**Cole Rivers Hatchery production history**

1. **Rogue Project Dams are unique**

* As approved by Congress, fish needs are a primary purpose.
* Research to inform dam operations and related projects to meet fish needs was planned in from the start, even in the House Bill that went to Congress. Research ensured information was available to help the Corps meet its fish obligations. Flexibility and adaptability were planned in to Rogue Basin Project dam development.

1. **Stipulations for fishery provisions approved by Congress (from Corps report for HB 566)**

* Fishery provisions include…storage and temperature regulating facilities for releases in the interest of fishery enhancement, and facilities for restitution of loss of spawning and rearing…areas. Lost Creek pg 57.
* Restitution facilities would consist of fish production facilities such as a fish hatchery or possibly spawning channels and related works, as might be found necessary upon completion of detailed studies in cooperation with federal and state fish and wildlife agencies…. Lost Creek pg 57.
* Project operation plans must be sufficiently flexible to permit desirable modifications in scheduled fishery releases …if experience and further study indicates such action to be desirable for overall project benefits. Pg 63
* ***Comment—the Corps report to Congress noted the complex interrelationship between enhancement and mitigation features--see pg 87. The fish obligation is multi-faceted.***

1. **Adult mitigation goals**

* The December 1966 letter from Director Schneider to Colonel Talbott updated the mitigation goals for hatchery production associated with Rogue Basin Project dams. The mitigation goals were updated due to additional information on Rogue spring chinook returns, and due to the request from the Corps to build Applegate and Elk Creek without the Congressionally authorized fish ladders. ***Comment--This is what I meant when I stated that the Corps asked for additional winter steelhead production. This increase in hatchery production was not requested by ODFW.***
* ODFW (1966) stated that Elk Creek production may be released directly from the hatchery.
* The adult mitigation goals for Applegate and Lost Creek are listed in the Environmental Impact Statements produced by the Corps for the two dam projects.
* Hatchery production for the first 20 years was developed to meet the mitigation obligation for all three dams. It wasn’t until 1990 that the Corps notified ODFW it would no longer fund production for Elk Creek Dam, although Elk Creek continued to affect fish migration for years until the dam was notched.
* Hatchery returns are intended to replace the fishery value of the natural production no longer taking place. Mitigation goals are measured as adult returns to hatchery traps.
* Adult goals provide a quantifiable benchmark for measuring the success of the hatchery mitigation program. Hatchery returns should meet the mitigation goal most years although returns will be affected by environmental and ecological conditions.

1. **Research is conducted to inform/improve reservoir operations**

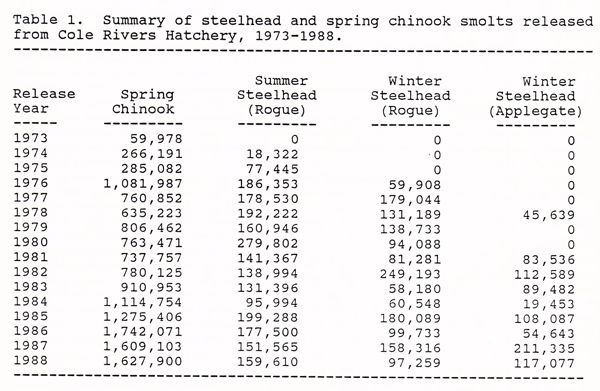
* Research to help the Corps meet its fish obligations was conducted in the Lost Creek Dam Fisheries Evaluation Project between roughly 1974-1994; with a special project in drought year 2001. Research concluded that the spring chinook population declined following dam construction and operation. The fish enhancement objective was not met for this species.
* The completion reports (by species) can be found at the following location: <https://www.dfw.state.or.us/fish/local_fisheries/rogue_river/research.asp>

1. **Research is conducted to inform/improve hatchery operations**

* Studies at the hatchery and the Cole Rivers Hatchery Evaluation Project began around 1975 and continued through at least 1991.
* The research was conducted to help the Corps meet its fish mitigation obligations in a manner consistent with its other fish obligations.
* Some examples of ChS production studies:
  1. Size at release 1975-79 broods
  2. Time of release 1975-80; 1984-1991 brood
  3. Off station releases 1981-84 broods
  4. Feed type 1984-1986 broods
* Information reports were developed 1978 to 1990, with partial funding from the USFWS.

1. **1973-1989 Initial production and hatchery evaluation studies**
2. Context:

* Hatchery production was ramping up to meet the mitigation obligation **for all three dams** in this time period. See table 1 below.
* Hatchery BMPs were being developed with results from the hatchery evaluation. The objective was to maximize adult returns to meet adult mitigation goals and minimize negative impacts on naturally produced fish to be consistent with the enhancement obligation that came with Corps dams on the Rogue.



1. Spring chinook

* The hatchery spring chinook program is the largest and most important program at Cole Rivers. The decline of naturally produced wild spring chinook abundance following dam construction and operation has added to the importance of meeting the hatchery mitigation goal on a regular basis.
* Studies resulted in numerous changes to spring chinook production over time. In the early years smolts were released in October, December and March.
* A 1984 ODFW memo stated the annual release of 825,000 smolts has resulted in adult returns averaging 5,400 fish, well below the mitigation goal. A release of 1.7 million smolts was recommended in the memorandum, which also noted better returns from October smolt releases over December releases.
* Later studies found good returns from August and September release groups. Production changed into approximately equal releases of August, September and October smolts totally around 1.6 million smolts.

1. Winter steelhead:

* Winter steelhead were erroneously not listed as a mitigation obligation for Lost Creek following the pre-dam surveys by USFWS, but rearing was permitted by USACE when several hundred adults returned to the hatchery during the first year of operation. Remember that production for Elk Creek Dam was also needed.
* The winter steelhead programs were acknowledged by ODFW to be the most complex and intensive programs at Cole Rivers, at least to start, due to late spawn timing.
* The early production goal was 150,000 smolts for each program: 60-90,000 yearling smolts; with the smaller fish held back to be released as two-year smolts. Releases in this period show a steady ramp up in production, although we did not appear to reach 300,000 smolts on a regular basis. See graph below.
* Studies at Cole Rivers found that yearling smolts over 18 cm in length migrate very well, and two-year smolts over 20 cm in length migrate. Smolt size at release targets (4 fpp for StW) were developed to produce smolts that migrate well and minimize the risk of residualism in the river. The size at release target is larger than what is listed in early Rogue Basin Project planning documents (7 fpp).
* The program also developed a sorting protocol to remove runts and precocially mature winter steelhead from the production release, to minimize the risk of residualism.
* A 1990 ODFW document stated that since hatchery production began, the adult mitigation goal for winter steelhead had been met for Elk Creek/Rogue in only 2 years, and the adult mitigation goal for Applegate in only 1 year.

1. Rogue summer steelhead

* The early production goal was 150,000 smolts.
* Studies at Cole Rivers found that yearling smolts over 18 cm in length migrate very well, and two-year smolts over 20 cm in length migrate. Smolt size at release targets (4.5 fpp for StS) were developed to produce smolts that migrate well and minimize the risk of residualism in the river. The size at release target is larger than what is listed in early Rogue Basin Project planning documents (7 fpp).

1. Coho

* Coho were erroneously not listed as a mitigation obligation for Lost Creek following the pre-dam surveys by USFWS, but coho were collected at Cole Rivers and not at the Applegate trap during the initial production years (coho now reach Applegate Dam). Remember that production for Elk Creek Dam was also needed. The decision was made to develop a Rogue hatchery stock of coho.
* Production was ramped up to meet the adult mitigation goal for both Applegate and Elk Creek.

1. **1990-current Stabilized production years**
2. Context

* By 1990 the summer steelhead program was meeting or exceeding the mitigation goal, while for winter steelhead, the release was only occasionally meeting the mitigation goal.
* In 1990 the Corps notified ODFW it would no longer fund production for Elk Creek Dam, although Elk Creek continued to affect fish migration for years until the dam was notched.
* The adult mitigation goals for coho and winter steelhead decreased at this time, down to the adult goals listed in the Environmental Impact Statements for the two remaining dams.
* The early 1990s were a time of very large El Nino event and poor ocean rearing conditions combined with a multiyear drought. There was a broadscale decline in steelhead abundance in the Pacific Northwest and petitions for listing under ESA.
* The Rogue implemented restrictive angling regulations in the 1990s, regulations that remain in place today to protect wild steelhead and coho. This includes a mark selective fishery for half pounders and adult summer steelhead (with only a limited opportunity to harvest wild winter steelhead).
* Around this time a task force was organized (I think at the request of the Governor’s Office) to review and respond to the decline in Rogue summer steelhead, especially the half pounder run. Anglers/guides blamed reservoir releases at least in part on problems with the half pounder fishery.
* A problem in the hatchhouse resulted in a catastrophic loss of brood year 1999 spring chinook.
* Water quality problems in the hatchhouse have been documented along with additional loss from disease. Disease treatments in the hatchhouse tripled between 2009 (6 treatments) and 2011 (19 treatments). A January 2013 sample of sediment in the incubators found a rich assortment of live organisms.
* Most production groups have been affected at times. Losses have dropped the spring chinook smolt release below the production goal in three years since 2010.
* ODFW completed a conservation plan to guide management of Rogue spring chinook (approved by the Fish and Wildlife Commission in 2007). Other conservation plans have followed.

1. Spring chinook

* The production goal remained relatively steady at 1.6 million smolts for most of the current period.
* When production was cut due to Elk Creek, ODFW kept the release at 1.6 million smolts but moved more production to August and September smolts, and fewer October smolts.
* The mitigation goal of 13,020 was met most years through 2004. The goal has not been met since 2005. Two things stand out —the mitigation goal was not met during a period of good ocean production around 2010-2014; and the adult return declined to new lows starting in 2016.
* A problem in the hatchhouse resulted in a catastrophic loss of brood year 1999 spring chinook. To minimize impacts to anglers, releases were increased to 1.9 million smolts annually over the next four years.
* ODFW has implemented multiple production changes to improve hatchery spring chinook returns and meet the adult mitigation goal. Beginning in brood year 2013, ODFW dropped the coho production goal from 200,000 smolts to 75,000 and increased the spring chinook production poundage. A March yearling release was added back to production with the objective of having some chinook smolts going to sea during different periods of ocean productivity. This group is released off site to minimize predation on naturally produced spring chinook fry in the upper Rogue. An off-site release to near Gold Hill did not increase stray rates during a previous study conducted during the hatchery research project.
* The large decline in adult returns in 2016 prompted additional action. Hatchery SARS have been monitored closely. ODFW has been moving more production into older and larger smolts, primarily October releases, due better survival rates. Rearing densities have been moderated.
* A legislative hearing followed the 2016 hatchery spring chinook return. Actions implemented include: adding CWT groups to all smolt releases to track which group is surviving at higher rates; and adding an estuary release group to test whether August smolts are being lost during outmigration.
* Adaptive management has been the mode of operation since at least brood year 2018 when another large loss of spring chinook occurred in the hatchhouse. ODFW has worked with the Corps to adjust production levels as needed to minimize impacts to anglers and help meet mitigation goals despite challenges.
* Adaptive management continues with the powerline problems. The August release was dropped entirely in 2022 (as well as this year) due to the inability to meet size at release targets. Both the September and October releases in 2022 did not meet size at release targets.

1. Winter steelhead

* The adult mitigation goal dropped when Elk Creek was not completed, but the production goal remained the same for about 10 years.
* In brood year 2000 the program changed from a combination release of 150,000 smolts per stock (1 and 2 yr smolts) to a release of all two-year smolts, 132,000 smolts per stock, due to the difficulty of getting yearling to size. Cole Rivers is currently releasing about 262,400 smolts at a target of 4 fpp.
* More importantly, the current production level meets the mitigation objective most but not all years. A drop in production would mean missing the mitigation goal on a more frequent basis.

1. Rogue summer steelhead

* The Rogue Summer Steelhead Task Force completed work in 1990. A primary proposal from the group was a proposal to rear wild summer steelhead fry. This proposal evolved into the production of an additional 70,000 StS smolts per year.
* Cole Rivers is currently releasing 220,000 smolts at a target of 4.5 fpp
* Returns from the current release exceed the mitigation objective every year. A drop in production may mean missing the mitigation goal on some years. This popular program provides fish for harvest in the mark selective half pounder and adult summer steelhead fisheries.

1. Coho

* The adult mitigation goal dropped when Elk Creek was not completed, but the production goal remained the same for about 23 years.
* Coho production was decreased beginning in brood year 2013 to 75,000 smolts, and the production was moved to spring chinook.
* Even with the program reduction, releases have only met the production goal in 5 out of 8 years since the change was implemented. The adult mitigation goal has been missed in 3 of the last 8 years.
* the current production level meets the mitigation objective most but not all years. A drop in production would mean missing the mitigation goal on a more frequent basis.