam, additional flow management provisions will be required to ensure adequate geomorphic recovery. The additional coarse sediment provided by the upstream Iron Gate Reservoir will not be a benefit if there is not sufficient flow to mobilize it downstream over time.

Reclamation (2011) is incorrect when it concludes, "It is expected that the reach between Iron Gate and Cottonwood Creek will have improved habitat function under the Dam Removal Alternative than under the No Action Alternative." Reclamation (2011) bases this future-condition geomorphic assessment off the Slight and not Significant Mobilization threshold. Given a Slight Mobilization event will do little more than flush sand (as defined by Reclamation), we find this conclusion to be in error.

Reclamation (2011) also asserts that the return period for future sediment mobilization flows will decrease – sediment is predicted to mobilize more frequently. We also find this conclusion incorrect. Reclamation's (2011) model results for reach average $D_{50}$ (coarse sediment) for the short distance between Iron Gate and Bogus Creek actually coarsens post-dam removal, while the Willow Creek to Bogus Creek reach does decrease in grain size slightly. The Cottonwood Creek to Willow Creek reach shows the greatest shift in grain size, but the Shasta to Cottonwood reach indicates no change in grain size. Given grain sizes for these reaches are not consistently (or significantly) trending downward, we find it dubious that the modeled return

period (for a Slight Mobilization event) would actually decrease, as predicted by Reclamation (2011) and the DEIS. Model results for the Significant Mobilization return period would have been far different, resulting in a longer return period likely only to be met during extreme flood conditions (i.e. 100-year floods).

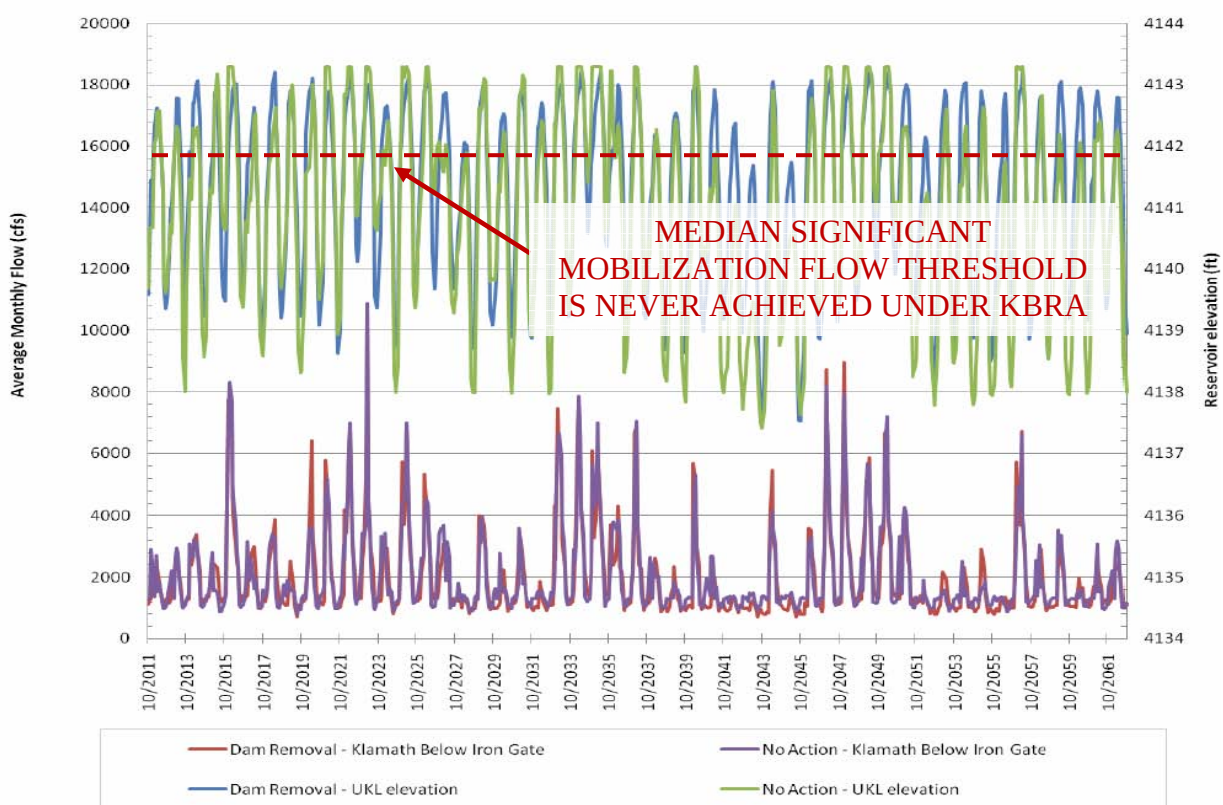


Figure 5. Modeled Iron Gate Discharge 2011-2061 contrasted with the median threshold (15,900 cfs) for Significant Bed Mobilization, which is never achieved. The low threshold for Significant Bed Mobilization (11,500 cfs) and the median threshold for Slight Bed Mobilization (9,800 cfs) is met only once in the fifty year forecast. Adapted from Reclamation (2011).

D. <u>The Alternatives Analysis Is Inadequate Because It Fails To Evaluate A No-KBRA Alternative</u>.

The EIS must evaluate an alternative of full Facilities Removal without execution or implementation of the KBRA. The omission of a Facilities Removal/No-KBRA alternative in the EIS renders it out of compliance with NEPA, because the No-KBRA alternative is both feasible and would be the alternative most likely to result in restoration of the fishery. Under this scenario, Klamath Hydroelectric Project dams would be removed, but diversions to the Klamath Reclamation Project would continue to be managed under currently applicable laws, such as the ESA, without the guaranteed diversions prescribed by the KBRA. The purpose of volitional

passage and a free flowing river would be achieved and the flows would continue to be managed for the fish first, and irrigation second.

It is clear that the failure to analyze a No-KBRA alternative violates NEPA and CEQA requirements. The No-KBRA is both a reasonable and a feasible alternative. The Department's own analysis concedes that the No-KBRA alternative would (i) remove dams to allow the river to flow freely; (ii) provide for full volitional fish passage; (iii) provide access to more of the watershed; (iv) create a free-flowing river, which would reduce quality concerns within existing reservoirs; and (v) is technically feasible. Final Alternatives Report, Section 4.2.8.

The DEIS contends that it is reasonable to not evaluate the no-KBRA alternative because that alternative "does not meet the purpose and need under NEPA." But, as stated above, it is improper to tie the KBRA to dam removal. The purpose of the EIS evaluation is to determine what is best for the fish and the health of the river. Agricultural subsidies and guaranteed irrigation diversions have little to do with that analysis. Also, the failure to evaluate a no-KBRA alternative deprives the decision-makers and the public of the information needed to determine if the no-KBRA alternative would better achieve the fishery and river-restoration goals, and without the need for $1 billion in subsidies, fundamental changes in existing law, and termination of tribal trust interests. The need to evaluate a no-KBRA alternative is especially important in light of the fact that the KBRA and KHSA require Congressional authorizations. Evaluation in this EIS of dam removal without the KBRA and its associated problems would assist the decision-makers in determining the best course of action.

E. <u>The Alternatives Analysis is Inadequate Because It Fails to Evaluate a Federal Takeover Alternative</u>.

The EIS must evaluate an alternative in which the Secretary does not render a Determination pursuant to the terms of the KHSA, but rather exercises authority to takeover the Klamath Hydroelectric Project pursuant to Section 14 of the Federal Power Act, 16 U.S.C. § 807 and/or supplemental Congressional authorization. Like the dam removal/no-KBRA alternative, this alternative would achieve the goals of volitional fish passage, improved water quality, and a free-flowing river without the harmful consequences and expense of the KBRA. The Final Alternatives Report, Section 4.2.13, contends that the Federal Takeover alternative is not superior to the Proposed Action because dam removal would occur on generally the same time-frame under both alternatives. There is no support for this statement. The KHSA artificially delays commencement of dam removal until 2020 or later solely to benefit the private hydropower licensee that has been operating on the terms of an expired 1950's era-license since 2006. There is simply no justifiable basis to allow PacifiCorp to continue its unmitigated operation of the Klamath Project for another decade. A federal takeover alternative, similar to that successfully implemented on the Lower Elwha River in Washington State, could disregard the KHSA terms solely designed to benefit the private licensee and commence dam removal years earlier for the benefit of the river and its resources.

F. The Alternatives Analysis Is Inadequate Because It Fails to Evaluate, or Even Consider Evaluation of the Water Quality Improvement Strategy Alternative Recommended by the Tribe in Scoping, or Any Alternative That Will Ensure Compliance With Hoopa Valley Tribe Water Quality Standards.

In its July 2010 scoping comments, the Tribe recommended evaluation of a Dam Removal/Water Quality Improvement Strategy alternative that would replace the KBRA measures with an alternative approach consisting of refilling Lower Klamath Lake using Lost River winter water, somewhat expanding the footprint of Tule Lake, and restoring riparian zones along the entire lower Lost River and Keno Reach of the Klamath River. The Tribe's scoping comments referenced the Klamath Basin Tribal Water Quality Work Group comments on the Klamath River TMDL, found at http://www.schlosserlawfiles.com/~hoopa/LostRiverTMDL.pdf. The DEIS fails to address this proposed alternative or provide any explanation for why it was not evaluated.

The DEIS, as drafted, fails to evaluate any alternative that will result in full compliance with Hoopa Valley Tribe water quality standards. Section 3.2 notes the existence of applicable water quality standards enacted by the Hoopa Valley Tribe, but fails to adequately address whether the Proposed Action of dam removal with associated implementation of KBRA flows, (or some other alternative) will ensure compliance with the tribal standards. We attach an explanation, Patrick Higgins, "KHSA and KBRA Likelihood of Meeting Hoopa Valley Tribe Klamath River Water Quality Standards" (October 6, 2011), which details this problem. In fact, certain statements in the EIS confirm that the Proposed Action will continue to result in violations of Hoopa standards. *See* page 3.2-103 (stating that Total Nitrogen (TN) levels will continue to exceed Hoopa objectives).

G. The Alternatives Analysis Is Inadequate Because It Fails to Evaluate Any Alternatives to the KBRA.

The proposed action assumes that the KBRA will be executed and implemented. The proposed action assumes that the KBRA is an interdependent component of a comprehensive program to restore the Klamath River. Yet, in addition to failing to consider an alternative in which dams are removed without the KBRA, the DEIS also fails to consider or evaluate any substantive alternatives to the KBRA. The execution of the KBRA, as argued throughout these comments, is a major federal action with significant known environmental impacts. The failure to fully evaluate the impacts of, and alternatives to, the KBRA is a violation of NEPA.

Assertions that the impacts of the KBRA will be evaluated at a later time are incorrect given the non-discretionary nature of many of those programs, such as the diversion guarantees. In addition, the proposed legislation attached as an Exhibit to the KBRA and KHSA would exempt the KBRA execution from NEPA review. Of course, that legislation has not been enacted and thus the Department has a currently binding obligation to review the KBRA under NEPA. The public, Congress, and decision-makers in the Department must receive the benefit of a thorough alternatives analysis which considers the pros and cons of the KBRA and whether there are alternative approaches that would achieve the river restoration goals with less impact.

IV. The EIS Fails to Evaluate the Impacts of the Proposals for Legislation, Which Are An Express Prerequisite of the KBRA and KHSA.

NEPA requires that federal agencies prepare an environmental impact statement for "every recommendation or report on proposals for legislation . . . significantly affecting the quality of the human environment." 42 U.S.C. § 4332(C). In this case, the action being analyzed is specifically tied to and dependent upon enactment of federal legislation containing specific elements proposed by the Department and other parties to the KHSA and KBRA. Pursuant to Section 3.3.4 of the KHSA, the Secretary will be barred from rendering any determination on dam removal unless Congress first enacts "federal legislation, which . . . is materially consistent with Appendix E [of the KHSA]." Appendix E of the KHSA is entitled "Elements for the Proposed Federal Legislation" and contains a detailed list of specific proposed elements for legislation related to both the KBRA and the KHSA. Even if the Secretary determines that dam removal is clearly in the public interest, will restore fisheries, and provide for a free-flowing river, the Secretary cannot, consistent with the KHSA, make any public determination about the benefits of dam removal unless the proposed legislation is enacted.

There are significant environmental consequences that will flow from the enactment of the KHSA and especially the KBRA that require complete analysis in the EIS. Of most significance are the effects associated with the guaranteed minimum diversions of the KBRA, the impacts of the $1 billion in subsidies that encourage unsustainable agricultural practices, impacts on the Trinity River Restoration Program, and the historic termination of tribal trust rights. Given that the enactment of the proposed legislation is a direct prerequisite to the Secretary's determination in this proceeding, the EIS must fully evaluate the impacts associated with the proposals for legislation that would authorize implementation of the KHSA and KBRA.

The proposed legislation, and execution of the KBRA, would also undermine enforcement and compliance with the Endangered Species Act. Although the EIS repeatedly states that the KBRA programs, and the irrigation diversions by the Klamath Reclamation Project, would need to comply with the ESA, this is clearly inconsistent with the text of the KBRA, which is designed to constrain NMFS and USFWS ability to protect threatened and endangered species. *See* KBRA, Sections 21.3.1 and 22.4. The objective of the parties under the KBRA is that reductions in flows to irrigators below those prescribed in the KBRA "will be a last and temporary resort to prevent jeopardy under the [ESA]." KBRA, § 21.3.1.B.ii.c. This objective is plainly inconsistent with the science (which shows flow to be the most significant factor affecting fish health) and the law (which mandates that the agencies protect endangered and threatened species based on the best available science).

Since Congress is not limited by the terms of the KBRA and KHSA, an EIS that accurately and completely describes and evaluates the full suite of reasonable and feasible alternatives, including a dam removal/no-KBRA alternative and a federal takeover and decommissioning alternative, is critical.

V. The DEIS Fails To Adequately Evaluate and Disclose the Impacts of the KBRA, and Overstates Its Potential Benefits, Precluding Informed Public Participation and Decision-Making.

The DEIS states that the KBRA is a connected action requiring analysis under NEPA. It is true that the KHSA and KBRA have been drafted as interdependent components of a larger plan relating to Klamath Basin restoration. Although the DEIS states that the KBRA is a connected action, the DEIS then fails to adequately describe or evaluate its impacts. Even if the KBRA is evaluated at a more general, programmatic, level, the EIS still must evaluate those aspects of the KBRA that have known or foreseeable impacts, in addition to any components that will not be evaluated under NEPA in the future. Describing the KBRA as "programmatic" does not excuse the Department from actually evaluating the known impacts of the KBRA that are ripe for evaluation.

Some of the key elements of the KBRA that are not adequately described and evaluated are the minimum guaranteed water diversions, the potential impacts on the Trinity River Restoration Program, and the unconsented subordination and waiver of trust obligations relating to tribal water rights. There will not be any future NEPA analysis of the impacts of the guaranteed water diversions because implementation of those diversions will be non-discretionary; therefore, a full analysis must occur now prior to approval and execution of the KBRA. The DEIS also improperly assumes that the various fisheries restoration and other programs are likely to occur when, in fact, those programs depend entirely on funding from Congress that is unlikely to materialize. In summary, the impacts of the KBRA are either not evaluated or minimized, while the benefits of the KBRA are made to appear more certain than they actually are. The public and decision-makers need to be made aware that approval of the KBRA could result in a scenario in which dam removal occurs, but there is insufficient water left in the river for fish to survive and the promised programs for fisheries fail to materialize.

Due to the need for substantial Congressional appropriations, the purported benefits of the KBRA are highly speculative, especially in today's political climate. The DEIS fails to adequately discuss the likely scenario in which the purported benefits from the KBRA are not achieved due to lack of Congressional funding. The KHSA and KBRA were signed in early 2010 and their implementation expressly depends on the enactment of federal legislation. Yet, we now approach the end of 2011 with no legislation. With good reason, there simply is not support from members of Congress to propose spending nearly $1 billion on needless subsidies for unsustainable agricultural practices. Nor is there support in Congress to advance legislation that unilaterally terminates Indian trust obligations. The DEIS needs to more fully explain that the purported environmental benefits of the KBRA are highly speculative and may not ever occur to offset the impacts of the guaranteed diversions for irrigation.

Even if funding does occur, the DEIS fails to adequately explain that the KBRA does not contain any fish restoration goals. It establishes no target salmon sizes or harvest goals. The KBRA simply calls for funding without any definition of success. The failure to connect the funding to any defined performance measures is likely another obstacle to obtaining Congressional funding in the current economic and political environment.

Numerous sections of the EIS require additional comprehensive discussion of the impacts of the KBRA on water, aquatic resources, and tribal trust rights, especially including Sections 3.2 (water quality), 3.8 (water supply/water rights), 3.12 (tribal trust) and 3.16 (environmental justice). These sections fail to openly disclose the negative consequences that will result from the KBRA's guaranteed minimum diversions and un-consented subordination of tribal trust rights, presenting only a one-sided view of the KBRA to the public and decision-makers.

VI. The DEIS Fails To Disclose That Execution and Implementation of the KBRA Would Result in a Historic Termination of the United States Trust Relationship With Klamath Basin Indian Tribes With Respect to Protection of Reserved Water and Fishing Rights and Would Unlawfully Result in an Un-consented Subordination of Senior Tribal Water Rights to Junior Water Rights of Non-Indian Irrigators.

In the KBRA, the United States provides assurances, without the consent or approval of the Hoopa Valley Tribe, that the United States will not assert the Hoopa Valley Tribe's tribal water, fishing, or trust rights, in a manner that will interfere with the Klamath Reclamation Project's annual diversion of 330,000 acre-feet of water from the Klamath River (the "Assurances"). These Assurances in favor of the Klamath Reclamation Project, once effective, are permanent regardless of: (a) whether federal appropriations are provided for anticipated fishery restoration and reintroduction programs; (b) the success or failure of anticipated fishery restoration and water quality improvement efforts; (c) future effects of climate change, or other environmental conditions, on water quality and quantity in the Klamath River; (d) the future fishery harvest needs of the Hoopa Valley Tribe; or (e) other unknown or unforeseeable events.

The Assurances in the KBRA effectively terminate most of the United States' fiduciary obligations to the Hoopa Valley Tribe by permanently subordinating the Tribe's senior water and fishing rights in the Klamath River to junior non-Indian irrigation interests in the Upper Klamath Basin, regardless of future impacts on tribal trust resources, and without the consent or approval of the Hoopa Valley Tribe. The Assurances become permanent if the Klamath dam facilities are removed pursuant to an Affirmative Secretarial Determination.

Although this issue has been a highly publicized area of controversy, the Draft EIS fails to mention it. Section 3.12 purports to discuss impacts on tribal trust resources. Yet, that section says nothing about the fact that the United States, in the KBRA, has agreed to subordinate tribal water rights to junior irrigation interests. Section 3.12 asserts that the Hoopa Valley Tribe will be eligible for KBRA funding "upon becoming a party" but fails to mention that the Tribe would be required to enact claim waivers and take other acts inconsistent with its trust resources in order to obtain those "benefits." The DEIS fails to mention that the Tribal Council of the Hoopa Valley Tribe enacted a resolution in February 2010 that finds in relevant part:

> WHEREAS: The Assurances in the *Klamath Basin Restoration Agreement* effectively terminate the United States' fiduciary obligation to the Hoopa Valley Tribe by permanently subordinating the Hoopa Valley Tribe's senior water and fishing rights in the Klamath River to junior non-Indian irrigation interests in the Upper Klamath Basin, regardless of future impacts on tribal trust resources, and without the consent or approval of the Hoopa Valley Tribe; and

> WHEREAS: The Assurances in the *Klamath Basin Restoration Agreement* conflict with the National Congress of American Indians (NCAI) Resolution #PSP-09-051 (October 2009), and Affiliated Tribes of Northwest Indians (ATNI) Resolution #09-63 (September 2009) in which the NCAI and ATNI each resolved to oppose "any policy of the United States to terminate the rights of, or impose adverse consequences upon, a tribe that chooses to retain its water rights instead of settling on terms desired by the federal government"; and
>
> WHEREAS: The *Klamath Basin Restoration Agreement* requires the Hoopa Valley Tribe, as a condition of the Tribe's participation and receipt of funding and benefits in the Agreement, to relinquish and release claims against the United States relating to water management in the Klamath Basin and associated impacts on Hoopa Tribe water, fishing, and trust rights; and . . .
>
> WHEREAS: The *Klamath Basin Restoration Agreement* thus conflicts with tribal sovereignty, violates trust duties owed to the Hoopa Valley Tribe by the United States; subordinates tribal water and fishing rights in favor of junior non-Indian irrigation interests without tribal consent; provides inadequate flows for the protection of tribal trust resources; offers a speculative and unfunded program for fishery restoration and water conservation; encourages unsustainable use of groundwater in the Upper Klamath Basin; and is not based on the best available, peer reviewed science; and . . .
>
> NOW, THEREFORE BE IT RESOLVED: The Hoopa Valley Tribal Council, acting under its sovereign authority on behalf of the Hoopa Valley Tribe, hereby rejects, opposes, and disapproves of the *Klamath Basin Restoration Agreement* and the *Klamath Hydroelectric Settlement Agreement* . . . .

If the priority given by the KBRA to Klamath River surface diversions has the effect of preventing fish restoration (which is likely), the United States will not only be unable to protect Indian fishing rights under the terms of the KBRA, but it will be legally required to defend the irrigation interests against the tribes and trust resources. In other words, the United States would be enforcing the priority for water diversions even if that leaves too little water to restore the fish on which the Indian tribes rely. By contrast, under existing law "Reclamation is obligated to ensure that project operations not interfere with the Tribes' senior water rights. This is dictated by the doctrine of prior appropriation as well as Reclamation's trust responsibility to protect tribal trust resources. . . . Reclamation must, pursuant to its trust responsibility and consistent with its other legal obligations, prevent activities under its control that would adversely affect [the Tribes' fishing] rights." Memorandum of Regional Solicitor (July 25, 1995). The KBRA would preclude the trustee United States from preventing such adverse effects to tribal trust resources. The KBRA changes the tribal right (enforceable by the federal trustee) from a right to sufficient water to produce the fish on which the Tribes rely, into a right to water left over after diversion per Appendix E-1 of the KBRA, regardless of what the habitat results may be. The effect is thus similar to termination provisions such as the one for the Klamath Tribes of Oregon, which provided "statutes of the United States which affect Indians because of their status as Indians shall no longer be applicable to the members of the Tribes." 25 U.S.C. § 564q(a). The

KBRA will abridge the Government-to-Government relationship between the United States and the Hoopa Valley Tribe.

In the DEIS, the public and decision-makers learn nothing about the impacts on Hoopa Valley Tribe's trust rights and resources. The Executive Summary asserts that there are no impacts to tribal trust flowing from the Proposed Action. This is patently false. The DEIS simply accentuates the "positives" in order to promote the KBRA and KHSA in accordance with the interests of the Department, while setting aside the anticipated termination and subordination of tribal trust rights. This also implicates environmental justice impacts. The failure to properly and fully disclose the impacts to the Tribe's rights results in an unlawfully deficient EIS.

VII. Conclusion.

The Tribe supports dam removal; however, the linkage of dam removal to the KBRA will result in non-achievement of the desired fish restoration goals. Thus, the Tribe requests that the EIS evaluate alternatives that do not include execution and implementation of the KBRA. We thank you for your consideration to these comments. We will continue to work with the Department to achieve a solution that will protect the Trinity River, restore the Klamath fishery, remove the dams of the Klamath Hydroelectric Project, and preserve Hoopa water and fishing rights.

Sincerely,

HOOPA VALLEY TRIBAL COUNCIL

Leonard E. Masten, Jr., Chairman

**Work Cited**

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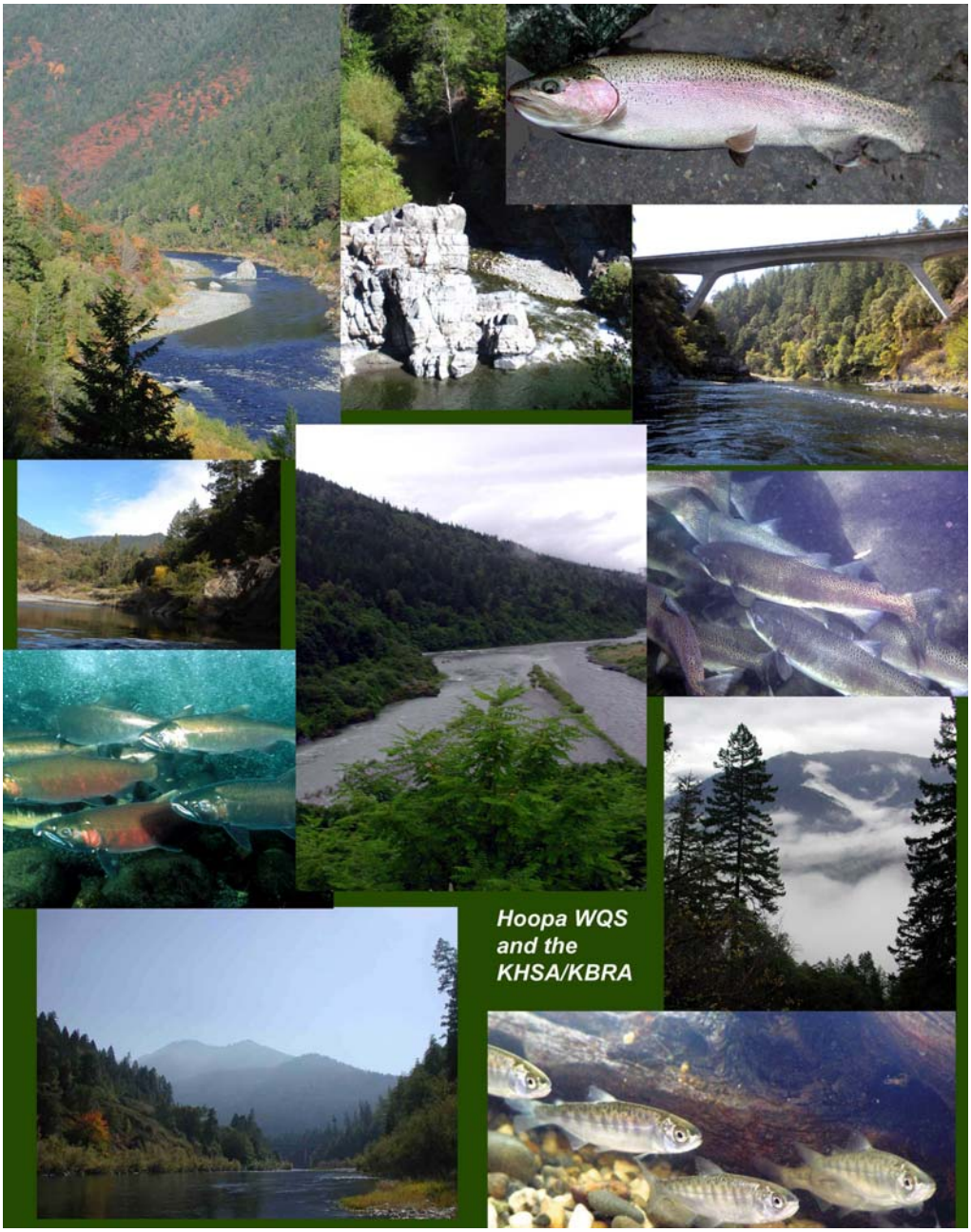
# KHSA and KBRA Likelihood of Meeting Hoopa Valley Tribe Klamath River Water Quality Standards

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**Consulting Fisheries Biologist**

Prepared for**:**
**Hoopa Tribal Environmental Quality Agency**

October 6, 2011

## Table of Contents

## Foreword

The purpose of this report is to provide the following information for the Hoopa Tribal Environmental Protection Agency (TEPA) in response to their request:

- Provide a clear over view of whether water quality management under the Klamath Hydropower Settlement Agreement (KHSA) and Klamath Basin Restoration Agreement (KBRA will attain Hoopa Valley Tribe (2008) Klamath River Water Quality Standards (WQS),

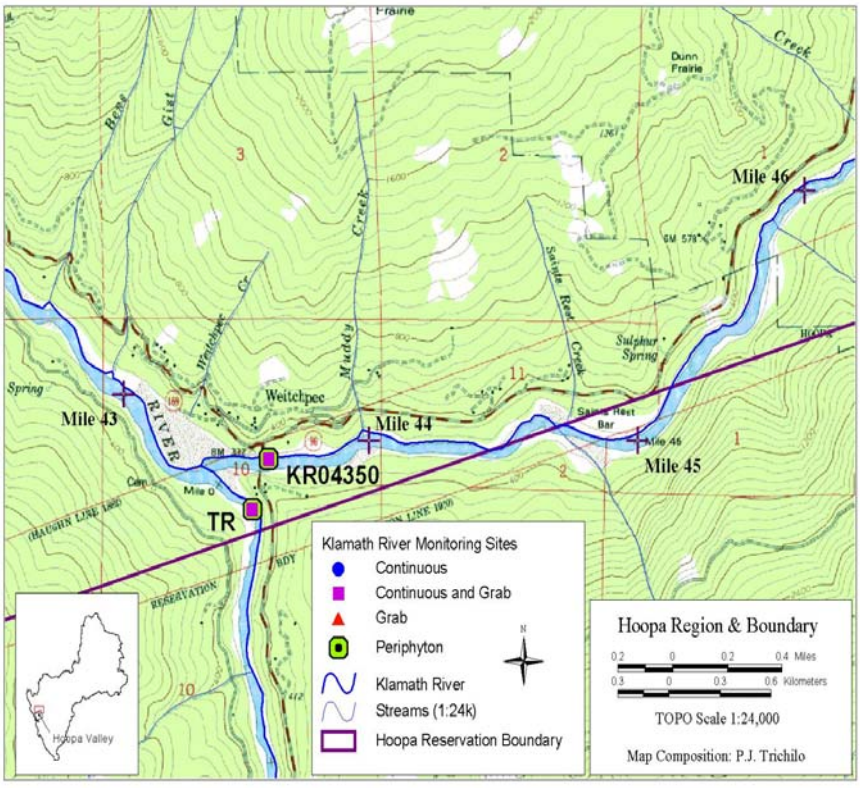
- Provide recommendations for exercising the Hoopa Valley Tribe's WQS authority under the KHSA/KBRA water quality management process, and

- Identify options other than the KHSA/KBRA for the Hoopa Valley Tribe that achieve dam removal.

These are section headers in the report below, but sections on the origin of the KHSA/KBRA and using ecological restoration to attain Hoopa WQS are also included.

The Hoopa Indian Reservation includes a segment of the mainstem Klamath River just upstream of its confluence with the Trinity River (Figure 1 at right).

Hoopa Valley Tribe water quality authority that allows them to create water quality standards (WQS) for the Klamath River is based on U.S. EPA (2002) approval.



## Origin of the KHSA and KBRA

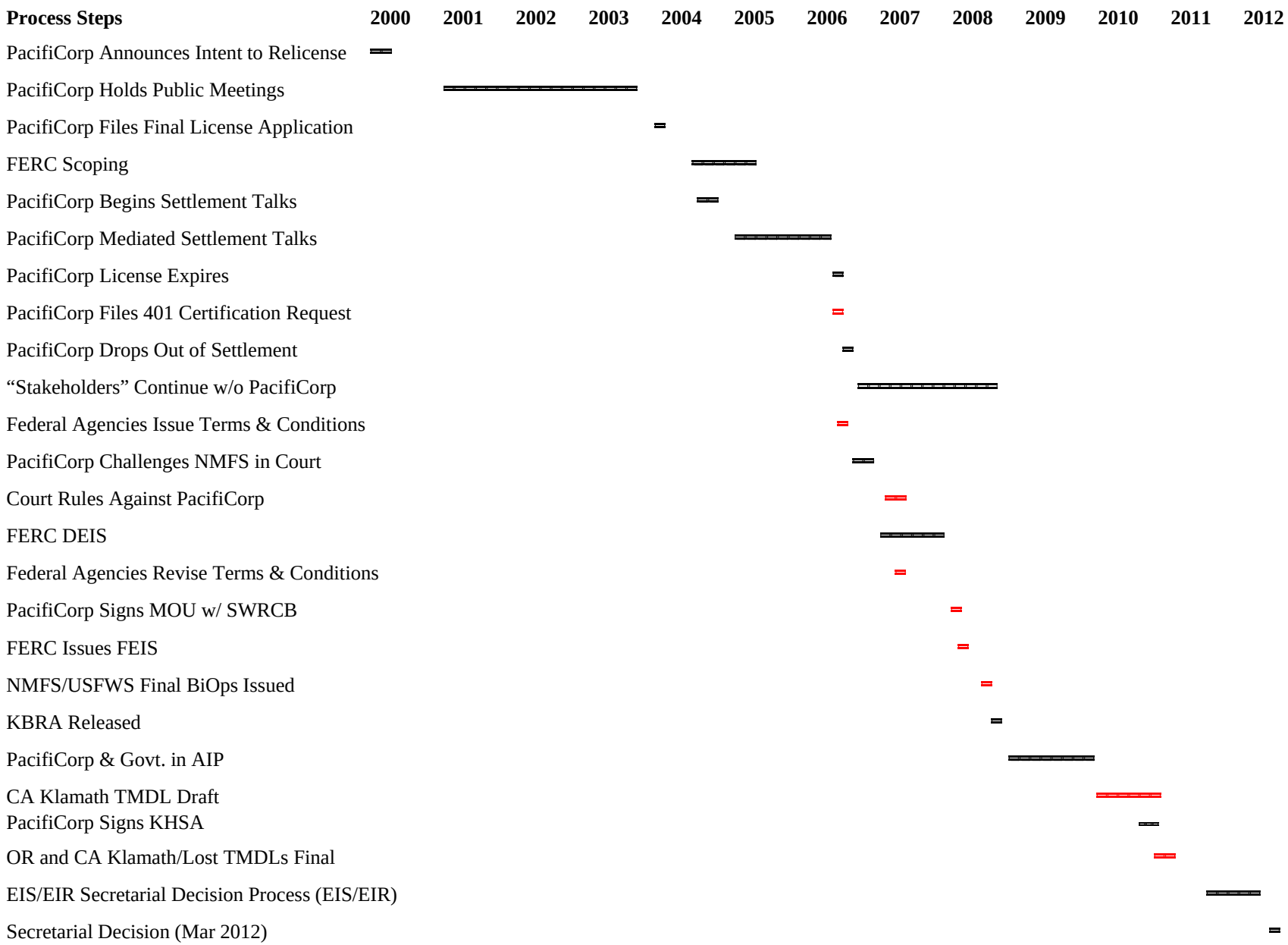
The KHSA is a negotiated settlement in lieu of following the Federal Energy Regulatory Commission (FERC, 2007) relicensing process for the Klamath Hydroelectric Project (KHP) (FERC #P-2082). The KHP is owned and operated by PacifiCorp and the company has pursued settlement because the outlook of their relicensing process did not look favorable (Brockbank 2010). The deposition of PacifiCorp Executive Vice President Dean Brockbank (2010) supplies much of the information in this section about the chronology of settlement talks (see also Alternatives for KHP Dam Removal).

PacifiCorp first announced its intention to relicense the KHP in December 2000 and held a series of public meetings before filing its Final License Application in February 2004. Table 1 provides a time line that chronicles steps in relicensing, other processes that have bearing on relicensing (i.e., 401 certification) and KHSA and KBRA development. Red highlights in the table indicate unfavorable components of relicensing of the KHP from PacifiCorp's perspective. In particular, PacifiCorp was apprehensive about obtaining necessary State water quality certification (SWRCB 2007) and the cost of fish passage facilities for Pacific salmon species mandated by the National Marine Fisheries Service (NMFS 2006).

PacifiCorp began informal settlement talks in October 2004 that became a "mediated" settlement in January 2005. The settlement process took over five years to complete and ironically PacifiCorp dropped out of talks in mid-2006 as other "stakeholders" crafted the KBRA. The Energy Policy Act of 2005 (Public Law 109-58) allowed entry into settlement at any time within the licensing process for PacifiCorp. This new law also allowed PacifiCorp to challenge NMFS' authority to require KHP fish passage but their challenge was rejected by an administrative law judge (McKenna, 2006). PacifiCorp's KHP license expired on March 1, 2006 and FERC has been issuing 1 year extensions since. The company reengaged with state and federal agencies regarding potential decommissioning through an Agreement in Principal (AIP) in July 2008 (CA, OR, USDOI and PacifiCorp 2008) that was superseded by their signing the KHSA in February 2010. PacifiCorp is not a signatory to the KBRA, but all Parties signing the KBRA also signed the KHSA.

The creation of the KBRA involved dozens of meetings spanning several years, all behind closed doors with participants bound by a confidentiality agreement. Although the process involved several counties, Tribes, environmental organizations and government agencies, key participants were excluded from participation, including Del Norte County and the federally recognized Resighini Rancheria and the Quartz Valley Indian Reservation. The Hoopa Valley Tribe participated in the Settlement, but declined to sign the final KBRA or KHSA because they would require giving up water rights and the ability to take legal action to abate water quality problems to protect fisheries (KBRA 15.3.9). The KBRA and KHSA are arcane documents written by lawyers with tedious cross references and a myriad of contradictions. Ultimately important decisions regarding public trust and Indian Treaty Rights and Trust responsibilities are embodied in these documents that were made out of public view and excluded legitimate stakeholders.

## Table 1. Time Line for Klamath Settlement Process



In April 2007 during the Settlement that preceded the KBRA, Klamath Project irrigators made an ultimatum with regard to their continuing participation; any Settlement would have to include farming in the Lease Lands of Tule Lake and Lower Klamath National Wildlife Refuges. Oregon Water Watch (OWW 2010) and Oregon Wild (OW) were expelled from Settlement talks because they would not agree to this condition. Talks continued without OWW and OW, but their expulsion sent a clear message and restricted subsequent consideration of viable ecological restoration options under the KBRA.

Although the KBRA is separate from the KHSA and deals with issues largely unrelated to KHP relicensing, the agreements are intertwined due to KBRA (7.2.1 C) and KHSA (8.1) "severability" clauses that state that neither can be implemented separately. Therefore, both the KHSA and KBRA are discussed below with regard prospects of meeting Hoopa TEPA (2008) WQS. The *Klamath River and Lost River Total Maximum Daily Load (TMDL)* (NCRWQCB 2010) and *Upper Klamath and Lost River TMDL and Water Quality Management Plan* (ODEQ 2010) are integral to improving water quality, so their potential to improve conditions is also considered.

## KHSA and KBRA Actions Insufficient to Meet Hoopa TEPA WQS

The KHSA has to do with dam decommissioning and pollution associated with KHP operation while the KBRA would deal with fishery restoration and potential remediation of water quality problems. Both the KHSA and KBRA will require federal authorizing legislation, including $1 billion or more in funding. Legislation has not been passed. Pollution associated with KHP dam operation will continue under the KHSA until 2020, but there is also a question as to whether measures taken under the KBRA after dam removal will be sufficient to abate nutrient pollution and meet Hoopa TEPA (2008) WQS. Interim Measures to abate water quality problems under the KHSA are pertinent to the Klamath River TMDLs and are discussed in that section below. Table 2 lists beneficial uses recognized by the NCRWQCB (2007) *Basin Plan* and Hoopa TEPA (2008) and their likelihood of being met under the KBRA/KHSA before and after 2020.

**Table 2. Likelihood of meeting Klamath River beneficial uses under the North Coast Basin Plan (NCRWQCB 2007) or Hoopa TEPA (2008) WQS before and after 2020 under the KBRA/KHSA. Green indicates beneficial uses are restored and red indicates that they are not.**

| Beneficial Use | Key | Before 2020 | After 2020 |
|---|---|---|---|
| COLD | Cold freshwater habitat | | |
| SPAWN | Fish spawning | | |
| MIGRATION | Fish migration | | |
| RARE | ESA and CESA Fish | | |
| COMM | Commercial & Sport Fishing | | |
| FISH | Subsistence Fishing | | |
| CUL | Cultural Use | | |
| REC-1 | Recreational Contact | | |
| REC-2 | Recreational Boating | | |

***KHSA***

The KHSA does not directly call for KHP dam removal but rather sets up a March 2012 Secretary of Interior Decision as to whether decommissioning is in the public interest and will benefit the environment, including Klamath River native fish species. A major effect of the KHSA is to delay the 401 processes of California (PacifiCorp 2008, SWRCB 2008) and Oregon that had the potential to force expeditious dam decommissioning (Brockbank 2010), if either State withheld certification. The serious nuisances caused by KHP reservoirs is justification for swift dam removal (SWRCB 2007), but instead under the KHSA the project will operate until 2020 on a year to year extension of its 1956 FERC license (Brockbank 2010). Numerous problems have been identified with regard to KHP operation that lead to major negative impacts on salmonids and other beneficial uses (Hoopa TEPA 2008), and to a large extent these cannot be mitigated without dam removal (SWRCB 2007, FERC 2007).

Fish Passage: Fish passage for anadromous species is considered as part of the COLD beneficial use according to the SWRCB (2007), and migration for Pacific salmon species (MIGR) will continue to be blocked until at least 2020 under the KHSA and KBRA (see Alternatives for Dam Removal). Coho salmon that are affected by the KHP are listed as Threatened under the federal Endangered Species Act (ESA); therefore, the RARE beneficial use is also compromised. The impediment to migration also continues to compromise the commercial and sport fishing beneficial use (COMM) and tribal subsistence fisheries (FISH).

Thermal Problems Created by Iron Gate Reservoir: The mass of water within Iron Gate Reservoir creates thermal problems that delay Chinook salmon spawning (SPAWN) in fall and impair juvenile rearing conditions (COLD) in spring. This will continue until drawdown of the reservoir or Iron Gate Dam removal. Klamath River fall temperatures remain above suitable for spawning three weeks later than if the river were free flowing (Figure 4). The KBRA Chinook Expert Panel (Goodman et al. 2011) noted high "pre-spawning mortality documented in the mainstem river may be related to high water temperature and moderately low dissolved oxygen", which are both side effects of reservoir operation. Increased fall water temperatures and associated stress are also likely to reduce fecundity. Fry from eggs laid later in the season emerge later in spring and their growth is then suppressed by artificially depressed Klamath River temperatures. Smaller fry migrate more slowly as the Klamath River water temperature rises and water quality becomes adverse. With their resistance compromised by water quality related stress, these fish also face much greater exposure to the disease organisms (see below). The thermal lag at Iron Gate appears to have shifted spawn timing of fall Chinook later and the losses of juveniles are sometimes in the hundreds of thousands (USFW 2001, Nicholas and Foott 2005). While temperature effects of Iron Gate Reservoir do not extend downstream to the Hoopa Reservation, maintaining Iron Gate Dam through 2020 leads to unacceptably high risk to the Klamath River fall Chinook population. Continued depressed Chinook populations blocks attainment of commercial and sport fishing (COMM) and tribal subsistence fishing (FISH) beneficial uses.

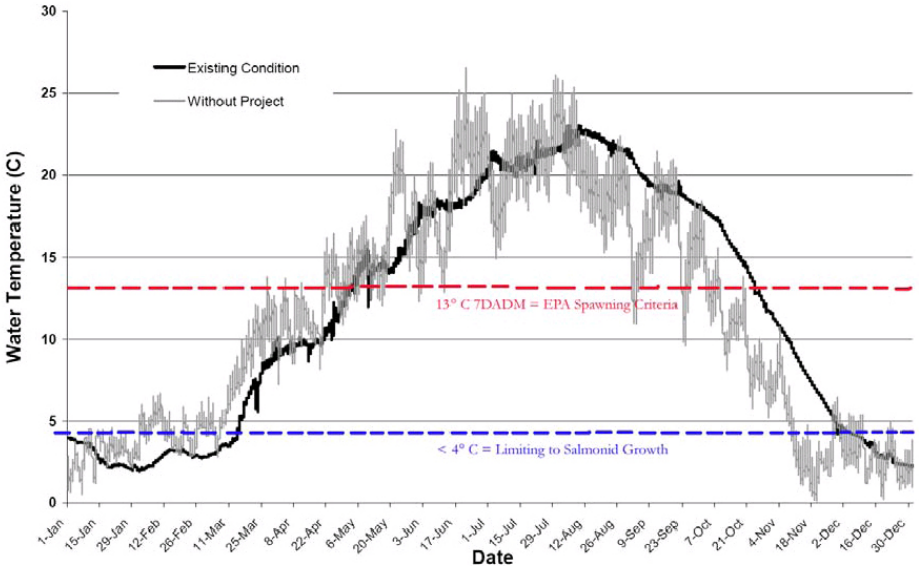



**Figure 2. Temperatures below Iron Gate Dam (bold) versus without dam scenario (grey). Warmer fall temperatures create a three week lag for suitability of spawn timing and rearing temperatures remain below optimal for a month. Reference thresholds from U.S. EPA (2003).**

Fish Disease Cycles: One of the main impediments to restoring COLD, COMM, RARE and FISH beneficial uses of Pacific salmon in the Klamath River, particularly Chinook salmon and coho salmon, is the extremely high prevalence of disease organisms below Iron Gate Dam (Foott et al. 2003, Stocking and Bartholomew 2004, Nichols and Foott 2005, Nichols and True 2007, Nichols et al. 2008, Bartholomew 2008, Stocking et al 2006, Stone et al. 2007). Two myxozoan disease organisms, *Ceratomyxa shasta and Parvicapsula minibicornis*, are endemic to the Klamath River and the Pacific salmon species have co-evolved with them and have developed substantial resistance. However, nutrient enrichment from the Upper Klamath Basin and from within Iron Gate Reservoir sets up conditions that cause extraordinarily high production of disease organisms that can overwhelm otherwise healthy fish (Nichols and Foott 2005).

The green algae species *Cladophora* is recognized as an indicator of nutrient pollution and there are areas below Iron Gate Dame where this species is dominant (Stocking et al. 2006). A polychaete worm, *Manayunkia speciosa*, which thrives in Cladophora beds also serves as an intermediate host for the deadly diseases. Fall Chinook spawning is concentrated below Iron Gate Dam and adults carry myxospores that cause a vicious cycle as *M. speciosa* captures them and then releases actinospores when Chinook juveniles are migrating downstream (Stocking et al. 2006, Bartholomew 2008). Stocking et al. (2006) concluded that actinospores remain viable during the 5 days required for water to pass from Iron Gate Dam to the Klamath estuary. Therefore, it is likely that disease problems will continue for fish migrating through the Hoopa Reservation portions of the Klamath River until at least 2020. Disease effects can extend downstream of the Trinity River and there indications of major impacts to juvenile Chinook from that river (Figure 3); therefore, Hoopa Valley Tribe Trinity River fish harvest is also directly impacted.

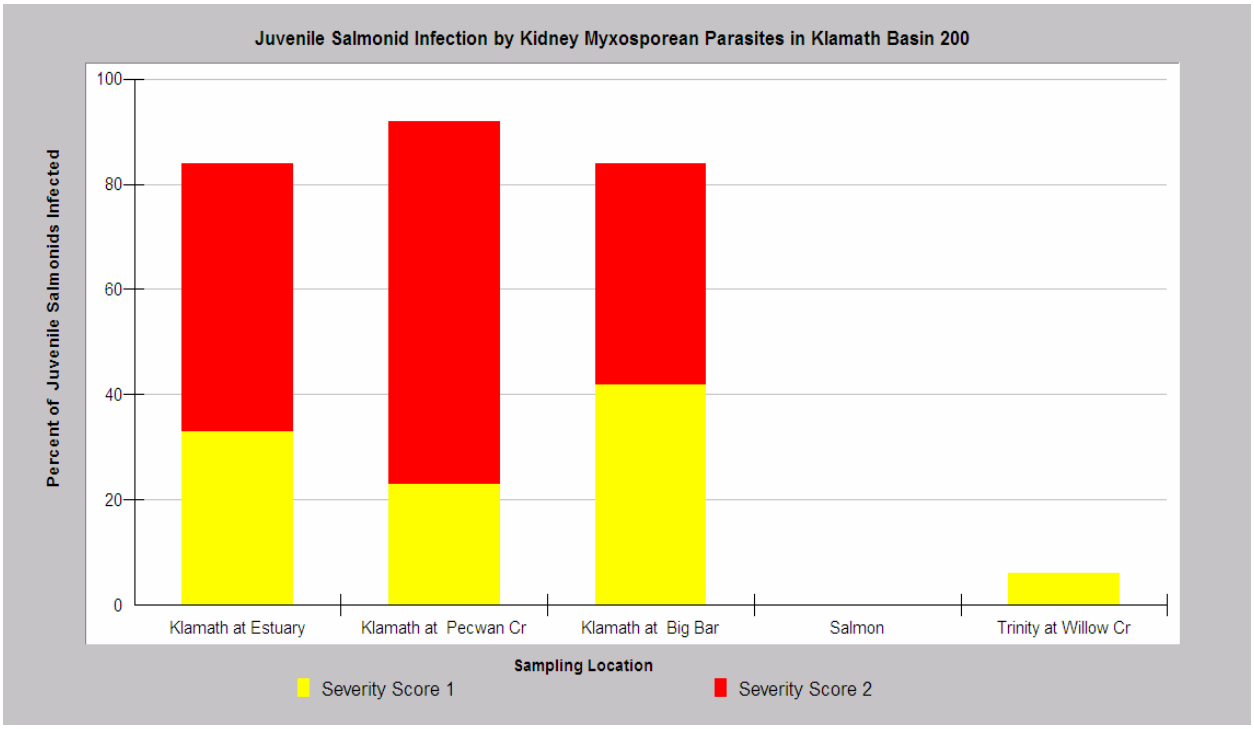



**Figure 3. Chart shows the percentage of juvenile salmonids infected by kidney myxosporean parasites. High severity (2) score indicates likely mortality. While Trinity River infection is low, Pecwan and estuary high disease incidence suggests Trinity fish are becoming infected. Most of the juvenile salmonids sampled were Chinook salmon. Data from Foott et al. (2003).**

Water Quality Stress: Fish susceptibility to disease is a function of cumulative stress caused by multiple water quality factors (Hoopa TEPA 2008). In addition to temperature, impairment below Iron Gate Dam can include elevated pH, algal toxins and dissolved ammonia as well as depressed dissolved oxygen (D.O.), all of which are linked to KHP dam operation (SWRCB 2007, FERC 2007). These conditions will continue to cause impairment until at least 2020 as a result of KHP operation and lack of attainment of the COLD, FISH, COMM, and RARE beneficial uses. The manifestation of nutrient pollution and associated problems for fish health may remain after dam removal, but that prospect is more fully explored under the KBRA section below.

Toxic Algae: Kann (2006) found the toxic algae species *Microcystis aeruginosa* to be prevalent within Copco and Iron Gate reservoirs but in low abundance or absent from the outlet of Upper Klamath Lake to below J.C. Boyle Reservoir within the Klamath Project. The SWRCB (2007) points out that there is little chance for remediation of toxic algae in the lower two KHP reservoirs before 2020; therefore, NCRWQCB (2011) staff do not recommend PacifiCorp carry out Interim Measures within the reservoirs aimed at treating algae problems (see TMDL discussion).

Kann and Corum (2009) found evidence of *Microcystis* downstream at Orleans and samples from the Yurok Reservation indicate it is present downstream to the estuary (Yurok 2009). Kann (2008) also reported bioaccumulation of microcystin toxin in Iron Gate Hatchery Chinook salmon juveniles. Yellow perch from Copco and Iron Gate

Reservoirs and mussels downstream of the KHP had such high levels due to bioaccumulation that they would pose a human health risk, if consumed. Emerging epidemiological evidence suggests that the substance BMAA (beta-methylamino-L-alanine) that is prevalent in toxic blue-green algae species may be linked to neurological disorders, such as Amyotrophic Lateral Sclerosis (ALS) (Lou Gehrig's disease), Parkinson's disease and Alzheimer's disease (Caller et al. 2009). Impairment of Hoopa Reservation waters on the Klamath River from toxic algae will continue through at least 2020 with the recreational (REC-1) beneficial use compromised and ceremonial use (CUL) in certain seasons inadvisable.

Keno Reservoir Operation: The KHSA (7.5.4, 7.5.5) stipulates that the U.S. Bureau of Reclamation (BOR) will assume ownership of the Keno Reservoir and will continue to operate it in the same way that PacifiCorp has since 1968. Keno Reservoir has major problems with seasonal anoxia (Deas and Vaughn 2006, Sullivan et al. 2009, 2010) and riparian marsh restoration needed to combat this problem will, therefore, be prevented. Historically a lava bedrock sill at the location of Keno Dam caused the Klamath River to back up and form a vast connected wetland with Lower Klamath Lake. Diking off of wetlands and farming up to the margin of the reservoir has disrupted river processes that could otherwise assist with nutrient processing and reduction, similar to the findings of Bernot and Dodds (2005). Dredging of the reservoir to increase water storage capacity circa 1968 likely contributed to a decreased ability for ecological function and an increased propensity for anoxia.

Goodman et al. (2011) call attention to persistent problems of prolonged anoxia in Keno Reservoir (Figure 4) that they believe will not be alleviated under the KBRA. Figure 5 shows a map from PacifiCorp (2004) of riparian vegetation of the Keno Reservoir just above Keno Dam and Figure 6 is an aerial photo of the same area showing the pattern of land use. Continuing this land use and pattern of operation of Keno Reservoir under the KHSA will prevent improved ecosystem function by riparian marshes that could otherwise assist with clean up of nutrient pollution (Lytle 2000, Mayer 2005).

The ODEQ (2010) TMDL found that the suspended load from Upper Klamath Lake is a major driver of anoxia in Keno Reservoir; however, they also found the waste load from the Straits Drain to be a major source of pollution. ODEQ (2010) provided a schematic of flow diversions from the Klamath River and flow contributions to Keno Reservoir (Figure 7). Waste water from the Klamath Straits Drain in August 2002 constituted 48% of flows to the reservoir, which is similar to NRC (2004) findings. The Lost River and Tule Lake were originally a sink and did not discharge into the Klamath River; therefore, the high level of nutrients contributed by them today help push the river past the tipping point where ecosystem processes are insufficient for the river to clean itself. This results not only in anoxia within the Keno Reservoir but also in very adverse water quality impacts in the lower Klamath River.

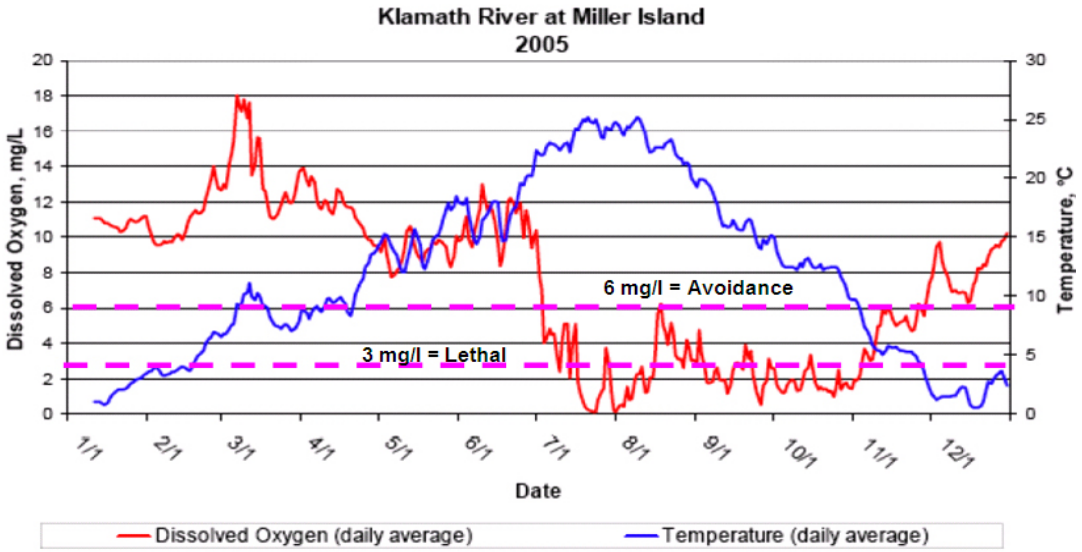



**Figure 4. This chart shows fluctuations of water temperature and dissolved oxygen in Keno Reservoir in 2005 with lethal levels extending from July through October. Taken from Goode et al. 2011 where it appears as Figure 4. Threshold reference annotations added based on WDOE (2002).**

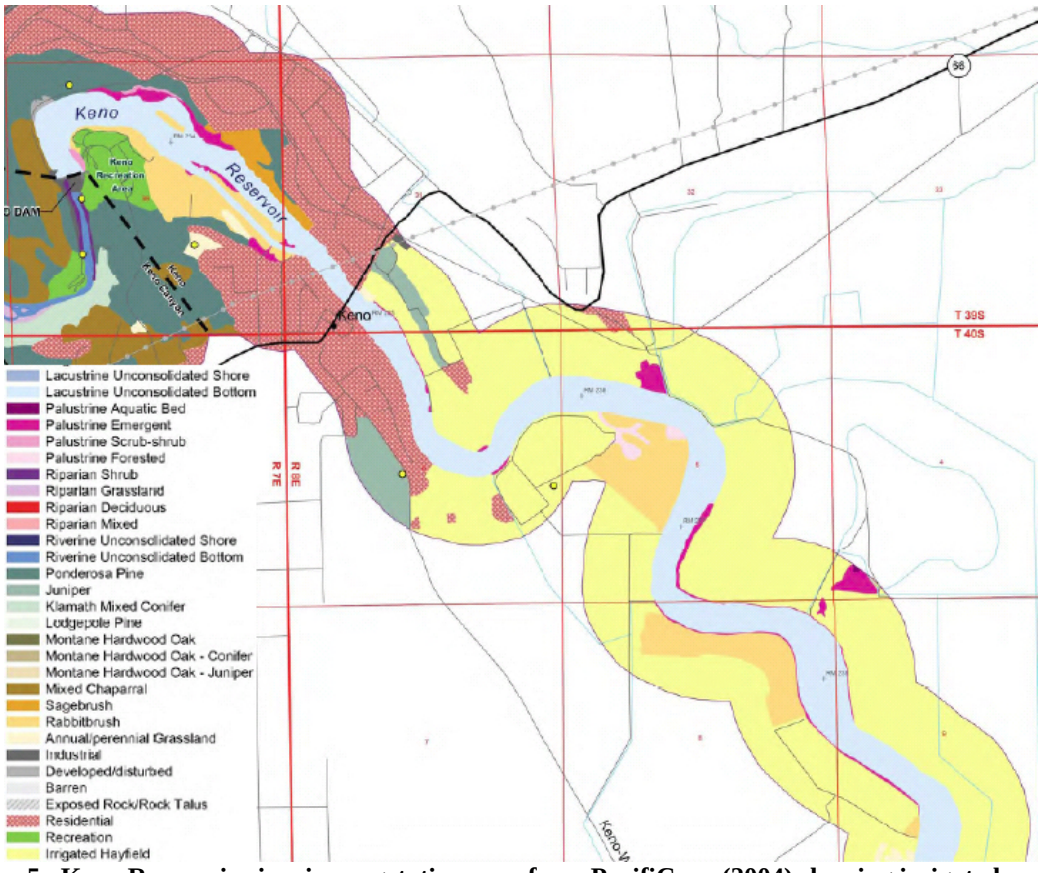



**Figure 5. Keno Reservoir riparian vegetation map from PacifiCorp (2004) showing irrigated hayfields right up to the margin with no marsh buffer to help absorb nutrients and to provide other ecosystem services.**

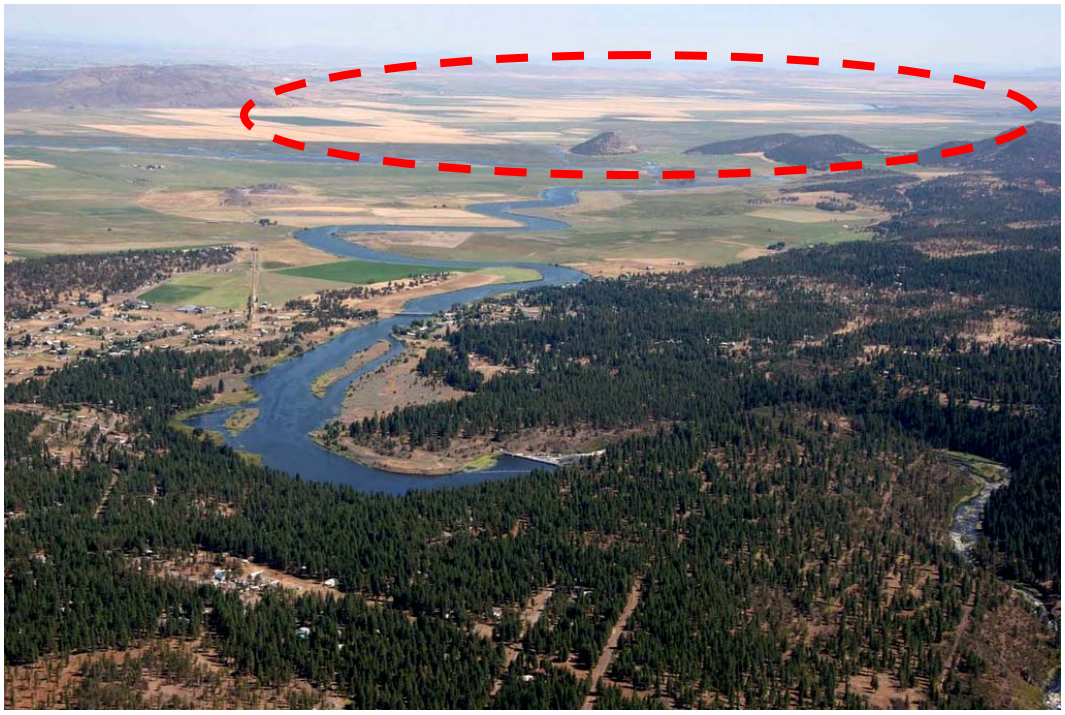


**Figure 6. Aerial photograph of Keno Reservoir with Keno Dam below center and the old Lower Klamath Lake bed in the distance (red oval).**

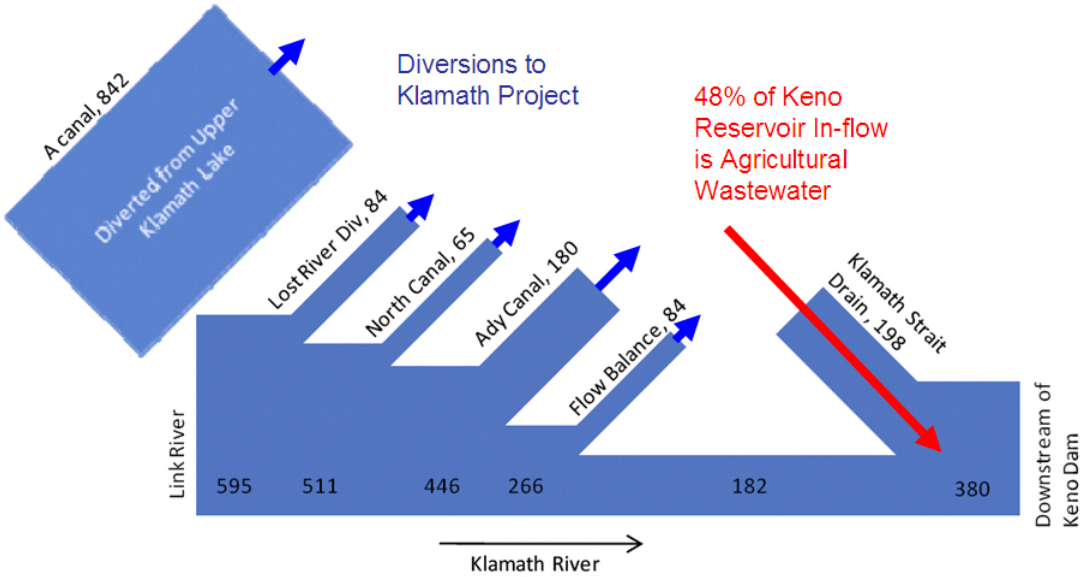



**Figure 7. Average daily flow in August 2002 into the Klamath Project and Keno Reservoir. From ODEQ (2010) where it appears as Figure 2-21.**

Agricultural discharges from the Lost River through the Lost River Diversion (LRD) canal are known to occur in winter (Deas and Vaughn 2006); however, ODEQ (2010) also found substantial nutrient contributions from that source in summer and fall of 2000 and 2008. ODEQ (2010) model runs of D.O. depletion in Keno Reservoir (Figure 9) show that the contributions from the LRD in September and October 2008 had substantial impacts in addition to discharges from the Klamath Project through the Straits Drain.

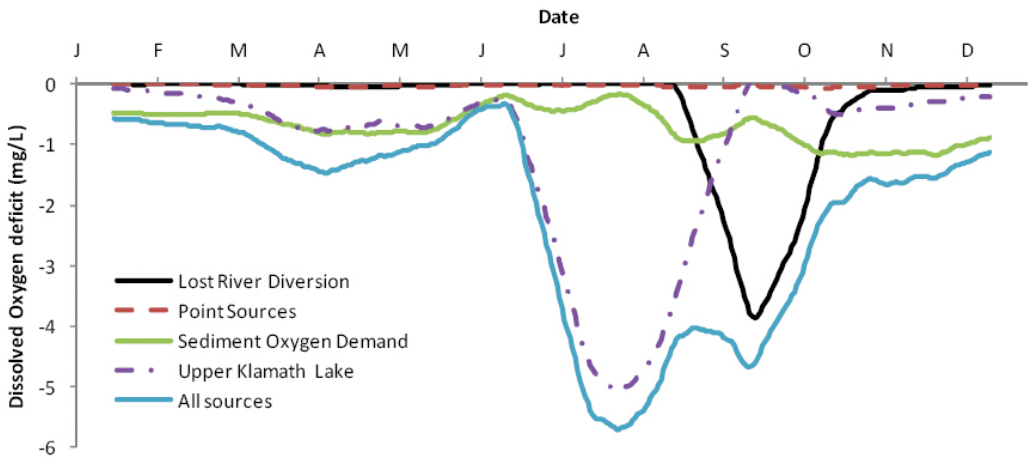



**Figure 8. This chart is taken from ODEQ (2010) and shows model results of the D.O. deficits in Keno Reservoir by month in 2008 with a substantial contribution from the LRD Canal in fall, which likely extended conditions lethal to salmonids for two months.**

## ***KBRA***

The KBRA does not have a water quality plan and has a very broad and ill defined strategy for clean up of nutrient pollution in the Upper Klamath Basin (Dunne et al. 2011, Goodman et al. 2011). Flows under the KBRA (Appendix E-5) will drop further from historic norms (Dunne et al. 2011), which will cause water pollution and fish health problems to persist or even worsen (Goodman et al. 2011). Lost River surface flows are likely to also be reduced under the KBRA resulting in direct impacts to ESA listed suckers and increased nutrient concentrations in waste discharges sent to the Keno Reservoir. The greatest KBRA effect on water quality, however, is that it guarantees continued agricultural land use over vast areas, including sites critically needed for ecological restoration. Major subsidy for maintaining low cost power for Upper Basin water users is also part of the KBRA, when the footprint of agriculture might otherwise shrink due lack of profitability (Jaeger 2004) helping to lower water demand and nutrient pollution.

Klamath River KBRA Flows to Increase Water Quality Problems: The KBRA convened Expert Panels (Dunne et al. 2011, Goodman et al. 2011) to judge the sufficiency of action in restoring conditions favorable for different fish species in the Klamath Basin. The Coho Salmon and Steelhead Expert Panel (Dunne et al. 2011) expressed concern that there would be no consideration under the KBRA of trying to restore historic flows in the Klamath River. Before the Klamath Project was created, Lower Klamath Lake (LKL) would fill in winter and then augment Klamath River flows from May through July (Weddell 2000). Dunne et al. (2011) charted flows before and after Klamath Project construction to show the departure from historical patterns (Figure 9). A return to historic flows would reduce water temperature and nutrient concentrations, which in turn would reduce algae blooms and fish diseases. Figure 9 is annotated to show where departures from the natural flow regime of the Klamath River since the construction of the Klamath Project increase water temperatures and water quality problems as well as

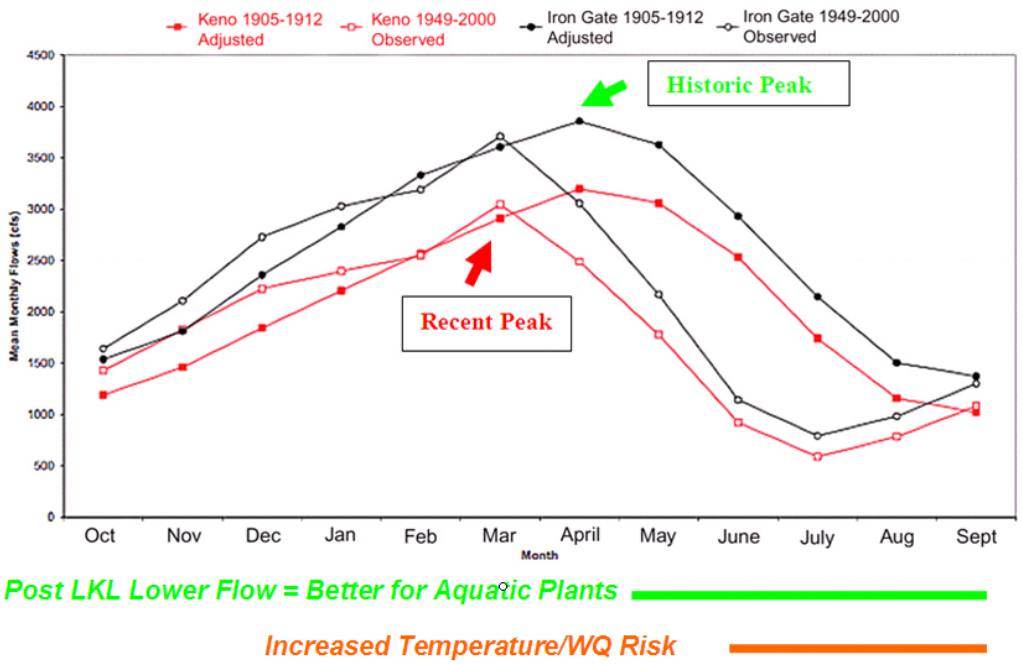



**Figure 9. Chart of historic seasonal flows versus those after the construction of the Klamath Project and the disconnection of Lower Klamath Lake. Annotations include historic and recent peaks as well as periods likely to increase algal growth, temperature and nutrient pollution (WQ) added. Taken from Dunne et al. (2011) where it occurs as Figure 3.**

promoting conditions that favor growth of algae beds. Continued agricultural activity in the Lower Klamath National Wildlife Refuge (LKNWR) under the KBRA forecloses the option of refilling the lake and increasing spring and early summer flows; instead KBRA flows will depart even further from historic norms.

Flows under the KBRA will be less than those called for under the Klamath Project operations NMFS (2010) Biological Opinion (B.O.) for coho salmon and Hardy et al. (2006). Figure 10 shows Klamath River flows at Iron Gate Dam for the 90% exceedance (very dry) water year with the KBRA WRMS R32 model run, the NMFS (2010) Biological Opinion (B.O.) flows and minimums recommended in the Hardy et al. (2006) Phase II study (Hoopa Tribe Fisheries Department 2011). Annotations once again show periods when very low flow conditions will foster increased algae growth and trigger more adverse water quality. Algae build up has the potential to be most injurious during prolonged droughts when there is insufficient water for flushing flow releases in spring.

Table 3 captures KBRA model (Appendix E-5) projections for Klamath River flows at the location of Iron Gate Dam Flows during extreme drought years similar to 1992 and 1994. Flows could fall as low as 442 cubic feet per second (cfs) (Figure 11) while the adult salmon kill of September 2002 was triggered by flows of 758 cfs (Guillen 2003, CDFG 2003). Reduced flow decreases the volume of water which in turn increases water temperature and nutrient concentration. Although the KBRA states that the Drought Plan would define higher flows for fish needs, the draft Drought Plan circulated in May 2011 does not have alternative levels to those in Appendix E-5 (Resighini Rancheria 2011a).

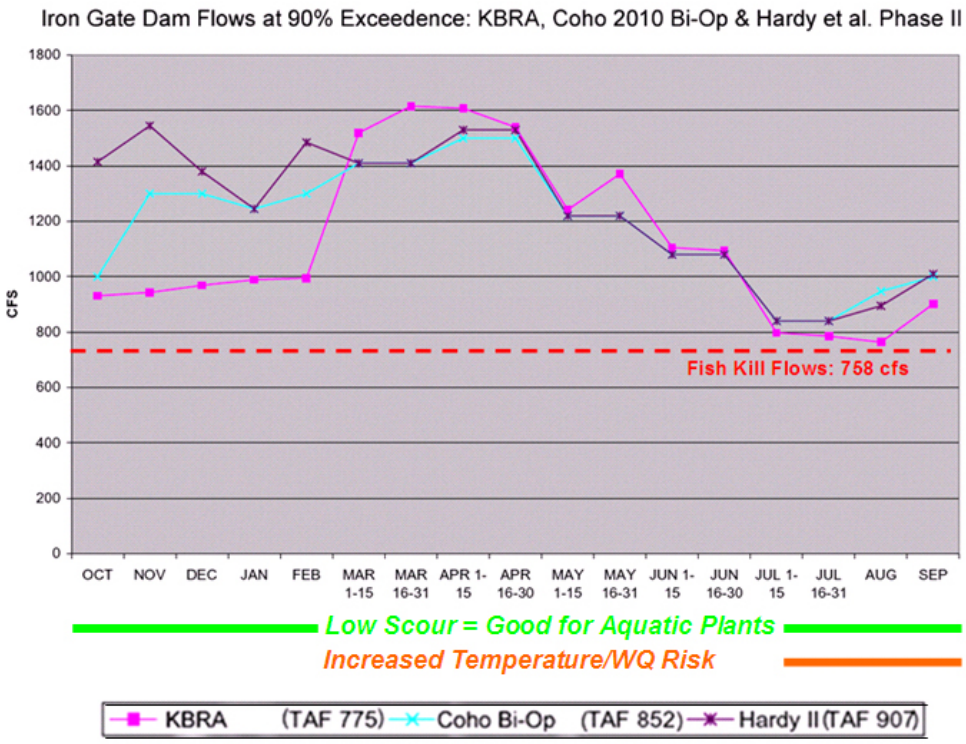



**Figure 10. Flows at Iron Gate Dam in a 90% exceedance flow year comparing the KBRA WMRS R32 model flows, NMFS (2010) BO flow levels and Hardy et al. (2006) Phase II. Data from the Hoopa Fisheries Department. Reference is USGS Iron Gate September 2002 fish kill flow release.**

**Table 3. KBRA WRMS model flow simulations at Iron Gate Dam for years similar to 1992 and 1994 under KBRA flow allocations. R32 = primary run. R33 = with additional storage. R34 = with additional storage and climate change. Yellow indicates lower than September 2002 fish kill flows (758 cfs).**

| Period | R32_1992 | R32_1994 | R33_1992 | R33_1995 | R34_1992 | R34_1994 |
|---|---|---|---|---|---|---|
| Jan | 854 | 959 | 819 | 1106 | 846 | 1106 |
| Feb | 809 | 928 | 800 | 1025 | 809 | 1025 |
| Mar_1_15 | 1022 | 1239 | 800 | 996 | 800 | 996 |
| Mar16_31 | 1021 | 1151 | 800 | 860 | 826 | 924 |
| Apr_1_15 | 1063 | 1184 | 800 | 824 | 786 | 847 |
| Apr_16_31 | 1022 | 1125 | 800 | 821 | 767 | 813 |
| May_1_15 | 807 | 924 | 800 | 813 | 701 | 798 |
| May_16_31 | 843 | 1069 | 800 | 812 | 668 | 823 |
| Jun_1_15 | 698 | 913 | 800 | 811 | 581 | 773 |
| Jun16_30 | 646 | 873 | 800 | 809 | 610 | 753 |
| Jul_1_15 | 509 | 629 | 700 | 706 | 515 | 607 |
| July15_30 | 524 | 574 | 700 | 705 | 537 | 561 |
| August | 442 | 485 | 800 | 804 | 533 | 548 |
| Sept | 512 | 577 | 800 | 808 | 519 | 552 |
| Oct | 549 | 582 | 800 | 811 | 800 | 811 |
| Nov | 647 | 690 | 829 | 800 | 829 | 800 |
| Dec | 774 | 762 | 914 | 800 | 914 | 800 |

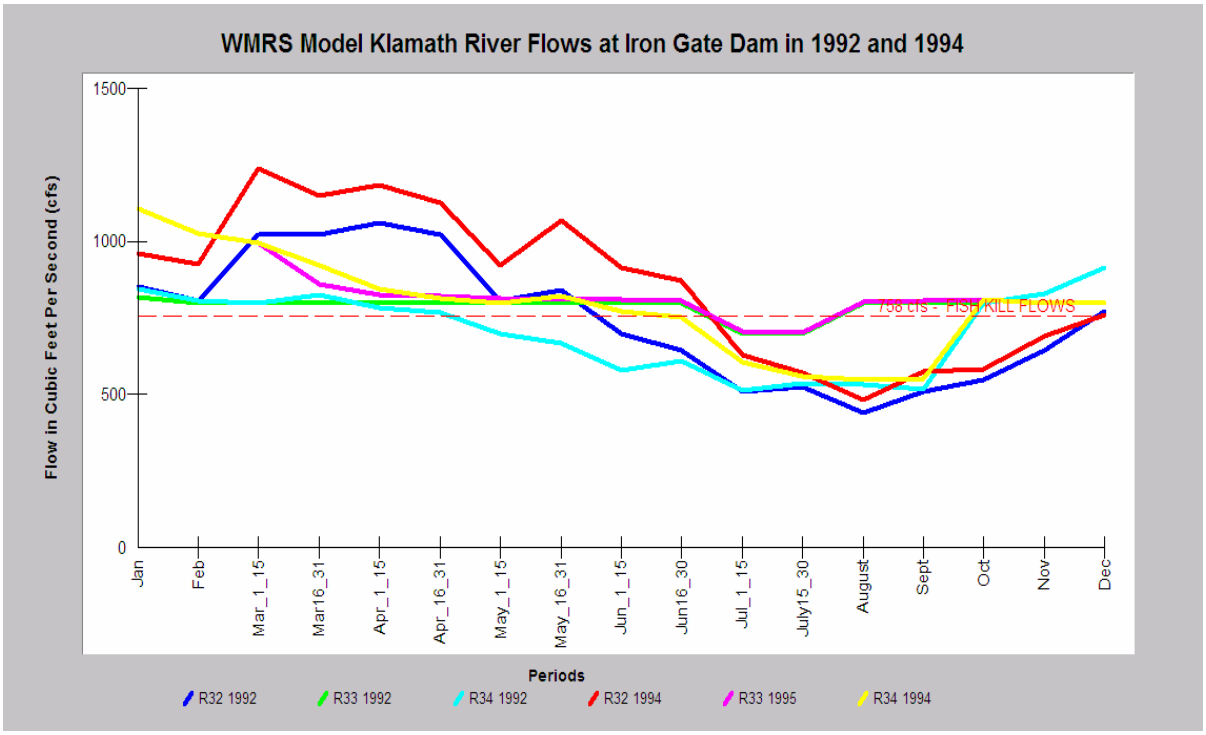



**Figure 11. KBRA WRMS model run for flows at the location of Iron Gate Dam in years of Extreme Drought, with similar Upper Klamath Lake in-flow to 1992 and 1994. Data from KBRA (E-5, Tables 2, 4, 6).**

Moving flows further away from their historic range of variability poses greater risk due to processes described in the FERC (2007) Final Environmental Impact Statement (FEIS) for the KHP relicensing:

> "Over time, the overall limitations on water availability and dynamic hydrographs contribute to conditions that result in a channel that becomes stable and prone to other undesirable consequences to water quality and aquatic resources."

Although nutrient concentrations are reduced by greater water volume (Asarian et al. 2010), the KBRA (Section 25.1.4) states that increasing flows will be the last option for improving water quality:

> "The Parties shall support all reasonably available alternative or additional water quality measures before considering any action for the purpose of water quality compliance that would reduce water supplies beyond the limitations provided in this Agreement."

Restricted Klamath River flows under the KBRA in and of themselves substantially lower chances of attaining Hoopa TEPA (2008) WQS, especially during drought or extreme drought years even after dams are removed.

Lost River Flow Reduction Impacts Under KBRA: The KBRA will likely reduce surface flows in the Lost River, which will have a direct impact on Lost River and shortnose suckers but will also increase nutrient concentrations in Straits Drain and LRD waste water sent to Keno Reservoir. The KBRA provides substantial resources that allow irrigation districts to bind together and create an On-Project Plan for water and power. This publicly funded document may not undergo public review and yet it will govern Lost River flows for the life of the KBRA. Lost River surface and groundwater have been used to make up for Klamath River shortfalls since 2001 through the U.S. Bureau of Reclamation (BOR) water bank. According to USGS (2005) "Water bank activities have resulted in an approximately eight-fold increase in ground-water pumping in the vicinity of the Klamath Valley and Tule Lake sub-basins." Gannett et al. (2007) measured water table drops from 2001-2004 of greater than 15 feet in the lower Lost River in California and stated that this was likely reducing surface flows. California State agencies and Siskiyou County do not actively manage groundwater and are not likely to prevent future adverse Lost River drought impacts. Increased nutrient concentrations in tail waters sent to Keno reservoir will promote continuing acute water pollution there with radiating negative impacts downstream.

KBRA Nutrient Reduction Insufficient: The U.S. EPA (2000) notes that "restoration should reestablish in so far as possible the ecological integrity of degraded aquatic ecosystems." A restored system would meet the following criteria: "Its key ecosystem processes, such as nutrient cycles, succession, water levels and flow patterns, and the dynamics of sediment erosion and deposition, are functioning properly within the natural range of variability" (U.S. EPA 2000). As noted above, the KBRA will cause flows to depart further from their historic range of variability and the amount of functioning marsh and area of shallow lakes that formerly helped improve water quality will remain at just a fraction of their historic extent.

Dunne et al. (2011) pointed out that the KBRA has no assured strategy for reducing nutrient pollution (emphasis added):

> "Experience from other locations where eutrophication is a major problem suggests that, at a minimum, drastic reductions in loading from the watershed must accompany local amelioration. These reductions must account for the apparently high natural nutrient inputs from the local watersheds, and the unavoidable leakage occurring in watersheds heavily altered for urban and agricultural use. *Thus, it would be premature to conclude that any problems caused by these blooms, including low dissolved oxygen, will be substantially reduced by KBRA*" (p. 39).

Goodman et al. (2011) urge consideration of more extensive wetland and lake restoration to recover the Klamath River's limnological balance:

> "Evaluate reductions in irrigated agriculture for lands draining to UKL and the Lost River for their feasibility to reduce summer and fall nutrient additions from those waters. Consider managing the refuges to further emphasize their benefits

> for fish and wildlife, which can be in contrast to their agricultural objectives." (Page 12, Section 2.1)

Goodman et al. (2011) also express doubt that problems with extremely low D.O. in Keno Reservoir will be resolved by KHSA and KBRA measures and as result that "a fully self-sustaining run of Chinook salmon to the upper basin is unlikely" even with KHP dam removal.

Asarian et al. (2010) project that available nitrogen at the location of Iron Gate Dam after removal of KHP reservoirs will increase in the months of July through September by 45-58%. Asarian et al. (2010) note that nutrient assimilation of periphyton and macrophytes will increase in the Klamath River below the location of Iron Gate Dam in response to increased nitrogen availability and state that "These increased retention rates downstream would then partially offset the effects of increased Iron Gate load on nitrogen concentrations in reaches farther downstream." The problem is that the process of photosynthesis associated with assimilating a 50% increase in nitrogen will continue to cause water quality perturbations that create stressful conditions for salmonids and disease rates similar to those experienced in the recent past (Halstead 1997, USFWS 2001, Nichols and Foott 2005).

Goodman et al. (2011) acknowledged the potential significance of the increased nutrient load in the Lower Klamath River:

> "Releasing these excessive amounts of nutrients to the Klamath River in the absence of the four lower dams means that the river, versus the reservoirs, will process the nutrients, perhaps in the form of excessive *Cladophora* biomass or increased periphyton production down river. These changes could elevate pH, lower night time dissolved oxygen, and cause gas supersaturation during afternoons in local areas."

The FERC (2007) FEIS also poses the same hypothesis as Goodman et al. (2011) with regard to nutrient surpluses and fish disease risk:

> "Continued high nutrient levels in the Klamath River that create ideal colonization conditions for *Cladophora*, at sites with favored flow and substrate conditions, would enable the host polychaete to become reestablished, and *C. shasta* and *P. minibicornis* would likely continue to pose a serious threat to downstream salmon for the foreseeable future."

As pointed out in the Fish Disease Cycles section above, no matter where the new fish disease node is below Keno Reservoir after dam removal, actinospores will be viable and increase exposure to *C. shasta* and *P. minibicornis* downstream to the estuary even after dam removal. Thus, Hoopa TEPA (2008) WQS beneficial uses will not likely be met and the Hoopa Valley Tribe will also likely continue to suffer fisheries losses both at Klamath River and Trinity River fishing sites.

Pulse Flow Mitigation Measures: The NMFS 2010 Biological Opinion for the Klamath Project envisions using strategic pulse flows to prevent algae build up. One of the few accomplishments of the biological opinion was a pulse flow release for one day of 5000 cfs in February 2011, which was an attempt to scour algae beds. However, no data on bedload movement was conducted so the effectiveness of this particular pulse flow is unknown. Since 2011 is very wet, it is very likely that algae and disease problems would be delayed by natural conditions and associated juvenile salmonid mortality likely to be modest. As pointed out above, the most severe water quality problems will arise during drought or extreme drought, particularly when there are several dry years in a row (e.g., 1986-1992), when excess water for flushing flows will not be available. There are no hard requirements within the KBRA or its associated Drought Plan for such flow releases.

## Potential Effectiveness of Klamath and Lost River TMDLs

Unfortunately both the California (NCRWQCB 2010) and Oregon (ODEQ 2010) TMDLs have very little chance of success in abating nutrient pollution in the course of the 50 year KBRA and KHSA. A fundamental flaw in both is their lack of recognition of the need to restore ecosystem function of the lakes and marshes of the Upper Klamath in order to help the Klamath River clean itself. Both TMDLs assume that incremental reduction of non-point source pollution from each farm field will eventually solve the problem, but their models do not account for the fact that nitrogen fixing blue-green algae can make up for any reduction unless ecosystem services suppress its growth. Both over-rely on voluntary measures for implementation and neither has expected compliance dates for meeting water quality standards. As noted above, the KBRA provisions that continue Lease Land farming on Tule Lake NWR and Lower Klamath NWR and support continued full use of the 200,000 acre Klamath Project through power subsidy essentially block TMDL implementation because they do not allow reduction of nutrient contributions and water demand. They also block strategic restoration of marshes and lakes needed for water storage and filtration.

### TMDLs Ignores Need for Marsh and Lake Ecosystem Function

Conversion of marsh land around Upper Klamath Lake has augmented phosphorous for aquatic plant growth and caused nitrogen to become potentially more limiting. However, the nitrogen fixing blue-green algae *Aphanizomenon flos aquae* colonized Upper Klamath Lake (UKL) and can transform nitrogen gas from the air into a form usable by plants. Research indicates that mild acids from decaying material within marshes causes the cells of blue-green algae, including *A. flos-aquae,* to break down when exposed to sunlight (ASR/WRC 2005, WRC 2009). Blue-green algae species were not present in UKL before the 20$^{th}$ Century (Bradbury et al. 2004, Eilers et al. 2001) likely because marsh ecosystem function suppressed them. PacifiCorp (2004) estimates that nitrogen exiting UKL is on the order of 2.5 times higher than water entering. In other words, UKL has been transformed from an ecosystem that helps clean up water to one that is a major engine for nutrient pollution. ODEQ (2010) TMDL does not recognize the need to reverse these processes and does not address restoring riparian function in the Keno

Reservoir reach to help improve water quality, the importance of which is discussed above.

Agricultural water supply from Upper Klamath Lake through the A Canal continually inoculates the Lost River and Tule Lake with *A. flos-aquae* and marsh complexes there need to be re-expanded to stifle its growth. Neither the U.S. EPA (2008) Lost River TMDL or the NCRWQCB (2010) Klamath and Lost River TMDL implementation recognize the need for these restored ecosystem functions and processes. The KBRA guarantees water delivery and continued agricultural use of the Lease Lands within the TLNWR (15.1.2 B i) and LKNWR (15.1.2 B i), which constitutes 21,000 acres (Figure 12) and is the only such arrangement on any wildlife refuge in the nation. Tule Lake was originally 110,000 acres whereas Tule Sump occupies between 10,000-14,000 acres and Lower Klamath Lake was 95,000 acres and is now only 4,000 to 7,000 acres depending on the water year (Figures 13-14). This essentially blocks ecological recovery of both areas; therefore, confounds successful abatement of pollution.

Dam removal will help ecosystem function of the Klamath River in the restored KHP reach, including elimination of toxic algae. However, the huge excess of nutrients from Keno Reservoir will continue to overwhelm the river's capacity for assimilation causing major algae blooms downstream. As noted above, this has consequences for fish diseases as well as exceedance of water quality standards. Lower Klamath River recovery also requires that flows and ecosystem function of the Shasta and Scott rivers also be restored, but conditions there have not improved since adoption of those TMDLs (Higgins 2011).

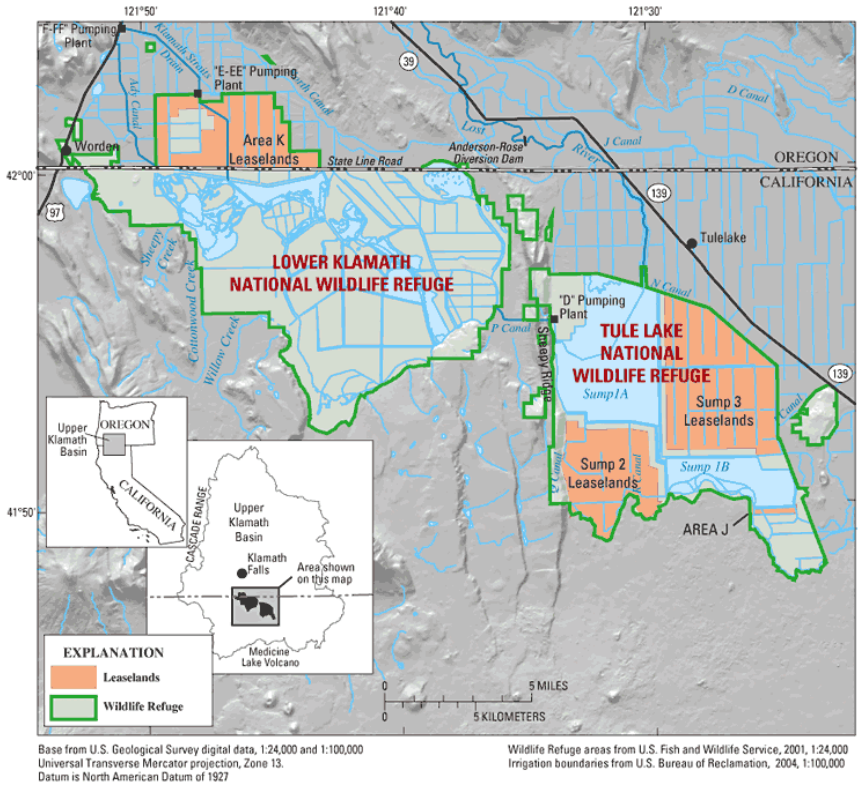



**Figure 13. USFWS and BOR map of TLNWR and LKLNWR Lease Lands occupy 21,000 acres.**

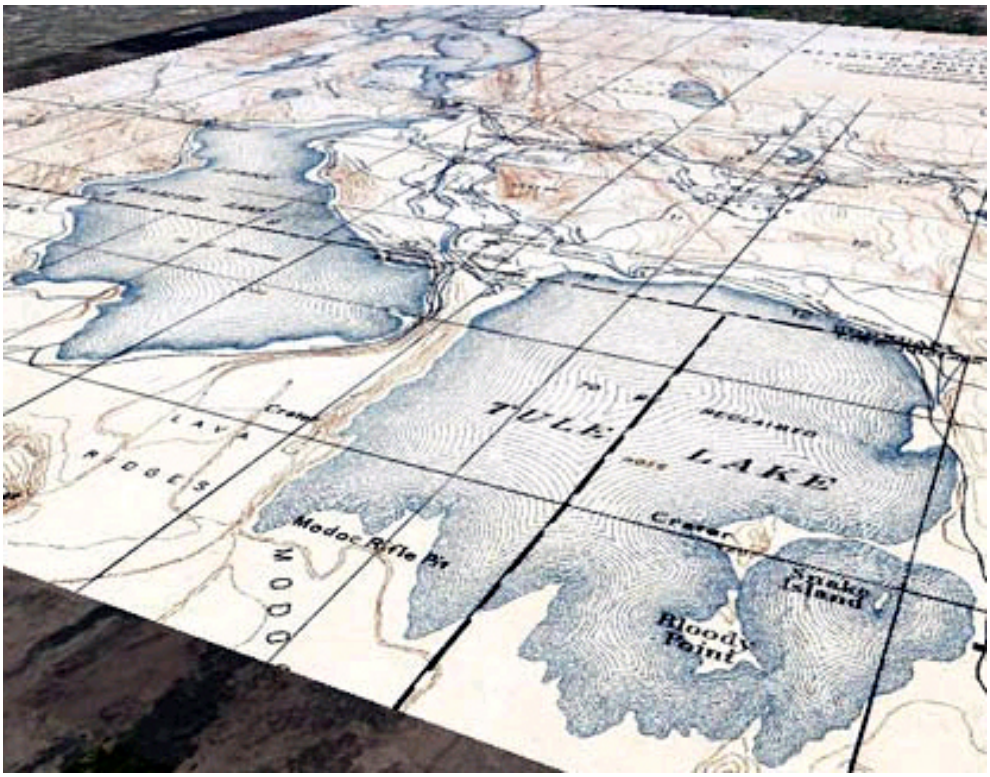



**Figure 13. Historic map of Tule Lake and Lower Klamath Lake from Oregon Wild website at www.oregonwild.org/waters/klamath/klamath-photos-and-maps/interactive_maps**

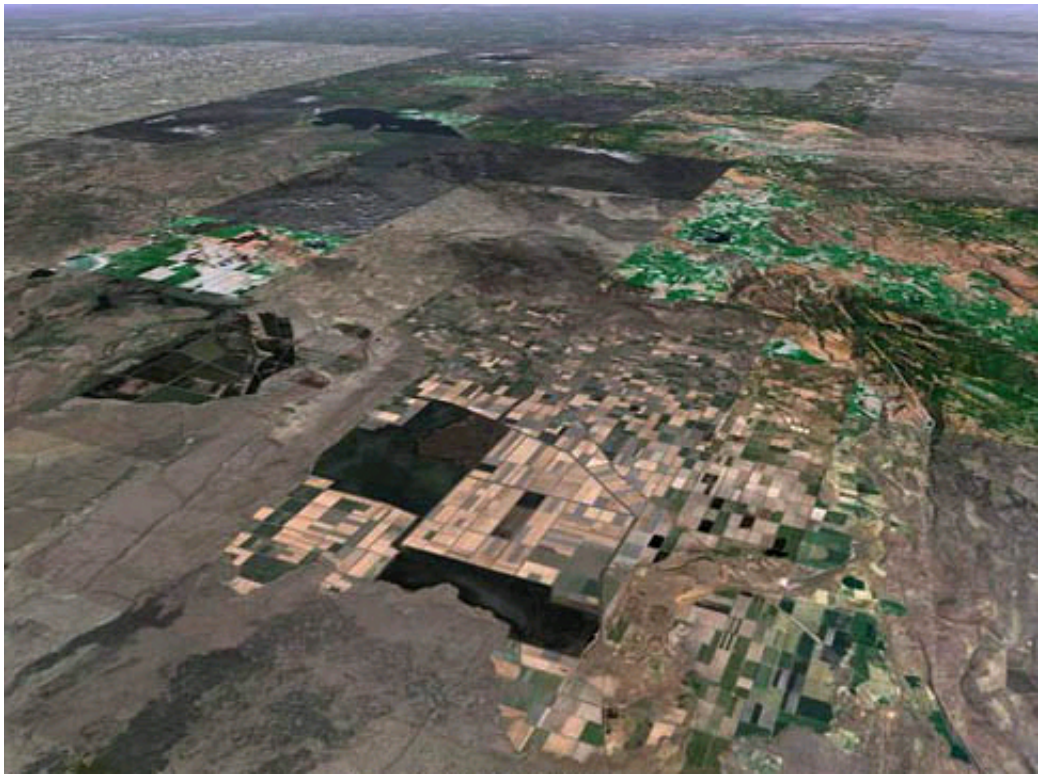


**Figure 14. Aerial photo of Tule Lake and Lower Klamath Lake from Oregon Wild website.**

The Tule Lake basin also has the highest use of pesticides in Siskiyou County (Figure 15) with up to 7,500 pounds per acre in use within the TLNWR on the Lease Lands.

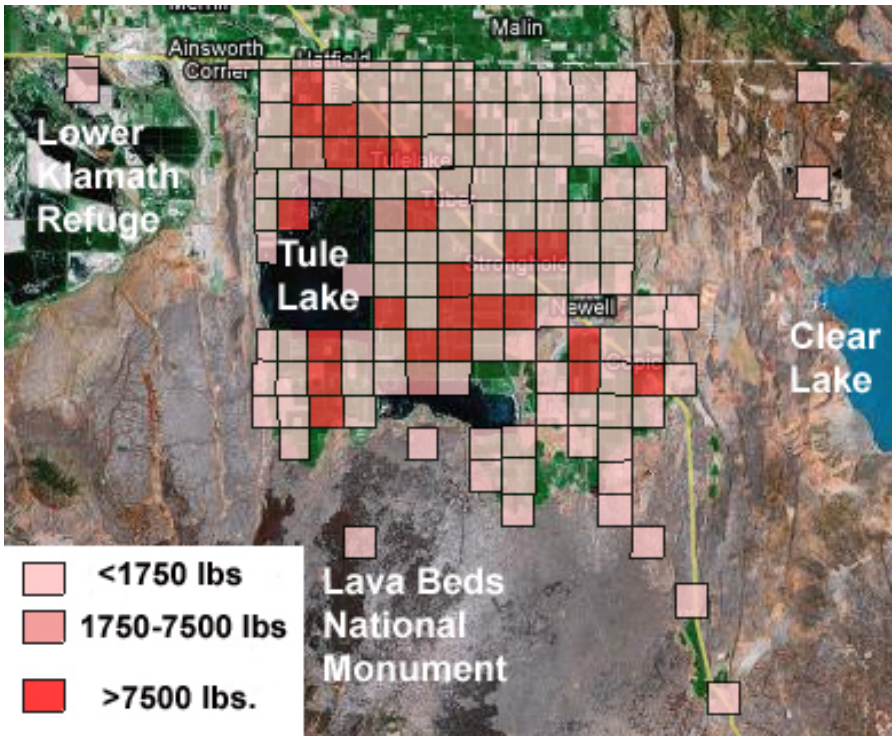



**Figure 15. Tule Lake pesticides in pounds per year, including within the TLNWR Lease Lands adjacent to Tule Lake. Data from CA Department of Pesticide Regulation (DPR).**

Recent studies have shown that even low levels of some chemicals can be injurious to coho salmon when acting together (Laetz et al. 2009). The KHSA and KBRA do not even mention the topic of pesticides but high contributions to the Keno Reservoir reach could be another factor that could impede Upper Basin salmon recovery. Laetz et al. (2009) found combinations of diazinon, malathion, chlorpyrifos, carbaryl and carbofuran in many Pacific Northwest rivers and exposing coho salmon juveniles to equivalent levels in a lab induced mortality. All of these chemicals are used in Siskiyou County where in 2007 an estimated 1,287,800 pounds of pesticides were applied to 187,595 acres, most of them within the Klamath Basin (CDPR 2008). Conversion to organic farming techniques needs to be pursued as part of any final settlement, especially on Lease Lands if farming there continues.

## Technical Fix of Water Quality Problems is Experimental and Unlikely to Succeed

The NCRWQCB (2010) frames the strategy for nutrient pollution as follows:

> "Explore engineered treatment options such as treatment wetlands, algae harvesting, and package wastewater treatment systems to reduce nutrient loads to the Klamath River and encourage implementation of these options where feasible."

These technical approaches to nutrient pollution all require intensive capital investments for implementation and also have substantial on-going costs for electricity for water pumping or purification. It is very unlikely with the current budget crisis that funds will be available for construction and availability of capital for operation and maintenance in the future casts doubt on the ability of this approach to succeed. Furthermore, harvest of algae at the outlet of Upper Klamath Lake in perpetuity makes far less sense economically than abating algae blooms through ecological restoration. Similarly, operating a waste water treatment plant at the Keno Reservoir is not cost-competitive with reducing nutrient loads by eliminating farming on the TLNWR and LKNWR and expanding marshes to clean the water.

Meyer (2005) found that water passed through the LKNWR marsh complex had a 55-77% reduction in total nitrogen (N) and 19-51% reduction in total phosphorous with permanent wetlands having a much greater retention rate than seasonal wetlands. Lytle (2000) assessed the potential for use of a treatment wetland to reduce nutrient loads from the Klamath Straits Drain:

> "With an estimated wetland treatment area ranging between 1,633 and 3,114 acres, according to the Kadlec and Knight Model, the wetland could achieve a 61% reduction in total P concentration (0.41 to 0.16 mg/L) and a 90% reduction in total nitrogen including $NH_3$-N."

The problem with operation of such a treatment wetland is that it requires a flow rate of 70-130 cubic feet per second, which would require additional water storage. Thus, even operation of a treatment wetland at the Straits Drain would require expansion of Lower Klamath Lake or Tule Lake, both of which are blocked by the KBRA. The report from Lytle (2000) remains in draft and there has been no action with regard to its implementation.

**TMDLs Rely on Voluntary Cooperation and Have No Timelines for Compliance**

Both the California (NCRWQCB 2010) and the Oregon (ODEQ 2010) TMDLs are overly reliant on voluntary measures for compliance. TMDLs from both States lack any projections for when water quality compliance will occur or when beneficial uses will be fully restored. The Final KHP EIS (FERC 2007) expressed the following concern with regard to potential for success of TMDLs in the Upper Klamath to remediate pollution:

> "The TMDL program relies on voluntary involvement for loads identified from non-point sources; therefore, nutrient load reductions to the allocated size may not be fully realized as farmers and ranchers choose between converting portions of their land to best management practices or maximizing their property's agricultural potential." (3.3.2.3)

ODEQ (2010) states the TMDL "does not attempt a timeline addressing the many ongoing and voluntary efforts."

The prospect of enforcement in Oregon is more remote than in California because ODEQ (2010) must delegate authority for implementation to designated management agencies (DMAs). The lead DMA is the Oregon Department of Agriculture (ODA), which is charged with both promoting agriculture and regulation of agricultural activities that affect water quality. Other DMAs include the U.S. BOR and irrigation districts. A program that relies on polluters to oversee abatement of pollution has a very low likelihood of success.

## Interim Measures for KHP Will Not Improve Reservoir or Lower Klamath River Water Quality Conditions

PacifiCorp has complied with Section 6.3.2 of the KHSA and submitted a TMDL implementation plan to the NCRWQCB. Appendix C and D of the KHSA lay out the 21 Interim Measures and they are reflected in PacifiCorp's (2011) *Plan for Implementing Management Strategies and Water Quality-Related Measures*. The NCRWQCB (2010b) response to the proposed measures states that in-reservoir actions will not abate nutrient pollution or toxic algae problems there. The PacifiCorp (2011) actions pursuant to TMDL implementation relevant to this report are as follows.

*Interim Measure 2* requires that PacifiCorp provide $500,000 per year for coho salmon habitat restoration or acquisition, but these measures will have small water quality benefits and will target projects below the KHP. The improvement of cold water refugia at the mouths of Klamath River tributaries is very laudable and worthwhile, but it does not fully mitigate impacts of the operation of KHP dams as PacifiCorp (2011) claims: "The thermal refugia actions to be implemented under the Coho Enhancement Fund will mitigate the continuing effect of the reservoirs on water temperature during the interim period." This measure will help coho salmon, but the major impact to fall Chinook of reservoir operation described above will remain huge as long as Iron Gate Dam remains. Also, increased flows in the Shasta and Scott rivers is needed to restore coho salmon habitat there, which has much greater potential to increase carrying capacity for these fish (Higgins 2011)

*Interim Measure 3* calls for turbine venting at Iron Gate Dam to improve dissolved oxygen (D.O.) levels that may improve lower Klamath River conditions within a short distance of the dam. Even if such measures were implemented, excess nutrients from the reservoir will continue to be released that stimulate profuse algae growth leading to D.O. sags stressful for salmonids downstream, when algae respires nocturnally.

*Interim Measure 5* calls on PacifiCorp to consult with agencies and tribes and to carry out experiments with different flow levels in fall and early winter to benefit salmonids. In February 2011 5,000 cfs was released for one day under the theory that such a peak would increase scour and potentially reduce algae beds. These short term events are aimed at offsetting potential problems from low fall and winter flows planned under the KBRA as described above. No experimental design is in place, so whether this isolated action had any benefit is unknown.

*Interim Measure 10* requires that PacifiCorp provide $100,000 to hold a conference "that focuses on the design and implementation of nutrient and organic matter reduction projects. The conference should assess the appropriateness and feasibility of various centralized pollutant removal technologies, including wetland treatment systems, wastewater treatment systems with energy recovery capabilities, aquatic plant harvesting, as well as agricultural best management practices" (NCRWQCB 2010). Planning for this event has been restricted to Parties to the KBRA and KHSA.

*Interim Measure 11* is entitled Interim Water Quality Improvements, but there will be no significant improvements to Lower Klamath River that result. PacifiCorp is to spend $250,000 a year on one or more of the following: 1) developing a water quality accounting framework, 2) constructing pilot treatment wetlands for evaluation, 3) assessing in-reservoir water quality control techniques, and 4) improving J.C. Boyle D.O.

The NCRWQCB (2011) is asking that PacifiCorp increase resources to fully develop the water quality accounting framework that will help evaluate TMDL implementation, which is good. In lieu of reservoir projects, the NCRWQCB staff recommends pilot projects for nutrient reduction that could be expanded and implemented under the KBRA. While treatment wetlands have the potential to reduce nutrient contributions (Lytle 2000), they are unlikely to be able to offset continuing high contributions of nutrients (see Ecological Restoration).

The KHSA would set up an Interim Measures Implementation Committee (IMIC) to work with PacifiCorp comprised only of signatories or "Parties" to the settlements. The committee would also appoint and oversee a Fisheries Technical Working Group and a Water Quality Technical Working Group. These processes would prevent involvement of the Hoopa Tribe and other legitimate stakeholders who did not sign onto the KHSA and KBRA. The Hoopa Tribe has used government-to-government consultations and Freedom of Information Act requests to try to keep abreast of activities within the IMIC. Exclusion of the Hoopa Tribe and other non-Parties will lead to a continuing bias against any solutions to water quality problems that require more land retirement or higher flows than agreed to in the KBRA.

**Sucker "Beneficial Use" Recovery Required by TMDLs Unlikely Under KBRA**

Both the Lost River and shortnose suckers are endemic to the lower Lost River, Tule Lake and Lower Klamath Lake and they are, thus, both considered beneficial uses under the Clean Water Act and the Lost River TMDL (U.S. EPA 2008). Both species have been extirpated in Lower Klamath Lake (LKL)(USFWS 2001b). The NRC (2004) recommended consideration of refilling LKL to re-establish sucker populations to reduce regional extinction risk and to improve ecological function of the Klamath River. As noted above, this option is precluded by KBRA provisions that guarantee farming in the lake bed and the LKNWR Lease Lands. Therefore, this aspect of TMDL implementation is not likely to occur within the 50 year life of the program.

Shortnose suckers are no longer present in the lower Lost River (Delineas et al. 1996). Although there is an adult population of Lost River suckers in Tule Lake, there is no viable spawning habitat for them in the lower Lost River (Delineas et al. 1996, Shively et al. 2000). The source population for Tule Lake may be partially supplied by Upper Klamath Lake larvae entrained in the A Canal (Scoppettone et al. 1995), and colonists will likely decrease as fish screens are improved. Consequently, with no ability to reproduce and a diminishing source of colonists, the Tule Lake Lost River sucker population is also likely to be lost over time. Marsh and lake restoration in the lower Lost River, Tule Lake and LKL basins would not only allow re-establishment of sucker populations to lessen species extinction risk, it would help attain algae suppression and nutrient reduction that will likely prove elusive otherwise.

## Ecological Restoration Approach to Restoring the Klamath River

An ecosystem based approach to resolving Klamath River water quality impairment is in keeping with current best-science principles: "Management of the freshwater habitat of Pacific salmon should focus on natural processes and variability rather than attempt to maintain or engineer a desired set of conditions through time" (Bisson et al. 2009). Major Upper Klamath Basin anthropogenic alteration and reengineering have overwhelmed ecosystem function and caused the Klamath River to develop acute water pollution. Ecosystem services that stifle algae blooms, absorb nutrients and provide water storage need to be regained, which will then allow Pacific salmon and sucker species recovery. The U.S. EPA (2000) gives similar guidance with regard to restoration:

- "Restoration strives for the greatest progress toward ecological integrity achievable within the current limits of the watershed, by using designs that favor the natural processes and communities that have sustained native ecosystems through time.

- Restoring the original site morphology and other physical attributes is essential to the success of other aspects of the project, such as improving water quality and bringing back native biota."

Despite naturally high phosphorous levels because of volcanic activity in its headwaters, the Klamath River was known as the "river of renewal" because of its ability to clean itself (NCRWQCB 2010). Marshes filtered run off, trapped nutrients and suppressed blue-green algae as described above. Lower Klamath Lake acted as the water storage system capturing winter flows and releasing them in late spring. The river bed itself, in a free-flowing condition, helped capture nitrogen from the water and release it back into the atmosphere similar to processes described by Sjodin et al. (1997). None of these ecological functions can be substituted for through technical fixes.

The Klamath River has passed its tipping point in terms of nutrient balance due to several changes:

- Changes within Upper Klamath Lake leading to A. flos-aquae domination,
- Blocking the connection to Lower Klamath Lake and drying it up,
- Pollution of the Lost River and Tule Lake and artificial connection to the Klamath River in the Keno Reservoir, and
- Keno Reservoir reach alteration that stopped denitrification and added to eutrophication.

The goal of ecological restoration as applied to the Klamath River is not to return the watershed to pristine conditions but rather to take strategic actions to restore the natural balance so that beneficial uses as defined by the Clean Water Act can be attained. If the natural system is restored to a level where its ecosystem processes clean the water, then it will be largely powered by gravity and far less expensive than technological fixes.

Studies are needed that go beyond those of Lytle (2000) and Mayer (2005) to determine quantitatively how strategic, large scale marsh and lake restoration would reduce water demand, increase water storage and resolve nutrient pollution as a result of improved ecosystem function. The current state of knowledge would suggest priorities include re-establishment of a marsh perimeter around Upper Klamath Lake, restoring the riparian marsh in the Keno Reservoir and in the lower Lost River, and expansion of Tule Lake and Lower Klamath Lake. The KBRA has hundreds of millions of dollars earmarked for restoration, which could be used for acquisition of wetlands for restoration. However, the obvious solution is to restore wetland and lake functions in TLNWR and LKNWR since there are 21,000 acres of wetlands there in public ownership. Costs of easements and acquisitions for areas in addition to the Lease Lands would be one time investments that lead to ecosystem function that has modest or no need for on-going maintenance.

## Hoopa Valley Tribe Alternatives to KHSA/KBRA for Dam Removal

The two most promising avenues for promoting KHP dam removal are to return to the FERC relicensing process and by pressing for a speedy decision by the California SWRCB regarding 401 certification.

The Hoopa Valley Tribe challenged continuing operation of the KHP on a year to year basis without implementation of mitigation measures (HVT vs. FERC 2010). While the challenge was rejected (U.S. Court of Appeals District of Columbia 2010), trying to re-initiate the FERC licensing process should provide benefits with regard to promoting decommissioning. PacifiCorp felt imminent KHP decommissioning and loss of their power generating facility was a possibility under the relicensing process (Brockbank 2010):

> "Throughout these negotiations, the federal government and the states of Oregon and California have expressed a strong policy preference that PacifiCorp's dams on the Klamath River be removed."

If the KHP relicensing process re-opens, NMFS' (2006) fish passage requirements at dams will be part of terms and conditions. Administrative Law Judge Parlen McKenna

(2006) upheld NMFS authority and PacifiCorp (2008) estimates that fish passage at all KHP dams would cost $267 million, which is far more than project revenue justifies. This will likely throw the project into the "uneconomic" category. Brockbank (2010) explains PacifiCorp's options: "The applicant may accept the uneconomic license, decommission and remove the facility, or pursue litigation and challenge the mandatory conditions."

The California SWRCB (2008) suspended the 401 certification process after entering into an Agreement in Principal with PacifiCorp and subsequently signing the KHSA. The Hoopa Valley Tribe (2011a) pointed out that the most recent SWRCB Resolution (2010-0024), which held the KHP 401 process in abeyance, required federal KBRA/KHSA legislation be enacted by May 17, 2011, which it was not. Therefore, the SWRCB should re-start its 401 certification process. Oregon and northern California environmental groups (Cascadia Wildlands et al. 2011) and the Resighini Rancheria (2011d) also made similar requests to the SWRCB, which is likely to consider the matter at its August 2011 meeting.

If the relicensing and 401 process restart, the SWRCB will likely prevent FERC from issuing a new KHP license by withholding 401certification because water pollution problems associated KHP reservoirs cannot be remedied (SWRCB 2006). The inability of PacifiCorp to acquire a new license would also force abandonment and decommissioning.

Hoopa TEPA (2008) WQS for the Klamath River must be considered by the SWRCB in the 401 certification process. When the 401 process is reopened, the Hoopa Valley Tribe should continue to provide the SWRCB with evidence that shows the need for immediate removal of KHP dams due to toxic algae problems and alarming continuing impacts to salmon resources, particularly in drier years.

## Conclusion

There is substantial concern that the lack of nutrient reduction at the source in the Upper Klamath Basin under the KBRA will cause a failure to remediate water quality problems even after dam removal (Dunne et al. 2011, Goodman et al. 2011). The chances that Hoopa WQS standards will be met appear low and all fisheries-related beneficial uses will continue to be compromised under the KBRA even after dams are removed. As noted above, a rigorous testing and reporting program to measure compliance with Hoopa WQS will be essential.

There is urgent need for action in promoting an ecologically sound restoration alternative. Current conditions have lead to a fish kill of 33,000-70,000 adult Chinook salmon (CDFG 2004) and the level of mortality of juvenile Chinook salmon in some recent years has had an equivalent impact (Nichols and Foott 2005). High levels of fish disease threaten the existence of remnant runs of spring Chinook and coho salmon and these problems are not likely to be remedied either before dam removal or afterward. Continuing operation of the KHP without mitigation poses high risk to these at-risk fish

populations and insufficient actions under the KBRA to abate nutrient pollution virtually assure the extirpation of these species before 2062.

A critical consideration is the urgent need for action given short term climate regime known as the Pacific decadal oscillation cycle (Hare et al. 1999, Collison et al. 2003) that affects Pacific salmon species:

> "If current patterns prevail, with shifts in the PDO occurring every 20 to 30 years (Hare et al. 1999), the next negative shift in the PDO for California is likely to occur in the 2015 to 2020 timeframe …... If fresh water habitats have not recovered by that time, the fish will simultaneously face both degraded freshwater habitats and an unproductive ocean. The result could shift the stocks to endangered status or result in extinctions" (Collison et al. 2003).

This suggests that dam removal needs to be in advance of 2020 for the highest potential of success. Toxic algae from reservoirs will also continue to pose unacceptably high health risk for recreational or ceremonial use of the Klamath River until at least 2020, and this condition in and of itself should be sufficient cause for speedy KHP dam decommissioning.

"We must restore impaired ecosystems if we are ever to regain the natural capital necessary to prevent continued economic and social decay and to approach economic and ecological health and sustainability" (Society for Ecological Restoration 2004).

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