

## **Klamath Basin Water Quality Workshop Evaluation of Nutrient and Organic Matter Reduction Options**

### **Workshop Description**

---

#### **Background and Project Overview**

On February 18, 2010, the United States, the States of California and Oregon, PacifiCorp, tribal nations, and a number of other stakeholder groups signed the Klamath Hydroelectric Settlement Agreement (KHSAs). The KHSAs lay out the process for additional studies, environmental review, and a determination by the Secretary of the Interior regarding whether removal of four dams owned by PacifiCorp on the Klamath River (i.e., Iron Gate, J.C. Boyle, Copco 1, and Copco 2 dams) will advance restoration of the salmonid fisheries of the Klamath Basin, and is in the public interest (which includes effects on local communities and tribes).

The KHSAs include provisions and detailed actions (called Interim Measures) for the interim operation of the dams and mitigation activities prior to removal of the dams or the termination of KHSAs. One of the measures- Interim Measure 10 states that PacifiCorp shall provide one-time funding of \$100,000 to convene a basin-wide technical workshop to evaluate approaches for improving water quality in the basin. The workshop will inform participants on water quality conditions in the Klamath River basin and engage invited experts and managers to evaluate several large-scale nutrient and organic matter reduction projects including the pilot studies conducted through Interim Measure 11<sup>1</sup>.

The Workshop includes three components:

- Preparation of a pre-workshop report (Attachment 1) that provides background information on the basin necessary to inform the design of water quality improvement projects, criteria for evaluating projects, and brief descriptions of large scale pollutant removal technologies to be evaluated at the workshop;
- Convene a workshop of invited experts and managers to evaluate and rank water quality improvement projects selected by the project steering committee; and
- Preparation of a post-workshop report (Attachment 2) that summarizes project evaluations and provides a conceptual level feasibility plan for those projects receiving the highest ranking from workshop participants.

Funding provided by PacifiCorp under Interim Measure 10 has been matched by the State of California Coastal Conservancy. These funds are being pooled to hire a contractor, under the direction of California State Coastal Conservancy, to assist with the preparation,

---

<sup>1</sup> Interim Measure 11 includes funding various studies or pilot projects with a focus on nutrient reduction in the basin including constructed wetlands and other treatment technologies, the Klamath Water Quality Tracking and Accounting Program, and projects to improve water quality conditions within Klamath Hydropower Project reservoirs.

execution and follow-up to the workshop. PacifiCorp, the North Coast Regional Water Quality Control Board, and the Oregon Department of Environmental Quality, has formed a steering committee (Attachment 3) to guide workshop development, including the format, agenda, composition of expert panels, and follow up activities.

### **Project Objective:**

The purpose of the workshop is to identify the technologies and strategies that will provide a clear working framework to reduce nutrient and organic matter loads to the Klamath River and improve water quality conditions within the Klamath Basin. Invited workshop participants and experts will be convened to evaluate the merits of various pollution reduction options for the Klamath Basin and develop recommendations for the development of engineering feasibility analyses for the most promising pollutant reduction projects. Based upon the outputs from the workshop, highly ranked options and projects will subsequently be presented in a planning level document as a conceptual level feasibility analysis, which will serve as a guide for further development of more formal engineering feasibility analyses.

### **Klamath Basin Nutrient and Organic Matter Reduction Projects**

Workshop sessions will be devoted to consideration of the application of large-scale pollutant removal technologies including wetland treatment systems, wetland restoration, biomass removal, sediment treatments, ambient water treatment systems, oxidation treatments, and other controls to improve water quality conditions in the Klamath Basin. Experts in wetland treatment systems, waste water treatment systems, and agricultural Best Management Practices (BMPs) will describe options and their merits regarding the feasibility of applying nutrient and organic matter reduction technologies and applying these technologies at specific locations within the Klamath Basin. The expert presentations will address questions developed by the project Steering Committee to focus on the effectiveness and feasibility of each proposed strategy / scenario in the Klamath Basin, and to identify the most promising locations within the basin that will maximize the benefit and likelihood of success of these technologies.

### **Workshop Approach**

Invited experts and workshop participants will be given an information packet several weeks prior to the workshop that provides information on potential pollutant reduction projects that have been identified as candidates for application within the Klamath Basin. In addition participants will be provided evaluation criteria in the form of questions regarding feasibility and benefits for each pollutant reduction option. Invited experts will also be encouraged to bring to the workshop additional nutrient reduction alternatives. Some of the invited experts will be asked to prepare presentations on the pollutant reduction project scenarios and related topics that have been identified by the Steering Committee and described in the pre-workshop report. Following the presentations by experts, workshop participants will be organized into smaller break out groups that will be charged with developing applying the evaluation criteria to each project and develop recommendations for continued development of pollution reduction project(s) should move forward in the design process for application within the Klamath Basin. The workshop will conclude with a final plenary session where subgroups will report out from their breakout sessions and workshop participants will then be asked to develop a priority listing for pollutant reduction options that will help inform potential funding decisions regarding the development of engineering feasibility analyses.

## **Workshop Format and Logistics**

The following proposed workshop format is subject to modification by the project Steering Committee.

Please refer to the draft workshop session schedule (Attachment 4) for a summary of workshop sessions.

### *Session 1: Setting the Stage – morning first day*

This session will include a summary of existing water quality conditions, existing water quality standards for both States, a brief overview of current research and restoration programs (current and proposed), and an overview of the physical and social environment of the upper basin. This session will provide basic information on environmental setting, hydrology, program operations, and other factors that provide the necessary context for evaluating pollutant reduction options.

The background information will be summarized in the pre-workshop report that will be distributed in advance to workshop participants.

Large-Scale Programs: Review of existing or planned large-scale program(s) to capture lessons learned and to establish the workshop perspective regarding the application of a mixture of technologies on a large-scale to restore ecosystem functions. This session would include examples of other large-scale restoration programs that have occurred (e.g. Everglades and Salton Sea)

The final presentation in this session will provide an alternative perspective which involves a proposal for large-scale restoration to pre-disturbance conditions. This proposal will review historical changes over time and provide a comparison with conditions today which could provide useful context for subsequent discussions regarding more modest restoration proposals.

### *Sessions 2 (afternoon first day) and 3 (morning second day): Candidate Nutrient and Organic Matter Project Descriptions for candidate projects*

These sessions would be devoted to expert presentations and discussions of each of the projects identified by the Steering Committee for conceptual feasibility evaluation. Each session, to address a single large-scale pollutant removal technology, will generally be composed of a 45-minute presentation on the specific technology, followed by a facilitated 15-minute question and answer discussion.

Example candidate project sessions include those listed below, as well as others that may be recommended by the project Steering Committee:

- Wetland treatment systems
- Wastewater treatment systems
- Algae / biomass removal
- Ambient water treatment systems
- Sediment nutrient sequestration

- Sediment removal
- Wetland restoration
- Treatment Wetlands
- Diffuse Source Treatment Systems
- Sediment Sequestration
- Algae / Biomass Removal
- Wetland Restoration
- Sediment Removal
- Oxidation Technologies
- Other (Circulation?)

The Steering Committee will determine the final list of candidate projects for evaluation and the order of presentation at the workshop.

Session 4: Break Out Evaluation Work Groups (afternoon second day) and Plenary Reporting Out (afternoon second day)

Workshop participants will be divided into smaller work groups (up to 10 participants) to apply the conceptual feasibility criteria (developed by the Steering Committee) to each of the candidate projects discussed in Sessions 2 and 3. These smaller group sessions will last two to four hours. A recorder / facilitator will be assigned to each group to ensure that discussions are documented and that all points of view are heard. It is possible that the evaluation discussions for each project will vary in length with some candidates meriting more attention than others. Each work group will include at least one Steering Committee member who will be responsible for reporting back the recommendations / questions / evaluation summary to the larger group. The (i.e., Session 5).

Session 5: Plenary Reporting Out and Consensus Assessment (morning of third day)

Following the reporting out of each work group the full group will then engage in a discussion to determine if there is consensus on a priority ranking (including a discussion of geographic targeting) of the evaluated technologies. Following the discussion to resolve the degree of consensus on project ranking, the group will provide suggestions on next steps for project development. The plenary is expected to take four hours.

**Proposed Workshop Time and Location**

It is anticipated that the workshop will be held in the Winter of 2011. Because the workshop logistics will be the responsibility of the California Training Academy, the workshop will be held in California. The Steering Committee has recommended that the workshop be held in close proximity to a major airport (e.g., Sacramento) in order to minimize travel time for invited experts.

**Final Project Report**

Based on the workshop recommendations, a report will be developed that includes the recommendations, preliminary conceptual design of projects, and the pros and cons of the technological options discussed in the workshop. This post-workshop report should include

information on each of the pollutant reduction options evaluated at the workshop including the comments and observations of workshop participants. The priority ranking developed as part of the final plenary session will be the foundation for development of a coordinated network of large scale pollutant removal technologies located in the upper basin to improve water quality for the Klamath River. The final section of the workshop report will describe priority technological options and any benefits from sequencing or linking the projects as a network to restore Klamath Basin water quality.

### Steering Committee

This committee responsibility includes: preparing the final agenda, keeping the subcommittees on task, tracking overall project budgets, developing evaluation criteria, and review of technical products. The Steering Committee membership and contact information is included in Table 1.

### Subcommittees

In addition to a meeting place/ logistics and a wrap up subcommittee, there will be a subcommittee established for each of the expert sessions identified for Day 2. The responsibilities of the subcommittees include preparing for each session including identifying and securing the participation of the invited experts, formulating key questions and session facilitation.

## Attachment 1 – Draft Outline for Pre-Workshop Report

### Background Conditions, Evaluation Criteria, and Project Descriptions

---

---

The Pre-workshop report as described in Task 1 will include relevant background information as well as descriptions of projects and methodologies to be evaluated at the workshop. The report shall include, as a minimum:

#### Section 1: Workshop Overview and Introduction

- Origin of Workshop
- Importance of reviewing information prior to workshop
- Workshop format

#### Section 2: Evaluation criteria

- Description and rationale of the criteria to be used by all workshop participants to evaluate proposed project concepts
- Provide direction on formulation of additional criteria recommendations from invited workshop participants

#### Section 3: Geographic and physical setting (including maps)

- Current and historical land use, vegetative cover, demographics, etc.
- Basic information on projects' (irrigation and hydroelectric) infrastructure
- Hydrology
- Water quality summary tables – maps with current water quality constituent concentrations by reach.
- Current water quality research and monitoring
- Respective state water quality standards and basin plans

#### Section 4: Description of project concept proposals

- Three-page overview of each project/technology to be evaluated at the workshop
- Basic design information, potential location, estimated cost per unit removal and total cost, anticipated ecological impact, complementary benefits (e.g., biological diversity), similar applications, etc.

#### Section 5: Summaries of national / regional examples to be presented at workshop

- Chesapeake Bay
- Everglades
- Salton Sea
- Other

#### Section 6: Document and Project References

- Annotated references used both in the pre-workshop report and references useful for additional background work.

## **Attachment 2 – Draft Outline for Post-Workshop Report Project Evaluation Summaries and Conceptual Feasibility Designs**

---

The Post-workshop report as described in Task 3 will include relevant background information as well as descriptions of projects and methodologies to be evaluated at the workshop. The report shall include, as a minimum:

### Section 1: Workshop Overview

- Workshop format
- Workshop participation
- Workshop summary

### Section 2: Project evaluation criteria

- Description and rationale of the criteria to use to evaluate proposed project concepts
- Provide direction on formulation of additional criteria recommendations from invited workshop participants

### Section 3 – 10: Individual projects summaries and evaluations

This section shall include a summary Table of the projects/technologies discussed at the meeting and how they ranked. For the top 3 ranked project/technologies, a more detailed review will be presented.

For each alternative, the report shall include, as a minimum:

- a. Goals and capabilities
- b. Conceptual designs
- c. Preliminary capital and operations and maintenance cost estimates
- d. Environmental, regulatory, and permitting constraints
- e. Power requirements and power sources
- f. Land and water rights requirements
- g. Timeline for alternative development
- h. Pros and cons and related risks

### Section 11: Potential Network Scenario

- Potential for the combined effect of sequencing or linking individual proposed projects and consideration of other ongoing projects
- Potential reach outcomes

### Section 12: Next Steps (4 pages)

- Recommendation for priority project(s) to pursue
- Timeline for phased approach

### Section 13: References

Appendix 1: Workshop Work Group Meeting Notes

Appendix 2: Workshop presentations

Appendix 3: Steering Committee and Workshop Participants Roster

<b>Attachment 3 - IMIC 10 - Water Quality Workshop - Steering Committee</b>			
<b>Last Name</b>	<b>First Name</b>	<b>Affiliation</b>	<b>Email</b>
Andersen	Barbara	CA Water Boards Training Academy	<a href="mailto:BAndersen@waterboards.ca.gov">BAndersen@waterboards.ca.gov</a>
Anderson	Chauncey	US Geological Survey - OR Water Science Center	<a href="mailto:chauncey@usgs.gov">chauncey@usgs.gov</a>
Barry	Matt	US Fish and Wildlife Service	<a href="mailto:Matthew_Barry@fws.gov">Matthew_Barry@fws.gov</a>
Bowen	Michael	CA State Coastal Conservancy	<a href="mailto:mbowen@scc.ca.gov">mbowen@scc.ca.gov</a>
Bowman	Crystal	The Karuk Tribe - Water Quality Program	<a href="mailto:cbowman@karuk.us">cbowman@karuk.us</a>
Cameron	Jason	Department of Interior - US Bureau of Reclamation	<a href="mailto:jcameron@usbr.gov">jcameron@usbr.gov</a>
Crammond	Dar	US Geological Survey - OR Water Science Center	<a href="mailto:crammond@usgs.gov">crammond@usgs.gov</a>
Creager	Clayton	CA North Coast Regional Water Quality Control Board	<a href="mailto:ccreager@waterboards.ca.gov">ccreager@waterboards.ca.gov</a>
Dunsmoor	Larry	Klamath Tribes Research Station	<a href="mailto:lkunsmoor@aol.com">lkunsmoor@aol.com</a>
Gearheart	Bob	Humboldt State University (Professor emeritus)	<a href="mailto:Robert.Gearheart@humboldt.edu">Robert.Gearheart@humboldt.edu</a>
Hemstreet	Tim	PacifiCorp	<a href="mailto:Tim.Hemstreet@PacifiCorp.com">Tim.Hemstreet@PacifiCorp.com</a>
Hicks	Jon	Department of Interior - US Bureau of Reclamation	<a href="mailto:jhicks@usbr.gov">jhicks@usbr.gov</a>
Holdren	Chris	Department of Interior - US Bureau of Reclamation	<a href="mailto:GHoldren@usbr.gov">GHoldren@usbr.gov</a>
Keydel	Sue	US EPA Region 9	<a href="mailto:keydel.Susan@epa.gov">keydel.Susan@epa.gov</a>
Kirk	Steve	Oregon Department of Environmental Quality	<a href="mailto:kirk.steve@deq.state.or.us">kirk.steve@deq.state.or.us</a>
Louis	Gail	US EPA Region 9	<a href="mailto:louis.gail@epa.gov">louis.gail@epa.gov</a>
Nigg	Eric	Oregon Department of Environmental Quality	<a href="mailto:NIGG.Eric@deq.state.or.us">NIGG.Eric@deq.state.or.us</a>
Prendergast	Linda	PacifiCorp	<a href="mailto:Linda.Prendergast@PacifiCorp.com">Linda.Prendergast@PacifiCorp.com</a>
Youngs	Margie	CA Water Boards Training Academy	<a href="mailto:MYoungs@waterboards.ca.gov">MYoungs@waterboards.ca.gov</a>

Attachment 4 - IM 10 Water Quality Workshop  
Workshop Session Summary and Schedule

