Tribal Water Quality Monitoring Programs in the Klamath River and Major Tributaries

Crystal Bowman - Karuk Tribe
Ken Fetcho – Yurok Tribe

National Water Quality Monitoring Council
8th Annual Conference Portland, OR

Jurisdictions and Stakeholders

- Two States: California, Oregon
- Two EPA Regions: 9 and 10
- Six Federally Recognized Tribes: Klamath, Karuk, Quartz Valley, Hoopa, Resighini and Yurok
- Stakeholders:
  - Agriculture
  - Commercial and Tribal Fisheries
  - Hydropower – 4 dams
  - Timber

- KHP
- Major Tributaries
- Ancestral Territories

Klamath Basin Water Quality Monitoring Plan: General Map of the Klamath Basin

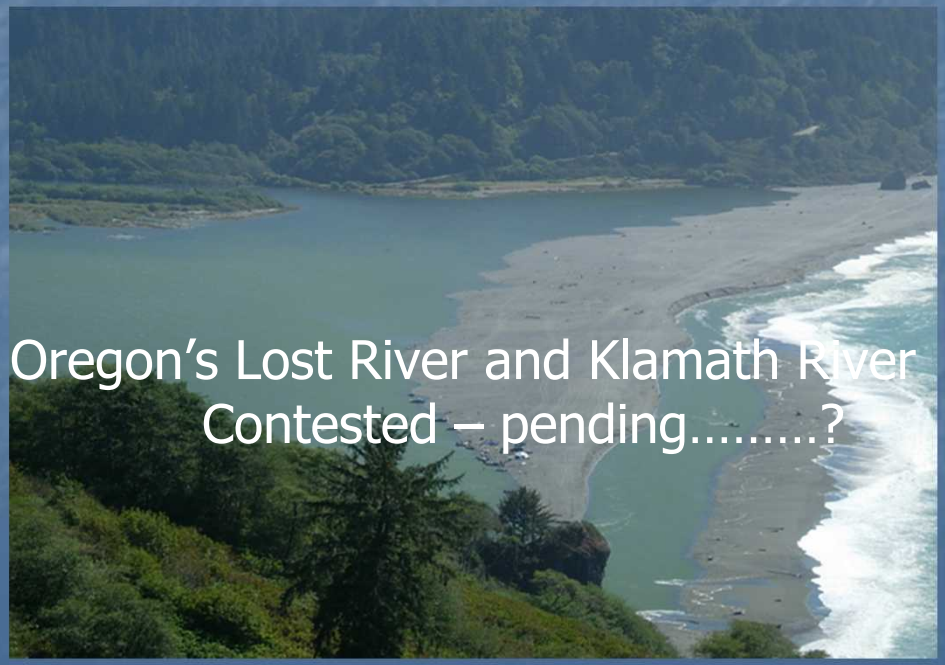
KHP Dam Removal

- 2006 FERC KHP License Expires
- 2006 Negotiations for Dam Removal Begins
- 2010 KHSA/KBRA Signed by Parties
- Implement 2012 KHSA and KBRA
- Secretarial Determination*
  - Interest of Public
  - Advance Fisheries
- Awaiting for KBRA legislation

*Disclaimer: Dam Removal must be done for < $450,000,000

Klamath Basin Total Maximum Daily Load (TMDL)

- Trinity River (2001) – sediment
- Salmon River (2005) – temperature
- Scott River (2005)
  - temperature
  - sediment
- Shasta River (2006)
  - temperature
  - dissolved oxygen
- Klamath River (2010) - CA
  - temperature
  - nutrients
  - dissolved oxygen
  - Microcystin
- Lost River (2010) – CA
  - Temperature
  - dissolved oxygen
  - ammonia toxicity
  - chlorophyll a



Oregon's Lost River and Klamath River Contested – pending.....?

Background on Formation of Tribal Coordination in the Klamath Basin

- **2001 WQ Coordination begins – USFWS, Yurok and Karuk Tribes**
- **2006 Yurok and Karuk Tribes**
  - **fully supported project planning**
  - **funding acquisition**
  - **data management**
  - **reporting**
- **Leverage CWA 106 funds to pursue other funds**
  - **US BOR, BIA, PacifiCorp, State of CA and OR**
- **Program that covers over 190 river miles on the Klamath River and 4 major tributaries**

Klamath Basin Tribal Water Quality Workgroup (KBTWQWG)

- Fish kill 2002 over 30,000 adult salmon died on the lower Klamath River
- Yurok Tribe wrote letter to USEPA Regional Administrator expressing dissatisfaction
- USEPA funds all 5 CA Tribal jurisdictions to help address unmet scientific needs – both monitoring and technical analysis assistance

KBTWQWG

- Jointly selected highly qualified consulting firm with funding
- Assistance in reviewing and developing comments for the following:
  - -TMDL development process
  - -FERC relicensing process and Secretarial Determination Process
  - -State process to regulate WQ on USFS lands in CA
  - -Suction Dredge Regulatory Process
  - -Scott and Shasta River ITP Process
- Analyze existing data and develop technical reports

-Asarian, E. J. Kann, and W. Walker. 2010 River Nutrient Loading and Retention Dynamics in Free-Flowing Reaches, 2005-2008.

-Asarian, E. J. Kann, and W. Walker. 2009 Multi-year Nutrient Budget Dynamics for Iron Gate and Copco Reservoirs

Klamath Basin Monitoring Program (KBMP) Participation

- KBMP is a multi-agency organization which strives to implement, coordinate and collaborate on water quality monitoring and research throughout the Klamath Basin. The KBMP evolved out of a collective concern regarding water quality issues facing the Klamath Basin.
- KBMP offers members and interested parties a forum for constructive synthesis and coordination of water quality monitoring efforts. KBMP members host an annual meeting aimed at addressing water quality concerns basin wide.

Purpose of WQ Monitoring

- Gather baseline information to:
  - improve our understanding of the Klamath River health as a whole
  - to help identify potential limiting factors and/or new studies
- Data will be used by other agencies and future water quality and fisheries management professionals.

Reports available on-line and data is submitted to WQX

Identified Objectives

- To establish baseline conditions across a wide array of water years
- To track long-term spatial and temporal trends through consistent, comparable sites and methods
- To document effects of various short-term and long-term management and regulatory actions throughout the basin

Klamath and Major Tributaries WQ Monitoring Activities

- **Continuous water quality monitoring datasondes**

- **Grab Samples**
  - nutrients
  - phytoplankton speciation and enumeration
  - cyanotoxins – baseline and public health

- **Periphyton Sampling**
  - speciation and enumeration
  - biomass (chl.a)

Real-Time Continuous Water Quality Monitoring

-SITES-

- 6 Mainstem Klamath River sites
- 4 Major Tributaries

-Frequency-

- May to November
- 30 minute interval

-Equipment-

- YSI 6600 Extended Deployments Systems Design Analysis data logger and transmitters

-Parameters-

- Water Temperature
- pH
- Dissolved Oxygen
- Specific Conductivity
- Phycocyanin

Grab Sampling

-Sites-

- 9 Mainstem Klamath River sites
- 4 Major Tributaries

-Methods-

- Churn Splitter
- Surface Grabs with wide mouth jar

-Frequency-

- Bi-weekly May – October
- Monthly November - April

-Parameters-

- Phytoplankton species ID and counts
- Nutrients
- Microcystin

Nutrient Related Analytes

- TOTAL-Phosphorus
- SRP (Ortho Phosphorus)
- TOTAL-Nitrogen
- NITRATE + NITRITE
- AMMONIA NITROGEN
- Chlorophyll-a/Phaeophytin-a
- Particulate Organic Carbon
- Dissolved Organic Carbon
- TOTAL Suspended Solids
- Volatile Suspended Solids
- ALKALINITY
- Turbidity

2011 Periphyton Pilot Project

-Sites-

- 8 Mainstem Klamath River sites

-Methods-

- Point Sampling
- Transect Sampling

-Frequency-

- Monthly June – October
- August transects: 2 sites only

-Parameters-

- Benthic Algae Species ID and counts
- Total Density (#/ml)
- Total Biovolume (um3/mL)
- Biomass -Periphyton chlorophyll-a

Benefits of Coordination

- Communication on method development
- Equipment and lab selection process
- Improved efficiency
- Comparable data
- Access to data
- Strength in numbers
- Familiarity of conditions outside network
- Place data in context of larger picture
- Assistance to neighboring Tribes
- Filling Data Gaps = Meeting Scientific Needs

Uses of Data

- Understand linkages with nutrients, WQ parameters, periphyton and toxic algae
- Real-Time Continuous WQ – Klamath Fish Health and Assessment Team
- TMDL development and tracking progress
- Provides evaluation of water quality effects on tribal resources
- Evaluate short and long term effects of dam removal to track temporal and spatial trends

Conclusions

- Technical coordination builds strong ties in the Basin
- Solidarity sends a strong message to Federal and State agencies to show ownership of the river and thorough knowledge of conditions and analysis of impairments
- Established network to efficiently collect additional pre and post dam removal data

Questions/Comments??