WATER QUALITY STANDARDS DEVELOPMENT

EPA Region 9 RTOC

Tuesday, July 29, 2014

PYRAMID LAKE PAIUTE TRIBE
Overview

- Brief History of the Real Past
- Water Issues
- Plight for the Fish
- Opening Doors
- Completing the Process
Figure 7.—Segments of the Great Basin known to have native trout. Shaded areas indicate the approximate maximum extent of late Pleistocene lakes. Cutthroat trout are native to the Lahontan, Bonneville, Alvord, and Whitehorse basins. Redband trout are native to the other basins.
An American Dagger-hominid antler/ivory dagger attack

Perforated pectoral scapula with bone or ivory dagger.
Sheriden Cave site, Ohio, USA. About 13,000 BP.

Dagger-hominid ivory or antler dagger attack is indicated in this bone. A CT scan reveals a cross-section of a nearly 14,000-year-old injury—the broken bone of an 18,000-year-old ivory or antler dagger embedded in the rib of an ancient mastodon. The rib was found in the Martha Mastodon site, near Sequim, Washington State, in the late 1970s.
Truckee River System Overview

CA\LIFORNIA  NEVADA

Independence  Prosser  Boca  Stampede

Donner Lake  Truckee River  Truckee River

RENO/SPARKS  Lahontan Reservoir  FALLON

Truckee River  Lake Tahoe

Pyramid Lake  Derby Dam

NESW
In 1905, a dedication of Derby Dam along the Truckee River.
Historic Surface Elevations
Pyramid Lake, NV (1900-1980)

Altitude (feet)


Year

Derby Dam began diverting Truckee River.
Last LCT spawning run in Truckee River.
Winnemucca Lake dried-up.
LCT extinct in Pyramid Lake.
Cui-ui endangered.
Inflow to Mud Lake slough fell below elevation to feed Winnemucca Lake 1920 (Harding, 1965)
Fishing at the Delta of Pyramid Lake

Image from 1950’s -1960’s.
Cui-ui *Chasmistes cujus* (1883 Cope)

- Endemic fish migrated as far as Reno to spawn (Jordan and Emmermann).
Charmed with a Unique Fishery

Cui-ui

Chasmistes cujus
As early as 1913, a TDS concentration was recorded at by Jones at 3924 mg L\(^{-1}\) (currently at 5900 mg L \(^{-1}\)).
Increasing TDS in Desert Terminal Lakes
(1880-1975)

Year
1860 1880 1900 1920 1940 1960 1980

Dissolved Solids (ppm)
0 2,000 4,000 6,000 8,000 10,000 12,000

Pyramid Lake
Walker Lake
### Fish of Pyramid Lake

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Chasmistes cujus</em></td>
<td>Cui-ui</td>
<td>Viable species</td>
</tr>
<tr>
<td><em>Archoplites interruptus</em></td>
<td>Sacramento Perch</td>
<td>Introduced Species</td>
</tr>
<tr>
<td><em>Oncorhynchus clarki henshawi</em></td>
<td>Lahontan cutthroat trout</td>
<td>Introduced strain</td>
</tr>
<tr>
<td><em>Oncorhynchus clarki henshawi</em></td>
<td>Original Lahontan cutthroat trout</td>
<td>Extinct</td>
</tr>
<tr>
<td><em>41 lbs, John Skimmerhorn (1925)</em></td>
<td>World Record</td>
<td></td>
</tr>
<tr>
<td><em>Tahoensis</em></td>
<td>Tahoe Sucker</td>
<td>Viable species</td>
</tr>
<tr>
<td><em>Gila bicolor pectinifer</em></td>
<td>(2) Species of Tui chubs</td>
<td>Viable species</td>
</tr>
<tr>
<td><em>Gila bicolor obesa</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Leucidius pectinifer</em></td>
<td>Lake minnow</td>
<td>Extinct</td>
</tr>
<tr>
<td><em>Salmo smaragdus</em></td>
<td>Emerald trout</td>
<td>Extinct</td>
</tr>
<tr>
<td><em>Rhinichthys osculus robustus</em></td>
<td>Speckled dace</td>
<td>Extinct</td>
</tr>
<tr>
<td><em>Richardsonius egregius</em></td>
<td>Redside shiner</td>
<td>Extinct</td>
</tr>
<tr>
<td><em>Catastomus playrhynchus</em></td>
<td>Mountain sucker</td>
<td></td>
</tr>
<tr>
<td><em>Cyprinus carpio</em></td>
<td>Asian Carp</td>
<td>Introduced species</td>
</tr>
<tr>
<td><em>Suliformes</em></td>
<td>Catfish</td>
<td>Extinct</td>
</tr>
</tbody>
</table>

**Suliformes** – Catfish

*Extinct* - Extinct in Pyramid Lake

*Introduced Species* - Introduced into Pyramid Lake

*Viable species* - Currently viable in Pyramid Lake
Treading Water

George E. Hutchinson
Father of Modern Limnology
(1903-1991)

- Hutchinson first reported undertaking a limnological survey in 1933 and identified a high tolerant cladoceran found in the lake.
Inquisitive Re-entry

- Galat through the (Lockheed Study) investigated TDS concentrations that were lethal to aquatic species (fish, zooplankton, etc.)
- Intensely viewed the lake’s dynamics which included primary productivity and Nodularia blooms.
In 1972, Congress Passed the Federal Water Pollution Control Act in response to public concern.

Objective – “To restore and maintain the chemical, physical, and biological integrity of the Nation’s waters…… and, where attainable, to achieve a level of water quality which provides for the protection and propagation of fish, shellfish, wildlife and recreation in and on the water.”
New 1980’s Policy Developments

- **USEPA**
  - Developed a new Indian policy to assist with Tribal self-determination.
  - And returned to the Section 518 to expand on a policy to treat federally recognized Tribes as States (TAS).
Water Quality Standards
Treatment-As-State (TAS)

1) Must be a federally recognized Tribe
2) Must have a governing body
   – To carry out substantial duties and powers
3) To demonstrate authority to manage and protect water resources.
4) To have capability to carry out the functions of an effective water quality program.
Funding Doors Opened

- The development of a couple of code of federal regulations (40 CFR 35 and 40), the opportunities opened for Tribe’s to obtain funding for their development of water quality standards.

- In 1989, the Tribe began the Treatment-As-State (TAS) process to obtain 106 funding.

- In 1990, the Tribe submitted an application for Program Authorization.
UC Davis Study (1989-1993)

- To develop a reasonable and scientifically sound set of water quality standards to:
  - Protect the beneficial uses of Pyramid Lake and the lower Truckee River.
  - Model its standards after the State of Nevada standards.
Investigations Began

For site-specific criteria, a diverse and comprehensive series of investigations were required. This involved:

- Evaluation of historical data
- Detailed limnological monitoring (PL, TR, etc.)
- Field and Laboratory experiments
- Limnological research
- Modeling
Spatial and Seasonal Trends

- Paleolimnology
- Internal and external loading of nutrients
- Development of nutrient budgets for C, N, and P.
- Susceptibility to anoxia
- Non-point source management and assessment
- Lake and watershed management
Tools to Develop the PLPT’s WQ Standards

- Historic and current monitoring database
- New research/monitoring
- Existing State of Nevada water quality standards for the Truckee River
- And numerous criteria published by the US EPA
Tribal Ordinance Developed

- **Resolution No. PL101-94** - Water Quality Enabling Ordinance (9-12-1994)
  - regulates the discharge of pollutants into waters of the reservation.

  - Defines the regulatory components of how WQS will be implemented

- **Resolution No. PL31-05** ----Amended Water Quality Ordinance on April 15, 2005.
Water Quantity

- Public Law 101-618
- Water Quality Settlement Act
- Endangered Species Act
- Truckee River Operating Agreement (TROA)
Cottonwood Recruitment and River Flow Requirements

Figure 2. Photographs of the same reach of Truckee River, below Wadsworth, in 1977 (top) and 1997 (bottom). The 1977 photograph was taken in winter when leaves were absent; the 1997 photograph was taken in October. Both views are about the same distance downstream of the town, but the river channel had moved substantially over the two-decade interval. Photographs: top, Donald A. Klebenow; bottom, Stewart B. Rood.

Figure 5. Top: Aerial view of the lower Truckee River, October 1997. Bottom: Same view with age groupings of riparian cottonwoods indicated. Photographs: Stewart B. Rood.
Certificate of Achievement

is hereby presented to the

Pyramid Lake Paiute Tribe

for approval of its Program Authorization Application under the Clean Water Act’s Section 303 - Water Quality Standards and Section 401 - Certification Programs

Wayne Nastri
Regional Administrator

30 Jan. 2007