

2025 BOGUS CREEK ADULT SALMON STUDIES

FINAL REPORT



Photo credit Bill Boggs

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ABSTRACT

The California Department of Fish and Wildlife's (Department), Klamath River Project (KRP) operated the Bogus Creek Fish Counting Facility (BCFCF), a video monitoring station, on Bogus Creek during the Chinook Salmon (*Oncorhynchus tshawytscha*), Coho Salmon (*Oncorhynchus kisutch*) and steelhead trout (*Oncorhynchus mykiss*) spawning season. The purpose of these surveys is to describe the run characteristics of adult fall-run Chinook Salmon, Coho Salmon and steelhead trout into Bogus Creek. Video fish counting operations began on September 30, 2025, and ended on December 15, 2025. In addition, spawning ground surveys began on October 14, 2025, and were conducted twice a week, weather permitting, every Tuesday and Friday, through January 29, 2026. The supplemental spawner surveys were conducted to collect biological information from encountered carcasses and to estimate escapement below the counting facility.

The first adult Chinook Salmon was observed at the BCFCF on October 1, 2025, and the last Chinook Salmon was observed on December 9, 2025. The total number of Chinook Salmon that entered and remained in Bogus Creek during the 2025 season is estimated to be **350** fish. Based on the proportion of male and female Chinook Salmon sampled during the spawning ground surveys, the run was comprised of approximately 114 (32.6%) males and 236 (67.4%) females. Scale analysis was used to determine the age proportions of the run. Adults comprised approximately 98.55% (345 fish) and grilse comprised 1.45% (5 fish) of the run. Males ranged in fork length (FL) from 45 cm to 94 cm and averaged 71.4 cm. Females ranged in FL from 52 cm to 82 cm and averaged 65.5 cm. Based on coded wire tag expansions, KRP staff estimated 187 Chinook Salmon (53.43%) were of hatchery origin.

The first adult Coho Salmon was observed entering Bogus Creek on November 10, 2025, and the last Coho Salmon was observed on December 14, 2025. A total of 12 Coho Salmon were observed moving through the BCFCF during the season. One additional Coho Salmon carcass was observed downstream of the BCFCF yielding an estimated season total of **13** Coho Salmon. Based on lengths observed from videography, age 3 fish comprised approximately 92.3% (12 fish) and age 2 fish comprised 7.7% (1 fish) of the run. There were no recovered male carcasses during the survey season. One female carcass was recovered below the counting station. The carcass FL measured at 64 cm. No carcasses with hatchery marks were recovered, due to limited carcass recoveries (1), no hatchery origin estimates were created.

A net total of **16** steelhead trout with a FL >40.64 cm (16 inches) were observed passing through the BCFCF. Zero steelhead trout were recovered during the spawning ground survey effort.

INTRODUCTION

STUDY LOCATION AND RUN TIMING

Bogus Creek is located on the southeast side of the Klamath River just downstream of Iron Gate Hatchery (IGH) (between river mile 189 and 190) in Siskiyou County, near the Oregon border (Figure 1). The mouth of Bogus Creek is roughly 75 feet downstream of the entrance to the auxiliary ladder used to collect adult salmonid returns at IGH. As a result of the extremely close proximity of Bogus Creek to IGH, there has been significant mixing of hatchery origin and natural origin salmonids from these two locations. As part of the Klamath Dam Removal Project, IGH was decommissioned and all fish rearing at IGH were relocated to a new facility known as Fall Creek Hatchery (FCH) in 2024. FCH was constructed on Fall Creek, roughly 6 river miles upriver from IGH. Chinook Salmon typically return to Bogus Creek to spawn from mid-September through November. The Coho Salmon spawning run typically occurs from late October to early January. Steelhead trout can be observed returning to Bogus Creek from September through May.

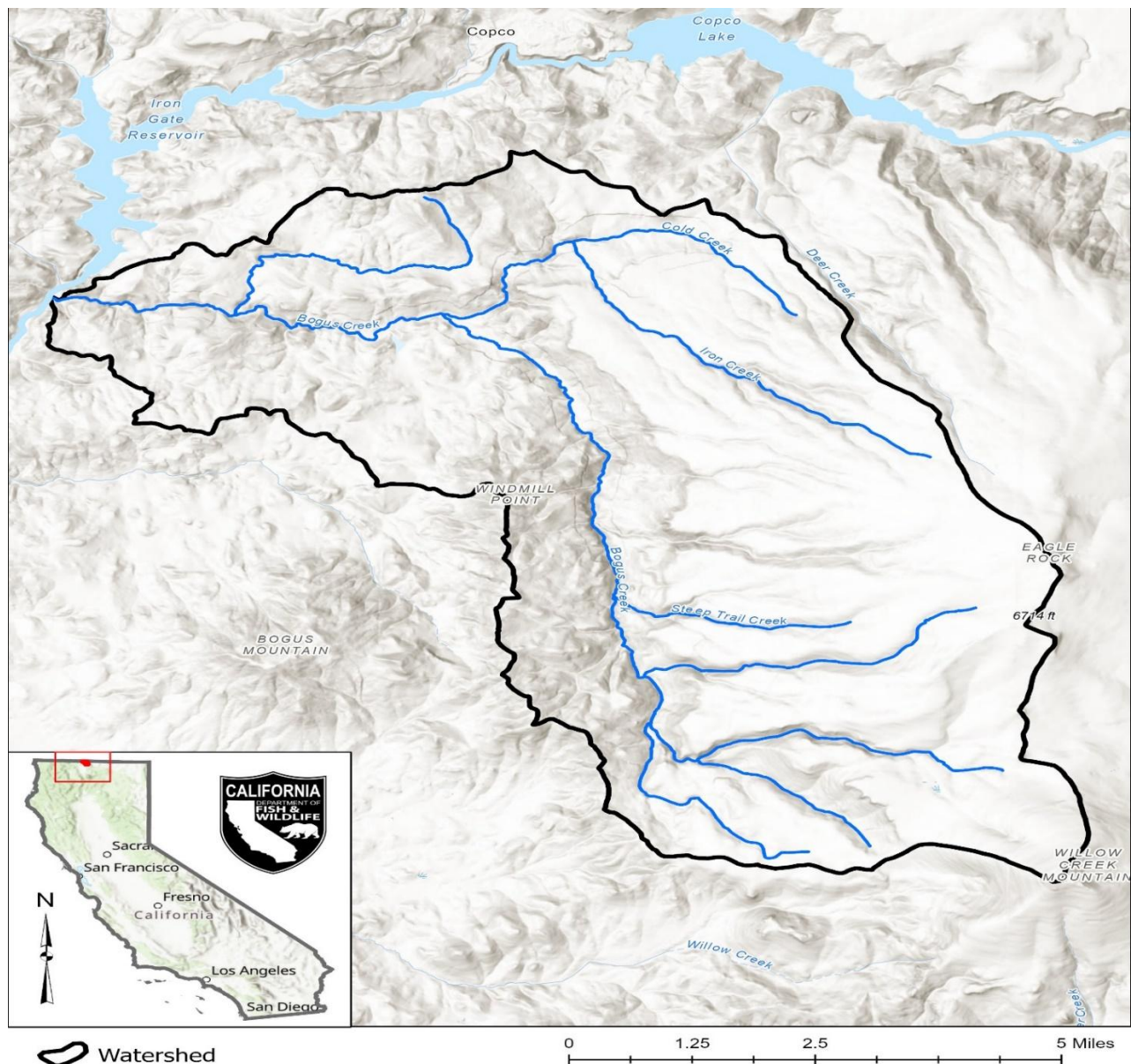


Figure 1. Location of Bogus Creek, tributary to the Klamath River, Siskiyou County.

BOGUS CREEK FISH COUNTING FACILITY

The purpose of the BCFCF is to count the number of adult Chinook Salmon, Coho Salmon and steelhead trout that enter Bogus Creek each year. Prior to the 2003 spawning run, a fish marking weir and trap were operated on Bogus Creek to collect biological data, recover heads from adipose fin clipped adults (ad-clipped), and mark Chinook Salmon with an opercle punch. The opercle punch was used to generate a mark and recapture population estimate from recaptures obtained during carcass surveys upstream of the weir. Incorporation of a video counting station in 2003 has improved the accuracy of run size estimates and has eliminated the need to handle migrating salmon during the season. Biological data collection occurs during spawning ground surveys and includes collection of FL's, determining sexual composition of the run, assessing female pre-spawn mortality, and recovery of coded wire tags (CWT) from ad-clipped salmon.

KLAMATH RIVER PROJECT AND BOGUS CREEK STUDY

The Bogus Creek study is one component of the KRP. The goals of the KRP include obtaining information on population abundance, hatchery composition, run timing, spawning distribution, fork length frequency, and sex ratios for salmonids (primarily Chinook Salmon) in various tributaries to the Klamath River including the Salmon, Scott, and Shasta rivers, as well as Bogus Creek and a dozen other smaller tributaries. Bogus Creek is particularly important because it is a major salmon spawning tributary, despite its small size. In addition to providing valuable escapement estimates to the Pacific Fishery Management Council for the effective management of Chinook Salmon in the Klamath Basin, the Bogus Creek studies provide an additional opportunity to recover CWTs and collect scale samples (which are used in the final determination of age composition).

BOGUS CREEK STUDY OBJECTIVES SUMMARIZED:

- A. Determine the in-river run size (escapement) of Chinook Salmon, Coho Salmon and steelhead trout returning to Bogus Creek.
- B. Determine run timing, spawning distribution, length frequency distribution, and sex ratio for Chinook Salmon and Coho Salmon in Bogus Creek.
- C. Collect scale samples and recover heads (containing coded wire tags) from ad-clipped Chinook Salmon in order to determine age composition and hatchery composition of the run.

METHODS

OPERATION OF THE BOGUS CREEK FISH COUNTING FACILITY

The video fish counting system was installed at the BCFCF on September 30, 2025. A temporary Alaskan style weir was installed to direct migrating fish into a fish ladder and flume where they pass in front of the camera. The underwater video system consisted of a digital color video camera, waterproof camera housing, viewing window, and counting flume which allowed for recording unimpeded fish passage through the facility. The video flume was blocked to prevent fish from moving upstream until the first Chinook Salmon was observed below the counting facility or the first Chinook Salmon was observed at IGH. The facility was operated 24 hours a day, seven days a week throughout the monitoring period which ended on December 15, 2025. Later season weather and flows granted eligibility to reinstall the counting facility. The secondary monitoring window ranged from January 15, 2026, to April 28, 2026. A Splash Cam digital color video camera equipped with a 3.6mm wide angle lens with an auto iris was used to collect the photo image and an InvidTech Digital Video Recorder (Model PD1B-4NH2) was used to record the image. The time lapse DVR was set to record continuously, and drive changes were made at least twice a week. After the Coho Salmon migration is over, during spring and early summer operations, the temporary weir is removed to minimize maintenance during the low flow period and damage to the facility during storm events. During low flow operation fish are physically unable to jump the dam structure and must swim upstream and downstream through the fish ladder and counting flume.

All hard drives were collected and immediately returned to the office where each was subsequently downloaded and reviewed by staff in the video lab. During each review, staff recorded the date, time (hour:min:sec), and species of each fish observed. Additionally, salmon are classified as either adults or grilse based on observed length in the videography. During videography adult salmon are considered greater than and equal to 56 cm and salmon less than 56 cm are considered grilse. All rainbow trout (*Onchorhynchus mykiss*) observed during videography greater than 40.64 cm (16 inches) in length are considered adult steelhead trout. Staff also noted the presence of hatchery clips or marks. If the species could not be determined because of poor visibility or picture quality, staff recorded that observation as unknown species. Species which could not be identified due to poor visibility or camera image were assigned species designations based on the proportion of known species migrating on the specific day for which the unknown observations were made. The estimate of fish passing through the counting station during periods of time when the video equipment was not operational were accounted for by averaging known fish migrations from 3 days prior and 3 days after the specific hours for which the camera was not functioning. All video data was then entered into computer files, and each data file was subjected to one independent edit prior to commencement of data analysis.

A secondary weir was installed upstream of the counting station which acted as an adult fish trap. The trap began operating on October 6, 2025, and was removed October 27, 2025. The trap was set systematically every Monday and operated continuously until Friday while being checked and cleared daily. The purpose of the trap was to serve as an extra source for hatchery broodstock. Video review continued throughout this period of trapping due to suspicion of upstream fish escapement. On October 27, 2025, the secondary weir was removed, and a smaller trap was installed directly upstream of the counting station. This smaller trap functioned from October 27, 2025, to November 4, 2025, until its removal. The systematic trapping operations remained the same between both trap styles, however, video

footage during smaller trap utilization was not reviewed as it was assumed 100% of adult fish passage was contained. Trapped fish were not included in the Bogus Creek population estimates.

SPAWNING GROUND SURVEYS

Spawning ground surveys were conducted twice a week on Tuesdays and Fridays throughout the salmon spawning season starting October 14, 2025, and ending January 29, 2025, permitting safe weather and flows. A total of 14 surveys were performed during the spawning season. For the purpose of the spawning ground surveys, Bogus Creek was divided into four reaches (Figure 2). Reach 1 includes the area from the mouth of Bogus Creek upstream to the BCFCF, approximately 0.3 miles. Reach 2 extends from the BCFCF upstream to a small waterfall approximately 0.6 miles. Reach 3 begins at the small waterfall and continues upstream to a road crossing approximately 1.6 miles and Reach 4 continues from the road crossing upstream to a larger waterfall (about 20 feet high) and fish ladder approximately 1.1 miles. There is additional spawning habitat upstream of the fish ladder that is not surveyed. The goal of the spawning ground survey upstream of the counting station is to collect biological information from salmon carcasses and not estimate abundance. Most surveys were conducted by four crews (one crew per reach), consisting of a minimum of two people for each crew.

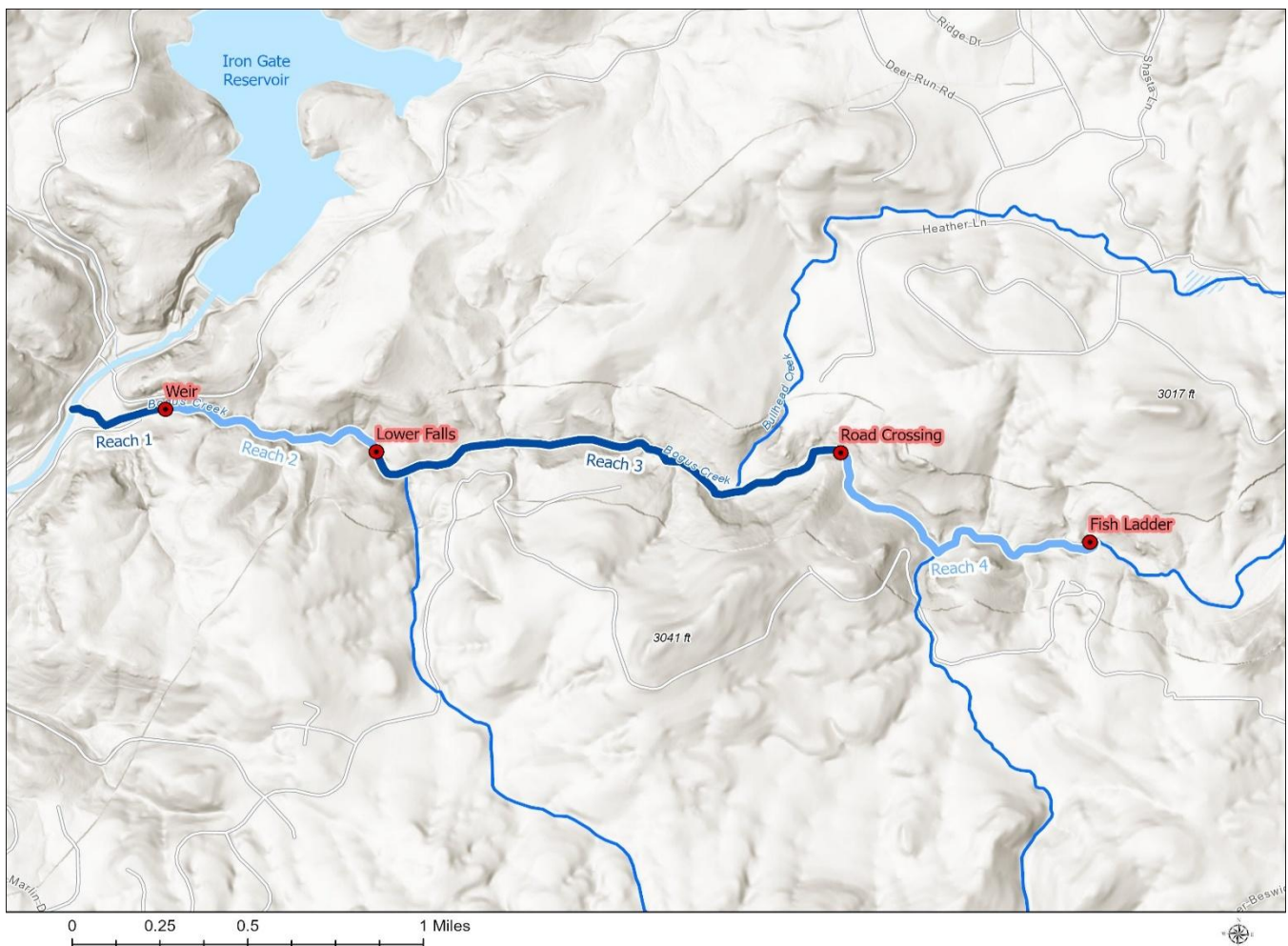


Figure 2. Map of spawning ground survey reaches on Bogus Creek used during the 2025 season. The weir denotes the location of the Bogus Creek Fish Counting Facility.

FL measurements to the nearest centimeter (cm), scale samples, sex determinations, and information regarding female spawning success were systematically collected from every Chinook Salmon carcass examined during the survey. Due to the low projected adult return in 2025, a systematic sub-sampling rate of 1 in 1 was implemented during the season. Every carcass was inspected for the presence of an ad-clip or any other marks or tags that might be present (jaw tag, radio transmitters, etc.). All scale samples were provided to the Yurok Tribal Fisheries Department for age analysis. Spawning status was evaluated for all sampled female carcasses and was defined as unspawned (many eggs remaining in the body) or spawned (few or no eggs remaining). Heads were collected from all ad-clipped fish (as well as FL and sex) for potential CWT recovery. Once examined, all carcasses were cut in half and returned to the river to prevent potential recounting during later surveys. Every Coho Salmon and steelhead trout carcass that was recovered during the survey was sampled.

The spawning ground surveys attempt to assign returning adult Coho Salmon into three groups: natural origin spawners (NOS), hatchery origin spawners (HOS), and surplus hatchery origin Coho Salmon (surplus). Surplus hatchery origin Coho Salmon are adult Coho Salmon that stray into Bogus Creek after first entering the IGH adult trap and are subsequently released as part of the surplus adult release program. The surplus release program is intended to reduce the demographic risk of extinction to the Upper Klamath Coho Salmon population unit as identified in the Iron Gate Coho Salmon Hatchery Genetics Management Plan (HGMP) and has been implemented since 2010. Prior to release surplus Coho Salmon are opercle punched for future identification during the spawning ground survey effort. Spawning ground survey crews carry PIT scanners and scan all Coho Salmon carcasses encountered to identify adults that were PIT tagged as juveniles during Bogus Creek juvenile sampling or other tagging projects in the basin.

To measure the long-term interaction of hatchery and natural origin spawners in Bogus Creek the proportionate natural influence or PNI can be calculated for the Chinook Salmon and Coho Salmon populations in Bogus Creek. It is theorized that when PNI values <0.5 the hatchery population is driving long term genetic fitness of the population and when PNI values >0.5 the natural population is driving the long-term genetic fitness of the population (HSRG 2012). PNI is calculated as:

$PNI = pNOB / (pNOB + pHOS)$ where

pNOB= IGH proportion of natural origin broodstock (directly measured for Coho Salmon and estimated for Chinook Salmon)

pHOS= Bogus Creek proportion hatchery origin spawners

To assist in developing stock identification baseline information, the KRP collected both genetic tissue and otolith samples during the season. Tissue samples were collected from 16 Chinook Salmon and 1 Coho Salmon for future DNA analysis. All samples were collected following protocols provided by the National Oceanic Atmospheric Administration's (NOAA) Southwest Fisheries Science Center. Tissue samples were sent to California Department of Fish and Wildlife's Central Valley Tissue Archive for archiving and analysis. Otoliths were collected from 13 Chinook Salmon and 1 Coho Salmon throughout the season and cataloged for future microchemistry analysis. All samples were collected following standard protocols.

POPULATION ESTIMATE

The salmon spawner escapement for the area of Bogus Creek upstream of the BCFCF was derived from a direct count of all salmon observed at the video counting facility (net total =upstream minus downstream movements). To estimate total escapement in Bogus Creek, the number of salmon carcasses observed downstream of the weir was added to the count of all salmon that were observed passing through the video counting facility. The Reach 1 carcass estimate is based on counting and chopping all observed carcasses on each survey day. Due to the sample frequency and small channel, a mark-recapture study design is not being implemented in Reach 1 to estimate carcass abundance.

The hatchery contribution rate of Chinook Salmon was derived independently for the areas downstream (Reach 1) and upstream (Reach 2-4) of the counting station. Reach 1 recoveries were simply expanded by their production multiplier (estimated at the time of juvenile release, obtained from hatchery records). Reach 2-4 hatchery composition was estimated upstream of the counting station using carcasses handled during the spawning ground surveys. The hatchery composition for upstream of the counting facility was calculated as follows:

- 1) The sampling fraction for fish examined for adipose fin clips (carcasses on spawning grounds) is estimated by dividing the number of carcasses examined for adipose clips by the number of fish migrating upstream of the counting station (from video counts);
- 2) Each coded-wire tag recovered during spawning ground surveys above the counting facility is expanded by the hatchery production multiplier (estimated at the time of juvenile release, obtained from hatchery records), to yield an estimate of the number of hatchery fish among observed carcasses; and
- 3) The expanded CWT recoveries from step 2 are multiplied by the reciprocal of the sampling fraction from step 1 to estimate the total number of hatchery Chinook Salmon escaping to spawning grounds upstream the counting station.

Preliminary grilse and adult proportions were determined using length frequency analysis of sampled male Chinook Salmon, and final grilse and adult proportions and age composition determinations were made by the Klamath River Technical Advisory Team using scale age analysis.

RESULTS

OPERATION OF THE BOGUS CREEK FISH COUNTING FACILITY

The BCFCF began recording fish movements on September 30, 2025. The first Chinook Salmon was observed at the BCFCF on October 1, 2025, and the last Chinook Salmon was observed on December 9, 2025. The run peaked between October 7, 2025, and October 14, 2025 (Figure 3) when 57% of the total run was observed. Eighty-seven percent of upstream migrating Chinook Salmon were observed passing through the BCFCF during daylight hours (between 0600 and 1700) and net upstream migration peaked in the afternoon between 1300 and 1700 hours (Figure 4).

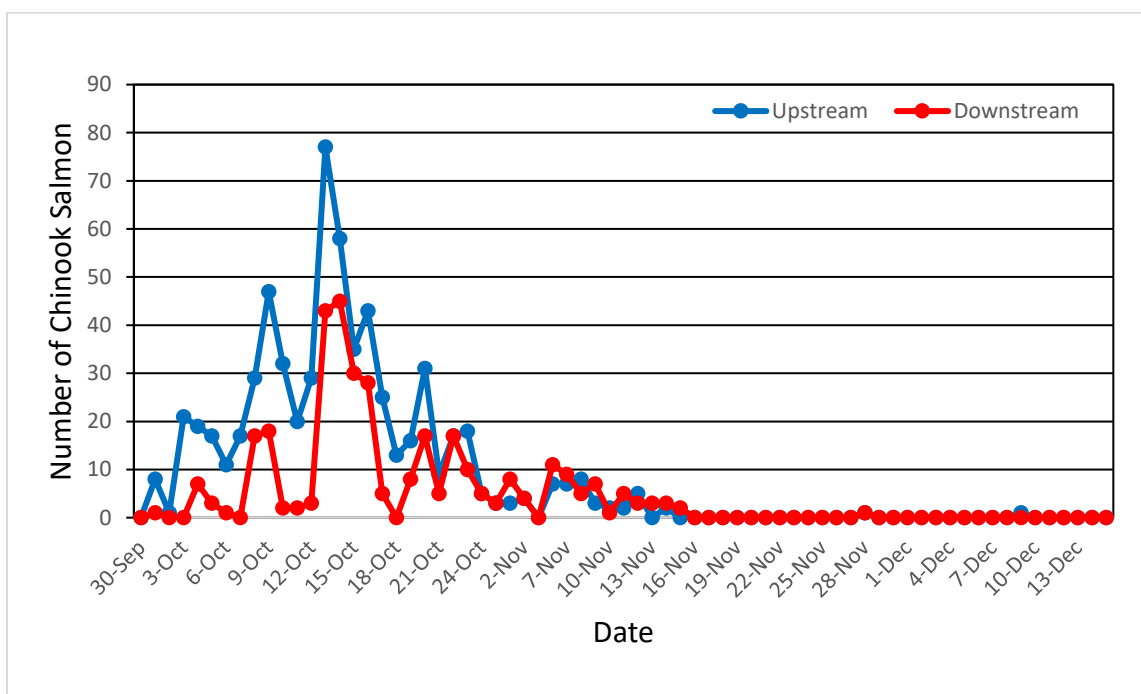


Figure 3. Run timing of Chinook Salmon through the BCFCF during the 2025 season. Both upstream and downstream movements through the counting flume are shown (N= 978).

A net total of 314 Chinook Salmon were estimated to have passed through the BCFCF during the 2025 season. The video monitoring station was inoperable on 2 occasions (10/24- 10/27 and 11/04- 11/06); during the season for a total of 51 hours. An additional 1 Chinook Salmon was added to the total population estimate by averaging the video net passage three days prior to the outages and three days after. A total of 99 Chinook Salmon carcasses were counted in Reach 1, downstream of the BCFCF. Trapping operations captured and transported 64 Chinook Salmon from Bogus Creek to FCH to be used as broodstock. Utilizing methods described above yields a total run size estimate of **350** Chinook Salmon. Based on the proportion of male and female Chinook Salmon sampled during the spawning ground surveys, the run was comprised of approximately 114 (32.6%) males and 236 (67.4%) females. Based on scale age analysis, adults comprised approximately 98.55% (345 fish) and grilse comprised 1.45% (5 fish) of the run (KRTT, 2026).

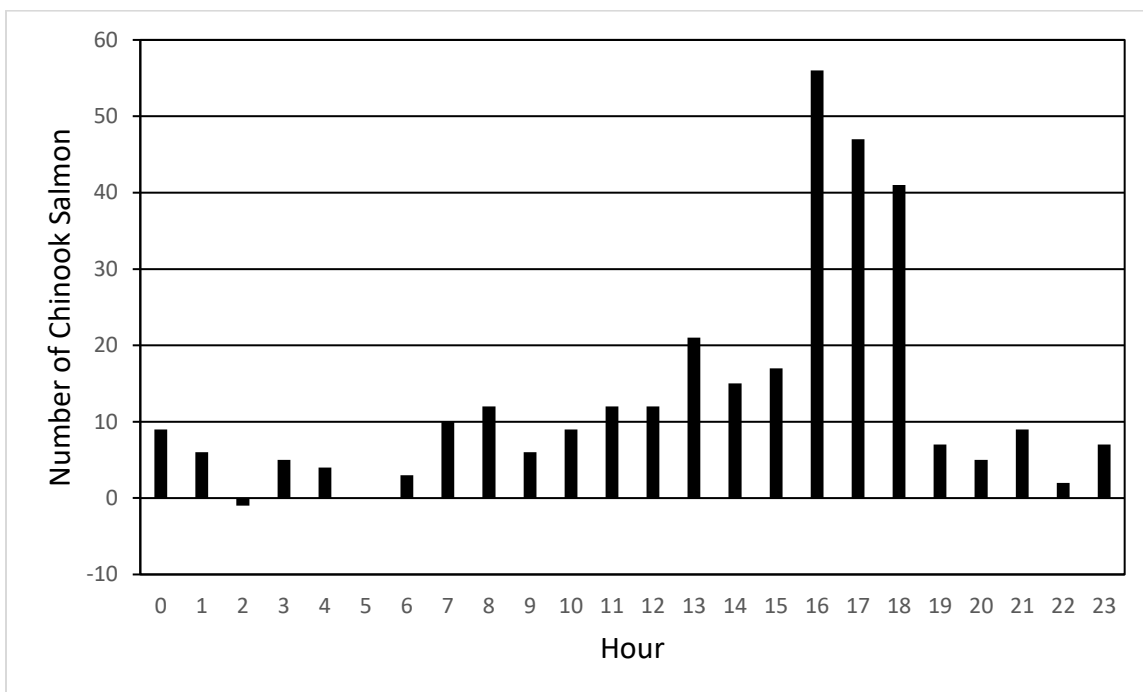


Figure 4. Summary of hourly run timing of Chinook Salmon observed (N= 314) at the Bogus Creek Fish Counting Facility during 2025.

SPAWNING GROUND SURVEYS

CHINOOK SALMON

A total of 184 Chinook Salmon carcasses were sampled (1:1 systematically sampled Chinook Salmon in the 2025 season) during the spawning ground survey. Of the 184 Chinook Salmon carcasses sampled, 60 (32.6%) were male and 124 (67.4%) were female, and 25 were ad-clipped. Males ranged in FL from 45 cm to 94 cm and averaged 71.4 cm (Figure 5). Based on the length frequency distribution of male Chinook Salmon presented in Figure 5, grilse were preliminarily determined to be ≤ 57 cm in FL. The grilse determination based on FL frequency was supported by scale age analysis (KRTT 2026). Females ranged in FL from 52 cm to 82 cm and averaged 65.5 cm (Figure 6). The grilse proportion based on aged scales was 1.45%. The grilse proportion based on FL frequency was 6.5%. The final age proportions were assigned based on the scale age analysis.

A total of 124 female Chinook Salmon carcasses were sampled during the spawning ground survey. Each of these was examined to determine if they had spawned prior to death. Spawning status was defined as un-spawned (many eggs remaining in the body) or spawned (few or no eggs remaining). Of the 124 female Chinook Salmon carcasses examined, 2 females (1.6%) were found to have been un-spawned.

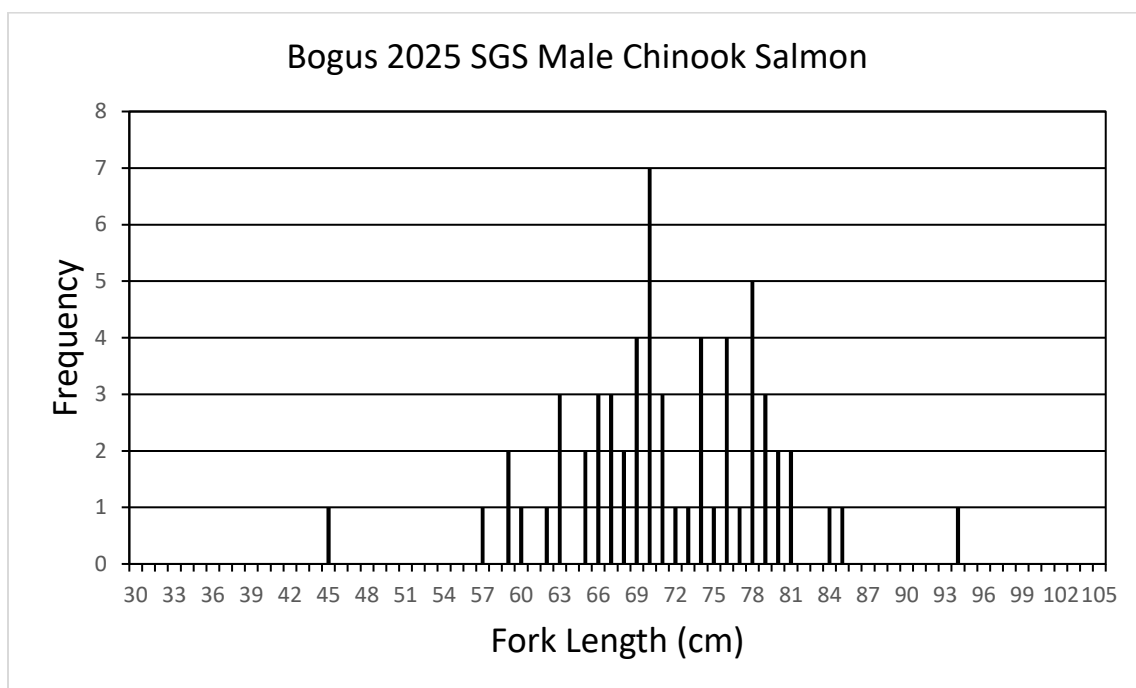


Figure 5. Length Frequency distribution of male Chinook Salmon sampled during spawning ground surveys in Bogus Creek, 2025 (N= 60).

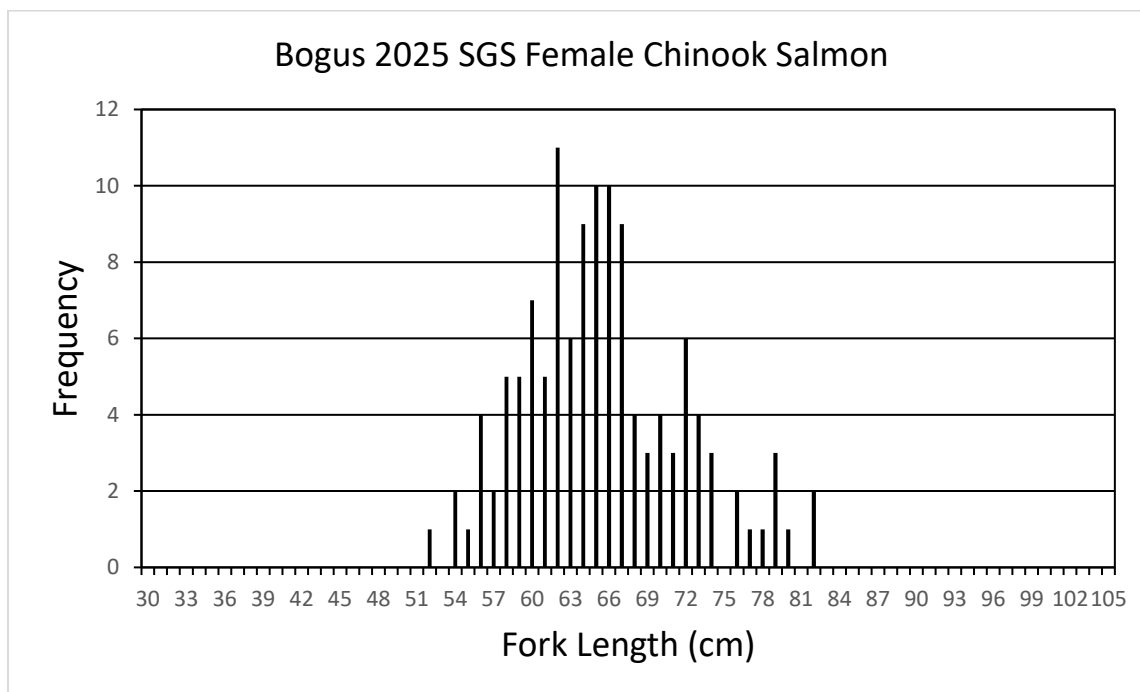


Figure 6. Length frequency distribution of female Chinook Salmon sampled during spawning ground surveys in Bogus Creek, 2025 (N= 124).

HATCHERY CONTRIBUTION ESTIMATE

A total of 25 heads were collected from ad-clipped Chinook Salmon. Positive CWT reads were obtained from 22 heads. Three heads were collected that did not contain a CWT. No tags were lost and none of the recovered CWT's were unreadable. All the CWT's recovered were from

IGH releases. To estimate the total hatchery contribution, the number of recoveries for each CWT was multiplied by the production multiplier derived at the time of release from IGH. As a result of the carcass survey effort upstream of the BCFCF not including all areas of anadromy, a sample expansion was applied to all CWT recoveries upstream of the BCFCF (Table 1). The sample expansion (2.95) is based on the inverse of the number of carcasses examined upstream of BCFCF during spawning ground surveys divided by the total number of Chinook Salmon observed passing through the station. The estimated number of hatchery origin Chinook Salmon in Reach 1 and Reach 2-4 are 29 and 158 respectively. Pooling the results from Reach 1 and Reaches 2-4 generates a total seasonal hatchery contribution estimate of 187 Chinook Salmon or 53.4% of the run. The calculated PNI value for the Bogus Creek Chinook Salmon population during 2025 was 0.36.

Table 1. Estimated contribution of hatchery origin Chinook Salmon in Bogus Creek, 2025

Bogus Spawning Ground Survey Reach 1								
CWT	Location	Release type a/	Brood year	Sample number	Production multiplier b/	Production estimate	Sample expansion	Total estimate
060032	IGH	AF	2022	3	4.04	12.11	1	12.11
060033	IGH	F	2022	1	4.12	4.12	1	4.12
060034	IGH	F	2022	1	4.02	4.02	1	4.02
061569	IGH	AF	2021	1	1.01	1.01	1	1.01
062269	IGH	AF	2022	1	4.06	4.06	1	4.06
062875	IGH	AF	2022	1	4.06	4.06	1	4.06
		Subtotal=		8		Subtotal=		29.37
Estimated contribution of lost and unreadable tags=					0	Subtotal=		0.00
						R1 Total=		29.37
Bogus Spawning Ground Survey Reach 2-4								
CWT	Location	Release type a/	Brood year	Sample number	Production multiplier b/	Production estimate	Sample expansion c/	Known estimate
060032	IGH	AF	2022	10	4.04	40.36	2.95	119.07
060035	IGH	F	2022	1	4.03	4.03	2.95	11.88
060036	IGH	F	2022	1	4.03	4.03	2.95	11.88
062269	IGH	F	2021	1	1.01	1.01	2.95	2.97
062875	IGH	AF	2022	1	4.06	4.06	2.95	11.97
		Subtotal=		14		Subtotal=		157.77
Estimated contribution of lost and unreadable tags=					0	Subtotal		0.00
						R2-4 Total=		157.77
Grand total of estimated hatchery contributions								187.15
a/	Release type; F=fingerling, Y=yearling, AF =advanced fingerling							
b/	Production multiplier is the ratio of # of fish released/fish marked							
c/	Sample expansion = ratio of fish estimated through weir/# of fish inspected for ad clips							

COHO SALMON

The first adult Coho Salmon was observed entering Bogus Creek on November 10, 2025, and the last Coho Salmon was observed on December 14, 2025. A net total of 12 Coho Salmon were observed moving through the BCFCF during the season (Figure 7). One Coho Salmon carcass was recovered downstream of the counting station during the season. Utilizing average net passage counts from 3 days prior and 3 days after the video outages, no additional Coho Salmon were added to the total population estimate. Summing the video estimate (12) and additional video outage fish (0); the recovered carcasses below the counting facility (1), the total seasonal Coho Salmon run-size estimate is **13**. Diel movements of Coho Salmon through the BCFCF varied but were generally higher during non-daylight hours (Figure 8).

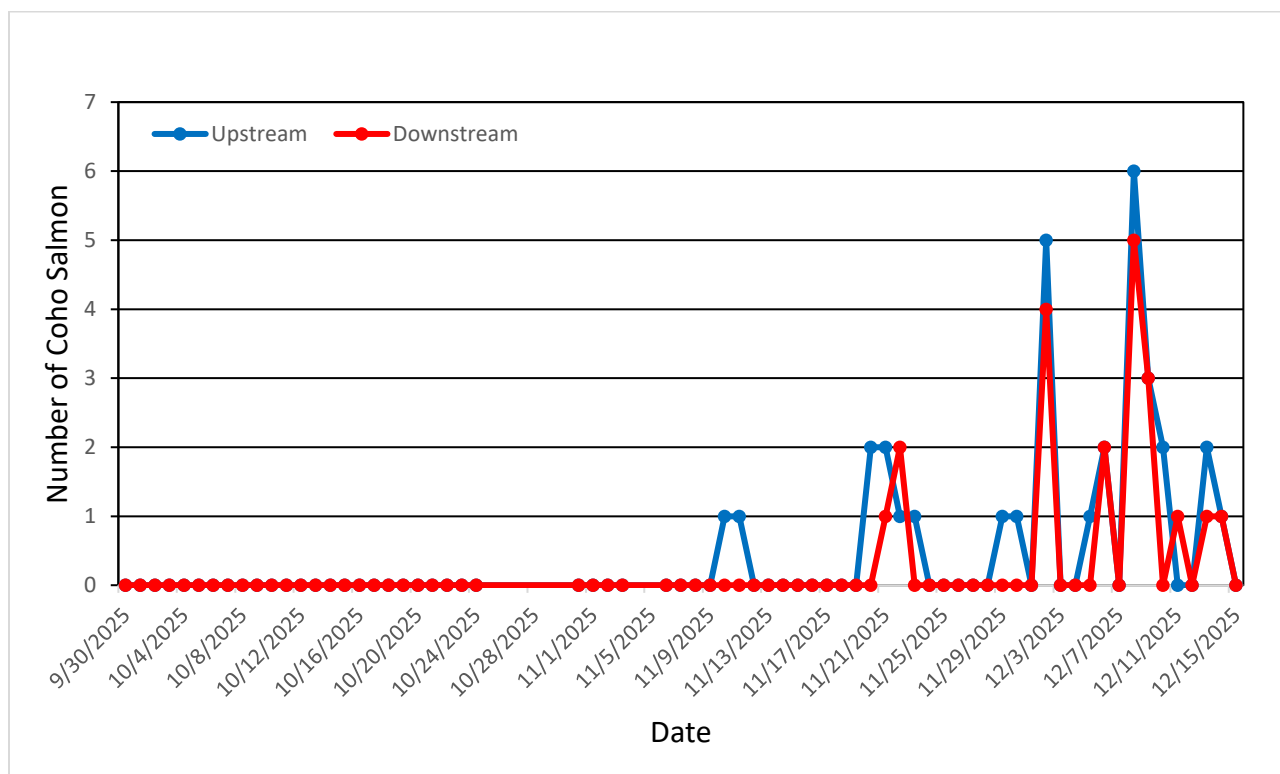


Figure 7. Run timing of Coho Salmon observed passing through the Bogus Creek Fish Counting Facility during the 2025 season. Both upstream and downstream movements through the counting flume are shown (N= 52).

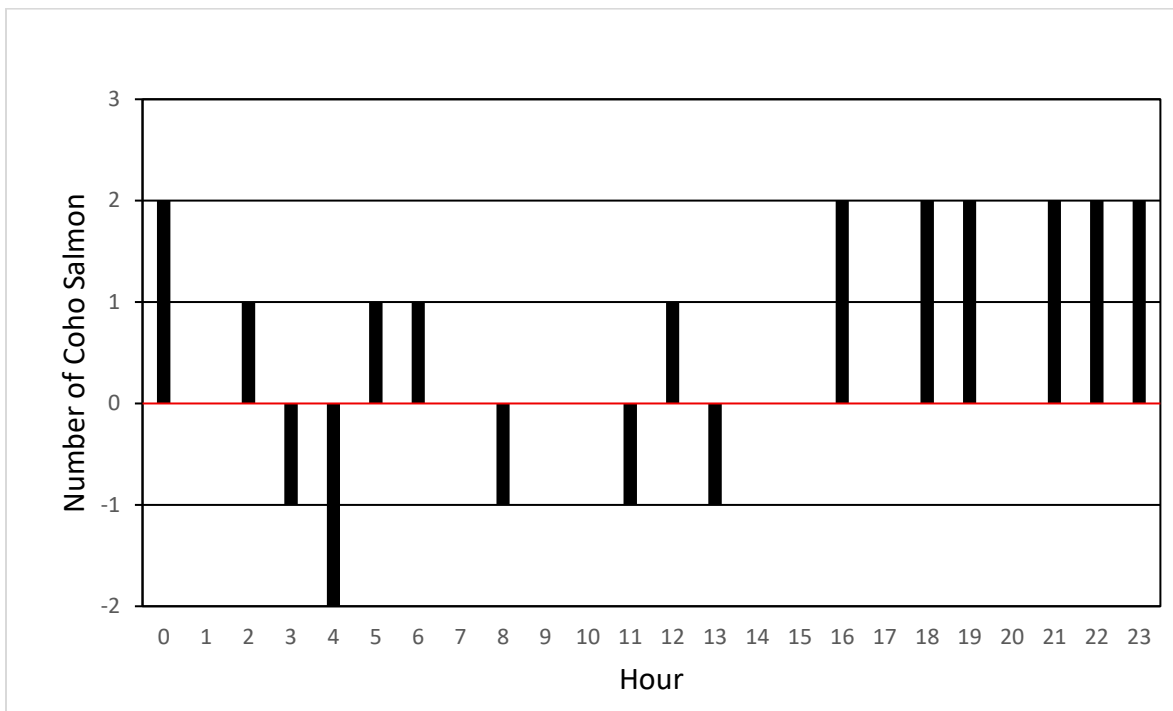


Figure 8. Diel migration patterns of Coho Salmon observed (N= 24) moving through (hourly movement) the Bogus Creek Fish Counting Facility in 2025 season.

SPAWNING GROUND SURVEYS

A total of 1 Coho Salmon carcass (1 female and 0 male) was sampled during the spawning ground surveys. Utilizing videography, a maximum grilse FL of <56 cm, 11 (91.7%) of the net twelve BCFCF passages were age 3 and 1 (8.3%) was age two. No male Coho Salmon carcasses were recovered or sampled in the 2025 season. The female had a recorded FL of 64 cm (Figure 9). The female Coho Salmon carcass was examined to determine if it had spawned prior to death. Spawning status was defined as un-spawned (many eggs remaining in the body) or spawned (few or no eggs remaining). Successful spawning was observed the female carcass. Left maxillary clips or ad-clips, indicating IGH or FCH origin was not observed on the female.

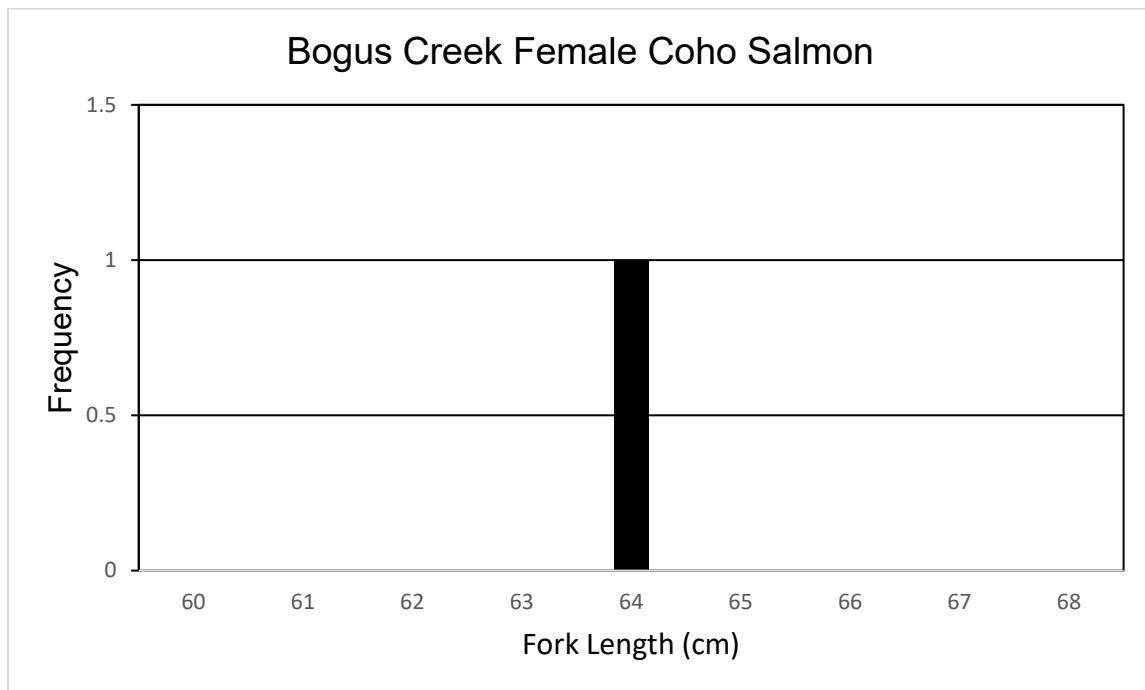


Figure 9. Length frequency distribution of female Coho Salmon observed during spawning ground surveys in Bogus Creek, 2025 (N= 1).

HATCHERY CONTRIBUTION ESTIMATE

In the 2025 season, a net total of 2 ad-clipped and 0 left maxillary clipped Coho Salmon were observed passing through the BCFCF. The 2 marked Coho Salmon were assumed to be of hatchery origin. Due to factors such as turbulence, position of the fish in the flume, and poor visibility because of water quality, hatchery marks are not always visible during video review. As a result, the observed number is possibly less than the number of recorded hatchery marked Coho Salmon that passed through the weir.

STEELHEAD TROUT

A net total of **16** adult (>40.64 cm) steelhead trout were observed moving through the BCFCF (Figure 10). No steelhead carcasses were recovered below the counting station.

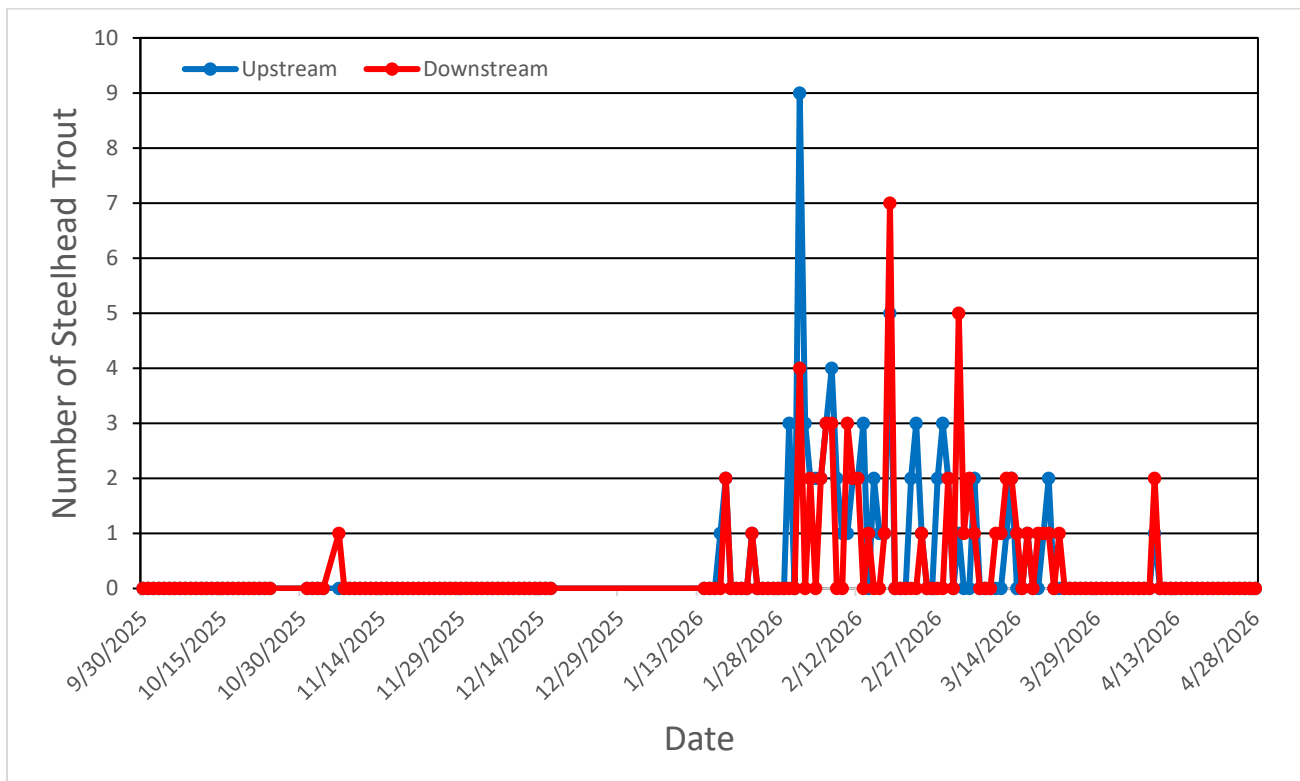


Figure 10. Run timing of steelhead trout >40.64 cm observed passing through the Bogus Creek Fish Counting Facility during the 2025 season. Both upstream and downstream movements through the counting flume are shown (N= 76).

DISCUSSION

CHINOOK SALMON

Since 1978, the Chinook Salmon run in Bogus Creek has ranged from 46,432 fish (1995) to 350 fish (2025) and averaged 7,100 fish (Figure 11). The 2025 Chinook Salmon run in Bogus Creek ranks 48th (350 fish) out of 48 years of data. During the peak return of Chinook Salmon to Bogus Creek in 1995 (46,432 fish), the ladder gates to IGH were closed after the hatchery met its egg production goal. Therefore, a significant portion of the IGH Chinook Salmon that would otherwise have entered the hatchery either spawned in the main stem Klamath River or entered tributaries including Bogus Creek. This would partially account for the large return of Chinook Salmon observed in Bogus Creek during the 1995 season. After 1995, the hatchery policy was modified to allow all Chinook Salmon to enter the hatchery regardless of the numbers of fish that may return. This policy reduces the potential for hatchery stocks to spawn in natural areas and as a result reduces the potential interactions between hatchery and natural area produced Chinook Salmon populations within the basin. Since video monitoring began in 2004 the Chinook Salmon run has ranged from 350 (2025) to 12,930 (2014) and averaged 4,015.

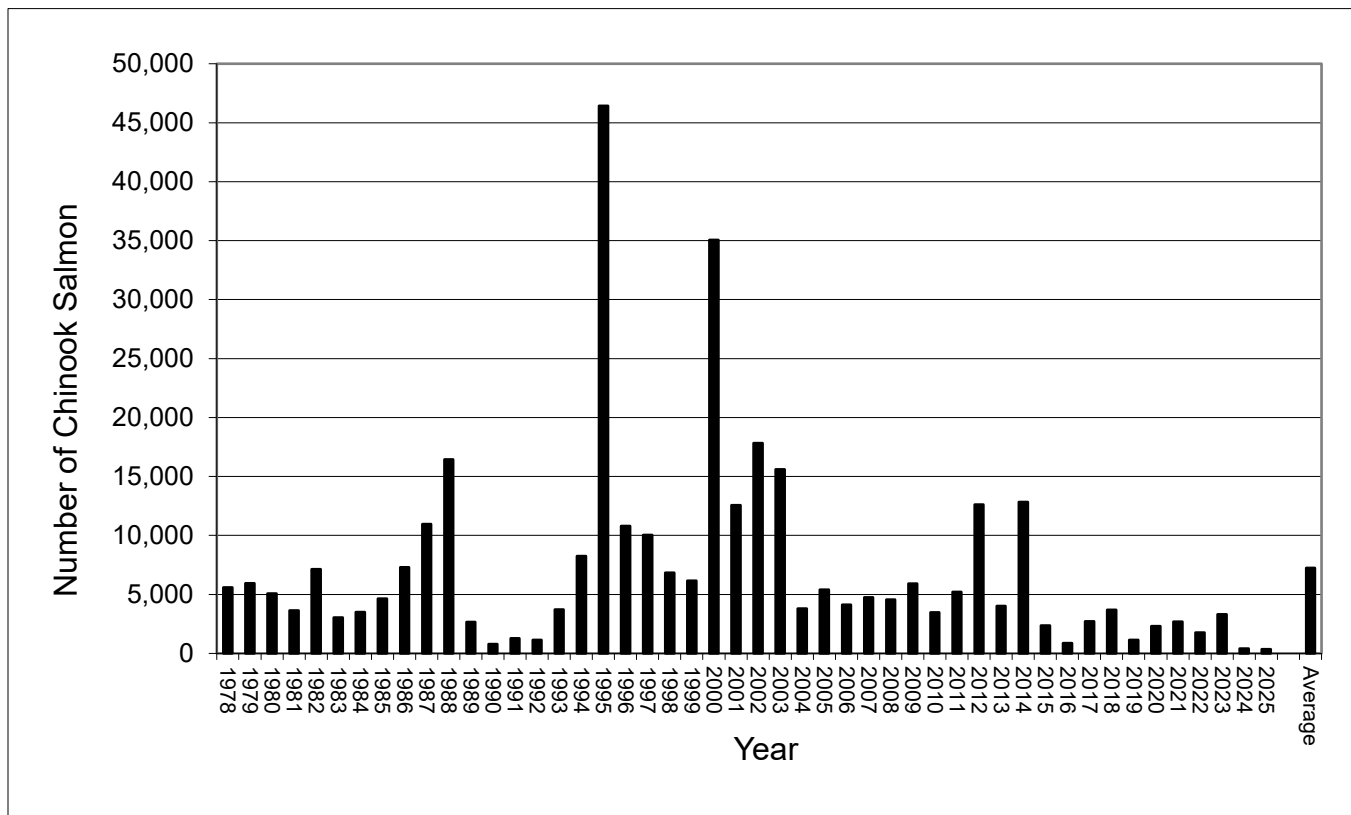


Figure 11. Estimated escapement of Chinook Salmon returning to Bogus Creek from 1978 to 2025.

HATCHERY CHINOOK SALMON CONTRIBUTIONS

The KRP has estimated the contribution of hatchery origin Chinook Salmon in Bogus Creek since 2003. Over that period, the contribution of hatchery Chinook Salmon in relation to the total Chinook Salmon run in Bogus Creek has ranged from 56.0% to 7.3% and averaged 31.2%. An estimated 53.4% of the Chinook that entered Bogus Creek during 2025 were of hatchery origin (Figure 12). IGH aimed to release 6.0 million Fall Chinook Salmon annually. FCH aims to release 3.25 fall Chinook Salmon annually. IGH/FCH releases for Brood Years 2020, 2021, 2022 and 2023 were 1.99 million, 2.09 million, 5.95 million and 2.42 million respectively. These brood years would have returned in 2025 as age 5, 4, 3, and 2-year-olds. The reduced hatchery releases during these years likely influenced the observed hatchery fraction in Bogus Creek during 2025. Additionally, starting in Brood Year 2008 (released in 2009), IGH initiated a 25% constant fractional marking program with the goal of marking and tagging 25% of its Chinook Salmon production. As noted previously, the mouth of Bogus Creek is roughly 75 feet downstream of the entrance to the auxiliary fish ladder used for trapping adult returns to the hatchery. As a result of the extremely close proximity of Bogus Creek to IGH and particularly the auxiliary fish ladder, there has been significant mixing of salmonids between these two locations.

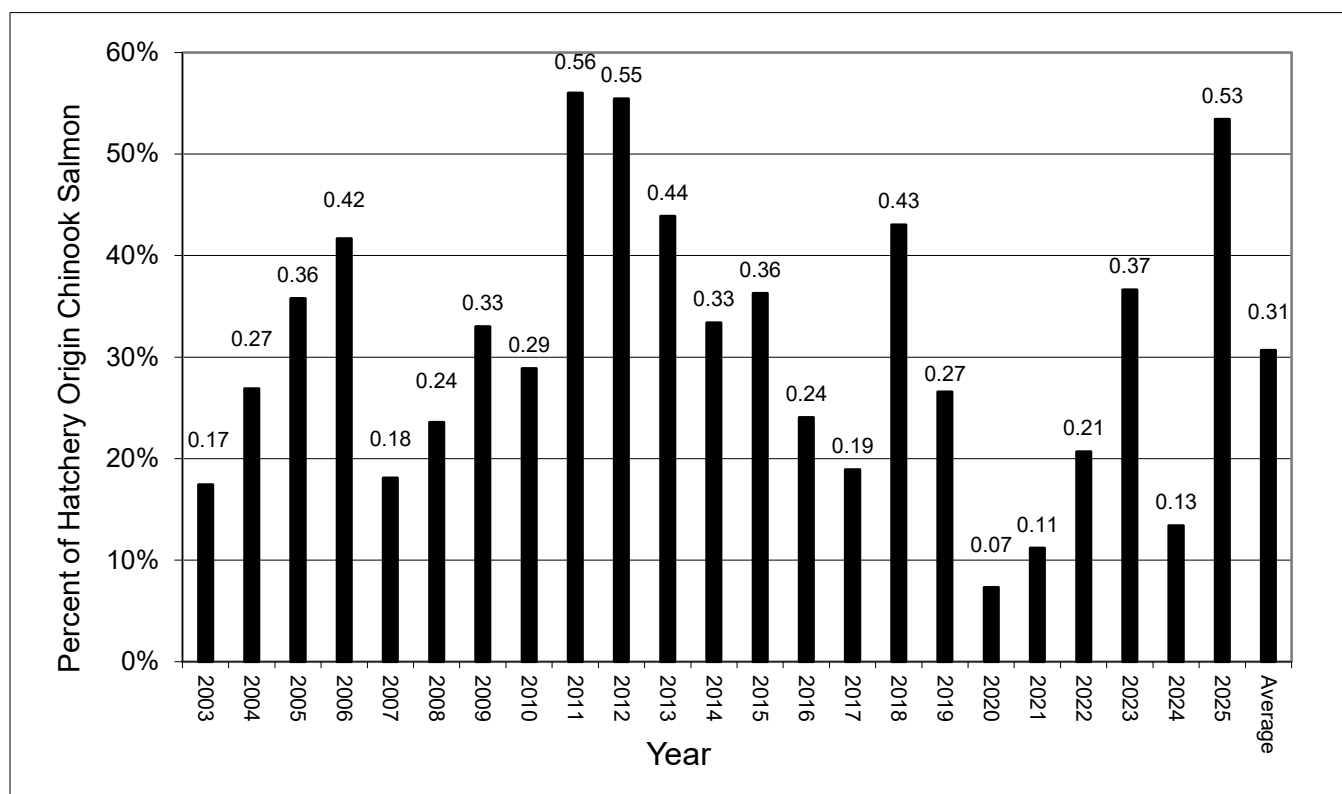


Figure 12. Estimated contribution of hatchery origin Chinook Salmon observed in Bogus Creek from 2003 through 2025.

COHO SALMON

Since video operations began in 2004 the estimated escapement by return year (all Coho Salmon regardless of age or origin) of Coho Salmon in Bogus Creek has averaged 150 fish (Figure 13). The escapement of Coho Salmon during 2025 was estimated to be 13, which was a decrease of 92% below the 21-year average. Coho Salmon escapement in 2025 (13) was 94% lower than the observed escapement in 2022 (201) when this specific brood year most recently returned as age three adults. The decrease in run size observed in 2025 was likely heavily influenced by the removal of the Iron Gate Dam. In previous years, some Coho Salmon stray into Bogus Creek after first entering IGH and are subsequently released as part of the surplus adult release program. The surplus release program is intended to reduce the demographic risk of extinction to the Upper Klamath Coho Salmon population unit as identified in the HGMP.

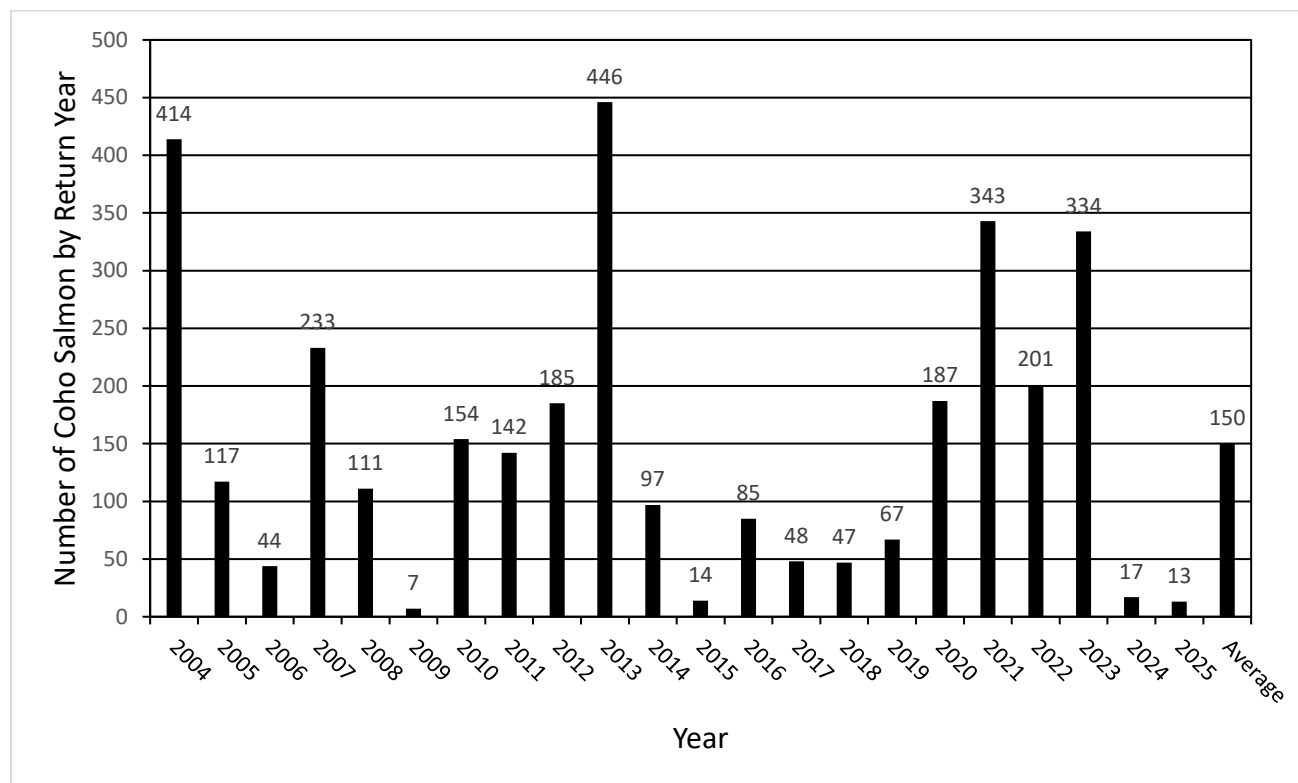


Figure 13. Estimated escapement by Return Year of hatchery and natural origin adult and grilse Coho Salmon (age 2 and age 3; different cohorts) returning to Bogus Creek from 2004 through 2025.

During carcass surveys, 1 Coho Salmon was sampled. Due to low carcass recoveries in the 2025 season, the observed historic hatchery rate average of 47% was applied. Two ad-clipped and 0 left maxillary clipped Coho Salmon were observed passing through the BCFCF during video review. The 2025 season marks the first year ad-clipped Coho Salmon from FCH were eligible to return as 2-year-olds. If low carcass recoveries continue in future years, hatchery marked Coho Salmon observations during video review may be considered to estimate hatchery influence. The proportion of hatchery and natural origin fish based on the historic average hatchery rate was 47% HOS (Hatchery Origin Spawners) and 53% NOS (Natural Origin Spawners). The proportion of Coho Salmon HOS in Bogus Creek has been estimated since 2004 and has ranged from 9% to 91% and has averaged 47% (Figure 14). As a result of implementation of the recommendations contained in the HGMP, starting in 2010, Coho Salmon IGH returns in excess of broodstock needs have been released back to the river. During the 2025 season, 1 excess Coho Salmon was released from FCH. Historically, these hatchery releases have significantly affected the proportion of HOS to Bogus Creek (Table 2).

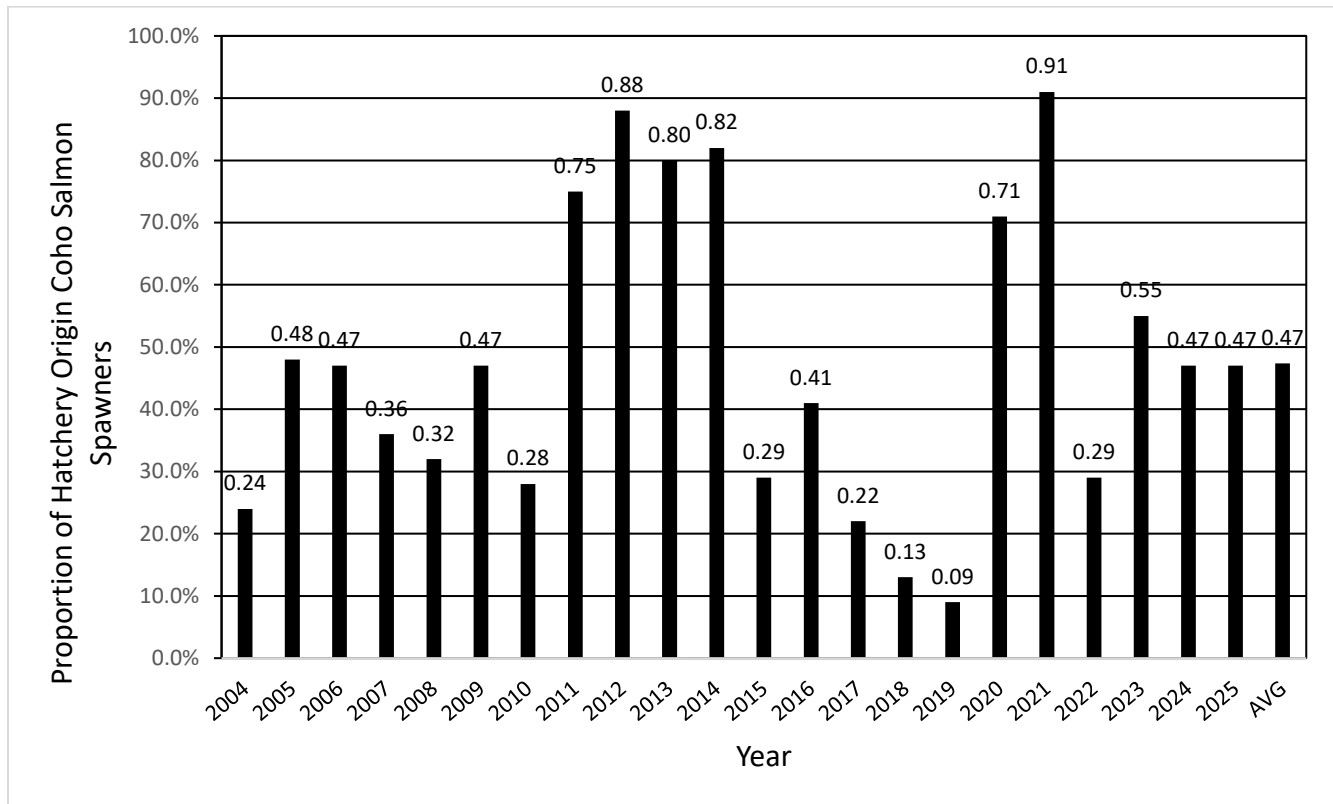


Figure 14. Estimated contribution of hatchery origin Coho Salmon observed in Bogus Creek from 2004 through 2025. Due to low carcass recovery in 2006, 2009, 2024, and 2025 hatchery contribution rates were not estimated in these years and the observed average hatchery proportion for the period of record (.47) was applied. Starting in 2010, Coho Salmon returns in excess of IGH broodstock needs have been released to the river.

Table 2. Bogus Creek Coho Salmon run size, natural origin spawners (NOS), hatchery origin spawners (HOS), Bogus Creek proportion hatchery origin spawners (pHOS), IGH/FCH proportion of natural origin broodstock (pNOB), proportionate natural influence (PNI) for Bogus Creek Coho Salmon and the number of IGH/FCH surplus adults released from 2004-2025.

Year	Bogus Creek Run Size	NOS	HOS	Bogus pHOS	IGH/FCH pNOB	Bogus Creek Coho PNI	IGH/FCH Surplus Adults Released
2004	414	313	101	0.24	0.02	0.07	337
2005	117	61	56	0.48	0.05	0.09	124
2006	44	24	20	0.47	0.06	0.11	53
2007	233	149	84	0.36	0.04	0.1	125
2008	111	76	35	0.32	0.03	0.09	15
2009	7	4	3	0.47	0.3	0.39	0
2010	154	111	43	0.28	0.26	0.48	60
2011	142	36	107	0.75	0.23	0.23	259
2012	185	22	163	0.88	0.09	0.09	342
2013	446	87	359	0.8	0.23	0.22	896
2014	97	17	80	0.82	0.31	0.27	239
2015	14	10	4	0.29	0.52	0.65	28
2016	85	50	35	0.41	0.47	0.53	6
2017	48	37	11	0.22	0.31	0.59	22
2018	47	41	6	0.13	0.28	0.68	11
2019	67	61	6	0.09	0.14	0.61	8
2020	187	55	132	0.71	0.13	0.16	421
2021	343	32	311	0.91	0.1	0.1	831
2022	201	144	57	0.29	0.24	0.46	580
2023	334	150	184	0.55	0.43	0.44	350
2024	17	9	8	0.47	0.88	0.65	4
2025	13	7	6	0.47	0.46	0.5	1
AVG	150	69	82	0.47	0.22	0.33	259

A total of 1 surplus Coho Salmon was released from FCH during the 2025 season and 1 carcass was observed during spawning ground surveys on Bogus Creek. During 2025 all released surplus Coho Salmon were operculum punched. Although unlikely, FCH surplus Coho Salmon may have entered Bogus Creek and went undetected.

To evaluate the natural origin abundance of Coho Salmon in Bogus Creek the estimated hatchery influence has been removed and the returns of age 2 and age 3 fish have been pooled by cohort. The natural origin returns of Coho Salmon by cohort ranged from a low of 5 to a high of 309 for the years 2004 to 2025 (Figure 15). The 2022 brood year cohort that returned in 2025 (age 3 in 2025 and age 2 in 2024) in one generation increased in total numbers by 1, from 12 to 13.

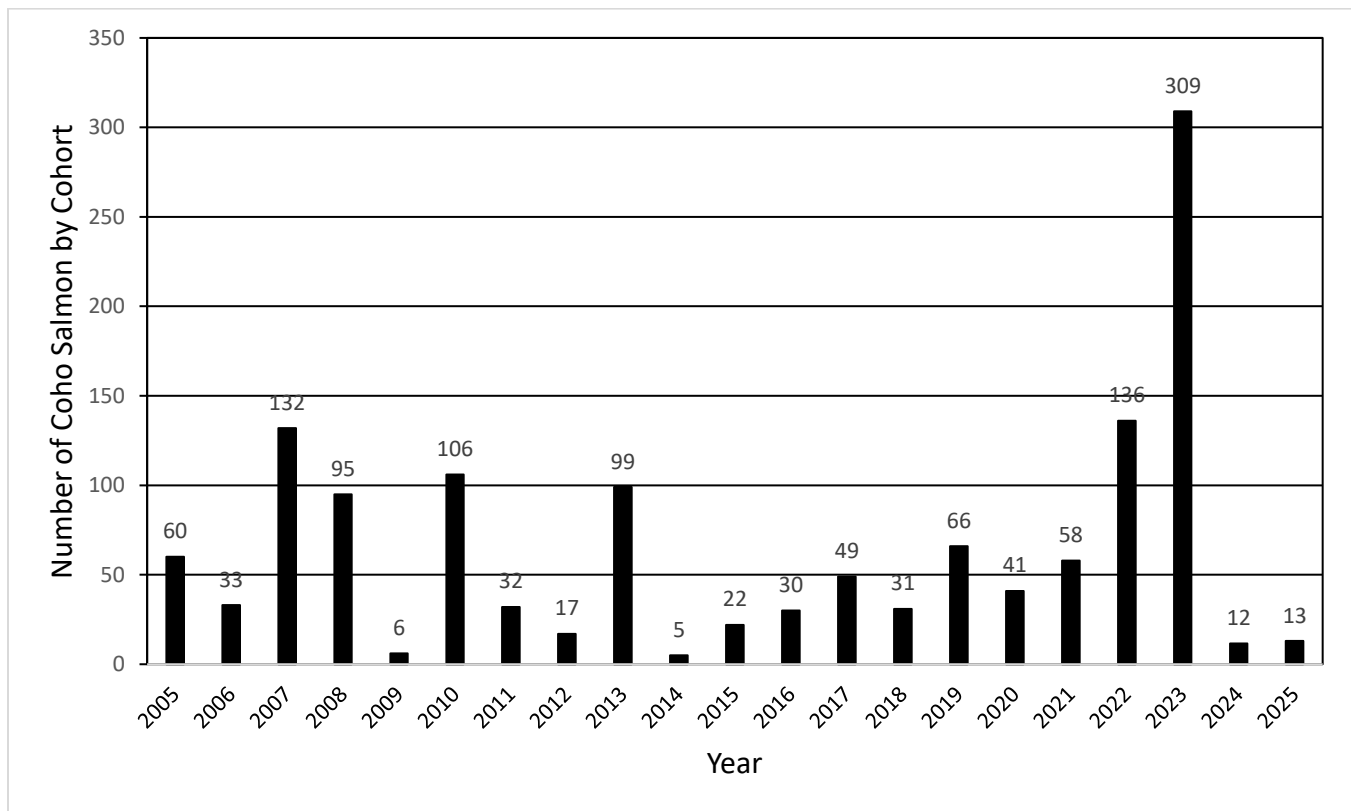


Figure 15. Estimated escapement by cohort of natural origin adult and grilse Coho Salmon (age 2 and age 3; same cohort) returning to Bogus Creek from 2004 through 2025. Year indicates when a cohort returned at age 3.

Utilizing total escapement, estimated proportion of natural origin Coho Salmon and estimated age structure of returning adult Coho Salmon to Bogus Creek allows for total spawner (natural origin plus hatchery origin) to natural origin recruit analysis for brood years 2004, 2005, and 2007-2022 (Figure 16). The spawner recruit analysis is limited to nineteen years of data but indicates that recruitment of natural origin Coho Salmon in Bogus Creek is less than replacement for fifteen out of nineteen years. Currently, under phase one of the HGMP, hatchery strays will not be controlled until natural origin abundance in Bogus Creek >309. Estimated natural origin spawners in Bogus Creek have not exceeded 309 since 2004 and have averaged 69 for the period of record (Table 2). Without significant increases in natural origin abundance phase two will not be reached. Phase 2 would direct the active management of annual Proportionate Natural Influence (PNI) levels and target >0.5 by limiting the number of hatchery origin spawners in Bogus Creek. Since passive supplementation started in 2010, the proportion of hatchery origin spawners on the spawning grounds (pHOS) in Bogus Creek has exceeded 50% seven out of twenty-two years and PNI values have exceeded 0.5 in seven of the twenty-two years. The higher the pHOS, the harder it is to achieve PNI values >0.5.

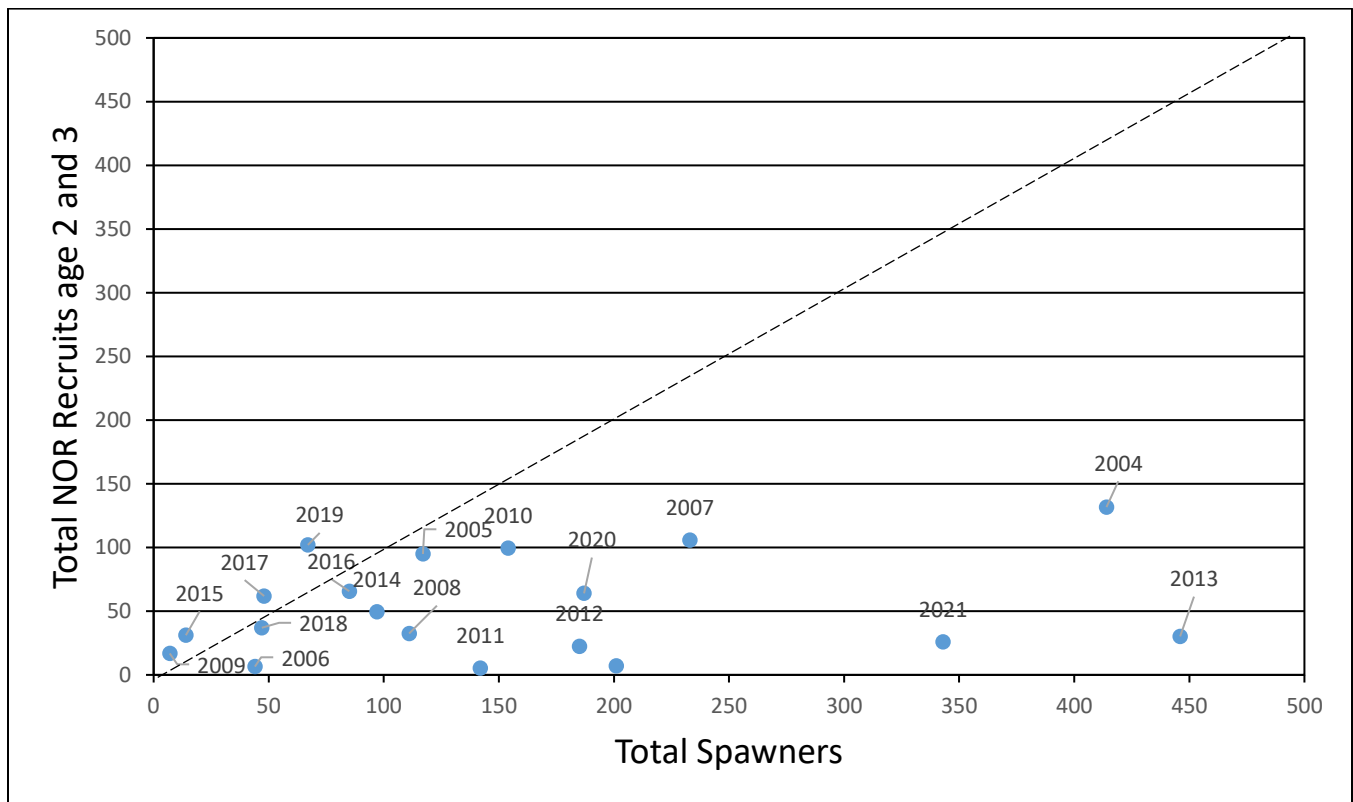


Figure 16. Total Spawner (natural plus hatchery origin) to natural origin recruit analysis for Bogus Creek Coho Salmon for spawner Brood Years 2004, 2005, and 2007-2022. The dashed line indicates a 1:1 replacement of spawners and recruits.

STEELHEAD TROUT

The BCFCF monitoring extended to December 15, 2025, however, the counting facility was reinstalled on January 14, 2026. Reinstalling the counting station allowed fish passage monitoring to include additional supplementary passage observations up to April 28, 2026. The net number of upstream steelhead trout >40.64 cm observations at Bogus Creek during the 2025 season was 16 (Table 3). During many seasons, the monitoring ended prior to the end of the steelhead trout migration but in 2013, and 2016-2023 seasons monitoring extended to or beyond May 1st. Since 2007 the annual number of steelhead trout observed has ranged from a low of 10 to a high of 637 and has averaged 166. It is unclear how the resident rainbow trout population in the Klamath River influences the anadromous steelhead trout monitoring in Bogus Creek. In previous seasons a bimodal return was observed with two pulses of fish migrating into Bogus Creek.

Table 3. Net upstream steelhead trout (>40.64 cm) observed at Bogus Creek and the last date of video monitoring for the years 2007 to 2025.

Year	Net Upstream <i>O. mykiss</i> > 40.64 cm	Last Date of Monitoring
2007	24	12/31
2008	48	12/22
2009	54	12/15
2010	24	12/14
2011	42	12/23
2012	59	12/7
2013-2014	103	5/1
2014	41	12/1
2015 - 2016	46	1/16
2016 - 2017	84	5/1
2017 - 2018	205	6/8
2018 - 2019	267	5/30
2019 - 2020	431	5/4
2020 - 2021	633	5/26
2021 - 2022	637	5/3
2022 - 2023	344	5/17
2023 - 2024	110	5/22
2024	10	12/23
2025- 2026	16	4/28
Average	167	

ACKNOWLEDGEMENTS

The California Department of Fish and Wildlife would like to thank the KRP staff for their dedicated efforts during the 2025 field season on Bogus Creek. We would also like to express our appreciation to the various landowners who have graciously provided permission to access Bogus Creek on their lands.

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