Big Pine Paiute Tribe of the Owens Valley

Practicing Water Conservation and Education to Sustain Future Generations

The Big Pine Paiute Tribal Utility Department (the Utility) developed a successful water conservation and education program providing benefits for both current customers and future generations. The foundation of the program is the belief that the Tribe is a steward of the land and its waters. That commitment has enabled the Utility to implement a strong program where water conservation is a reality.

> ***"Water conservation is about respecting water and fairness across our community."***
>
> *– Alan Bacock*
> *Environmental Department Water Program Coordinator*

Realized Benefits

- The Utility is reducing domestic water use.
    - Installation of water meters allowed the Utility to track individual customer's water usage. This brought awareness to customers of the volume of the water they consumed and enabled the Utility to charge customers according to their use. As a result, the Tribe has reduced domestic water usage by over 65 percent from 2007 to 2011 (Figure 1).

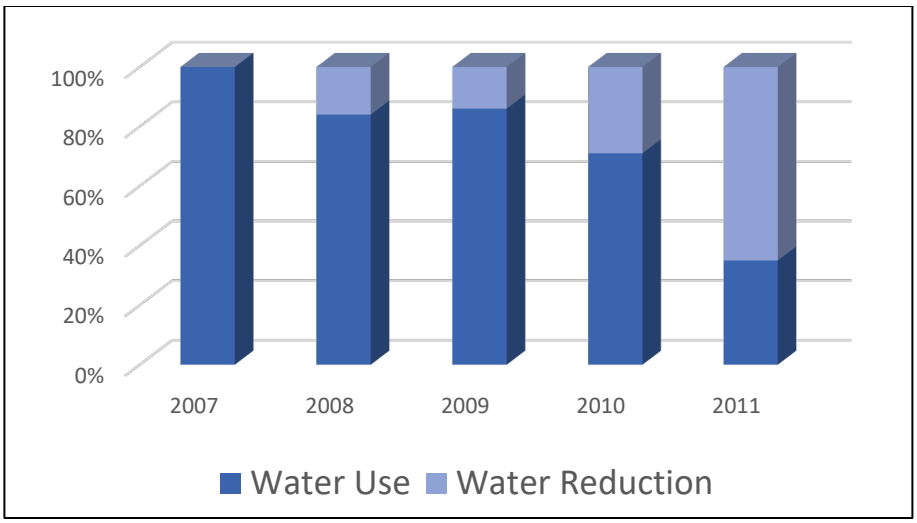

Figure 1. Percent Reduction in Domestic Water Use from 2007 to 2011 for the Big Pine Indian Reservation.

- The Utility currently operates solely on user fees and is no longer subsidized by the Tribe.
    - Funds previously used to subsidize the Utility can now be used to support other Tribal programs and services to the community.
- The Utility reduced water loss from the irrigation system and improved access to non-potable water for the community.
    - Improving the irrigation system supported the domestic water conservation program by providing the community a source of clean water for food production and landscaping purposes. Repairs to the deteriorated irrigation system increased water availability to the community resulting in less use of the potable water system.

Background

The Tribe has long recognized water as a precious resource that must be respected. Big Pine Paiute Tribal ancestors moved water slowly across the landscape to maintain a subsistence lifestyle and increase the quality of life of all organisms. This correlates to a saying used by the Tribe, "Paya [Water] is Life."

Located in Big Pine, California, northwest of Death Valley, the Tribe had a history of water shortages prior to initiating the water conservation program including extreme cases where some customers had no access to water for short time periods. Convincing customers to conserve water was initially challenging especially since customers knew that water that is not used by the Tribe and others in the Owens Valley is diverted to the city of Los Angeles. The lack of water for irrigation, limited conservation practices, and the resultant water outages drove the need to establish a Water Conservation and Education Program.

Figure 2. Big Pine Tribe Location.

Big Pine Customers

- *550 residents*
- *198 connections*

The Big Pine Drinking Water System

Provides drinking water service to all residential and commercial customers except the mobile home park and consists of:

- *One well (A second well is currently in the design phase)*
- *One tank*
- *Water mains*
- *Chlorine disinfection*

The Big Pine Sewer System

Provides sewer service to all residential and commercial customers and consists of:

- *Sewer collection system mains*
- *One lift station*
- *A two-cell lagoon*

Operating and Maintaining Three Systems

The Utility is responsible for operations and maintenance of the water and sewer systems and the irrigation system. There is one full-time operator to staff all three systems. The Big Pine Paiute Environmental Department is separate from the Utility but is responsible for collecting compliance samples and applying for grant funding.

Innovative Water Conservation and Education Program

In 2008, the Utility received a grant from the Bureau of Indian Affairs (BIA) to develop a Water Resource Management Plan. The plan included several key elements critical to improving water conservation, such as:

- The cost of supplying water to customers,
- Water use trends,
- Leak detection strategies, and
- Water meter implementation.

From the plan, the Utility identified numerous community water conservation and consumer education projects, for which they obtained additional funding from the BIA. A key aspect of the management plan was to promote efforts to educate consumers about water conservation.

This plan enabled the Utility to seek funds from the Bureau of Reclamation (BOR) which provided funding for implementing the plan. BOR funding helped the Utility in the early 2000's to initially provide more water accessibility from the irrigation system and from 2012 supported the water conservation efforts of the Tribe. In addition to funding water conservation efforts, BOR also helped the Utility to establish a drought contingency plan to put in motion actions for greater drought resilience.

What About Potential Cross Connections?

The domestic water system (potable water) and irrigation system (non-potable water) are two distinct systems with separate piping networks.

Water Conservation Projects

The Irrigation System

One of the ways the Tribe conserves domestic water is by using non-potable water for irrigation. In the 1940's, in exchange for land the Los Angeles Department of Water and Power made an agreement with the Tribe to supply just over 1,100 acre-feet of non-potable water per year in perpetuity. To utilize this water source, BIA built an irrigation system that distributed non-potable water from a holding pond to different areas of the reservation through a network of large mains. Valves located in 12-inch manholes were used to discharge the water; the original design was to flood open lands for agricultural purposes. Because the system is operated by gravity, some areas would flood more than others. As the Tribe grew and more houses were built, flood irrigation became a hazard for some new residences. As a result, use of the non-potable irrigation water declined and use of domestic water for irrigation increased.

Figure 3. A residential irrigation system including a storage tank and small pump. *Photo Credit: Alan Bacock, Water Program Coordinator.*

To conserve domestic water by better utilizing the non-potable water, the Tribe has been working with BOR to include controls and efficiencies to limit flooding during irrigation. These efforts include installing:

- Yard hydrants to allow users to connect hoses to the system,
- Small pumps to pressurize the flow, and
- Additional piping to reach more homes.

The Tribe also improved the irrigation system by encouraging LADWP to repair the deteriorated watermain and incentivizing customers to use non-potable water for irrigation by eliminating charges for that water.

With a dual system in place (domestic and non-potable) water demand is better balanced to provide the appropriate type of water for its intended use.

> **"One customer's water use impacts all customers."**
>
> *– Alan Bacock Environmental Department Water Program Coordinator*

Domestic Water Meter Installations

In addition to the modifications to the irrigation system, the Water Resources Management Plan also identified the need to track domestic water usage. The Utility initially began installing meters on commercial facilities to track water usage from large domestic water users. As funding became available, the Utility installed water meters on homeowner connections. This effort identified the high-demand and the low-demand water users. Water metering allowed the Utility to transition water fees from a flat rate system to a rate structure that accounts for water usage. Now the Utility is fully funded through user fees rather than Tribal subsidies.

Education and Community Outreach

When the Water Conservation Plan was written, the Utility started a robust education plan to inform users about the importance of conserving water. The focus began with teaching customers that there is a limited supply of available water and explained, based on current practices, why the Utility was frequently running out of water.

Education efforts have included:

- Door-to-door discussions with customers on the importance of water conservation and water use.
- Identifying and reaching out to high domestic water users. Every month, the Utility develops a 'top 20' list of the highest water users to be read at Tribal Council meetings.
    - Prior to publicizing this data some customers were unaware of their high-water usage.
- Providing educational materials through Posters, Tribal Education Fairs, and Tribal Newsletters.

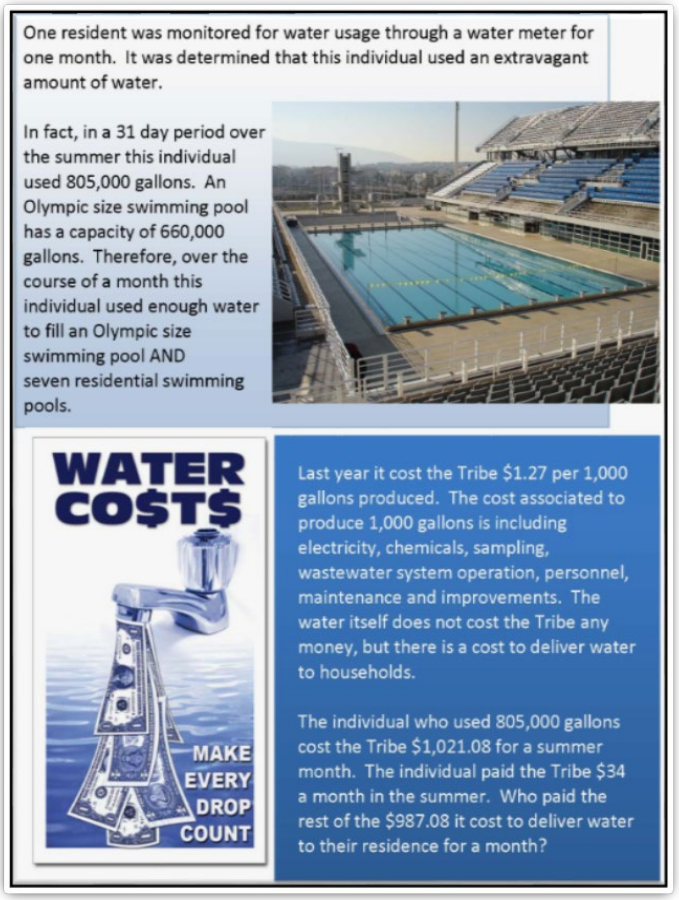

Figure 4. Poster display to encourage customers not to waste water.

Figure 5. Educational materials on water conservation and other conservation measures at a Tribal Education Fair. *Photo Credit: Alan Bacock, Water Program Coordinator.*

Program Successes in Overcoming Challenges

The greatest challenge in establishing a successful Water Conservation Program is convincing customers that conservation is necessary. This presented a significant challenge for the Utility because when irrigation water is not used, it is diverted to LADWP. As a result, customers were not motivated to conserve water. To overcome this obstacle, the Utility has spent several years educating the community on the importance of water conservation. In addition, the Utility changed the focus from water conservation to water itself, emphasizing that water is to be respected. Repairs to the irrigation system and installation of meters enable the Utility to provide tangible data showing water usage by customer and identifying high users. Successes of the program include:

Changing a customer's way of thinking regarding water conservation can be challenging and requires dedication and patience on the part of the Utility.

- Reduced demand on drinking water system due to irrigation system repairs.
- Improved community relations due to a realistic and transparent budget, and customers who understand the true cost of water.
- Customers willing to pay their fair share and the Tribe no longer needs to subsidize the utility which allows Tribal funds to be used for other programs and services.
- Increased funding for capital projects from Bureau of Reclamation due, in part, to the system being fully funded through user fees.

Lessons Learned and Looking to the Future

Big Pine Paiute Tribal Utility Department has developed an effective water conservation and education program that positively impacts the Tribe now and will continue to provide future benefits. The Utility has shown that it is possible to achieve a successful conservation program even in the face of many obstacles. The Utility acknowledges that the road to success is not easy and that changing customer water usage and promoting conservation practices is a lengthy process requiring significant Utility resources.

"It is not just a paycheck to me, it's serving my community"

– Paul Huette
Big Pine Paiute Tribal Utility Department Operator

The key to changing water use practices is to educate customers by providing data showing water usage on an individual basis and a community basis. The Utility also provides data to show how user fees are utilized so customers know the Utility is fiscally responsible. This transparency gives customers an appreciation for the resources required to operate and maintain water, wastewater and irrigation systems.

The Utility is always seeking out ways to improve water conservation. In the fall of 2017, the Utility completed a preliminary engineering report including design plans to upgrade the irrigation system. Reducing water loss will allow more water to be available now and in the future.

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EPA United States Environmental Protection Agency

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