



## The Early Years – 1928-1962

Wise folks were looking to the future in 1928 when H. R. Smith filed for water rights to store 50,000 acre feet of water in Moses Lake. On March 25, 1929, he assigned this permit to E.A. Rudloff, who in turn assigned the water rights to the Moses Lake Irrigation District on March 29, 1929.

In its early years the District was primarily concerned with irrigation and construction of an impounding structure and outlet works to contain and control the water level of Moses Lake at or near an elevation of 1046 feet.

Work on the impounding structure was completed in the spring of 1930. There was also a timber dam approximately one mile southeast of the new outlet structure that washed out in May of 1940. A replacement embankment was subsequently constructed by “end dumping” material following advice from the State Department of Conservation & Development based on 1941 surveys by the District Engineer, A.B. Clark.

On October 8, 1952, the Moses Lake Irrigation District’s “Certificate of Surface Water Right” to store 50,000 acre feet of water in Moses Lake was perfected and filed with the Grant County Auditor’s office. This was the era when the Bureau of Reclamation’s Columbia Basin Irrigation Project was becoming a reality. With thousands of acres now under irrigation, concerns were raised about greater flows through the lake, raising the lake level by 2 feet to elevation 1048, and water pressure near the outlet. This was resolved through construction of a second outlet control structure by the Bureau of Reclamation in the mid 1960’s.

As irrigation and fertilizer use increased, District responsibility expanded to include recreation and also to deal with seriously degrading water quality. A committee of 40 citizens was formed to determine what could be done. This led to a request for the state legislature to allow conversion from simply providing irrigation services to deal with lake restoration. Legislation was enacted to allow Irrigation and Rehabilitation Districts, Chapter 87.84 RCW. Shortly thereafter, through a rate payer petition process, the District became the Moses Lake Irrigation *and Rehabilitation* District on April 17, 1962 while Karl Goodrich served as the District Chairman.

To deal with pollution and algae, early water quality remediation efforts included:

- Copper sulfate for algae control

- Pollution studies by University of Washington Civil Engineering
- Dilution experiments were proposed, but the South Irrigation District prevented this from being carried out.

## **District Mission Expands – 1962-1980**

To provide for lake recreation as the former Larson Air Force Base was being decommissioned, the “Program of Utilization” for Airmen’s Beach Park was drawn up in 1967 between the Government Surplus Agency (GSA) and the District, signed in 1968.

District obligations under this contract include:

- Annual Report to GSA on improvements, uses, and expenditures for recreation improvements
- Provide a master plan and annual updates on improvements
- Submit proposed projects, comments, and approvals

By the 1970’s Moses Lake had reached such a magnitude of nutrient loading from fertilized irrigation that excess nutrients in the water actually remained unused during the summer growing season. Phosphorus was thought to be the principal cause and that nutrient control showed the most promise in reversing the problem. The effects of this enriched state in Moses Lake were numerous and undesirable for most water uses. Most effects resulted from the dominance of plankton by nuisance species of blue-green algae such as: *Microcystis*, *Aphanizomenon*, *Anabaena*, *Coelosphaerium* and *Aphanocapsa*. These species floated during warm days, accumulated at the surface in scum and were blown onto beaches where decomposition resulted in “odors similar to those of a pig sty” (E.B. Welch). These large floating masses were unsightly, interfered with fishing, swimming and other recreational uses and left undesirable tastes and odors in the flesh of fish. To save the lake as a community resource, something had to be done.

Due to the lake’s status as decaying in a state of “hypereutrophy” (Bush and Welch, 1972), a University of Washington study on alternative controls was completed in July of 1973. The study purpose was to determine which nutrients were controlling the trophic state of the lake, what were the principal sources of those nutrients, and recommended methods showing the most promise in improving or “recovering” the lake. In the Rocky Coulee Wasteway, the principle sources identified were the Trout Lodge Fish Hatchery, irrigation discharge, and subsurface seepage. In the Crab Creek Tributary, sources identified were fertilizers from irrigation waste water, farm animals, Columbia Basin fish hatchery, and a livestock sales yard.

Study conclusions provided two main recommendations: 1.) Increase inflows from Crab Creek and Rocky Ford Tributaries to “flush” the Moses Lake Reservoir to O’Sullivan Reservoir. 2.) Control the waste waters from irrigation and fish hatcheries by pretreatment and other best management practices (BMP).

In 1977, a water “dilution” pilot program was carried out by Brown & Coldwell Engineering. This narrowed an array of alternative lake rehabilitation treatment methods to one, a recommendation that nutrient-rich lake water be diluted with high-quality Columbia River water. The pilot project was carried out in Parker Horn using Columbia River water transported into the lake via the East Low Canal, Rocky Coulee Wasteway, and Crab Creek.

The results and findings of the 1977 Pilot Project indicated that desired water quality conditions could be achieved by routing Columbia River water into the lake at three points. Recommended dilution water flows were: 1.) Upper Parker Horn — 100-200 cubic feet per second (cfs) or less if the effects of Crab Creek were minimized. 2.) Upper Pelican Horn — 50 cfs. 3.) Upper end of the main lake — 400—600 cfs.

It was further shown that the most feasible and cost effective manner to supply required dilution water into Moses Lake would be to divide the overall rehabilitation effort into three separate projects, each with its own schedule and budget, rather than attempt to restore the entire lake as a unit. Separate plans were developed for Parker Horn, Pelican Horn, and the main water body.

The Parker Horn Project consisted of an agreement with the Bureau of Reclamation to increase flows through Crab and Rocky Ford creeks with no additional cost incurred. The Pelican Horn Project recommended construction of a pumping plant at the extension of Beach Street with a 2,000 foot, 36-inch transmission line to pump flows into Pelican Horn. Total project construction was estimated at \$688,000 and annual operating costs of \$10,000.00.

Main Lake recommendations called for the District to collaborate with the Bureau of Reclamation and Quincy East, and South Columbia Irrigation Districts. The plan was to develop the proposed second water feed route as a multi-purpose project, not only to supply irrigation water to Potholes Reservoir but also to route dilution water through the main lake and Parker Horn.

## **Increased Complexity of Lake Management – The 1980’s**

It is important to note that the Moses Lake watershed included in these projects covers

over 2,400 square miles and extends from Moses Lake east to about 30-miles from Spokane. Approximately 60-percent of this drainage basin was then utilized for agricultural purposes and the remainder was predominantly rangeland.

In 1980, Brown & Caldwell prepared three major reports:

1. Moses Lake Agricultural Best Management Practices Restoration Project,
2. Environmental Impact Statement and
3. Drawings & Specifications, Parker Horn Pumping Station and Pipeline project.

The Agricultural Best Management Practices (BMP) Project examined existing dry-land and irrigated practices in the Moses Lake drainage area; expected impact of “208 swales” (non-point source water quality management programs in surface water pollution abatement); and projected effects on the Moses Lake Restoration Project.

The Parker Horn Pump Station contract was awarded in August, 1981 to IMCO General Construction, Inc. for \$ 795,855.37 to enhance water quality in the Pelican Horn section of Moses Lake by transfer of high quality Columbia River water supplied by the Bureau of Reclamation from mid-March until September. This water, which enters Parker Horn via Rocky Coulee Wasteway and Crab Creek, dilutes algal blooms and increases the lake’s value for recreational uses.

Parker Horn was completed at a cost of \$875,000.00 during the summer of 1982 with grant funds provided to the District by the Department of Ecology and the Environmental Protection Agency. A second dilution project was determined to be non-feasible so additional grant funds were used to assist in removing the City of Moses Lake’s sewage effluent from Pelican Horn and evaluation of nutrient controls further upstream in the watershed.

Later grants helped produce a three-phase plan known as the Moses Lake Clean Lake Project report, a five year effort completed in March, 1990 to further restore water quality. Accomplishments included reports and new approaches to lake restoration.

1. Identification- Nutrient sources, data collection, monitoring, March 1984
2. Nutrient Control & Practice Demonstrations, Feasibility Analysis, March 1985
3. Implementation of Stage 2 control practices, April 1985-March 1987

While the complex nature of lake re-habilitation remains a challenge today, major steps toward a healthy and more user-friendly lake were undertaken in the 1980's.