

## Eagle Lake Trout Spawn

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Pine Creek is the largest of the seasonal tributaries that feed Eagle Lake. Merrill Creek and Papoose Creek located at the south end of the lake are lesser known but still contribute more than just water. The Eagle Lake trout is drawn to the fresh flowing water to spawn in every flowing tributary. One is no less important than the other when the water flows. Our trout will swim up a garden hose as long as it was flowing.

The Eagle Lake trout (ELT from this point forth) is believed to be a hybrid subspecies of rainbow trout that has adapted to surviving the harsh, alkaline conditions of Eagle Lake as well as being adaptable to most all other fresh water lake, streams and reservoirs. The ELT has been one of the leading propagation trout species used by CDFG due to its hardiness and adaptability. CDFG first began collecting eggs on Pine Creek in 1949 when only a handful of trout (16ish) came up Pine Creek to spawn that spring. In past years, the numbers were much greater and CDFG employee thought it might be best to collect some of those eggs. The lake had just recovered from devastating water loss through the Bly Tunnel and it was believed these few trout could have been all that remained in the lake. Over the years, Eagle Lake has become a top fishing destination and a native spawn would not likely support the heavy fishing pressure the lake see's today. However it would eventually refresh the gene pool after 6 decades of artificial spawning. [SEE RESEARCH PAPER "CAPTIVE BREEDING OF RAINBOW TROUT" BY GERARD CAMERON-CATOT, PETER MOYLE AND RACHEL A SIMMONS](#)

California Department of Fish and Game collect 2 to 3 million eggs from the egg collection facility located on Pine Creek at Spalding in the northwestern basin of the lake. Once collected and fertilized, the embryo's are taken back to Chrystal Lake Fish Hatchery for incubation. Only Chrystal Lake and Mt Shasta Hatchery's artificially spawn ELT as they have the ideal water temperatures needed for the first 21 days of incubation. ELT need fresh flowing water in order for their eggs to survive long enough to hatch. The time period from fertilization to hatching is 50 days and the water temperatures have to be close to 50F for the first 21 days before they can handle warmer water temperatures. This is generally when they are transported to other hatcheries for rearing. Scale samples have shown the ELT to have a longevity between 11 and 12 years, double that of a normal rainbow trout. It is believed this gene developed to insure that at some point in the life of that trout, it would be able to spawn once during the 12 year drought cycles.

Eagle Lake trout are a red fleshed salmonoid. However, in nature 15% to 20% of red-fleshed salmonoid's can have light or white meat. A fish geneticist told me that when testing the whiter flesh it was "found to have more of everything that was good for you". However in artificial or captive breeding some traits can be exponentially expanded from one year to the next.

Eggs are collected specifically for planting back into Eagle Lake. These eggs are collected from fish generally 21 inches and larger which are sorted in pens during the process. These fish are called "select". CDFG also has a broodstock program. Broodstock are trout from eggs collected at the trap at Eagle Lake making them a first generation fish, however, the young they produce are considered a second generation removed and are produced for planting in other lakes. These second generation hatchlings are not allowed to be planted in Eagle Lake to prevent any damage to the gene pool. In the hatcheries, the races are labeled as to never mix them up. ELT-H for hatchery, ELT-T for trap.

In the late 1980's it was determined that the spawning beds upstream on Pine Creek were ruined by years of logging (railroading) and cattle grazing/ranching. The trout could not navigate upstream to what was perceived to be their historic spawning beds approximately 28 miles upstream from the lake. Over the years some rehabilitation projects have been completed yet many more projects remain. Since that time, scientists have attempted to reestablish a native spawn for the Eagle Lake trout. For over 2 decades CDFG and Lassen National Forest (2011 Susanville Indian Rancheria also

worked with the agencies) have transported (by tank truck) around 400 mature spawner's upstream hoping some survive long enough to spawn and that the minnows get passed the voracious brook trout that are waiting downstream.

Nearly every year LNF, CDFG and US Davis biologists implant transmitters in the trout and release them upstream. Receivers are installed so these trout can be tracked. Thankfully, technology of the day has reduced the size of the transmitters and the days of performing a major surgery of inserting a thumb sized device with a 12 inch antena are over. The new transmitters or PIT tags are easily slipped under the skin below the dorsal fin. Healed scars are barely detectable and finding one in a cooked trout is not unheard of. The devices are not poisonous if cooked and are inserted under anesthetic under clean conditions. [See photo of transmitter and placement here](#) Generally around 30 to 50 trout are transmitted and released with 100 or so companion fish. The numbers of fish released upstream could be increased. Finally, in 2011 the first confirmed Eagle Lake trout minnows (200) were trapped on Pine Creek. However, they were hatched about 3 ½ miles upstream from the lake, not 28 miles where scientists believed the historic spawning beds were located. Causing them to pause and reflect...only in a positive way. There were also approximately 6 trout minnows spotted that were estimated to be a year old near the trap heading down to the lake. These trout have still been manipulated by humans so it is not truly a native spawn. But, it is getting closer! The transmitting program has been less than successful in the years past when the spawning beds were suspected to be further away than the fish seemed to need. They could have the instinct to head upstream, but no longer the imprint as to where to go. But, one success could lead to another. Perhaps the trout just did what they could, where they could and headed home to the lake. [SEE THE SCIENTIFIC STUDY HERE](#) (Eagle Lake Guardians purchased two solar chargers and control panels for the team in 2011 when dilapidated equipment failed in the middle of tracking around 100 fish in the creek. It was extremely appreciated and was expedited. It was only a matter of 6 days from order to working and online. THAT's what a local nonprofit can do.

In the past, rescues of fish stranded in the creeks every year that the creeks flow. Pine Creek is now protected by an Alaskan weir and there is enough now to cover nearly every tributary if needed. Once the creeks start flowing, CDFG and volunteers install the Alaskan weirs across the creeks to keep the trout from heading upstream in large numbers where A) they run out of dissolved oxygen because the streams are not large enough to support the numbers of fish in them. B) the seasonal creeks are susceptible to cold temperatures freezing them up to the point of no flowing water leaving the fish high and dry. C) all are exposed to predators.



This is the Alaskan weir crossing Pine Creek. In this photo the weir is open to allow passage of the trout. Over the many years, CDFG, volunteers and local residents have rescued trout and returned them to the lake when the creek flows stop. Having the weirs helps reduce the number of trout that would surely perish if they were not installed. Installing the weirs in time is critical and they have to be maintained and checked for erosion. It doesn't take much of a hole and before you know it, 400+ trout need rescued again. However it has reduced the losses substantially despite having some problems.



Once the trout get upstream to the egg collection facility and fish trap, they are sexed and sorted. Not all the fish are ripe and ready to spawn. Quite a few are “green”. These pens fill up quickly and the “green” trout are transported by truck back to the lake to make room for spawn ready fish in the system. Generally, CDFG collects from around 400 fish. But, no matter how one looks at it, Eagle Lake trout are a hatchery trout and spend their first year to year and a half in the hatchery before being put in the lake. Over the years, we are becoming a put and take lake, water level and quality is not helping through extensive drought years. Will Eagle Lake ever come back? We sure hope so and are doing everything in our power (the power of the people) to make sure that doesn’t happen....let’s hope we are not too late.



Inside the egg collection facility. Sinks are filled with water and anesthetic to reduce the stress of handling on the fish. Once asleep, CDFG determines the sex, readiness to be spawned and trim the adipose fin. The adipose trim is to identify the fish. In the event the fish returns to the trap the following year(s) it will not be used again. Center photo is Len Griswold of Susanville.



Once there are enough fish sorted, CDFG personnel from Chrystal Lake Fish Hatchery collect and artificially fertilize the eggs and take them back to the hatchery for rearing.



Once at the hatchery the eggs are placed in jars or racks with water continually flowing over the eggs. It takes approximately 21 days before the eggs are placed through a sorter to remove dead or damaged eggs. At the 21 day age, the eggs are toughened up and can survive transportation, moving around and passing through a mechanical sorter that removes any dead or damaged eggs. Before 50 days is up, the trays and jars are placed over trays (races) where the hatching minnows can swim out into the raceway.

The temperature of the water going through the hatchery determines how fast the fish grow. Generally, the fish are collected for planting the following year. Chrystal Lake Hatchery spring runs about 50F + or - 2F. The trout don’t grow as fast as they do at Darrah Springs hatchery where the water temperatures run approximately 57F + or -. At Darrah Springs, the trout grow to 10 to 12 inches in one year whereas at Chrystal Lake Hatchery the same age trout only grows to about 8 to 9 inches in approximately 18 months. This allows for a spring trout plant from Darrah Springs and a fall plant from Chrystal Lake Hatchery. Between the two plantings, Eagle Lake receives a total of 90,000 POUNDS of trout.



Approximately 45,000 pounds from each hatchery once per year. The average count is two fish per pound for 180,000 trout yearly total. Worsening conditions of the lake may make for changes in the future. Sure enough at a lake elevation in February 2012 of 5096ft and little to nothing coming down the tributaries, CDFG has reduced our yearly allotment to 160,000 due to water quality, habitat loss, and a trend showing the trout not growing as fast as they have in the past. [See trap and creel data from CDFG between 2007 and 2011 here.](#)

Every year 15% of the trout planted in Eagle Lake are freeze branded for identification. Branding leaves a round scar on the fishes skin. It will be on the right or left side depending on the hatchery it was branded at. Chrystal Lake (fall plants) is on the right side, Darrah Springs on the left. Anterior and posterior determines the year, even or odd anterior/posterior respectively. These markings are identified and used by CDFG personnel for creel studies to determine age resulting in yearly growth rate data.



Trout are placed in anesthetic prior to handling. They are netted out of the race and placed in sinks filled with water and anesthetic. A metal bucket is filled with nitrogen. A metal bolt protrudes from the bucket. A trout is gently pressed against the bolt which instantly freeze burns a bolt-head size mark. Sometimes, the skin can fall off leaving the flesh exposed. However, the wound is sealed and the meat of the fish is not affected.

During this time of year we can lose hundreds if not thousands of Eagle Lake trout in the tributaries. Our losses come from having cold ambient temperatures freeze up the flow of the water in the creeks. This can strand the fish in pools where they run out of dissolved oxygen as well as virtually running out of water. This also leaves them open for predation from coyotes, bobcats, eagles, pelicans and an occasional bear. But, be very aware, that these are poison for domestic dogs. Not every trout has the parasite that kills your dog in less than three days, but if you know your pal has gotten into a dead trout, it's better to seek treatment ASAP. It will only take hours before your pet shows symptoms and your already on borrowed time. Be sure to let your veterinarian know where you have been and what it could be so the correct treatment can be dialed in immediately.

Merrill Creek and Papoose Creek on the south end of the lake attract a lot of fish and usually well before Pine Creek catches their attention. This is what can happen when the creeks are left unprotected.



When we know there is going to be a threat, locals and CDFG work together to get the trout back to the lake and prevent as many losses as possible. This entails netting the fish from one area and transporting them net by net to the lake. Only so many fish can be placed in a net before the weight of them smother the ones at the bottom. Countless trips. Often driving the fish downstream with nets side by side helps move the masses back downstream but individual trips are never out of the question.



At the end, we're all exhausted but it's a great feeling knowing that thousands of trout were returned to the lake on just about any given year. Despite having the weirs, CDFG needs to make an effort to get them up and installed before the trout get upstream.

Little do people realize how much local support it takes to preserve the fishery. Rescues can easily save 700 to 1200 trout in EACH smaller tributary. Past rescues on Pine Creek had topped 5000. Over the years, lessons have been learned. As long as there is decent flow in Pine Creek, the fish can navigate the main channel. They still get trapped inside channels and need to be placed back in the main channel before they can return to the lake. So manual rescues will never be out of the equation. CDFG opens the weir when rising water temperatures drive the fish back to the lake. Once the creek temperature is pushing 60F, the fish know they are out of time to spawn and naturally return to the lake. In summer we occasionally catch a ripe hen spawning eggs when netted. These eggs are long past their prime and will not have survived in the lake anyway. When the hen doesn't spawn, her eggs are retained in the body. Over time the eggs are absorbed and we can see old and new skeins mixed together when cleaning. It is very hard on the fish and generally the meat is light colored and soft. But, the hen survives and by the following year she's ready to spawn again. The spawning takes place in spring, but in December some trout are loaded with large skeins and the bucks are well endowed. This leads me to believe that in an extremely wet winter we have a great potential for a "winter run" spawn. The Alaskan weirs have helped reduce the number of rescues and despite needing maintained, function great. The Alaskan weirs cannot be left in place due to theft and vandalism fears. So timing for installation is everything. Alaskan weirs were purchased with funds raised by California Inland Fisheries Inc. Project Eagle Lake Trout was founded by Randy Aubrey.

Local residents including Rebecca Walker, Eagle Lake General Store and Valerie Aubrey, Publisher of this website have formed a local nonprofit called Eagle Lake Guardians. The Guardians goal is to help enhance and protect Eagle Lake water levels, water quality, heritage trout fishery and avian habitat. See [www.eaglelakeguardians.org](http://www.eaglelakeguardians.org) for all the information. Eagle Lake now has a voice!

The artificial spawning of Eagle Lake trout has revived the species however, there is an urgency to produce a native spawn. There are two petitions pending wanting the Eagle Lake trout listed on the endangered species list. If this special species does end up on the listing, it will end up being protected....thus, anglers may not legally be able to target or catch one. This is why it is critical this program continue and be successful at that. Artificial spawning is not natural selection but we hope that the small success in 2011 leads to some changes at the trap where the trout can make their own choice and a truly native spawn can be accomplished. A plan for a ladder is in the making. A native spawn will never be able to

restock the lake from the seasonal fishing pressure and an artificial program will be a part of Eagle Lake trout for eternity. But, it would go a long way genetically and will help the gene pool in the long run. I highly recommend reading this study as it is history and a future in the making.

**[FOR EVERYTHING ABOUT THE CAPTIVE BREEDING OF EAGLE LAKE TROUT AS WELL AS JUST ABOUT EVERYTHING THAT EAGLE LAKE NEEDS IS CONTAINED IN THIS ARTICLE. Gerard Carmona-Catot, Peter B. Moyle & Rachel E. Simmons](#)**

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