



Natural Resources Department Newsletter Articles

July 2013

Coastal Cleanup Day 2013!!!

This year's Coastal Cleanup Day on September 21st is quickly approaching. International Coastal Cleanup Day began as a local program of the Northcoast Environmental Center (NEC) in 1978, and has since grown into the largest volunteer event in care of the marine environment in California and across the world. The success of Coastal Cleanup Day is owed to the support and participation of our hundreds of volunteers. Last year, over 500 Humboldt County volunteers came out in support of their communities and environment and succeeded in the cleanup of over 5 tons of trash and recyclables!

The Wiyot Tribe's Natural Resources Department is committed to cleaning up not only our marine environments but all others as well. This year the Department will be assisting and/or leading a group of committed volunteers in cleaning up a marine site within Wiyot Ancestral Territory. The site will be determined in August and more information will be posted to the Natural Resources Department website @ <http://www.wiyot.us/natural-resources>. Thank you for helping to keep our oceans and beaches clean from marine debris and other harmful pollutants.

Youth Environmental Education Program Continues During the Summer!

The Natural Resources Department has created a curriculum full of fun and exciting field trips and activities for the Wiyot youth. With the assistance of the Social Services Department's Youth Activity Program, the education program has gotten off to a great start! So far, the program has included surf day at Moonstone Beach, a watershed demonstration, a fish identification workshop, a polluted runoff demonstration, a TBR wetland field trip with a Wiyot language lesson by Language Program Manager Lynnika Butler, a trip to Indian Island, and a trip to the Elk River Headwaters Forest Reserve and estuary with a language lesson as well. Other field trips that are planned include a river floating trip on the Eel River with a visit to Cock Robin Island, a plant and wildlife exploration field trip to U.S. Fish and Wildlife Service's Humboldt Bay National Wildlife Refuge, a beach day focusing on marine debris cleanup, and a tree planting day on TBR. If you're interested and would like more information on the summer program, please feel free to contact the Natural Resources Department via phone, email, or visit the Tribe's Facebook page.

Tuluwat, Indian Island Restoration Project Nearly Complete!

We are approaching an exciting time in the Wiyot Tribe's Tuluwat Restoration Project, and we expect the cleanup phase of the project to be essentially complete this summer!

Tuluwat Village is located on the northeastern tip of Indian Island in **Wigi** (Humboldt Bay). The village was the site of the annual Wiyot World Renewal Ceremony until its violent interruption in February 1860. After the massacre, the sacred site was used as a drydock for about 100 years, where boats were hauled ashore, repaired, and treated with chemical preservatives. When the Wiyot Tribe purchased its land back in 2000, we were left to remediate the toxic legacy. After over 12 years, countless hours of work by staff and volunteers, and millions of dollars of donations and grant funding, the cleanup is nearly complete. Most of the soil contamination, including dioxins, PCBs and PCPs, and heavy metals, has been treated, including an innovative *in-situ* peroxide based treatment that helped neutralize dioxin without harming the midden or any cultural artifacts or remains contained within. The final phase of the cleanup plan is a semi-permeable cap and soil fill. This will make the site safe for the general public and especially for the completion and continuation of the 1860 World Renewal Ceremony. The work on this phase will begin in July 2013 and be completed in August. This work is being completely funded by the United States Environmental Protection Agency (USEPA) Emergency Taskforce of the Superfund Division, at no cost to the Wiyot Tribe. The Wiyot Natural Resources Department has also secured funding through NOAA's Community Based Marine Debris Removal program to address remaining debris in the tidal mudflats surrounding the Tuluwat midden. Future work will include removal of invasive plant species from the wetlands, and planning and construction of a traditional ceremonial area.



Tuluwat Village and remnants of abandoned drydock in 1998, shortly before being purchased by the Wiyot Tribe (left); site visit with USEPA Project Officer Damian Willson in 2013 (right). Note reconstructed drydock, erosion control sheetpile, and cleared debris

Funding for this project has come from (in no specific order): Wiyot Tribe Sacred Sites Fund, USEPA, California Cultural and Historic Endowment, Humboldt County Economic Development Division, Headwaters Fund, California Integrated Waste Management Board, California Conservation Corps, Tribal Conservation Corps, Sierra Service Project, Coast Seafoods, National Park Service, California Sea Grant, Coastal Conservancy, Seventh Generation Fund, Humboldt Area Foundation, McLean Foundation, National Oceanic and Atmospheric Administration, and numerous volunteers.

Swap Out Your Lead Based Ammunition for Free!

The Natural Resources Department is assisting the Yurok Tribe's Wildlife Program in getting the word out to all parties interested in swapping out lead based ammunition for non-lead based ammunition. The ammunition can be old, cheap, corroded, hand-loaded, and/or unusable, it doesn't matter! The Yurok Tribe will then give you a box of premium factory-loaded non-lead ammo in the matching caliber for free!

The problems associated with lead based ammunition can have a devastating effect on the environment, wildlife, and even humans. Residual lead can degrade water quality that can have an effect on aquatic species, wildlife can ingest the lead pellets while foraging, scavenger species (i.e. vultures and condors) can ingest the lead after wildlife have been shot and not taken, and humans can ingest pieces of lead-based shot in game or meat that has absorbed the lead shot. The dangers of lead can include lead poisoning leading to kidney problems, high blood pressure in adults, and delays in physical or mental development in kids.

If you are interested in swapping out your ammunition (REMEMBER: can be old, corroded, and/or unusable!), please give the Natural Resources Department a call at 707-733-5055 or contact us via Facebook (Wiyot Tribe). A booth will also be set up at Wiyot Day, September 7, 2013 to swap out old lead based ammunition for new, non-lead based ammunition.

The Challenges of the *Gou'daw* (Pacific Lamprey)

Recently, the Natural Resources Department has been conducting passage assessments within the Eel River/Van Duzen watersheds to determine barriers to *gou'daw*, Pacific lamprey (*Entosphenus tridentatus*), migration. Our work has been primarily focused on culverts (especially along roads) but has not been limited to other barriers such as railroad crossings, bridges, dams, etc. So far our work has taken us to the Lower Eel, Van Duzen, South Fork Eel, and Middle Main Eel sub-basins with future work to occur in the North Fork Eel, Middle Fork Eel, and Upper Main Eel.

The life history of lamprey (specifically Pacific lamprey) is unlike the life history of other culturally important and more closely studied species such as salmonids (i.e. steelhead, Chinook/Coho salmon). Lamprey begin their journeys by spending 5-7 years buried in fine substrate (i.e. silt and/or sand) filter feeding. After this period, the ammocoete (eyeless, jawless lamprey) emerges from the substrate grows an eye and small mouth (technically referred to as a macrophthalmia at this stage) and begins to “feed” on a host species. Pacific lamprey are considered a parasitic fish since their method of feeding consists of latching on to a host species (trout, salmon, etc.), boring a hole with their three teeth (“*tridentatus*” meaning “three teeth”), and sucking their blood. Once the macrophthalmia reaches a large enough size, it begins its migration to the ocean where it will spend 1-2 years attached to another host (i.e. salmon, tuna, etc.) growing even larger before making its way back into the river system where it will find a suitable spot to make a redd. The premier location for a lamprey redd is usually situated above a riffle with suitable substrates comprised of cobbles. Larger substrate is difficult for a lamprey to move around and smaller substrate does not provide the necessary size and protection. Unlike salmonids, lamprey do not return to their natal stream but rather select river systems based on pheromones secreted from ammocoetes upstream.

During the years that pass from the ammocoete to the spawning stage of the Pacific lamprey life cycle, there are numerous threats to the survival of an individual lamprey. For instance, ammocoetes require little for survival since the majority of their lives are spent in the substrate. These necessary requirements would be water (for oxygenation), suitable sediments (for protection), and food. If these three requirements exist, the survival rate for the ammocoete is high since predator species are less likely to “dig” for their prey. But, if these requirements are absent and/or depleting, the ammocoete is required to leave the sediment and search for a more suitable location. This makes the small, eyeless, jawless creature prey to any larger predator in the area. Also, if the area in which the ammocoete is located has been cut off from the river, it runs the risk of dying from either low oxygen levels as water temperatures heat up or suffocation from the pool drying up before rains can reconnect the river system.

So what are the real challenges to lamprey success? The big, glaring problem (especially on the Eel and Van Duzen River) has to do with water quantity. This year in particular has been an awful summer in regards to precipitation. Combine this with the existing legal diversion to Sonoma County along with hundreds to thousands of illegal diversions, most often for marijuana cultivation, and there is little water remaining. Of the water that is remaining, hot temperatures (especially in low flow areas) in combination with high nutrient loads cause blue-green algae blooms that can lead to human and wildlife sickness as well massive fish kills when the algae dies, taking up large stocks of oxygen.

Besides water quantity and quality, lamprey also have to deal with predation from large, non-native fish called Sacramento pikeminnow (aka squawfish). Pikeminnow can grow as large as 1 meter in length and are considered a piscivorous cyprinid known to compete with trout and also prey upon young salmonids and lamprey. Pikeminnow were introduced for sport fishery purposes and quickly populated the Eel River system. Once established, the pikeminnow further depleted an already crippled salmonid and lamprey population thus slowing restoration efforts.

Barriers to lamprey migration (i.e. road culverts, railroad crossings, etc.) can have an impact due to the fact that lamprey lack the ability to jump like salmonids. Rather, lamprey have to attach to substrate or other structures using their suction disk mouth and inch their way up over a barrier as long as some water flow exists. The problem with this type of maneuvering has to do with angles. If the lamprey suctions up a barrier and hits a 90° angle (i.e. concrete steps on culverts and fish ladders), they lose suction and cannot pass the barrier. If flows reach a point where lamprey can pass through without climbing, then the upper reaches are accessible as long as flow through the culvert is not too powerful for a lamprey to swim and/or attach and pass through.

So how do we fix these problems? A quick solution, that many believe is the root cause of all the problems, is to remove the Potter Valley Project dams that are situated on the Eel River. As much as these barriers have a huge impact on the migration of lamprey, there are some stretches, such as the South Fork of the Eel River, that are not impacted by the flows from the dams. Rather this stretch is mainly impacted by human use within these watersheds. Streams natural dry up or occur “intermittently” (water in stream for a certain distance, then dry for a certain distance due to underground flow, then flow above ground downstream) but illegal diversions of Eel River water are having a huge impact in that they are drying up important tributaries that lamprey would use for spawning and/or ammocoete habitat. More conscious approaches to water storage and/or use, especially on a river like the Eel that has existing water quantity issues, will be a primary reason for the success or failure to the migration of Pacific lamprey.

Organizations have been working hard to retrofit barriers to fish passage and we are glad to say that lamprey (specifically Pacific) are being considered in the same breath as salmonids when infrastructure such as road culverts, bridges, dams, fish ladders, etc. are constructed. The Mattole Restoration group has the Good Roads Clear Creeks program that has retrofitted nearly 36 culverts which have allowed fish access to more than 29 miles of upstream habitat! California's Department of Fish and Wildlife as well U.S. Fish and Wildlife Service are also working closely with California's Department of Transportation to remove and/or retrofit barriers to fish migration.

The Department has collected data on approximately twenty (20) passage barriers in the Van Duzen and Eel River watershed and have photographed/visited approximately fifteen (15) other barriers. Throughout this field work, the team has garnered a further appreciation for lamprey due to the enormous challenges that they are consistently subjected to. So far it appears that Pacific lamprey are holding to stretches of river or tributaries that have adequate water supply and/or little human impact. There is a lot more work to do but as long as the species exists, the Wiyot Tribe's Natural Resources Department will continue to work towards reviving the run of Pacific lamprey on the Eel River.