Quartz Valley Indian Reservation
13601 Quartz Valley Road
Fort Jones, CA 96032
530-468-5907

To: State Water Resources Control Board
From: Crystal Robinson
Environmental Director, Quartz Valley Indian Reservation
Date: July 23, 2018
Re: *Updated* Review and comments on Draft Water Quality Certification for Klamath River Renewal Corporation's Lower Klamath Project

Note: these comments are intended to be a complete replacement for the comments we previously submitted via email on July 22, 2018 at 6:07pm (filename "Quartz Valley Indian Reservation_Klamath401cert_20180719.pdf"). Please disregard the previous comments and use these updated comments instead.

We thank you for this opportunity to review and provide comments from the Quartz Valley Indian Reservation. Klamath River water quality has been severely degraded due to the existence of the dams and cultural resources in the Scott Watershed have been impacted. The Reservation's annual return of salmon, steelhead and lamprey have been devastated due to a plethora of environmental conditions, one being the water quality experienced in the mainstem Klamath during emigration and migration. We hope to continue to work toward productive solutions and hope you find the comments incorporated within to be helpful in refining the 401 Certification.

COMMENT SUMMARY

We have reviewed the California State Water Resources Control Board's (SWRCB) *Draft Water Quality Certification for Federal Permit or License, Klamath River Renewal Corporation, Lower Klamath Project Federal Energy Regulatory Commission Project No. 14803* that was circulated for public comment in June of 2018. We focused our review almost solely on two sections: Condition 1. Water Quality Monitoring and Adaptive Management, and Condition 2. Compliance Schedule (pages 14 through 21). We have a few concerns about the adequacy of the proposed water quality monitoring plan. Our primary concerns are outlined in the following several paragraphs and then additional details on those and other issues are provided in the "Comments on Specific Details" section that follows.

Our biggest concern is the 60 mile gap in monitoring stations between Iron Gate and Seiad Valley. Given the proximity of this reach to the dams, dam removal is expected to cause this river reach to experience both short-term impacts and long-term changes that are greater than will occur in other reaches further downstream. Therefore, we were extremely surprised to see that no water quality monitoring is being proposed in this reach. This is not acceptable to us. At

least one additional continuous water quality monitoring station, preferably two, must be added in this reach to provide baseline (i.e., Pre-Drawdown Monitoring) data on dissolved oxygen and document the conditions during and after drawdown. We suggest adding one station upstream of the Shasta River and another between the Shasta River and the Scott River. To offset the cost of adding these stations, we suggested consolidating the number of stations between J.C. Boyle Reservoir and Copco 1 Reservoir.

Another major concern is the substantial reduction in the number of stations in the proposed water quality monitoring plan relative to the Klamath Hydroelectric Settlement Agreement (KHSA) Interim Measure 15 (IM15) monitoring program which has been collecting baseline data since 2009 (PacifiCorp 2018). Given the major changes in water quality which occur along the Klamath River's entire length, all these river stations are important to retain, especially given the long-term datasets at these stations. The IM15 plan was developed through extensive discussion between many entities, so we recommend that SWRCB rely heavily on it rather than re-inventing the wheel. This will allow the KRRC dataset to be placed within the context of previous data and lead to a better understanding of the short-term and long-term effects of dam removal on Klamath River water quality. A key data gap in IM15 is the lack of turbidity monitoring and suspended sediment sampling, which the draft certification's monitoring plan proposes to fill by operating a subset of the IM15 stations year-round and adding collection of sediment samples. We definitely support the addition of the year-round continuous water quality monitoring and the sediment sampling; however, we feel strongly that these should be in addition to the sites and parameters already included in IM15, not as a replacement for IM15. The IM15 program costs approximately $500,000 per year, but that cost would likely be substantially less after dam removal because it would no longer be necessary to sample the reservoirs with boats and because the public health sampling could be scaled back due to elimination of the reservoir's blue-green algae populations.

We recommend significantly strengthening the sediment-related aspects of the water quality monitoring plan by adding even-based sampling for suspended sediment concentrations (SSC), and clarifying that the SSC data will be combined with continuous turbidity and flow data to construct sediment budgets.

We do not want monitoring requirements to delay dam removal, but given the Klamath River's high inter-annual hydrologic variability, one year is not enough data to adequately characterize baseline sediment loads. Therefore we request that the Pre-Drawdown Monitoring period be expanded from "a minimum" of one year to "starting as soon as possible, with a minimum" of one year. Given the current lack of sediment monitoring in the Klamath River, it is important to get at least a few sites up and running as soon as possible. In addition, it is unclear how monitoring will need to continue post-drawdown. As noted below, we suggest five years, with the potential for reduced sampling intensity in years four and five.

COMMENTS ON SPECIFIC DETAILS

Pages 14-18. The headings in the section "Condition 1. Water Quality Monitoring and Adaptive Management" do not seem to follow a logical hierarchal structure (i.e., italics, underlined, indents, etc.), making it somewhat confusing to understand how the various components are intended to relate to each other. We suggest revising to make it more consistent.

Page 14. The draft certification calls for the Klamath River Renewal Corporation (KRRC) to develop a water quality monitoring plan in consultation with staff from SWRCB, North Coast Regional Water Quality Control Board, Oregon Department of Environmental Quality, and California Department of Fish and Wildlife. We recommend that a sentence be added stating that KRRC and the state agencies should also consider asking for advice from the US Geological Survey, Yurok Tribe, Karuk Tribe, and Hoopa Valley Tribe regarding locations and protocols for sample collection and analysis.

Category 1: Continuous Water Quality Monitoring

Page 15. The draft water quality monitoring plan calls for "hourly readings averaged based on 15-minute interval recordings." We are unclear on the benefits of averaging the data to hourly values. Averaging could mask important fluctuations. To maximum compatibility with existing datasets, for all continuous water quality parameters, it would make more sense to use a 15 to 30-minute interval with no averaging. The Karuk Tribe and Yurok Tribe currently use 30-minute intervals for their continuous water quality monitoring of the Klamath River while U.S. Geological Survey streamflow gages have a 15-minute interval.

Page 15. Chlorophyll-a values are likely to be very low in the winter months because there is little algal growth in the river during the cold, short days with high-flow conditions and turbid water. Turbid water may cause issues for the reliability of the chlorophyll-a measurements. It is still probably worth using the chlorophyll-a probes in the winter, but data should be interpreted cautiously. Some probes may also not have enough capacity to simultaneously record both turbidity and chlorophyll, in which case turbidity should be a higher priority during the winter.

Category 2: Water Quality Grab Samples

Note: given the relative brevity of the proposed monitoring plan, we do not know the intended purpose for some of the water quality parameters, so we might be misinterpreting some aspects.

Page 15. The plan calls for nitrate and nitrite to be analyzed separately. Previous monitoring data has shown that the Klamath River has very low (i.e., close to detection limits) concentrations of nitrite. For example, we briefly queried CEDEN (http://www.ceden.org/) which has 487 nitrite samples for Klamath River sites from the US Fish and Wildlife Service and the SWRCB's Surface Water Ambient Monitoring Project (SWAMP). Only 83 of these samples exceeded the detection limits which ranged from 0.0012 to 0.016 mg/L, and the maximum concentration observed was 0.14 mg/L. Therefore, existing monitoring programs on the Klamath River do a combined analysis for nitrate/nitrite, rather than analyzing nitrate and nitrite separately. There may be higher levels of nitrite for several months during the drawdown period when oxygen levels in the reach of the river immediately below the dams are expected to be quite low, so it may be beneficial to also specifically analyze some samples for nitrite during that specific period. But we do not see a compelling need to analyze nitrate and nitrite separately for the entire period at all sites. It seems better to combine nitrate/nitrite and use the cost savings on

something else?

Page 15. We are unclear what is meant by "microcystin toxicity". We recommend changing that to simply "microcystin" or "microcystin toxin."

Page 15. The draft water quality monitoring plan includes organic phosphorus in the list of parameters for water quality grab samples. We are assuming that this is intended to be particulate organic phosphorus which is included as a parameter in IM15. Please clarify.

Page 15. The draft water quality monitoring plan includes suspended sediment concentration (SSC) in the list of parameters for water quality grab samples. We fully support inclusion of that parameter because it is necessary for construction of sediment budgets, but wanted to make sure that SWRCB is aware, and that a note is added to the monitoring requirements, that standard protocols for SSC require collection of a width and depth- integrated sample which is representative of the entire river cross-section. In non-wadeable streams such as the Klamath River, this requires a bridge or cableway. SSC samples take more time to collect than standard grab samples for other parameters. In addition, because a disproportionate amount of suspended sediment transport occurs on just a few days a year, to be able to construct accurate sediment budgets, it is imperative that some samples specifically target the highest flow storm events rather than just sample at a set monthly or twice monthly schedule. Similarly, we recommend that additional event samples target the drawdown period.

Page 15. The draft water quality monitoring plan includes methyl mercury in the list of parameters for water quality grab samples. Sampling protocols are substantially more complicated for methyl mercury than most other parameters, so it may be much less expensive to analyze total mercury rather than methyl mercury. Please clarify whether it is really necessary to analyze samples for methyl mercury. Also, the proposed plan limits mercury sampling to sites downstream of Copco 1 Reservoir. It may be a good idea to add one upstream station, for example the USGS gage below Keno Dam, to provide data on background conditions coming into the reach.

Page 15. Is "settleable solids" intentional or was that intended to be "total suspended solids" which is more standard parameter. It is our understanding that total suspended solids is measured by filtering the sample whereas settleable solids is the amount of material that settles within a set period of time. Is there some specific intended use for the settleable solids data? Please clarify.

Page 15. The draft water quality monitoring plan refers to "total aluminum" and "dissolved aluminum". Since "total recoverable aluminum" is a more common term than "total aluminum" so we are assuming that "total aluminum" should be "total recoverable aluminum". Please clarify.

Page 15. We are unclear why aluminum and mercury are the only metals proposed as parameters in the grab sample water quality monitoring? Is that because these are the only metals listed for which the Klamath River is listed as impaired under the Clean Water Act? It may make sense to restrict the number of sites where metals are analyzed but add additional metals to the list of parameters analyzed, especially during the drawdown period. For information on other metals to consider, we recommend reviewing the screening-level sediment contaminant evaluation report conducted as part of the Secretarial Determination (US DOI and CDFG 2012). Relative to some

other toxic metals and contaminants, it seems like aluminum should be a relatively low priority. Is it really worth analyzing so many samples for aluminum?

Page 15. We recommend adding chlorophyll-a to the list of parameters for water quality grab samples. These samples can be used as quality assurance to check readings from the continuous chlorophyll-a probes. Chlorophyll-a samples are commonly included in many water quality monitoring programs including IM15.

Page 15. To maintain compatibility with IM15, we recommend adding phytoplankton speciation and enumeration to the list of parameters for water quality grab samples. We recognize that this is a relatively expensive parameter since it requires microscopy in a laboratory, so if it is too expensive to include at all stations then a subset of stations should be chosen (e.g., perhaps Below Keno Dam, Above Shovel Creek, Iron Gate, Seiad, and Klamath?).

Page 15. The meaning of "during and following drawdown" in this sentence is confusing: "Frequency: Every two weeks, at approximately the same time of day, during and following drawdown." Does it mean that sampling will be conducted every two weeks, with additional samples during and after drawdown? Why only mention "during" and "before" drawdown, but not "before" drawdown? Please clarify. As noted in comments above regarding SSC, it is necessary to add additional event-based sampling to capture high flow events.

Page 15. We are not sure that the proposed strategy of relying solely on the Klamath riverbed sediment grab samples for contaminant analysis is a good idea. The sediment that settles on the riverbed may have a different physical and chemical composition than the sediment that is suspended in the water column. Therefore, we recommend analyzing some of the water samples (perhaps during drawdown) for contaminants.

We cannot find anywhere in the plan that clearly states how long the Category 1 (Continuous Water Quality Monitoring) and Category 2 (Continuous Water Quality Monitoring) monitoring will continue after drawdown. Please clarify. We recommend five years. KRRC should be responsible for monitoring until the river settles into a new equilibrium. Depending on hydrologic conditions, the river may still be undergoing substantial adjustment even after several years. It may be possible to progressively reduce the scope of the monitoring program in years four and five (e.g., drop stations or parameters).

Category 3: Klamath Riverbed Sediment Grab Samples

Page 16. PCB, DDT, DDE, and dioxin are typically associated with organic carbon, so in addition to analyzing the sediment samples for contaminants, we also recommend that the sediment samples be analyzed for sediment size composition (e.g., percent fines) and percent organic carbon.

Page 17. We recommend that this section provide additional guidance on where the Klamath Riverbed sediment grab samples should be collected. For example, we recommend that samples should be collected in slow-velocity depositional habitats (eddies and backwaters) where fine sediments are expected to accumulate, rather than in high-velocity transport areas with coarse, rocky substrates.

Monitoring Locations:

Page 16. As noted in our comment summary above, we strongly recommend that all baseline IM15 river locations (i.e., J.C. Boyle, Copco, and Iron Gate Reservoir stations not needed) be maintained rather than substantially reduced. Specifically, this means that Category 1 (water quality grab samples) stations also need to include the Klamath River below the Trinity River, Klamath River above the Trinity River (Weitchpec), Klamath River below Happy Camp, Klamath River at Walker Bridge, Klamath River (Keno Reservoir) at Miller Island, and Link River at Link Dam, as well as the mouths of the Trinity River, Salmon River, Scott River, and Shasta River. The parameters at these stations can be the same as IM15; the additional parameters for Category 1 stations that are not included in IM15 (e.g., mercury, aluminum, and SCC) do not need to be included for these stations. In addition, Category 2 (continuous water quality) stations need to include Klamath River below the Trinity River, Klamath River above the Trinity River (Weitchpec), Klamath River (Keno Reservoir) at Miller Island, and Link River at Link Dam, and the mouths of the Trinity River, Salmon River, Scott River, and Shasta River. We recognize the expense of upgrading the infrastructure at the existing seasonal continuous water quality stations to be able to support year-round monitoring, so we are fine with keeping the stations mentioned in the previous sentence as seasonal rather than upgrading year-round. Because these Category 2 stations would not be operational during the winter, they do not need to include turbidity.

Page 16. We recommend replacing the "Klamath River upstream of Copco No. 1 Reservoir, and downstream of Shovel Creek" and "California/Oregon Stateline" stations into a single new station "Klamath River upstream of Shovel Creek (above Copco No. 1 Reservoir)" which is the site that has been monitored for many years under IM15 and other programs. The "Klamath River upstream of Copco No. 1 Reservoir, and downstream of Shovel Creek" currently backs up reservoir water so is not a good river site, and after dam removal it would be redundant with above Shovel Creek (or Stateline).

Page 16. The 60-mile gap between Iron Gate and Seiad Valley with no monitoring stations is unacceptable. We strongly recommend adding at least one, preferably two, stations in this reach of river because it will be the reach mostly strongly affected by dam removal in both the short-term and long-term. Modeling conducted for the Secretarial Determination predicted that during drawdown, dissolved oxygen (DO) could drop down to near 1 mg/L at Iron Gate Dam with as much as 15 km of river downstream having DO concentrations below 5 mg/L (US DOI and CDFG 2012). Given the severity of the predicted impacts to DO during drawdown, it seems extremely important to have additional continuous dissolved oxygen probes within this reach to determine the spatial extent of low DO. In addition, the long-term changes in hydrology, nutrient concentrations, and sediment transport following dam removal will also change growing conditions for primary producers (algae and aquatic plants) in this reach, and having continuous dissolved oxygen data here would allow calculation of ecosystem metabolism which characterizes reach-wide photosynthesis and respiration (Genzoli and Hall 2016). Site access seems to be a major issue (i.e., KRRC's water quality monitoring plan [Appendix M to the Definite Plan] notes that KRRC was unable to obtain access for the planned Walker Bridge site) so perhaps access should be the deciding factor in determining placement of additional sites. We suggest adding one station upstream of the Shasta River and another between the Shasta River

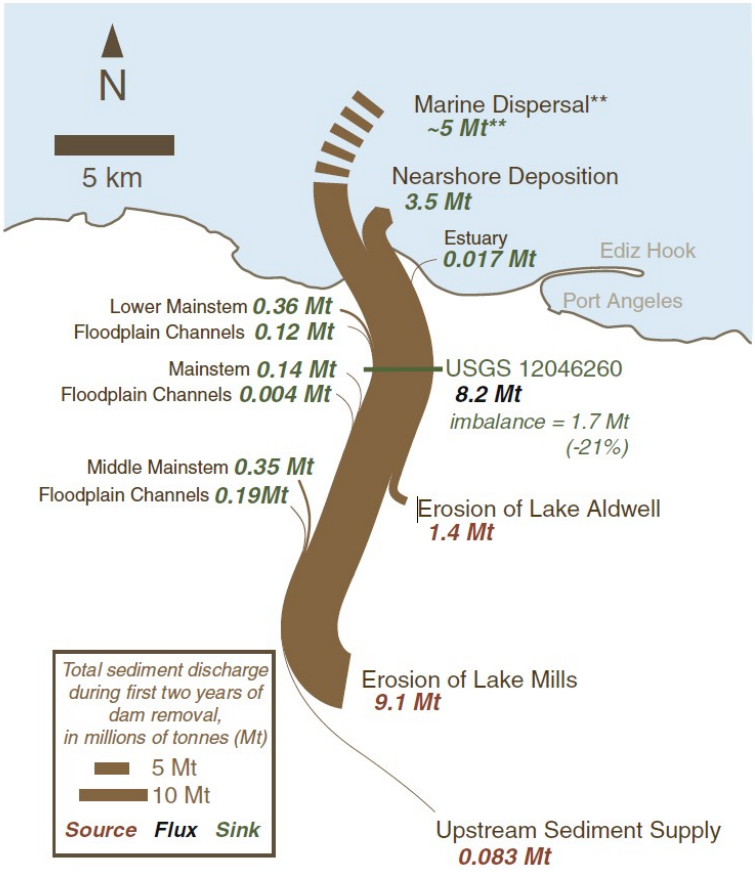
and the Scott River. Potential sites that all have been previously monitored in those reaches include Klamathon Bridge, Interstate 5 Collier Rest Area, Above Shasta River, Tree of Heaven, and Above Scott River. We would also like to see water quality grab samples collected at whatever stations are added in this reach in addition to continuous water quality monitoring; however, the inability to add grab samples at these sites should not preclude adding the continuous water quality monitoring.

Page 16. What is the purpose of the estuary site? Optimal placement of the site within the estuary will depend on what the goal is. The estuary is a complex and dynamic environment which should be monitored but will need additional information to chose the ideal site.

Page 16. We are confused as to why Jenny Creek and the Trinity River are the only tributaries proposed for suspended sediment grab samples and continuous turbidity monitoring. Is the purpose of these stations a sediment budget or is it compliance with water quality criteria? Jenny Creek has a substantially larger watershed (544 km^2) than any other tributary between Keno and Iron Gate, so is a fine representative for a tributary in the reservoir reach; however, we are puzzled as to why no monitoring is being required in the Shasta River (watershed area 2054 km^2), Scott River (watershed area 2107 km^2), and the Salmon River (watershed area 1945 km^2). If for some reason (i.e., budget constraints) it is only feasible to add one station we would recommend the Scott River because is located relatively close to Iron Gate, is unregulated by dams so has high winter and spring flows (in contrast to the Shasta River which is partially regulated by Dwinnell Dam), and is listed under the Clean Water Act as impaired by sediment. The U.S. Bureau of Land Management operates a streamflow gage on lower Jenny Creek but due to lack of infrastructure, flows above 80 cfs are extrapolated because there is no bridge or overhead cableway for measuring high flows (Asarian et al. 2009), which would limit the accuracy of sediment loads calculated at that site (sediment loads require flow data because load is calculated by multiplying flow times concentration).

Sediment Load Quantification:

Page 17. We suggest expanding and clarifying this section. In addition to what is already stated in this section (i.e., quantifying erosion and deposition), we suggest that the continuous turbidity data and suspended sediment samples be combined with continuous flow data to estimate continuous sediment loads (i.e., continuous transport). These sediment loads and estimates of erosion and deposition should then be used to construct reach-scale and basin-scale sediment budgets, similar to what was done for the Elwah River dam removal (Warrick et al. 2015):



As noted in comments above regarding suspended sediment concentration (page 15), construction of accurate nutrient budgets will require event-based sampling to capture high flow events.

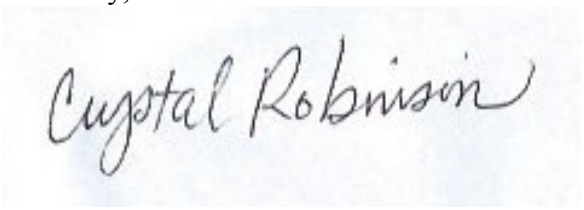
Page 17. The draft certification calls for sediment load reports to be submitted to SWRCB at 12 and 24 months after drawdown, but does not state what time period these should these reports cover. Please clarify. Should the period be 6 and 18 months post completion? Or if SWRCB wants reports that cover data for 12 and 24 months post removal, then the submittal data for the reports should be something like 18 and 30 months after.

Page 17. We suggest editing part of this sentence "For (a) and (b) estimates shall be provided in million cubic yards, tons (dry weight), and percentage of sediment present compared to total amount of sediment present prior to drawdown" so it reads "…of sediment present <u>within the reservoirs</u> prior to drawdown" (underlined text is the addition).

<u>Reporting and Adaptive Management:</u>
Page 17/18. The plan calls for monthly reports. It would probably make sense to have the intervals between the reports be variable depending on the phase of the project. For example, prior to drawdown it seems like would be fine to have reporting quarterly or twice per year rather than monthly. During and immediately following (six months?) drawdown when rapid changes are occurring, monthly reporting may be warranted, but it seems onerous to require monthly reporting throughout the entire study period.

Top of Page 18: The draft certification says that the monthly reports should highlight "exceedances of water quality objectives." It would be good to provide guidance on how exceedances of narrative water quality objectives will be determined.

Sincerely,



Crystal Robinson
Environmental Director
Quartz Valley Indian Reservation

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