

The Importance of Water Quality Sampling (Cont. Page 12)



have been collected, samples are transported to the Tribe's Water Quality Lab in Sutcliffe for lab analysis. These analyses include dissolved reactive phosphorus, total phosphorus, nitrate, nitrite, ammonia-nitrogen, and total Kjeldahl nitrogen. Nutrients are important because an influx in both nitrogen and phosphorus can lead to excess algae growth, which eventually decays and produces bacteria that depletes dissolved oxygen needed by aquatic life.

Why is all of this important? Everyday activities can impact the waters we see daily. When we sample, we are taking a "snapshot" of the water quality at that point in time. Another reason we collect and compile our data is to ensure our water quality standards are being met, and to protect our waters from degradation. The data we collect helps us track the health of tribal waterbodies and determine management actions to protect and improve water quality conditions.



Sampling/Sonde Readings at Tile Drain Site



Taking Sonde Readings at Pierson Dam Site



Sampling at Paiute Pit Site



Sampling at Tile Drain 1 Site



Taking Sonde Readings at Tile Drain Site 1



Sampling at Nixon Bridge Site



Sampling at Pierson Dam Site



Taking Sonde Readings at Tile Drain 1 Site



Sampling/Sonde at Readings Tile Drain 2 Site

If you're interested in finding out more about water quality monitoring, feel free to contact me at pjohn@plpt.nsn.us.

Earth Day 2019: Event 1

- Ruben Ramos-Avina, Tribal Response Program Coordinator



To commemorate Earth Day, the PLPT Natural Resources Department hosted an Earth Day event in collaboration with the Natchez Elementary School, and the Truckee Meadows Parks Foundation. At the event, 5th and 6th graders from the elementary school and PLPT Natural Resources Department employees, helped with the cleanup of an illegal dump site in Wadsworth, NV.

Prior to the cleanup, Courtney Scott, Naturalist Educator with the Truckee Meadows Parks Foundation, gave a presentation on the importance of protecting species and their habitats. Similarly, PLPT employees gave a presentation on the effects of littering and illegal dumping, and the importance of maintaining clean land, water, and air.

The event was a great success as the site was returned to its pristine condition and students went home aware of the significance of environmental protection.



Photos of illegal dump site BEFORE clean-up



Truckee Meadows Parks Foundation's Presentation for The Natchez Elementary School's 5th and 6th Grade classes



Photos of illegal dump site AFTER clean-up

Earth Day 2019: Event 2

- Mervin Wright Jr., Environmental Manager



EARTH DAY WITH THE HIGH SCHOOL STUDENTS

The High School kids participated in Earth Day by cleaning up Dago Bay along the lake. Before hitting the beach, the Manager and Brownfield specialist discussed with the students littering and open dumping on the reservation. The presentation was interactive and the students told them about the litter and open dump items they typically saw on the reservation, discussed solutions to the problem, and how much time it takes for certain objects to decompose under the conditions in the arid climate. The students were very vocal and interested in the subject. They were motivated to begin the cleanup. There were 13 students and they picked up 2 truckloads of litter from the beach, filling 25 large garbage bags. The day was very productive and rewarding for the students, teacher, and environmental staff. We believe the Earth Day event was very successful!



Beach Cleanup Day

- Amanda Davis, Environmental Assistant/Recycling Program



On May 31st, our department challenged other tribal departments to “Adopt-a-Beach” to clean at Pyramid Lake. Smaller departments teamed up with other departments to do the cleanup. Water bottles and raffle tickets were given out to all participants.

14 departments participated, and 35 employees volunteered to adopt 7 beaches to cleanup over **672 lbs.** of trash.



Harmful Algal Blooms: An Overview of a Public Health Threat

- Aaron Bill, Water Quality Standards Specialist



The Pyramid Lake Paiute Tribe (PLPT) manages the aquatic resources within its reservation, and assumes the duties of addressing public health concerns during the summer recreation season. The Water Quality Program (WQP), under the Natural Resources Department, continues its practice of monitoring surface water quality, and now Harmful Algal Blooms or HABs, in protecting public health for tribal members and guests to the reservation.

What are Harmful Algal Blooms? HABs are the result of the over-enrichment of nutrients to a waterbody that leads to the growth of cyanobacteria, or blue-green algae species, which emit certain toxins and can cause health problems. Cyanobacteria exist naturally within Pyramid Lake, and only become a health concern when conditions favor excessive growth of mainly *Nodularia spumegina*, a blue-green algae species identified through past scientific research. Past studies have identified nitrogen as a limiting reagent in the growth cycle, and cyanobacteria contribute nitrogen to the water via nitrogen fixation as part of their biological processes. During the summer, when excessive sunlight, higher water temperatures, and higher nitrogen levels are prevalent, the cyanobacteria blooms and releases the toxin microcystin into the water. This toxin affects humans and animals alike, causing harmful effects to the liver and kidneys, nervous system, digestive system, and skin (causing rashes and blistering). Keep in mind that microcystin levels may still be elevated, even after the bloom recedes and is no longer visually present or apparent.



An example of a HAB event that occurred in 2013. Note the soupy-like quality of the mucky water

Like our monthly surface water sampling events, the HABs sampling event takes further parameters of water quality into account. The multi-sensor sonde measures dissolved oxygen, turbidity, dissolved solids, temperature, and other parameters, and the fluorometer detects the fluorescence of compounds produced by cyanobacteria, like phycocyanin and chlorophyll-a, and turbidity. Fluorescence is the emission of light from a substance that absorbed light, and substances emit light at specific wavelengths. Essentially, the fluorometer emits radiation at specific wavelengths in the form of light, and in return, measures the amount of radiation/light that is emitted from the compounds; the intensity of the returned radiation provides the concentration of the compounds in question. Samples of the algal growth are taken to be visually identified through compound microscopy. Additionally, we measure the level of microcystin in the lake waters via test strips, which confirm the presence of the toxin to a concentration of up to 10 $\mu\text{g/L}$, or micrograms per liter. A positive confirmation of the compound triggers a sample submission to a laboratory which uses quantitative analytics to determine the toxin concentration, and also genetic testing to confirm the identity of the cyanobacteria.

The U.S. Environmental Protection Agency (EPA) released recommendations for the magnitude, duration, and frequency of exposure that are considered protective of public health in recreational waters. However, the PLPT has adopted more stringent recommendations based on the state of California, and the Yurok Tribe who have set the Caution Tier at Detection, the Warning Tier at $\geq 0.8 \mu\text{g/L}$ microcystin, and the Danger Tier at $\geq 4.0 \mu\text{g/L}$ microcystin. The Tribal Council adopted these Project Actionable Limits (PALs) to be protective of public health, and can close down beaches should the levels of cyanobacterial toxins reach the Danger Tier. The PLPT WQP advises water recreationalists to be observant and compliant to posted signs in the occurrence of a HABs event.

It is important that any potential event be reported early, since early reporting of a potential event can help the Tribe avoid potential adverse public health events. To report any HABs events to the PLPT WQP, contact us at (775)-574-0101, extension 13.