

2024-2025
Spawner Survey Program Final Report



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Forward to Skagit Fisheries Enhancement Group's Volunteers

Dear beloved volunteers,

Without you, the Spawner Survey Program would not exist. Thank you so much for yet another wonderful season! We are left in awe of the number of new and returning volunteers that turned out to monitor the creeks of the Samish and Skagit Basin this season - we had a record number of you show up for an entire season of surveying. I want to give particular praise to all the new students from Bellingham Technical College, Skagit Valley College and Western Washington University that donned waders each week for 4+ months, stepped into the creeks, endured weather of all kinds, spotted tons of spawning salmon and unwaveringly dissected salmon carcasses in the name of data collection.

Being a Volunteer in the Spawner Survey Program is no small commitment and you all made it look like a cake walk. I loved hearing the stories of new friendships forming with survey partners and landowners; from sharing garden vegetables and smoked salmon, to being offered a job on the family farm for the summer, to seeing bright, beautiful fish you hadn't thought would show up in your stream and then counting dozens. These stories and experiences are what make the Spawner Survey Program such a special niche in our community. Not only do you all collect critical information on the creeks that have undergone enhancement and restoration efforts, but you also have become a voice for the watershed and get to share all your stories and care for the water and environment to your family, friends and colleagues.

This is how real change happens. You are why we have hope for our future generations and know that the work we do is working for a more resilient, just future that supports the health and well-being of everyone from our salmon to our forests to our waters and our people. Volunteers, you are truly committed environmental stewards, and we are so grateful!

In addition to all the hard work of the volunteers, my hands go up to Devon Bedard and PJ Heusted, our AmeriCorps Habitat Restoration Associate and Spawner Survey Intern. Without them this Spawner Survey Program would not have been possible. Devon and PJ put in remarkable hours of walking creeks, communicating with Volunteers and Landowners, crunching data numbers, writing this remarkable report below and all the while brought a whole new level of vigor to the Program. Devon spent hours creating a comprehensive Spawner Survey Program Manual and Sampling Protocol, compiled temperature data for the watersheds, organized creek walks and substitutes, made graphs, and the list goes on. PJ took it upon herself to conceptualize our monitoring data into a way that made the "fishiness" of a creek truly comparable and thus her brainchild, Fish per Mile was born! PJ also spent hours entering data, doing QA/QC on all of it, catching the littlest errors and compiled decade-old data that had been collecting dust in filing cabinets. Y'all are rockstars!

Thank you all for the memorable and remarkable Spawner Survey Season!!

All my best,

Myrriah Crowley

Habitat Restoration Coordinator

Skagit Fisheries Enhancement Group

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Introduction

Skagit Fisheries Enhancement Group's (SFEG) volunteer-based Spawner Survey Program is a long-term salmon monitoring project that began in 1998 and has collected data at over 30 creeks within the Samish and Skagit Watersheds. The Spawner Survey Program plays an important role in connecting our community to local watersheds and to the culturally and ecologically important Pacific salmon species that are native to this region. At SFEG, our vision is to involve the community with the work that we do to foster a better understanding of the diverse array of ecosystems that are so critical to the health of salmon populations and the interconnectivity of those habitats.

In addition to being a valuable tool to engage the public, the Spawner Survey Program helps guide restoration projects at SFEG that have been completed at or near each spawner survey stream location. The spawner surveys allow us to gain a better understanding of riparian habitat condition, the in-stream habitat usage by salmon, and the general, seasonal patterns in run timing and the number of fish returning each year. SFEG works closely with partners from the Skagit River System Cooperative (SRSC), Skagit County, Washington Department of Fish and Wildlife (WDFW), local cities, and other local or state-wide entities to determine the best locations and methods to improve salmon habitat. Private landowners are key collaborators of the Spawner Survey Program as well, without their willingness to have restoration projects and volunteer surveyors on their property, SFEG would not have been able to expand the Program to what it is today.

The spawner survey data that SFEG and volunteers collect on spawning adult salmon is mainly used for internal purposes or to guide land management and provide insight into local restoration efforts, particularly if salmon are present/absent in a certain reach of a creek. Understanding what salmon species are documented (present or absent) are in a stream, or reach of the stream, aids and informs the planning of restoration efforts in these tributaries; however, the Program's data is not intended to be used for population forecast modeling or determining the level of success of restoration efforts (i.e., effectiveness monitoring) unless the stream is specifically listed as a WDFW index stream.

A small subset of the streams surveyed in this program are part of the WDFW index reach system (WDFW Managing Fish Populations, 2024). The WDFW "index reach" denotation means that a reach of a stream has been chosen as a subset of all the streams in a particular watershed in which data is collected for many years. In general, a stream with an index reach is used as an indicator for the surrounding tributaries in that watershed. The data that SFEG collects on index reaches is utilized by WDFW as part of their forecast models of salmon escapement and annual fish counts. A salmon escapement number is the number of salmon (per species) that return to a stream to spawn in a given season or "escape" being caught/predated on before they can return to freshwater (NOAA Fisheries, 2022).

In February, WDFW released their predictions or forecasts for salmon escapement in the fall 2024- winter 2025 season (WDFW Forecasts, Model Runs, and Management Objectives, 2024). These prediction numbers were developed alongside Tribal co-managers during many meetings to decide on the timing and length of the fishing seasons for each species of salmon in the Skagit and Samish watersheds. Escapement numbers for different salmon species are like a weather prediction;

for example, they can grant an insight into what to expect for a season but are not guaranteed to be 100% accurate. Some amount of error in escapement models is bound to arise given the complex nature of the system in question and the high number of interacting variables. Consider all the factors affecting a salmon throughout its entire life from egg to spawning adult and the fact that even the most advanced model has to simplify or omit some percentage of the total, possible number of interacting variables (McElhany et al., 2010). Any simplification or omission of information/data in the model can cause error in the results particularly when forecasting or extrapolating further into the future (Burke et al., 2013). Even with some error, forecast modelling still remains an extremely valuable tool for fisheries management and setting realistic harvest goals for the continued conservation of salmon and steelhead in Washington.

The data SFEG provides to WDFW can also be used to update their current distribution database called SWIFD or Statewide Washington Integrated Fish Distribution. The SWIFD database can be accessed via an [interactive map](#) (*Statewide Washington Integrated Fish Distribution*, 2024). The SWIFD map is an excellent educational tool that is available to the public and can be used to view salmon bearing streams and understand what species are present/potentially present in each stream. This interactive database also provides information on specific run timings (i.e., Spring Chinook and Winter Chinook), and if a salmon species' presence was documented, presumed, or is determined "gradient accessible" through predictive stream gradient remote modeling. Stream gradient modeling is important since all salmon species have varying abilities to migrate upstream. SFEG also uses information from SWIFD internally to assess fish presence at restoration sites; for example, the restoration project design may be tailored or modified to suit a certain salmon species present at that site and their respective needs and gradient thresholds for upstream migration.

SFEG could not complete the work that we do through the Spawner Survey Program without the hard work and dedication of our volunteers and community members. Through this Spawner Survey Program at SFEG and beyond, we hope to continue to educate and engage the public with the shared goal of ensuring that our local rivers and streams have abundant and self-sustaining Pacific salmon populations that can be enjoyed in the present and for future generations.

Methods

Sampling Protocol

**This protocol is constructed with guidance and input from WDFW District Fish Biologists and is meant to complement the methods currently utilized by WDFW for spawner surveys in the Skagit and Samish watersheds.*

Training volunteers to collect spawning data is an effective way for SFEG to monitor a large suite of sites each year and engage the community in their local watershed. Volunteers are recruited via outreach to the community on social media, newsletters, college listservs, and through SFEG memberships.

The Spawner Survey Program begins in early October and runs until roughly the end of January or early February. This program requires a large time commitment and dedication across a long period of winter months, as each stream reach will be surveyed weekly. At the beginning of the

spawning season, SFEG holds a training workshop to teach volunteers how to identify Pacific salmon and trout species native to Washington and properly collect field data. The training includes a two to three-hour classroom component with presentations and discussion, followed by an in-person field day at Hansen Creek near Sedro Woolley (Skagit Fisheries Spawner Survey Program, 2024). After the in-person training, SFEG staff assign every volunteer to a creek that fits their home location, desired level of difficulty, and time constraint needs as best as possible. For safety reasons, all creeks are assigned two or three volunteers to survey the creek together for the season.

After being assigned a creek, volunteers that have not surveyed their assigned creek in previous years will schedule a “first walk” with a SFEG staff member or qualified, “veteran” volunteer with experience on that stream. Once volunteers have walked their stream with a staff member or qualified volunteer for the first survey, the team coordinates amongst themselves to find a day each week that is appropriate for all members to survey their stream. It is beneficial to pick one day and survey on the same day each week to simplify communication with the landowners that live along the reach of stream being surveyed. SFEG relies heavily on access to privately-owned properties for the work and surveys we do, and we strive to make communications as easy and positive an experience as possible for all landowners and volunteers involved.

Surveys are scheduled every seven to 10 days, throughout the season. It is imperative that sites be monitored at regular intervals of no fewer than seven days and no more than 10 days for consistency in the data. Surveys conclude when there have been two consecutive weeks of sampling with no new live or dead fish seen. For most creeks in the Skagit and Samish watersheds, the end of surveys usually occurs during January but can range from mid-December to early February.

At the beginning of each survey, data is collected on the provided data sheet (Appendix 1) regarding the stream conditions. Volunteers collect the start and stop time of their survey, water temperature (same location each survey), stream flow, and viewing conditions.

The stream temperature should be recorded in the thalweg of the channel by holding the thermometer in the water for at least 30 seconds in flowing water. If the temperature is recorded at a different location other than the original, that information is added to the “Notes” section of the data sheet and volunteers describe where the new water temperature reading was taken.

Under the survey viewing/visibility conditions, there are four different variables collected in the SFEG data sheet: flow type, visibility, water conditions, and viewing conditions. All four of these variables combine to give a comprehensive understanding of the survey conditions and directly relate to the confidence that an individual can see a spawning salmon in the water. For example, a day with high water and high turbidity would indicate that the individual has low confidence in their ability to see fish in the water.

The stream flow data is classified on a relative gradient from “dry” to “high” flow and documents the volume of water moving through the system. Generally, the water tends to be at its lowest during the months of September and early October. Throughout the season, the water height is compared to the bankfull width and the relationship between the two is used to determine the

flow type for a given survey. The bankfull width is identified on stream banks by looking at the highest point where the creek usually flows. At this high-water level, there is usually a strong contrast between rocks that are clean looking with no moss and the higher portion of the bank where vegetation and moss grows readily (*Bankfull Width Definition*, n.d.). Where the vegetation starts growing is generally considered the “ordinary high-water mark” and just below the ordinary high water is the point that marks the bankfull width of the creek for reference.

Water conditions are classified on a gradient from Low-Clear to High-Muddy. This variable is estimated by looking at a combination of the flow type and water turbidity. Likewise, visibility and viewing conditions will be determined by the individual and should reflect how much water conditions will affect your ability to see spawning, adult salmon. For example, fair visibility roughly indicates that one would likely see 50% of the fish in the creek, excellent visibility indicates roughly 90% of the fish, and poor or not survey-able indicates that less than 10% of the fish were thought to have been seen. These tiers for the “percentage of fish seen” are meant to indicate the surveyors’ viewing confidence level not the actual amount seen. For example, there could be a survey where no fish were seen but the viewing conditions were excellent so there was the possibility or confidence level of seeing 90% of the fish even if there were none actually seen on that particular survey. Visibility/viewing conditions should be assessed as an average throughout the stream survey and should be finalized at the end of the survey.

Spawner survey volunteers also collect several types of data on salmon observed in the creek survey reach. This information includes data on live salmon, salmon carcasses, and redds. Live, adult salmon are counted during the survey and the species is recorded to the best of the surveyor’s ability. If a species of adult fish cannot be determined, then that fish is marked as unknown and recorded as “UNK” in the data sheet. SFEG asks that volunteers provide as much information as possible regarding the unknown fish (e.g. photos, markings, where the fish was observed in the stream), recorded in the notes section of the data sheet. Salmon redds are only recorded if a salmon is present on the redd and are then marked with green flagging tape to prevent re-counting and disturbing/harming the redd on future surveys.

All salmon carcasses are examined to collect species, origin (hatchery/wild), sex, fork length, and document any pre-spawn mortality (PSM). PSM is only assessed on deceased, female salmon. After cutting open the belly of the salmon to determine the sex, PSM is estimated for female salmon. The estimate of PSM is based on the percentage of the total number of eggs remaining in the fish. For example, if there are less than approximately 100 eggs, the fish is considered to have 0% eggs remaining. If the egg skene is fully intact or the belly of the fish is still stuffed full of eggs, consider the fish to have 100% eggs remaining. The 50% of eggs remaining determination is a judgment call that ideally lands equally between those two extremes of 100% and 0% eggs remaining.

Other data collected during each spawner survey is the general site conditions and any notable features or events that occur during the survey. These notable events can include things such as presence or absence of juvenile fish in the creek and/or estimated numbers of juvenile fish,

predation/observed predators, notable interactions with landowners/pets, geomorphological and/or habitat changes (e.g., landslides or downed trees), or other wildlife observations (e.g., salamanders, crayfish, stream invertebrates, etc.). Volunteers are highly encouraged to take and send photos to SFEG from surveys of salmon, other volunteers, and the beauty of the creeks. Photos provide additional insight into stream conditions, carcass/fish ID, and oddities described in the notes. Additionally, SFEG uses photos to show our grant funders the incredible work that our spawner survey volunteers are doing in the Spawner Survey Program and for public outreach and education.

Fish Per Mile Calculations

Fish per mile (FPM) is modelled after the catch per unit effort (CPUE) relative abundance index used in fisheries science. A relative abundance index is a method to compare live observation data collected in different seasons on different creeks (Hubert & Fabrizio, 2007). In general, the FPM data used for calculations is from the present going back to 2014. The year 2014 is the first year where the number of surveys in a season was stored in the database. Not having the number of individual surveys in a season prohibits FPM calculation before 2014 because that number is needed to obtain the total season mileage used to calculate FPM (Equation 1). If surveys do not go back to 2014, then the first year of available survey data until the present are used (e.g., 2021 was the first year surveyed therefore FPM is only calculated from 2021 to present year).

The relative abundance value, FPM, is calculated for one year using three different variables: total fish seen, total surveys completed, and survey reach length. FPM is obtained by taking the total number of fish in a season and dividing that by the total season mileage. To get the total season mileage, the total number of surveys completed is multiplied by the survey reach length. This FPM number gives you the “fish per season mile” or the number of fish seen per mile of creek surveyed in each season. For these calculations, all species of adult salmon seen by volunteers were included together for the total number of fish seen each year.

Equation 1

Formula used to calculate FPM with simplifications moving to the right.

$$\frac{\text{Total Fish Seen (all spp.)}}{\text{Total Number of Surveys} \times \text{Survey Reach Length (Miles)}} = \frac{\text{Total Fish Seen (all spp.)}}{\text{Total Season Mileage}} = \text{FPM}$$

Each one of these three variables in FPM can change between different years and a change in any one of these variables will impact the resulting FPM value calculated. For example, if surveyors saw the same number of fish between two years (e.g., 100 fish in year one and 100 fish in year two). However, if in year two the survey team walked twice as far to see that same 100 fish, the FPM would be lower in year two than in year one. Still assuming the total number of fish seen stays the same between the two example years, the more times a team surveys (i.e., increased total season mileage) to see the same 100 fish, the lower the FPM value will be. In contrast, the fewer times a team surveys (i.e., decreased total season mileage) to see the same 100 fish, the higher the FPM value will be.

FPM can be more useful than a variable like total live counts to make comparisons across multiple survey seasons. This is because FPM accounts for changes in survey effort (e.g., changes in survey reach length or total number of surveys completed) between different years whereas total live counts do not.

Updates in the 2024-2025 Season

This year SFEG added seven entirely new survey reaches across five stream systems. These new survey reaches are located on sections of stream that are planning to undergo, or have undergone, habitat restoration projects (fish passage projects or fish barrier removal projects). Little Carey’s Creek (Skagit watershed), Barrel Springs, and Dry Creek (Samish watershed) were added to collect monitoring data for pre- or post-construction habitat restoration projects. Two new survey reaches were added to both Carpenter Creek and East Fork Walker Creek (Skagit watershed) expanding on the reaches already surveyed sections in these creeks. The first new survey reach added on Carpenter Creek was at Hickox Road, near the quarry, where a fish passage project is being designed. The second new survey reach on Carpenter starts at Ervine Lane, roughly 0.5-miles upstream of our Carpenter and English Creek survey reach; a fish passage project is planned to be constructed in the Summer of 2025. Lastly, the East Fork Walker Creek survey reaches were expanded upstream to encompass stretches of the creek that are planned for fish passage restoration construction in the Summer of 2025.

The 2024-25 season had a record number of volunteers who signed up to be a part of the Spawner Survey Program. This year just over 50 volunteers registered, which is almost double the average amount from past survey seasons (Table 1). The high number of volunteers allowed us to survey new creeks and have more flexibility when finding substitutions for survey teams if one of the team members needed to miss a day for any reason.

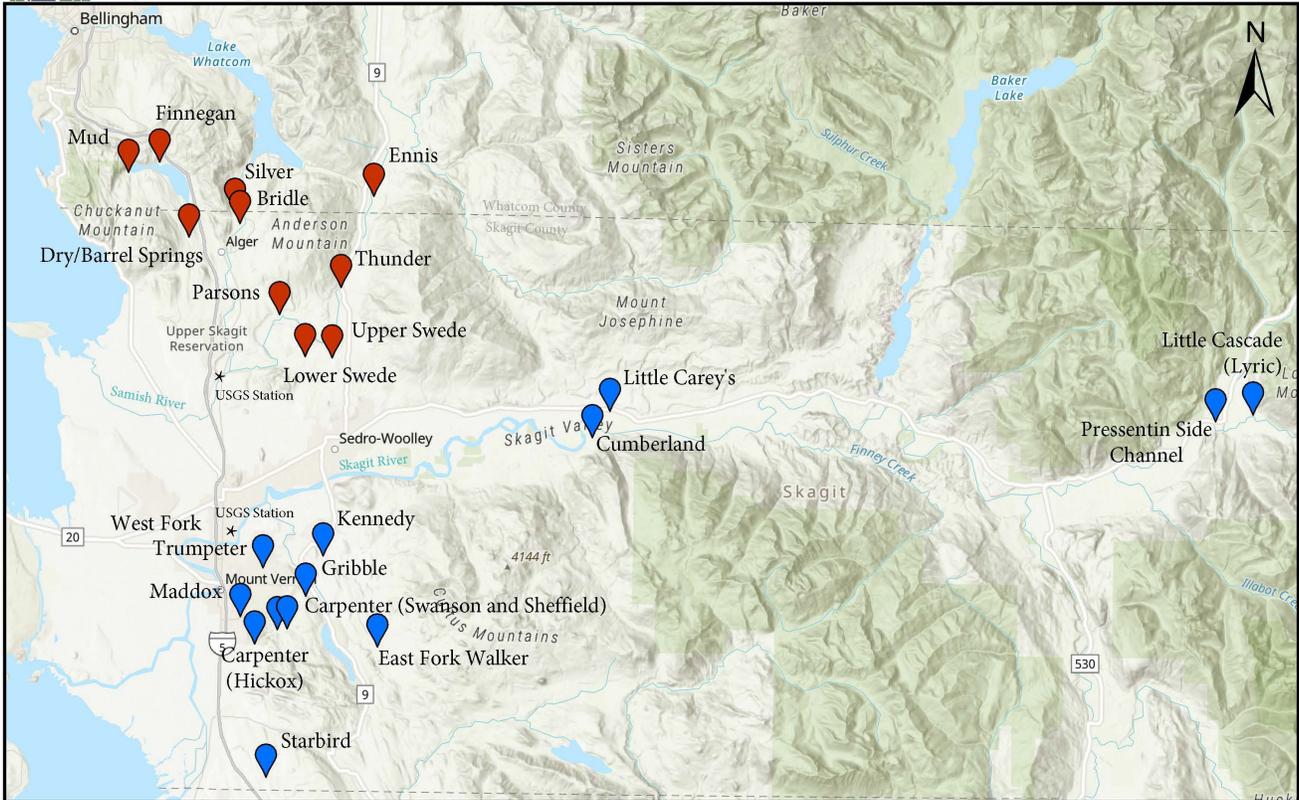
Table 1

2024-2025 SFEG Spawner Survey Season Summary. Numbers represent totals from achieved by the 53 volunteers that participated in the entire salmon spawning season.

Summary Categories	Season Totals
Surveyed Reaches	23
Total Surveys Completed	262
Sites with Fish Observed	21
Total Volunteer Hours	*882

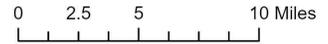
**Includes only hours submitted via timesheets.*

2024-25 Volunteer Spawner Survey Locations



-  Samish Watershed Survey Locations
-  Skagit Watershed Survey Locations
-  USGS Monitoring Locations

All sites surveyed by volunteers, WSC members, and staff during the 2024-2025 spawning season. 23 sites surveyed across the Skagit and Samish watersheds.



Credits: SFEG 2024, Esri, NASA, NGA, USGS, Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community

Figure 1

Overview of all 2024-25 Spawner Survey Program volunteer survey locations and USGS water gage monitoring locations.

Pre-Spawn Mortality (PSM)

Pre-spawn mortality (PSM) in Pacific salmon and trout (*Oncorhynchus spp.*) is generally defined as an adult fish that dies before it can successfully reproduce/spawn after returning to freshwater (Scholz et al., 2011; McIntyre et al., 2017). Fish can experience PSM for a multitude of reasons. A particular subset of PSM is referred to as Urban Runoff Mortality Syndrome or URMS (McIntyre et al., 2021). Fish experiencing URMS show signs of cardiorespiratory distress, which might present as irregular/surface swimming or gaping among other internal, biological signs (Scholz et al., 2011; McIntyre et al., 2021). URMS is a term applied in urban areas that have a high percentage of impervious surfaces within the watershed and have leachate from car tires reaching the freshwater. In contrast, PSM is a more general term than URMS and encompasses a broader range of conditions that may lead to pre-spawn mortality in freshwater. Salmon bearing streams in densely populated areas of the Pacific Northwest (e.g., Seattle) tend to be the most heavily affected by PSM/URMS (Spromberg & Scholz, 2011). More than any other Pacific salmon and trout species, Coho salmon (*Oncorhynchus kisutch*) have shown an acute sensitivity to pollutants (e.g., 6ppd-Quinone from car tires) found in roadway or impervious surface runoff (Tian et al., 2021). There is a large amount of variability, however it is possible for coho salmon to have PSM rates as high as 90% in highly urban streams that receive elevated volumes of unfiltered runoff (Feist et al, 2017).

In addition to roadway runoff, there are a variety of small and large-scale factors that can lead to an increased chance of PSM in adult salmon within a given watershed. Some notable factors influencing PSM include high water temperature, low water levels, disease load, lack of spawning habitat, and shifts in climate patterns (McIntyre et al., 2021). Given the complex mix of variables at play, it can be difficult or impossible at times to pinpoint the exact cause of any given PSM. The PSM data that SFEG collects is not meant to diagnose a given fish mortality but rather can be used as a reference point for future comparisons of PSM throughout the Skagit and Samish watersheds. PSM is important to monitor while trying to recover higher salmon populations. If PSM levels get too high in a population it can impede the recovery of certain populations or ESA listed salmon stocks and even harm population levels of healthy stocks (Bowerman et al., 2017).

Collecting PSM data on male fish tends to be more complicated than female fish. It is possible for a male salmon to spawn while only using a small percentage of their total milt available. Thus, the biology of male salmon inhibits SFEG or volunteers from reliably determining whether a male fish has spawned based solely on the amount of milt left inside the body. Given the potential complications that may arise with visually assessing PSM on male fish, the decision was made to limit the PSM data collection to females only. Therefore, SFEG's 2024-2025 PSM data represents only female salmon and is simplified into categories of 100%, 50%, and 0% of eggs remaining inside the fish. Female fish with 100% of eggs remaining would be considered a fish that died before being able to spawn or a "PSM fish". The categories and simplifications for PSM data collection are meant to streamline the data collection process for volunteers and improve the usefulness of the data. SFEG strives to make our Spawner Survey Program accessible to a diverse audience with unique backgrounds and experience levels and has worked to develop the PSM protocol with this in

mind. However, it should be said that any simplifications in the data collection (e.g., excluding male fish) may create bias in the data displayed/reported and should be considered while interpreting the data shown here.

This year in the 2024-25 salmon spawning season, there were 588 female salmon carcasses observed (only including fish documented as wild or hatchery): 431 female fish carcasses in the Skagit Watershed and 157 in the Samish Watershed (Table 2 & 3). The majority of the carcasses recorded were 0% eggs remaining or ‘UNK’ in both watersheds (Table 2 & 3). Including both wild and hatchery origin, the Skagit Watershed (Table 2) saw only nine carcasses with 100% eggs remaining and the Samish Watershed saw one more with 10 carcasses at 100% eggs remaining. Only female salmon carcasses found with 100% of their eggs remaining could be considered likely candidates for a PSM designation yet the cause of death remains unknown. PSM should be monitored closely moving forward to effectively recognize any shifting patterns and detect potential causes expeditiously.

Table 2

2024-2025 Skagit Watershed. Summary of the quantity of eggs remaining in female salmon carcasses. These data represent the percent of eggs remaining in the female salmon carcasses only and includes both wild and hatchery in the total counts (W+H). 100% eggs remaining could be considered pre-spawn mortality (PSM), W=Wild, and H=Hatchery. The % of total counts are rounded to the nearest tenths place.

Creek Name	Total Counts (Female, W+H)			Eggs remaining (Total # (% of total counts))							
				W				H			
	Coho	Chum	Chinook	100%	50%	0%	Unk	100%	50%	0%	Unk
Maddox	26	-	-	0	0	15(57.7)	8(30.8)	0	0	0	3(11.5)
English	-	-	-	0	0	0	0	0	0	0	0
Carpenter (Hickox)	-	-	-	0	0	0	0	0	0	0	0
Carpenter (Swanson)	-	-	-	0	0	0	0	0	0	0	0
Carpenter (Sheffield)	-	-	-	0	0	0	0	0	0	0	0
Kennedy	7	-	-	0	0	6(85.7)	0	0	0	1(14.23)	0
Starbird	-	-	-	0	0	0	0	0	0	0	0
*Gribble	-	-	-	-	-	-	-	-	-	-	-
Little Carey's	4	-	-	0	0	2(50)	2(50)	0	0	0	0
Little Cascade (Lyric)	108	-	-	0	0	45(41.7)	5(4.6)	0	0	45(41.7)	13(12)
W.F. Trumpeter	-	-	-	0	0	0	0	0	0	0	0
East Fork Walker (Reach 1)	150	-	-	3(2)	6(4)	139(92.7)	2(1.3)	0	0	0	0
East Fork Walker (Reach 2)	93	-	-	0	3(3.2)	90(96.8)	0	0	0	0	0
East Fork Walker (Reach 3)	24	-	-	0	0	22(91.7)	2(8.3)	0	0	0	0
Presentin Side Channel	4	-	-	0	0	1(25)	0	2(50)	0	1(25)	0
	-	12	-	0	0	2(16.7)	0	4(33.3)	3(25)	3(25)	0
**Cumberland	1	-	-	0	0	1(100)	0	0	0	0	0
	-	1	-	0	0	1(100)	0	0	0	0	0
	-	-	1	0	0	1(100)	0	0	0	0	0

*39 Coho carcasses were found. No carcasses were identified as M or F and could not be analyzed in this table.

**1 of the 2 Chinook was unknown origin (not H or W), 0% eggs remaining.

Table 3

2024-2025 Samish Watershed. Summary of the quantity of eggs remaining in female salmon carcasses. These data represent the percent of eggs remaining in the female salmon carcasses only and includes both wild and hatchery in the total counts (W+H). 100% eggs remaining could be considered pre-spawn mortality (PSM), W=Wild, and H=Hatchery. The % of total counts are rounded to the nearest tenths place.

Creek Name	Total Counts (Female, W+H)			Eggs remaining (total # (% of total count))								
				W				H				
	Coho	Chum	Kokanee	100%	50%	0%	Unk	100%	50%	0%	Unk	
*Dry	-	-	-	0	0	0	0	0	0	0	0	0
*Barrell Springs	-	-	-	0	0	0	0	0	0	0	0	0
Ennis	5	-	-	0	0	5(100)	0	0	0	0	0	0
Parsons	44	-	-	3(6.8)	2(4.5)	33(75)	0	1(2.3)	1(2.3)	4(9.1)	0	0
	-	1	-	0	0	1(100)	0	0	0	0	0	0
Thunder	8	-	-	1(12.5)	0	5(62.5)	1(12.5)	0	0	1(12.5)	0	0
	-	87	-	3(3.4)	2(2.3)	28(32.2)	54(62.1)	0	0	0	0	0
Swede (Lower)	1	-	-	0	0	1(100)	0	0	0	0	0	0
Swede (Upper)	1	-	-	0	0	1(100)	0	0	0	0	0	0
Silver	4	-	-	0	0	2(50)	2(50)	0	0	0	0	0
Bridle	4	-	-	1(25)	0	3(75)	0	0	0	0	0	0
Mud	-	-	1	0	0	1(100)	0	0	0	0	0	0
Finnegan	-	-	1	1(100)	0	0	0	0	0	0	0	0

*No female carcasses seen all season

Samish Watershed Overview

The Samish River is an independent watershed situated north of the Skagit River between Bellingham and Burlington, Washington. The mainstem Samish River travels for 29 miles from headwaters northeast of Wickersham, near Acme in Whatcom County, and flows Southeast towards Samish Bay. The Samish watershed in its entirety contains 85 tributary streams and has a total of 215 linear river miles of drainage within the watershed (A Catalog of Washington Streams and Salmon Utilization, 1975).

The most notable tributary of the Samish River is the Friday Creek system that flows for nine miles from its headwaters around Lake Samish to its confluence with the Samish River near the township of Belfast. There is one hatchery within the Samish watershed, and it is located on Friday Creek with a collection rack and weir nearby just downstream on the Samish River. The Samish Hatchery is located on the lower portion of Friday Creek near Pomona Grange County Park and is a WDFW operated salmon hatchery that produces fall Chinook for conservation and harvest support. Historically, wild Chinook salmon are not native to the Samish system and the presence of Chinook in these creeks is a direct result of roughly a century of hatchery operations.

All five species of Pacific salmon native to Washington – Chinook (*all Chinook in this system are of hatchery origin and any “wild” Chinook could better be described as feral hatchery stock*), coho, chum, pink, and sockeye – along with steelhead, cutthroat, and rainbow trout, utilize the Samish and its

tributaries for spawning and rearing habitat. The fish make use of the many miles of creek tributaries, as well as Lake Samish that is stocked annually with 70,000-90,000 kokanee fingerlings (WDFW *Statewide hatchery trout and kokanee stocking plan*, 2024).

To illustrate any possible correlations, we have overlaid Samish River water height data (USGS station 12201500) with 2024-2025 spawner survey live-count data in Figure 2. Water temperature, light, and river discharge all have the potential to influence the timing of salmon migration patterns. In certain river systems, coho salmon will delay their upstream migrations until the river cooled down to a suitable temperature and the mainstem flow was relatively low (LovellFord et al., 2020). Once salmon are in the freshwater system, there may be additional delays in migration based on the seasonal availability of spawning habitat (Fausch et al., 2002; LovellFord et al., 2020). For example, fish may need sufficient flow to travel farther up small tributaries of the mainstem river that are usually inaccessible to large fish such as salmon during low-flow regimes.

This year the first rain event with significant impact on water flow was on October 19, which was followed by a similar rain event on October 27 (Figure 2). In the Samish watershed, the first live salmon were observed by volunteers on October 19 with the peak returns not occurring until later in November shortly after the rain event on November 13. Like many aspects of this report, Figure 2 is meant to show large scale patterns and correlation relationships in the data collected but not to make a statement of causation.

2024-25 Samish River Gage Height and Salmon Live Counts

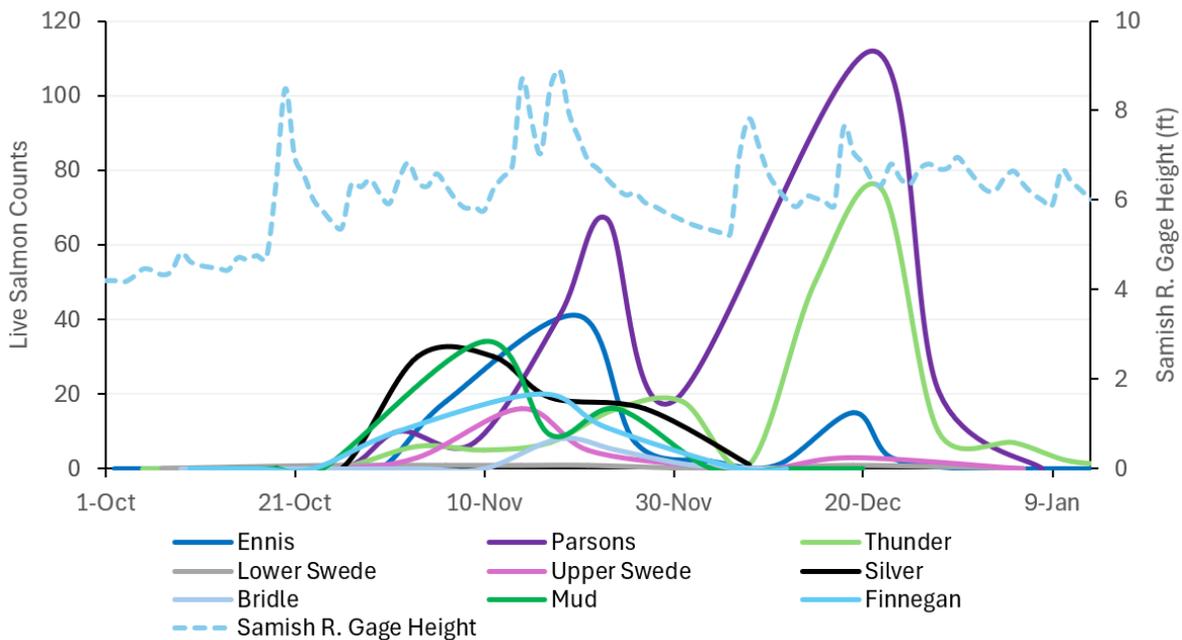


Figure 2

2024-25 Seasonal fluctuations in Samish River gage height measured near Burlington, WA (USGS Station 12201500) and Live salmon counts per creek across one spawning season in 2024-25. USGS site coords: 48.54594127, -122.3382169.

Table 4*2024-2025 Samish Watershed Detailed Survey Season Summary*

Creek Name	Total Fish Seen	Survey Length (Miles)	Surveys Completed	Fish Per Mile (FPM)	Volunteers
Dry	0	0.15	11	0	Devon Bedard, PJ Heusted
Barrell Springs	0	0.15	11	0	Devon Bedard, PJ Heusted
Ennis	105	0.5	16	13.1	Devon Bedard, PJ Heusted
Parsons	294	1.7	13	13.3	Danny Hays, Cody Tolle
Thunder	302	0.3	15	67.1	Reese Muirhead, Jon McKenzie, Rebecca Rising
Swede (Upper and Lower)	33	0.7	9	4.7	Catherine Houck, Victor Garcia
Silver	96	0.6	10	16	Erin Matthews, Felipe Muñoz Felix
Bridle	14	0.2	8	8.8	John Leighton, Avery Austin-Landers
Mud	60	0.5	9	13.3	Rebecca Cochran, Sophia Shafer
Finnegan	41	0.3	8	22.8	Finnian Towle, Taylor Ocheltree, Claudia Basso

Creeks Surveyed in Samish Watershed

Ennis Creek

Ennis Creek is a tributary within the Samish watershed and flows into a large wetland portion of the Samish River. WDFW identifies the creek as being a productive spawning habitat in use by coho salmon. From 2005-2007, SFEG, Skagit Conservation District, and the Whatcom Land Trust worked on a fish passage and riparian restoration project on the lower portion of the creek. Prior to the project, Ennis Creek flowed along Innis Creek Rd in a roadside channel and then under the road through an undersized culvert. The project involved a realignment of the creek away from the roadside and back through its historical flow pattern, the installation of large woody debris to enhance channel flow complexity, the building of a bridge to replace the undersized culvert, and the installation of native vegetation along the new channel. Since the completion of these projects, Ennis Creek now flows through much healthier salmon habitat with increased pool riffle habitat in the stream, improved resting and hiding areas for both juvenile and adult salmon, and improved sediment distribution.

This year's survey took place on a shorter reach of Ennis Creek than in past years due to a change of land ownership and private property restrictions. The survey was shortened to 0.5 miles from the typical 0.7 miles, ending before the transition from lower gradient creek flow to steeper, rockier drainage. Surveys began in early October on the shortened reach, but the first coho salmon of the season were not seen until November 6 (Figure 6). There were consistent coho sightings throughout the rest of November with 76% of the season's total fish (66 of the total 81 fish observed) being recorded between November 1 and 30 (Figure 6). From the beginning of December on, the weekly fish sightings dwindled before a slight peak again with 15 coho observed on the December 19 survey, coinciding with an increase in stream temperature and water level (Figure 2

and Figure 4). After December 19, the live coho sightings dwindled again with the final live fish being documented on December 23.

Despite seeing fewer fish than in recent years, the relative abundance remained relatively close with previous survey seasons (Figure 3). For this season there were 105 total fish sightings on Ennis creek seen over 16 surveys on a survey reach length of 0.5 miles. This season’s FPM was 13.1 (Figure 3) and the 11-year average is 27.2 FPM.

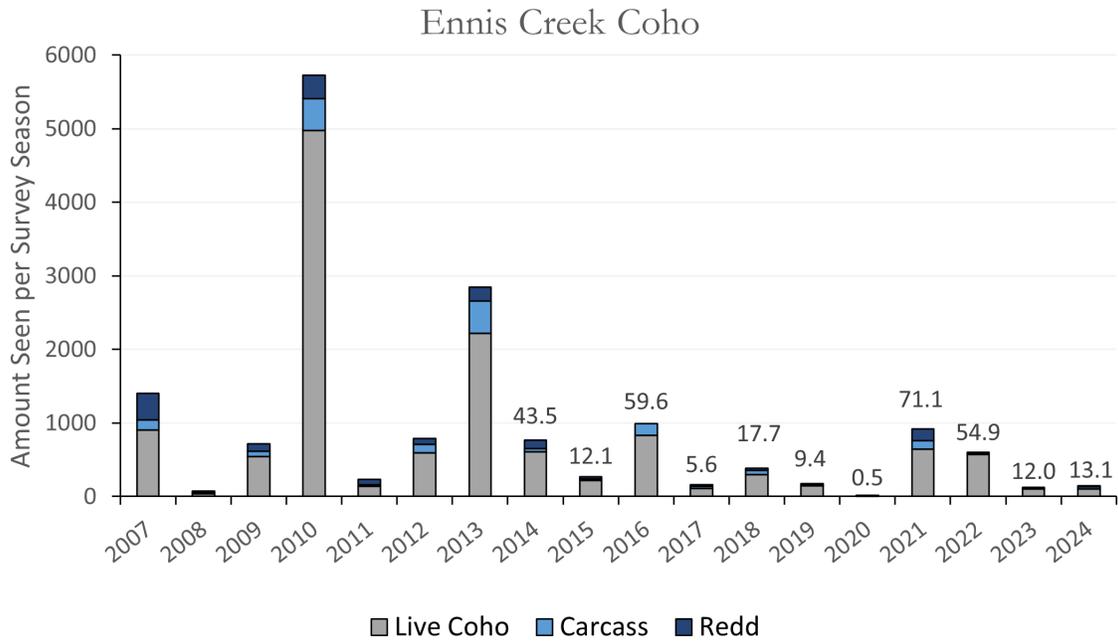


Figure 3

Total counts for coho seen in Ennis Creek for each yearly spawner survey season. Fish per mile (FPM) numbers are indicated at the top of each year’s column back to 2014. FPM numbers can be utilized to compare the relative total abundance of fish between years by accounting for survey effort.

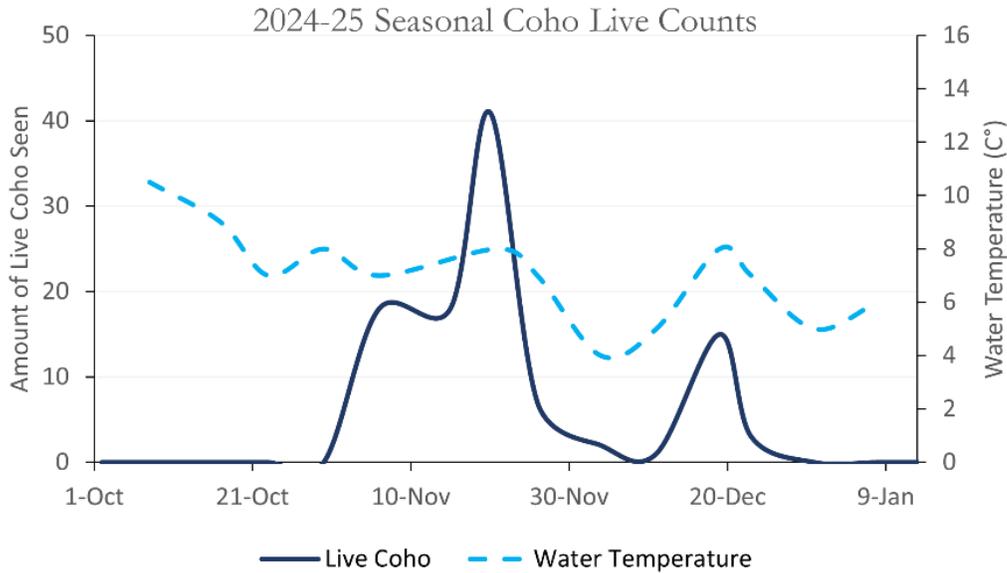


Figure 4

Total live counts for coho seen in Ennis Creek for the current spawner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

Barrell Springs

Prior to 2023, Barrell Springs creek was blocked by a 13-foot tall 36-foot-wide dam approximately 150ft upstream of the confluence with Dry Creek. The dam blocked fish passage and disrupted sediment distribution within the drainage system. The presence of the dam prevented use by spawning anadromous salmon for many years; despite this, the creek saw use by resident cutthroat trout (*Oncorhynchus clarkii*) above and below the dam. The dam was removed in the summer of 2023. The dam removal and habitat improvement projects were led by Skagit County Public Works. In the fall of 2023, the riparian area adjacent to the newly re-constructed creek channel was planted with native trees, shrubs, ferns and forbs by the SFEG Washington Conservation Corps (WCC) crew, enhancing a riparian corridor that was already dominated by native species.

No adult salmon were seen in Barrell Springs during surveys this season; however, juvenile fish were frequently spotted in the larger pools in the lower section of the survey reach. The juvenile fish spotted during the surveys were approximately two to four inches and appeared to be entirely resident cutthroat trout. The flow in Barrell Springs is frequently very low with most of the water passing quickly over gravel and settling in dark, heavily-sedimented pools near the large woody debris installed after the dam removals. It is anticipated that sediment will continue to be flushed out of the system, restoring a more balanced sediment regime after decades of retention by the dam structure.

Dry Creek

Dry Creek is a tributary to Friday Creek, and confluences just below the output of Lake Samish. The surrounding habitat to Dry Creek is rich with native conifers, deciduous trees and shrubs, and has some Himalayan blackberries lining a portion of the stream. The drainage area of Dry Creek is fed from Blanchard Mountain and according to the landowners the stream flow can become very flashy during heavy rains. A small portion of Dry Creek was re-routed because of the Barrell Springs dam removal project to restore channel flow, sediment transport and natural habitat features. Dry Creek has a large fish barrier removal project planned for 2025 in which Skagit County Public Works plans to remove a perched, cement box culvert that has created a more than 4-foot waterfall and is considered a complete barrier to fish passage. Dry Creek is a pre-restoration site, as it currently has two fish passage barriers upstream of the survey reach, so the data will give SFEG valuable information to compare pre and post-restoration salmon usage.

No adult salmon were seen in Dry Creek during surveys this year. There was a population of cutthroat trout (*Oncorhynchus clarkii*) regularly seen throughout the season ranging from small juveniles to moderately sized adult fish living in the large pool beneath the perched box culvert at the end of the survey reach. Landowners and gradient accessibility data suggest that salmon and steelhead were using this creek historically.

Swede Creek

Swede Creek is a tributary to the Samish River and is fed by Cranberry Lake and upstream wetlands therefore has a lot of tannins; visibility can be difficult at times, especially during high flow events. In 2019, SFEG worked with a private landowner on Swede Creek to remove and replace a barrier culvert. The previous crossing consisted of a culvert which impeded access for coho, steelhead, and Sea-run cutthroat cutting off approximately 2.45 miles of upstream spawning and rearing habitat.

In 2022 the two survey reaches were shortened. Reach 1 starts at the first bridge that replaced an undersized culvert. From the first bridge, volunteers survey to the railroad culvert, then cross over Hoogdal Branch Rd at the culvert and continue down the other side. This section of the first reach is more open, however redd gravel is limited due to clay veins. The reach follows the creek to a square cement culvert with a large embankment that leads up to a BNSF railroad, this is the end of Reach 1. Reach 2 starts from a different landowner's bridge upstream built for fish passage in 2021 and is essentially a seasonal wetland. Water depth can vary between 4 inches to 3 feet. The flow through the wetland makes it hard to follow the exact path of the creek. However, the wetland is great for juvenile rearing, has suitable spawning gravels, and is densely covered in native shrubs and conifers (e.g., willow, red osier dogwood, and western red cedar).

The 2024-25 season at Swede Creek was altered by a change in data collection and management. Over the last five years, SFEG has surveyed various reaches of Swede Creek, and this year, made the change to collect separate data sheets for the upper and lower sections of the creek.

Separating the reaches makes comparing the two reaches easier and allows for the assessment of differences in habitat availability and spawning preferences.

Lower Swede saw only five coho on surveys this year. These sightings were split up with singular fish sightings throughout the season with no discernable pattern or trend in the returns. Upper Swede Creek accounted for 85% of the coho sightings with 28 of the 33 adult fish sightings recorded in the upper reach (Figure 8). Additionally, of these 28 adults, 57% were seen during one survey on November 14. The remaining fish were seen in smaller returning quantities throughout November and December (Figures 7 & 8).

For this season there were 33 total fish seen across 9 surveys and a survey reach length of 0.7 miles. FPM came out to 4.7 on Swede Creek this year (Figure 5 & 6). FPM remains relatively low compared to previous years on Swede Creek. The five-year average on Swede Creek is 1.9 FPM. Fish per mile is a useful metric on a creek with changing survey reach lengths such as Swede.

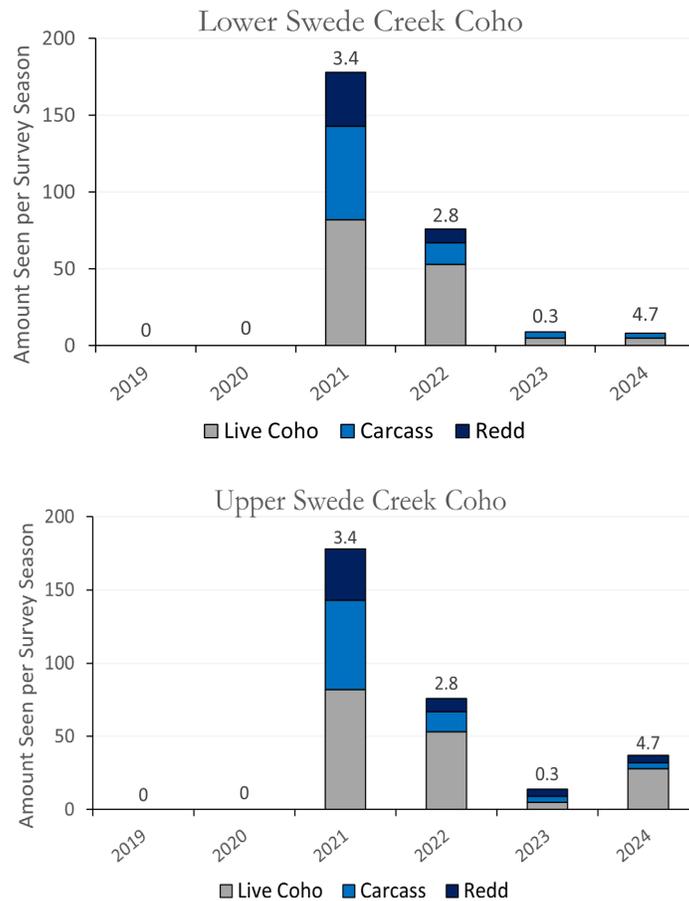


Figure 5 & 6

Total counts for coho seen in Swede Creek for each yearly spawner survey season. Fish per mile (FPM) numbers are indicated above each column back to 2019. FPM numbers can be utilized to compare the relative total abundance of fish between years by accounting for survey effort.

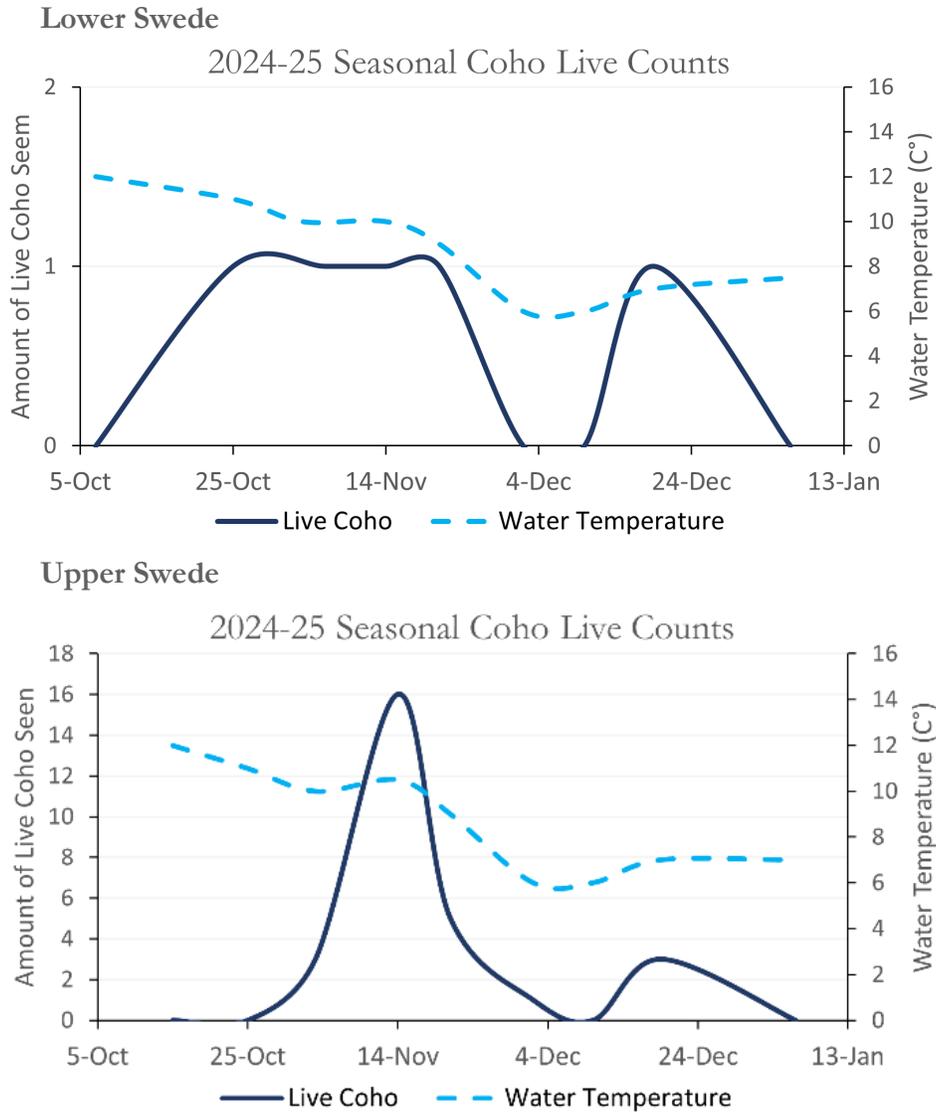


Figure 7 & 8

Total live counts for coho seen in Lower and Upper Swede Creek for the current spawner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

Parsons Creek

Parsons Creek traverses 2.2 miles of the upper Samish watershed. The creek largely consists of stable step-pool habitat with intact, mature forest canopy and large woody debris in the creek. Parsons Creek hosts wild runs of coho and chum salmon as well as steelhead (*O. mykiss*) and resident coast cutthroat trout. Hatchery Chinook salmon occasionally make their way up to the creek if they surpass the Samish Hatchery collection system. Prior to 2006, habitat at the upstream end of the reach was blocked to fish by a culvert perched about four feet above the creek. In the summer of 2006, SFEG and contracted engineers completed a project to remove the former undersized culvert and replace it with an 18-foot-wide arched pipe to allow for fish passage under a private logging road and up to the spawning habitat in Parsons Creek.

Volunteers on Parsons Creek observed 294 live adult salmon in the creek this season consisting of 283 live coho and 11 live chum. The first returning salmon were sighted on November 1 when volunteers saw 10 adult coho in the creek; chum sightings began on November 18. Coho sightings remained consistent during the duration of the survey season with fish being seen on every survey (Figure 11). In contrast, the chum sightings were limited to just two surveys on November 18 and 23.

This season Parsons creek saw a total of 294 live fish and there were 13 surveys completed on a 1.7-mile survey reach length. The FPM equates to 13.3 this year (Figure 9). There was an observable decline in live sightings during the first weeks of December. However, this decline was a direct result of the fact that no surveys occurred between December 1 and 20. Despite fluctuation in the total live counts, the relative abundance remained high this year with 13.3 fish per mile. In comparison, the 10-year average for Parsons Creek was 10.8 FPM (Figure 9).

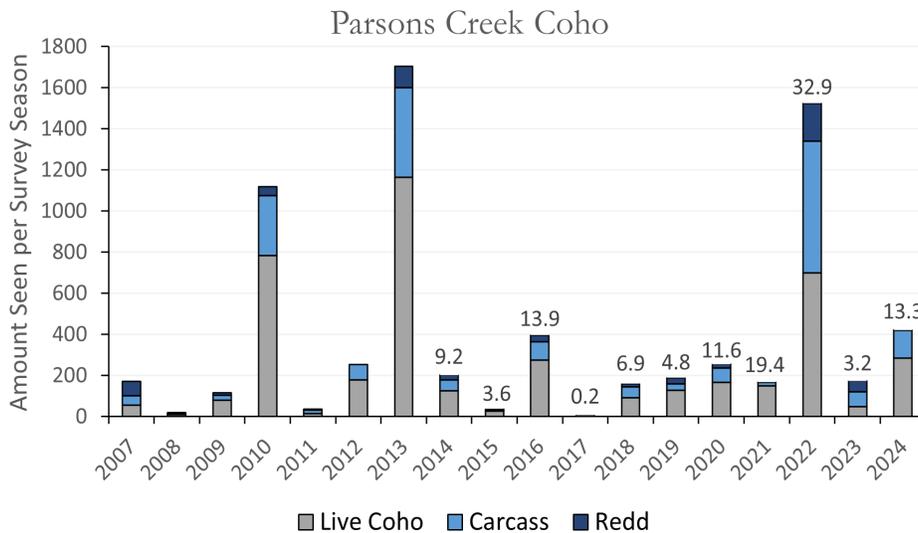


Figure 9

Total counts for coho seen in Parsons Creek for each yearly spanner survey season. Fish per mile (FPM) numbers are indicated above each column for coho back to 2014. FPM numbers can be utilized to compare the relative total abundance of fish between years by accounting for survey effort.

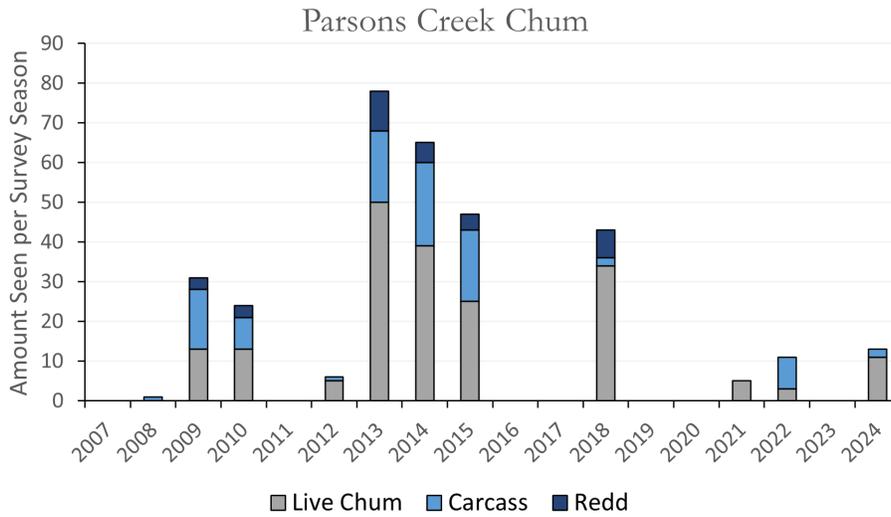


Figure 10

Total counts for chum seen in Parsons Creek for each yearly spawner survey season. Fish per mile (FPM) numbers are only included for coho salmon for Parsons Creek because they are the most common species seen and FPM numbers are more useful to compare coho counts between years.

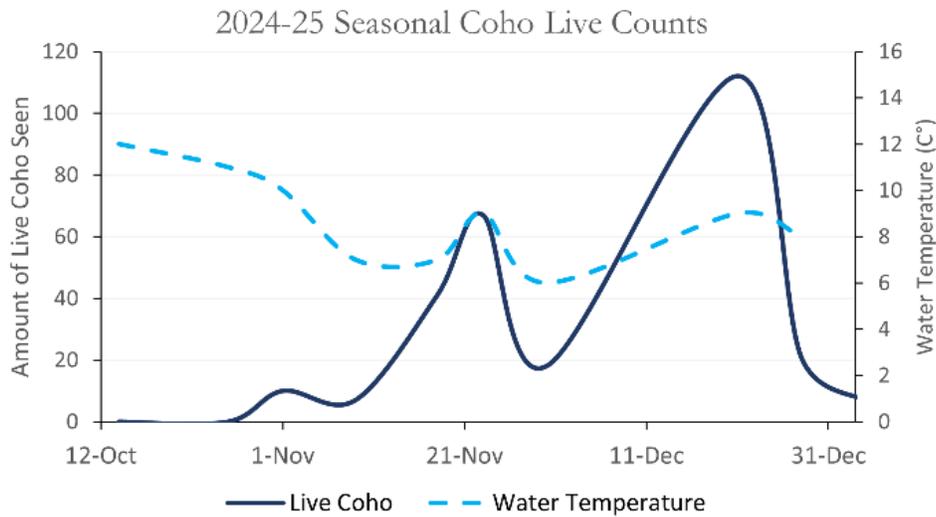


Figure 11

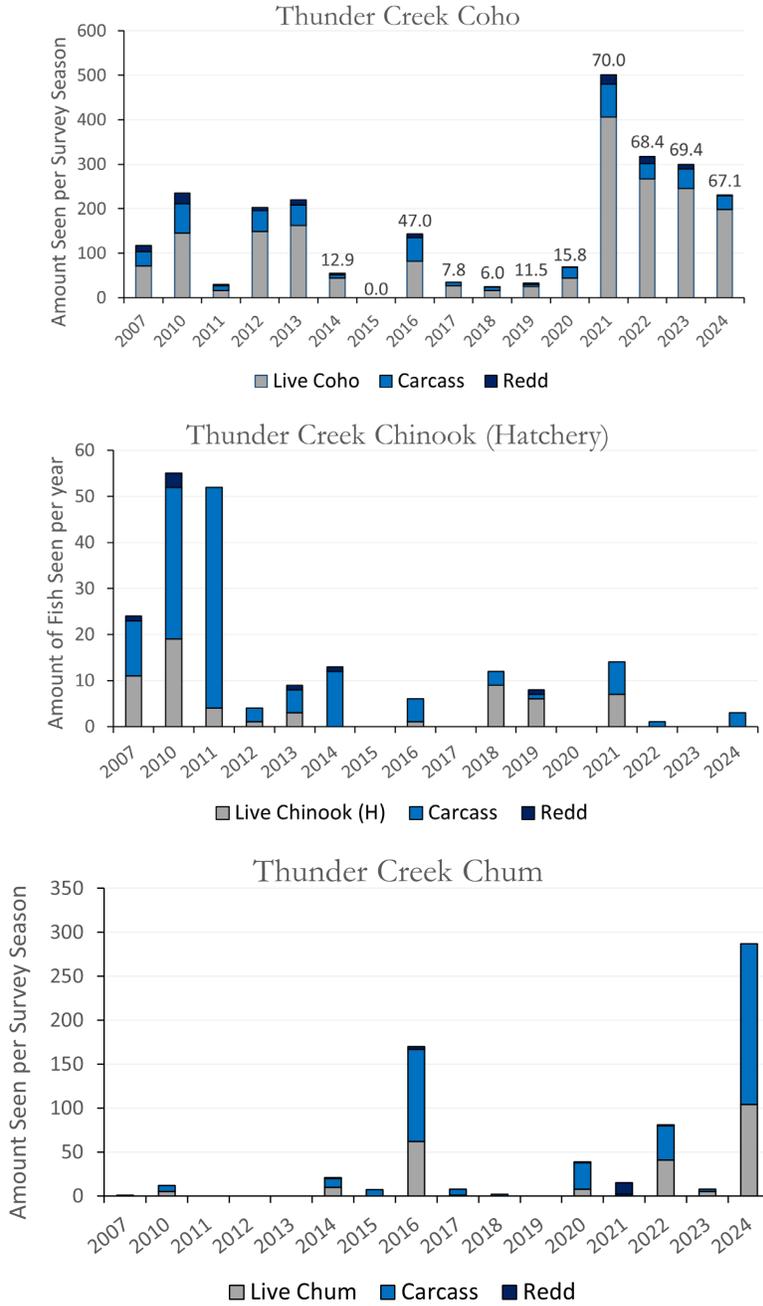
Total live counts for coho seen in Parsons Creek for the current spawner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

Thunder Creek

Thunder Creek is an important tributary to the Samish River. Thunder Creek hosts wild populations of coho, steelhead (*O. mykiss*), chum salmon, and the occasional hatchery Chinook sightings because of the influence from the nearby Samish Hatchery. SFEG completed a variety of restoration projects along Thunder Creek between 2010-2015. The initial project included the repair and installation of a livestock exclusion fence between pasture and the bank of the creek. Skagit County Public Works mowed Himalayan blackberry (*Rubus armeniacus*) to clear the area for SFEG to install fencing and plant native plants along the creek's bank.

Thunder Creek's salmon sightings began in early November when coho and chum began to return to the system. On November 3, volunteers documented six coho and three chum. In the initial surveys, chum were the prominent species with 100% of the sighted chum being seen between November 3 and December 1; as opposed to only 26% of the coho sightings occurring in this same timeframe (Figure 15 & 16). The coho sightings increased dramatically in December with two surveys on December 15 and December 22 hosting 63% of the season's coho sightings (Figure 15).

This season on Thunder Creek volunteers saw a total of 302 live fish and surveyed 15 times on a survey reach length of 0.3 miles. FPM this year was 67.1 (Figure 12). The FPM on Thunder Creek has been consistent from 2021 through 2024. The FPM values ranged from 70 to 67.1 respectively over the last four years. While total live counts continue to fluctuate between seasons, the four years of consistent FPM values may be promising for the future of Thunder Creek coho runs.



Figures 12 -14

Total counts for coho, Chinook, and chum seen in Thunder Creek for each yearly spanner survey season. Fish per mile (FPM) numbers are indicated above each column back to 2014. FPM numbers can be utilized to compare the relative total abundance of fish between years by accounting for survey effort.

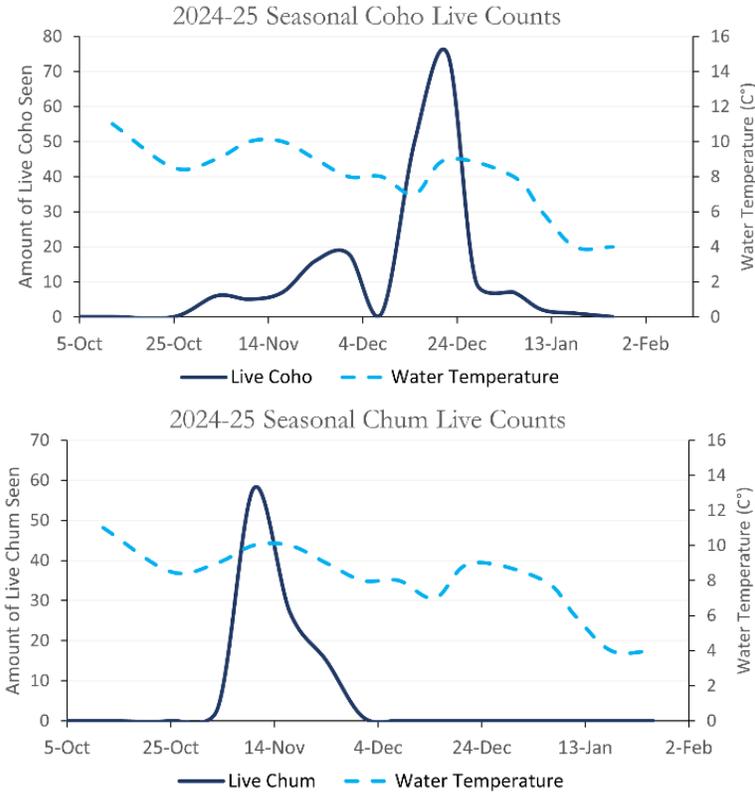


Figure 15 & 16

Total live counts for coho and chum seen in Thunder Creek for the current spawner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

Silver Creek

Silver Creek has documented presences of all five Pacific salmon and steelhead species (WDFW SalmonScape, n.d.). In 2013, SFEG replaced a barrier culvert on Silver Creek and two barrier culverts on tributaries of Silver Creek. All culverts replaced on Silver Creek were within the same neighborhood. The three culvert removal projects restored fish passage to salmon so they can now freely move up and downstream between rearing and spawning habitats.

Silver Creek volunteers began seeing salmon in the first week of November with 30 live coho on November 3 and 11 combined. After these initial sightings, the abundance began to taper off towards the end of November until the last live coho were seen on December 8 (Figure 18). 99% of live coho sightings occurred in November this year and 67% of carcasses were recorded during November as well (Figure 18).

This season volunteers on Silver Creek saw a total of 96 live fish and surveyed the 0.6 mile survey reach 10 times. The calculated FPM for the 2024 season was 16 (Figure 17). An FPM of 16 is noticeably higher than last year (i.e., 0.6 FPM in 2023) but remains relatively close to the average when compared to the historical data going back to 2015.

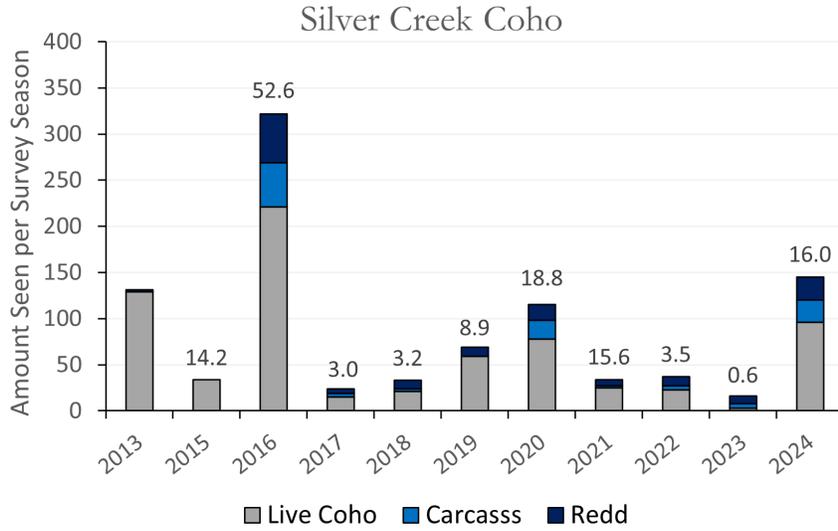


Figure 17

Total counts for coho seen in Silver Creek for each yearly spawner survey season. No surveys were completed in 2014 on Silver Creek. Fish per mile (FPM) numbers are indicated above each column back to 2015. FPM numbers can be utilized to compare the relative abundance of fish between years by accounting for survey effort.

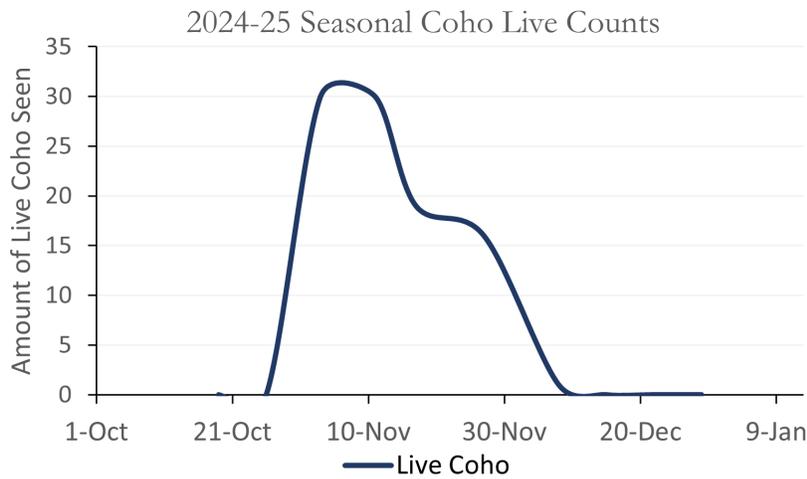


Figure 18

Total live counts for coho Silver Creek for the current spawner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. No water temperature data recorded in the 2024-25 season.

Bridle Creek

Bridle Creek is a tributary to Silver Creek and the survey reach is located approximately 1,000 ft upstream from the confluence of Bridle Creek and Silver Creek. Bridle Creek has been walked by volunteer, John Leighton for about a decade. In 2014, SFEG replaced an undersized culvert underneath Silver Creek Lane to accommodate fish passage in the creek. According to John, the previous culvert was “very small and collapsing inward”. He helped SFEG with aspects of the project, as well as planting that happened on either side of the road above the new culvert. Bridle Creek is known for being an incredibly healthy stream system with a diverse range of habitats and inhabitants including coho salmon, lamprey (*Occidentis ayersii*), and even river otter (*Lutra canadensis*) within the surveyed reach.

The live fish sightings in Bridle Creek did not start until the fifth survey on November 18 and all sightings occurred during the following three weeks. Likewise, all carcasses were recorded in the same three-week timeframe. This left Bridle Creek with one of the shortest survey seasons in either the Samish or Skagit watershed with all surveys completed by December 11 (Figure 20).

This season there were a total of 14 live fish seen on Bridle Creek and there were 8 surveys completed on the creek survey reach of 0.2 miles. This equates to an FPM of 8.8 for this year, 2024 (Figure 19). The FPM for 2024 was lower than last season when volunteers recorded an FPM of 16.9. For comparison, the 7-year FPM average is 23 for Bridle Creek.

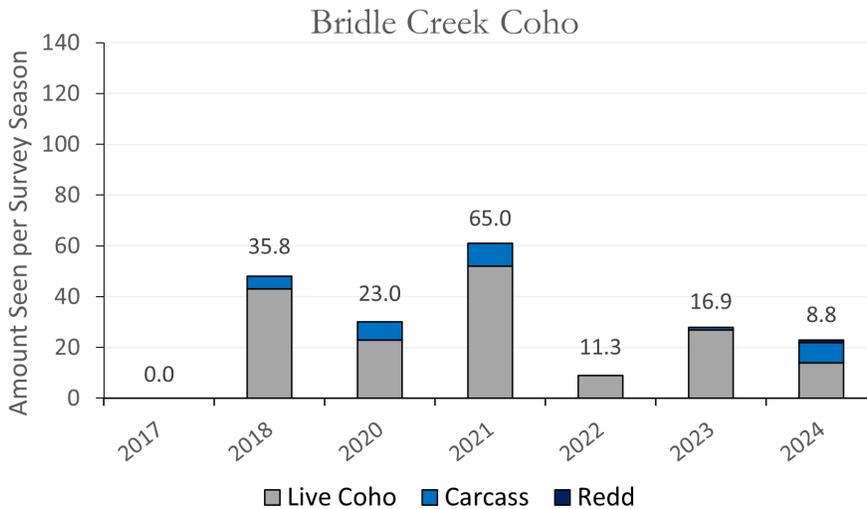


Figure 19

Total counts for coho seen in Bridle Creek for each yearly spawner survey season. Fish per mile (FPM) numbers are indicated above each column back to 2017. FPM numbers can be utilized to compare the relative abundance of fish between years by accounting for survey effort.

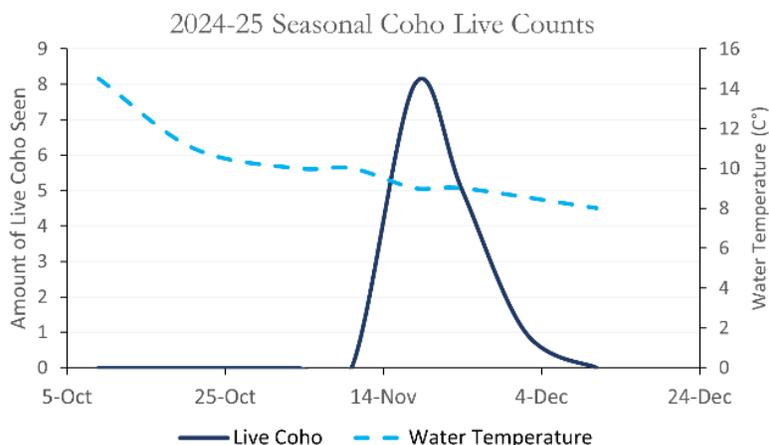


Figure 20

Total live counts for coho seen in Bridle Creek for the current spawner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

Mud Creek

Mud Creek is one of the main tributaries to Lake Samish and is located at the most northwestern portion of the lake. This survey reach starts at the mouth of Mud Creek (which is also called Friday Creek on some maps). For the first half of the survey reach, volunteers can walk along the banks of the creek. The banks are undercut in some places and fish like to hide under the edges. This stream has a good canopy of coniferous and deciduous native trees, and the water usually stays quite cold. The second half of the survey reach is more wooded, and the creek braids a bit which makes following one channel difficult. There are some large log jams in the second half of the reach as well, that make navigation and viewing the fish more difficult. Above the log jam there is a much steeper gradient on the creek. If fish were seen in the hard to access portion of water above the log jam, care was taken to make a note of this in the data. Mud Creek had a fish passage project completed on it in 2017 by Nooksack Salmon Enhancement Association (NSEA). While this watershed is within the region assigned to SFEG to conduct work (Water Resource Inventory Area 3 & 4), NSEA was able to do this work when SFEG did not have the capacity to.

Mud Creek saw considerably fewer kokanee spawners than our 10-year average given both live count and FPM metrics. All the live kokanee were sighted in the span of three weeks from November 10 to 24 and the only coho sighting occurred during the November 10 survey (Figure 23).

Volunteers documented 60 live fish and surveyed the 0.5 mile stream reach 9 times. The FPM equates to 13.3 this season (figure 21). This season on Mud Creek, the FPM of 13.3 is lower than the average from 2014 until present.

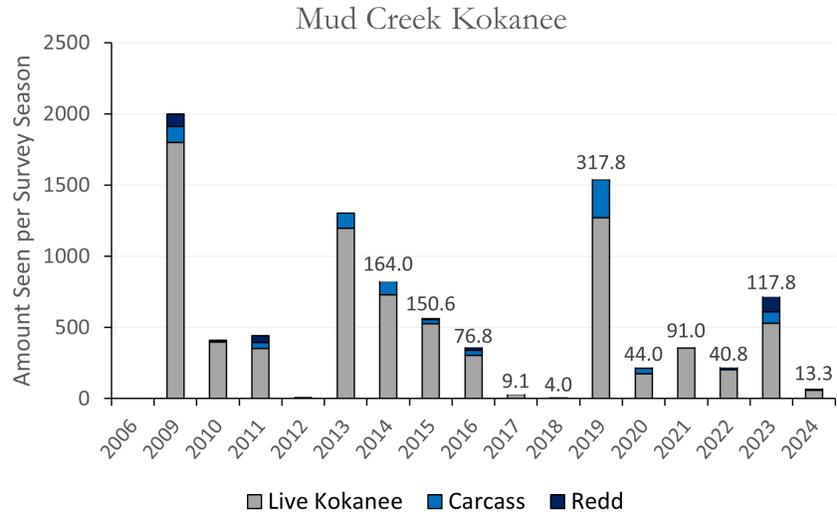


Figure 21

Total counts for kokanee seen in Mud Creek for each yearly spawner survey season. Fish per mile (FPM) numbers are indicated above each column back to 2014. FPM numbers can be utilized to compare the relative abundance of fish between years by accounting for survey effort.

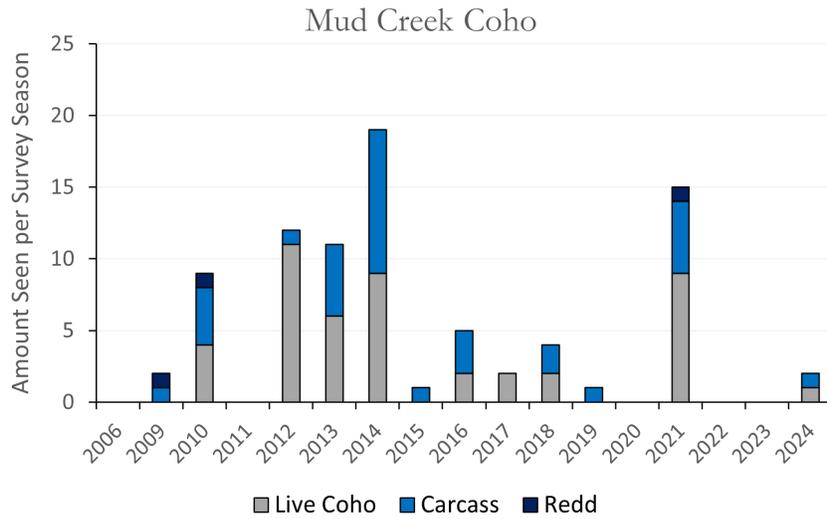


Figure 22

Total counts for coho seen in Mud Creek for each yearly spawner survey season. Fish per mile (FPM) numbers are not indicated for coho because there is a small amount of coho in this stream and it is more relevant to compare FPM on kokanee only to avoid misleading interpretations of the data.

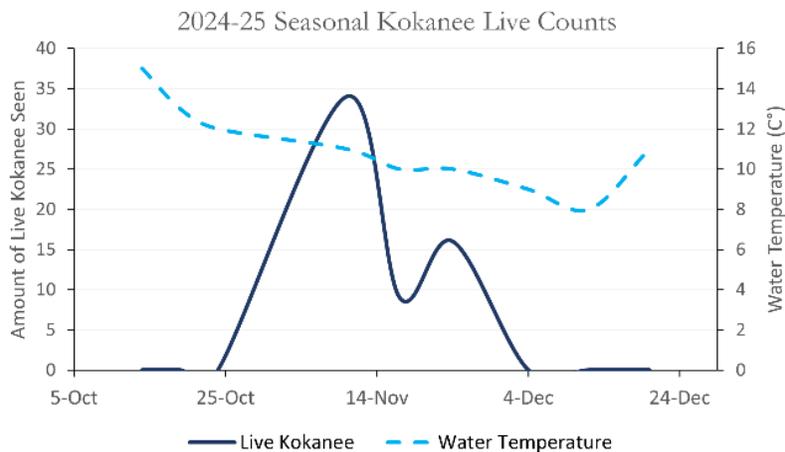


Figure 23

Total live counts for kokanee seen in Mud Creek for the current spawner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

Finnegan Creek

Finnegan Creek drains from Lookout Mountain into the middle section of Lake Samish and supports many spawning kokanee salmon each year, and a small number of coho. Steelhead and rainbow trout as well as cutthroat trout have also been documented on this tributary. In 1999, a fish passage barrier removal project corrected a culvert on a residential road going over Finnegan Creek about 300-feet upstream of Lake Samish. SFEG has also done riparian restoration work installing native plants upstream of the bridge. As part of the restoration efforts, this area has been treated for invasive species including knotweed (*Polygonum spp.*). In 2023, SFEG completed a riparian restoration project and planted 1,500 native trees and shrubs on 1.2 acres. There is still a partial barrier at the top end of the Finnegan Creek survey reach about 0.3 miles upstream from the mouth of the creek. The culvert at the end of the reach is owned by Whatcom County and does not currently have plans to be replaced, but it is known to be a fish passage barrier.

The live salmon sightings on Finnegan Creek this year were limited to exclusively kokanee and all kokanee were seen over the span of three weeks in November. Although the season on Finnegan was short, the sightings were very evenly distributed over the 3 weeks of sightings. The live count patterns for kokanee demonstrated a clear peak to the documented seasonal abundance; for example, in the first week of live fish sightings there were 10 kokanee, followed by 20 in the second week, and then 11 in the third and final week of sightings of live fish (Figure 26).

This year there were 41 live fish seen and the 0.3 mile long survey reach was completed 8 times. This equates to an FPM of 22.8 for this 2024/25 season (Figure 24). Finnegan Creek had the third lowest live fish sightings and the second lowest FPM value in the last 10 years. The only years where fewer fish were seen were in 2017 and 2020 when one and two fish were seen, respectively.

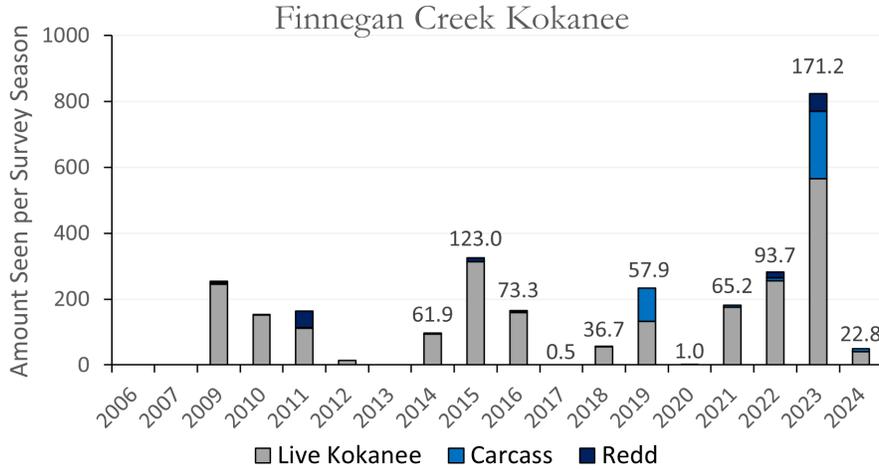


Figure 24

Total counts for kokanee seen in Finnegan Creek for each yearly spawner survey season. Fish per mile (FPM) numbers are indicated above each column back to 2014. FPM numbers can be utilized to compare the relative abundance of fish between years by accounting for survey effort.

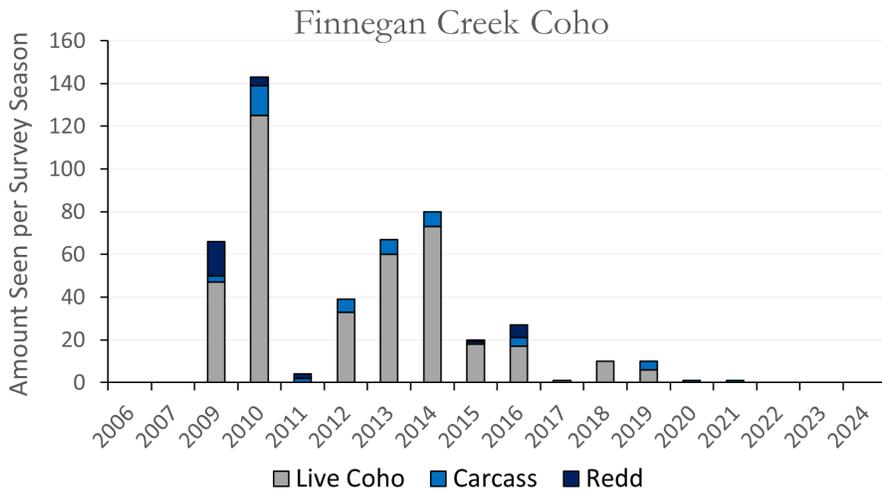


Figure 25

Total counts for coho seen in Finnegan Creek for each yearly spawner survey season. Fish per mile (FPM) numbers are not indicated for coho because there is a small amount of coho in this stream and it is more relevant to compare FPM on kokanee only to avoid misleading interpretations of the data.

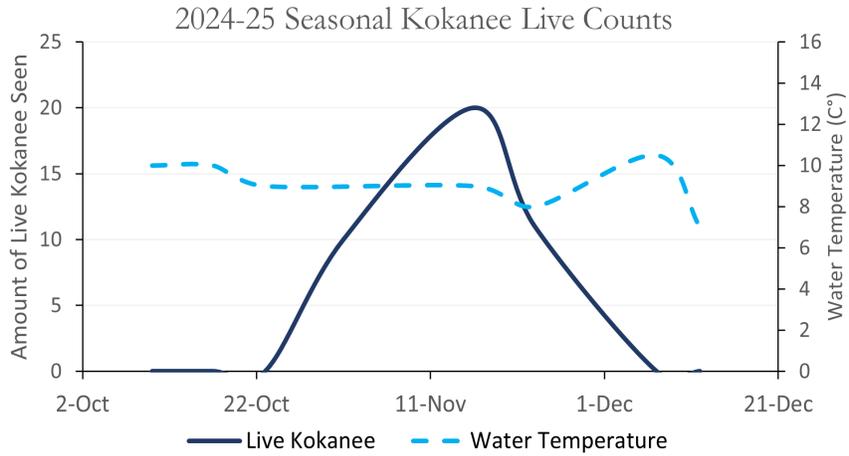


Figure 26

Total live counts for kokanee in Finnegan Creek for the current spawner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

Skagit Watershed

The Skagit River begins in E.C. Manning Provincial Park in British Columbia, Canada and flows southwest into Washington state. On the journey to the ocean, the Skagit River is joined by several large tributaries including the Cascade River, Sauk River, and Baker River. The mainstem of the Skagit River is approximately 150 miles long. The entire Skagit watershed covers an area of 2,650 square miles and is fed by thousands of small streams and creeks (A Catalog of Washington Streams and Salmon Utilization, 1975). All five species of Pacific salmon (*Oncorhynchus spp.*) native to Washington call this river system home as well as other closely related trout and char species, Pacific lamprey, and *Lampetra spp.* The native trout and char species in the Skagit watershed include steelhead/rainbow trout, bull trout, Dolly Varden (*Salvelinus malma*), and coastal cutthroat trout.

The Skagit River is particularly important to Puget Sound Chinook salmon, which were listed as threatened under the Endangered Species Act (ESA) in 1999 (ESA Date, EPA 2023). Six years after the ESA listing, the Skagit River System Cooperative (SRSC) and WDFW produced the Skagit Chinook Recovery Plan identifying restoration actions to improve wild Chinook salmon production and provide a framework to evaluate success moving forward (SRSC & WDFW, 2005). The recovery plan outlines critical areas that are required throughout the Chinook salmon's life cycle and what aspects of the watershed restoration would have the most positive effect. The critical areas included in the plan encompass a wide array of habitats from spawning grounds to nearshore rearing habitat (e.g., pocket-estuary restoration) (SRSC & WDFW, 2005). The near-shore rearing habitat and, in particular, tidally influenced-pocket estuaries have been identified as an area of emerging concern and are likely a limiting factor for a large portion of the Skagit River Chinook population (Chamberlin, 2022; SRSC & WDFW, 2005).

According to the Recovery Plan (SRSC & WDFW), in the lower section of the Skagit Watershed the Nookachamps Creek is likely to have significant Chinook production potential, but currently Chinook are scarce to non-existent (pg. 42, 2005). Chinook, coho, chum, pink, steelhead, resident coastal cutthroat and rainbow trout, as well as Pacific lamprey (*Entosphenus tridentatus*) and western river lamprey (*Lampetra ayresii*) have all been documented in the Nookachamps (*Statewide Washington Integrated Fish Distribution*, 2024). Unfortunately, the Nookachamps watershed spawning habitat is considered "impaired" due to the lack of proper sediment size required for spawning and egg incubation, and warming water temperatures (Skagit Watershed Council, 2022). SFEG has continued work with landowners in the Nookachamps watershed to improve riparian habitat and fish passage. Within our Spawner Survey Program at SFEG, East Fork Walker, Gribble, and Kennedy Creeks are all tributaries surveyed in the Nookachamps Creek sub-watershed. Nookachamps Creek joins the Skagit River approximately three miles upstream of the I-5 bridge that crosses the Skagit River between Mount Veron and Burlington.

To exemplify any possible correlations, we have overlaid Skagit River water height data (*USGS station 12200500*) with 2024-25 spawner survey live-count data in Figure 27. The first rain event of the season caused an increased river water level at the beginning of the season on October 19, which was followed by a similar rain event on October 27 (Figure 27). In the Skagit watershed,

no live salmon were recorded in survey reaches of Skagit tributaries by SFEG volunteers before the first rain event of the year. The peak in live salmon observations occurred near the third, large rain event of the season between November 11 and 19 (Figure 27).

Like many aspects of this report, Figure 27 is meant to show large-scale patterns in the data collected but not diagnose a cause for these patterns. Precipitation and increased water levels are only a subset of a large assembly of variables affecting the spatiotemporal patterns of salmon spawning migrations. The variables presented (i.e., live salmon count and river gage height) are useful for our interpretation; however, they are not all inclusive.

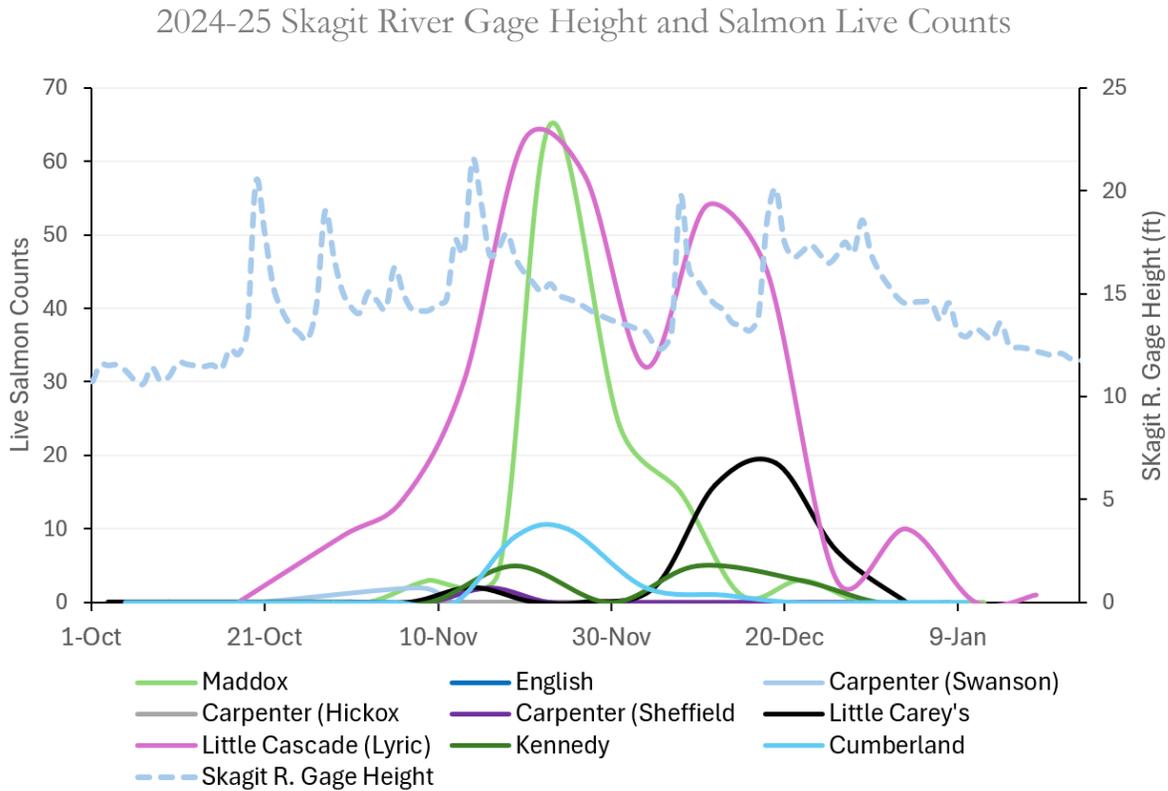


Figure 27

2024-25 Seasonal fluctuations in Skagit River Water gage height measured near Mount Vernon, WA (USGS Station 12200500) and live salmon counts per creek across the spawning season. USGS site coords: 48.4448278, -122.3354369.

Table 5

2024-2025 Skagit Watershed Detailed Survey Season Summary

Creek Name	Total Fish Seen	Survey Length (Miles)	Surveys Completed	Fish Per Mile (FPM)	Volunteers
Maddox	115	0.8	13	11.1	John Yaeger, Kurt Buchanan, Ryan Nowak-Crawford
English	0	0.4	7	0	Chloe Soloman, Kiley Carrigan
Carpenter (Swanson)	2	0.1	7	*0.8	Chloe Soloman, Kiley Carrigan
Carpenter (Sheffield)	2	0.25	10	*0.8	Makenna Johnson, Siara Woods-Lindholm
Carpenter (Hickox)	0	0.15	12	*0.8	Dean Tilles, Nate Peterson
Kennedy	13	0.18	10	7.2	Doug Davidson, Elizabeth Drozda
Starbird	4	0.5	11	0.6	Loren Fuell, Brian Kershaw, Emily Carter
Gibble	133	0.3	11	40.3	Karin Gibble, Chris Farrow
Little Carey's	46	0.3	16	10.2	Alipio Terenzi, Gabrielle Lamb, Dannon Engquist
Little Cascade (Lyric)	319	0.25	14	98.2	Hal Lee, Phil McCloud
W.F. Trumpeter	1	0.6	9	0.2	Anne Wendt, Liliana Hart Beck, Luci Riddle
East Fork Walker	548	0.66	10	59.3	Chad Verbitsky, Brianna Mafnici
Pressentin	3	0.5	10	0.6	Sarah Glover, Asher Marlin, Candice Hawkins
Cumberland	43	0.2	12	17.9	Maddie Player, Mike Oras, Lucy Swenson

*This FPM incorporates all three reaches for Carpenter Creek

Creeks Surveyed in Skagit Watershed

Maddox Creek

Maddox Creek is a unique part of the Skagit watershed as it flows directly into the bay and does not feed into the mainstem of the Skagit River. It flows south paralleling the Skagit River and Interstate-5 and is hemmed in on either side by a dike until it empties out into estuarine marshlands adjacent to Conway. Maddox Creek is one of the most urbanized creeks SFEG includes in the Spawner Survey Program (Figure 1). The creek begins within Mount Vernon city limits and flows through suburban neighborhoods and agricultural fields. So much of the riparian habitat that once existed along this creek is no longer intact. Maddox Creek has known populations of wild coho and resident cutthroat trout, and according to SalmonScape (*WDFW SalmonScape*, n.d.) is gradient accessible to Chinook, pink, and steelhead, but they have not been physically observed in recent years. In 2013, two impassible culverts were removed and replaced by large cement bridges allowing fish to regain access to a well-treed section of Bonnie Rae Park and an additional three miles of upstream habitat. Large woody debris was added to the stream, along with many willows to help create stabilization of the banks as well as refuge spots for juvenile and spawning fish. The survey reach that SFEG volunteers survey is considered an ideal spawning habitat. The 0.7-mile reach is within a small ravine, cut off from the noise of urban life above. In 2020, an impassible culvert was removed by Washington State Department of Transportation (WSDOT) and the crossing was abandoned. In its place lots of large woody debris and riparian planting now take up the space and there are many places for spawning coho to take refuge. Many long stretches boast good-sized gravel

and flowing water for them to make their redds as well. However, to get to this ideal habitat, about nine miles of urbanized and agricultural land stand in their way. Changes in land use between the seasons may be a limiting factor for coho trying to reach the upper parts of Maddox Creek

Maddox Creek saw a large increase in total live fish sightings this year as compared to the previous six years of surveying (Figure 28). Live fish sightings began in early November, but during these initial surveys, volunteers reported poor visibility in the creek, indicating live fish sightings would not be very accurate. As viewing conditions improved in the week of November 23, the number of fish sightings quickly increased from just a few sightings to 65 coho in one survey. Visibility remained “Very Good” or “Good” for the following weeks as 90% of fish sightings occurred in the three surveys that occurred with these improved conditions (Figure 29).

The total live fish sightings increased in 2024 compared to 2023 as did the FPM (Figure 28). For this season (2024), there were 115 fish seen and the 0.8-mile-long survey reach was completed 13 times. This equates to an FPM of 11.1 for the 2024 season (Figure 28). The 10-year average FPM on Maddox Creek is 4.1. By accounting for survey effort, this change in FPM demonstrates that the increased sightings were likely not the result of increased surveys, but more of a reflection of an increase in spawning coho abundance in the creek between years.

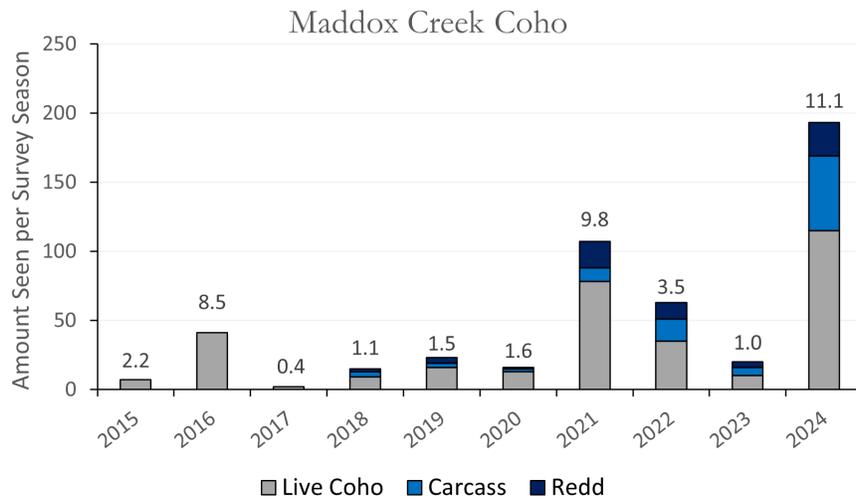


Figure 28

Total counts for coho seen in Maddox Creek for each yearly spawner survey season. Fish per mile (FPM) numbers are indicated above each column back to 2015. FPM numbers can be utilized to compare the relative total abundance of fish between years by accounting for survey effort.

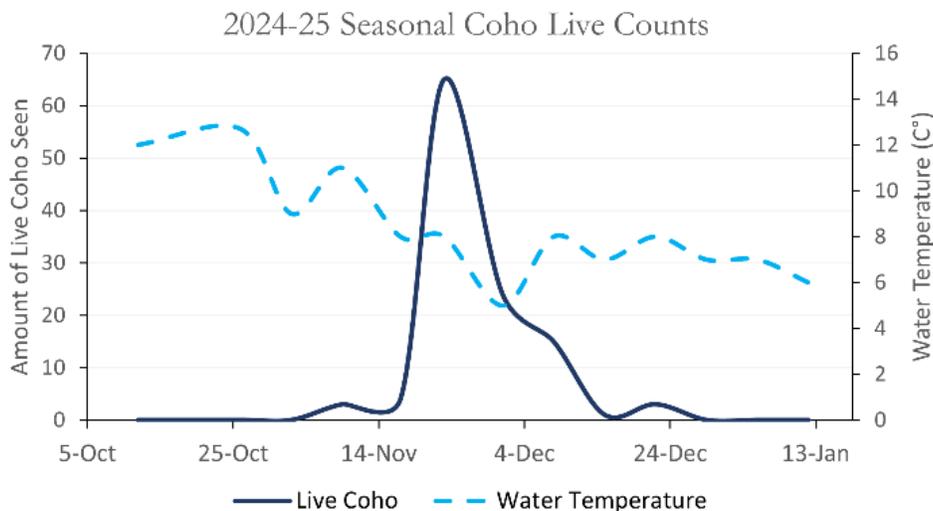


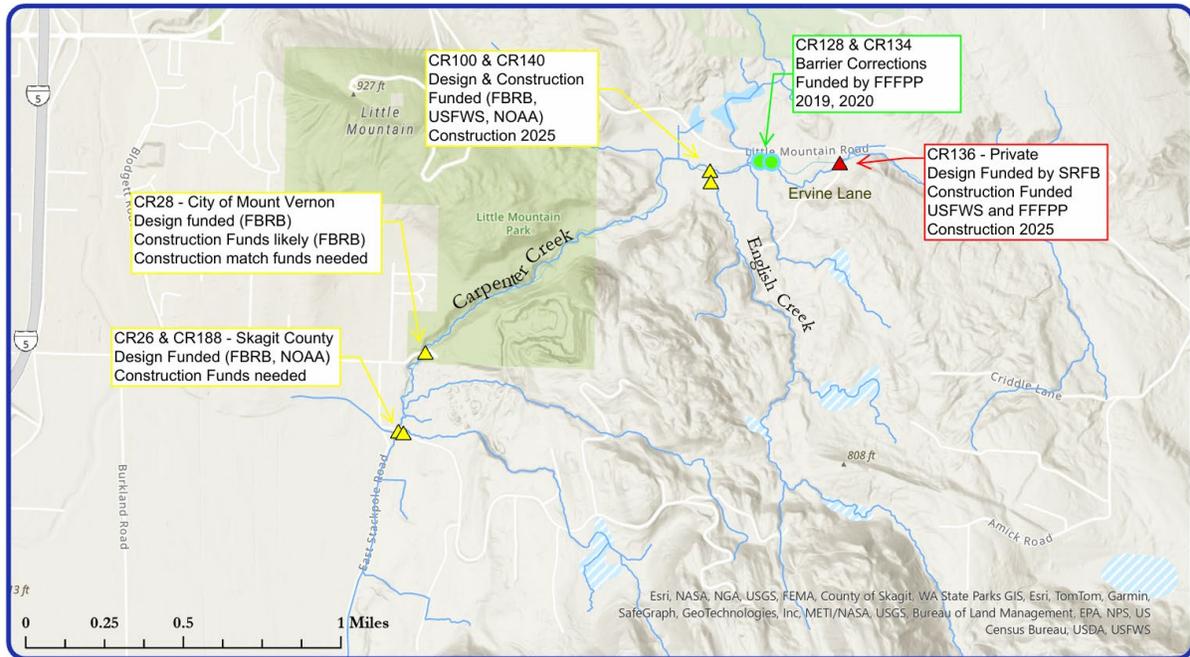
Figure 29

Total live counts for coho in Maddox Creek for the current spawner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

Carpenter Creek System

Carpenter Creek is a large tributary that joins with Fisher Creek south of Mount Vernon and quickly thereafter flows into the South Fork Skagit River and then Skagit Bay. SFEG has been making a concerted effort to open up all the fish passage barriers within the Carpenter Creek system for over a decade. The entirety of the Carpenter Creek system is more than 10 miles long and encompasses dozens of smaller tributaries. The headwaters of Carpenter Creek begin in low elevation mountains to the west of Big Lake. Carpenter Creek flows through a rural neighborhood paralleling Little Mountain Road to the southeast corner of Little Mountain Park and eventually into Hill Ditch. Hill Ditch is an artificially straightened creek that flows through agricultural fields in south Skagit County. Despite the fact that Hill Ditch is lacking many habitat features important for salmon, such as trees for shade and habitat complexity, many adult salmon are observed migrating up Hill Ditch to the Carpenter Creek tributaries that SFEG spawner survey volunteers survey. The Carpenter Creek system is gradient accessible to all 5 species of Pacific salmon, at least in the lower portions, along with Steelhead/rainbow trout, cutthroat trout, Dolly Varden and lamprey. Coho salmon are particularly relevant in this system and have been documented throughout.

Several culverts on Carpenter Creek have been replaced with bridges, and there are three more planned for by 2026 construction season (“Carpenter Creek Full Passage Restoration Project”, map below). The 3 survey reaches will be expanded on below and are all within the Carpenter Creek System and “Carpenter Creek Full Passage Restoration Project”. The three sites include: Carpenter Creek – Hickox Rd, Carpenter Creek – Swanson, English Creek (tributary to Carpenter Creek – Swanson), and Carpenter Creek – Ervine Lane.



Carpenter Creek Full Passage Restoration Project

- Hydrography
- ▲ Carpenter Creek Fish Passage Partial Barrier
- ▲ Carpenter Creek Fish Passage Total Barrier
- Barriers Corrected



Carpenter Creek – Hickox Road Seasonal Summary

The Hickox Road reach is the most downstream reach of Carpenter Creek surveyed this season. This is a well shaded creek with good woody debris recruitment and cold water. Unfortunately, a large culvert is bisecting the creek and is a fish passage barrier, particularly for juvenile salmon who cannot swim upstream to seek refuge in deep pools and undercut banks. The drop at the outlet of the culvert is not easy for spawning adult salmon to jump into but is an absolute barrier to all young salmon and Pacific lamprey. The culvert associated with this reach is slated for removal; a design has been created and construction funds have been applied for by the SFEG with the help of the City of Mount Vernon. We hope to restore fish passage by 2027. This was the first year surveying this reach and is being surveyed in order to indicate the presence or absence of salmon species below and above the culvert.

The Hickox Road reach did not positively identify any adult salmon this year, however volunteers did document three adult fish of unknown species, one on November 7 and two on November 14. Given the strong presence of coho in this system it is likely that the fish sightings were coho, but it is impossible to know with certainty.

Carpenter Creek – Swanson Seasonal Summary

The Swanson reach of Carpenter Creek is particularly challenging for adult salmon to navigate through because there is a barrier culvert perched nearly 3 ft above the downstream creek. This culvert has degraded substantially over recent years. SFEG is working with the private landowner to replace the culvert with a bridge in the summer of 2025. Similar to the Hickox Road reach, the data collected on this survey reach will be useful to compare to post-construction fish presence.

Volunteers on Swanson reach of Carpenter Creek recorded the first year of spawning salmon in the creek's in three years, noting two live coho. These two fish were documented on November 8 and were the only fish sighted on the creek this season and since surveys in 2021.

English Creek – Tributary to Carpenter Creek (confluence on Swanson property)

English Creek is a tributary to Carpenter Creek with headwaters that drain from a small wetland up the mountainside. It flows into Carpenter Creek at the Swanson property directly downstream of the barrier culvert on the Swanson property. The landowners report seeing coho access the stream each year, but there have been few in the last several years. The survey reach focuses on an undersized culvert that is a fish passage barrier. This reach has not yet been restored for fish passage, but has plans to restore in tandem with the Swanson culvert in the summer of 2025.

No fish were seen in English Creek this survey season which remains the recent trend for the creek. The last time salmon were seen by SFEG volunteers was in 2021 when 41 coho were documented, but in the years since there have been no salmon seen in this small stretch of creek.

Carpenter Creek – Ervine Lane Seasonal Summary (A.K.A. Sheffield reach)

The Ervine Lane reach of Carpenter Creek (also referred to as the Sheffield reach) is the upstream most survey reach within the Carpenter Creek system. The reach is wooded with dense understory shrubs and has shade cover to keep the creek cold. Like the previous three Carpenter Creek reaches, the Ervine Lane reach has an undersized culvert that restricts fish passage to the upper reaches of the system. The creek is artificially widened upstream of the culvert because the culvert has restricted the natural flow of water, sediment and organic debris. The culvert in the Ervine Lane reach is slated for removal in the summer of 2025 and is planned to be replaced with a 30-foot bridge. This is the first year that this reach has been surveyed and the survey efforts will inform SFEG on the presence or absence of salmon in relation to pre- and post-construction restoration.

Volunteers on the Ervine Lane reach of Carpenter Creek documented two live coho salmon during their surveys this year. This additionally serves as the first year of live fish sightings on Carpenter Creek with these two fish being recorded on November 16.

Kennedy Creek

Kennedy Creek is a tributary of East Fork Nookachamps Creek, flowing in about a half mile before the East Fork Nookachamps-Turner Creek confluence (Figure 1). Kennedy Creek is the site

of a 1999 SFEG restoration project in which 12 log weirs were installed to provide access to upstream habitat. Since this restoration project, the stream has down cut, and the weirs now (25 years later) represent a barrier for juvenile fish. Upstream of the weirs under the driveway, is an undersized culvert that is a partial barrier to adult salmon. SFEG is currently working with an engineer and has design plans to remove the culvert and replace it with a box culvert that is completely passable by adult spawning salmon. This project will enhance salmon spawning and rearing habitat quality and access. The survey reach is approximately 0.20 miles from the confluence with the East Fork Nookachamps Creek to the culvert under the landowner’s driveway. 2024 was the third year of spawner survey data collection at Kennedy Creek to provide pre-construction data to be used in assessing the effects (e.g., trends in salmon abundance and utilization) of the restoration project pre- and post-construction. In the fall of 2023, SFEG staff observed both Pacific lamprey (*Entosphenus tridentatus*) and Western Brook lamprey (*Lampetra spp.*) in the creek as well.

Kennedy Creek had a total of 13 live coho sightings during this survey season and the first live fish sightings were in early November (Figure 31). There was a slight increase in live fish seen this year compared to the previous two years. Four fish were seen in 2022 and 10 fish were seen in 2023. The FPM also increased over the last three years. The FPM rose from 1.1 in 2022 to 4.6 in 2023 and then to 7.2 in 2024 (Figure 30). It is notable that this survey reach finds a high number of carcasses in proportion to the number of live fish. There has been speculation that this may be due to the flooding that downstream portion of the reach receives when Nookachamps Creek is high. After floods, carcasses can often be found in the reed canary grass wetland area just upstream of the Nookachamps Creek confluence.

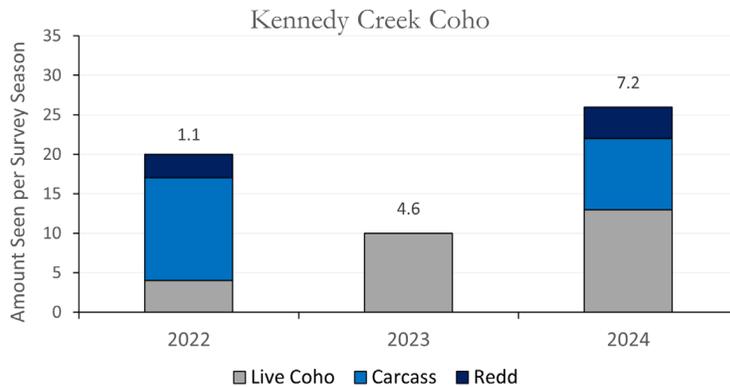


Figure 30

Total counts for coho seen in Kennedy Creek for each yearly spawner survey season. Fish per mile (FPM) numbers are indicated above each column back to 2022. FPM numbers can be utilized to compare the relative abundance of fish between years by accounting for survey effort.

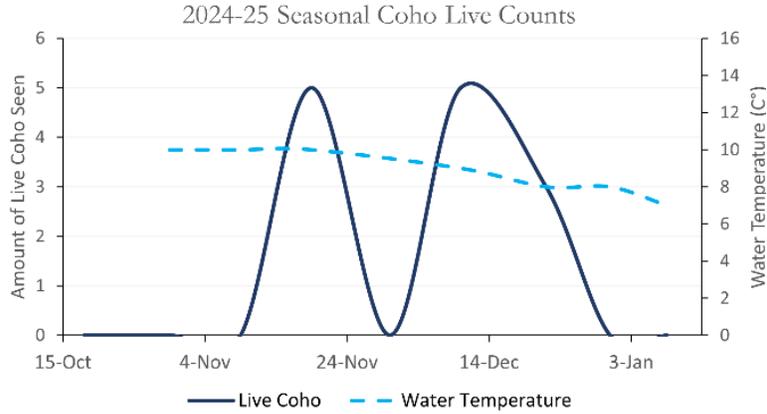


Figure 31

Total live counts for coho in Kennedy Creek for the current spawner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

Starbird Creek

Starbird Creek is a tributary of Fisher Creek, which then joins Carpenter Creek/Hill Ditch and flows into the South Fork Skagit River. SFEG has completed two large fish passage barrier removal projects on Starbird Creek. The first project completed in 2014 was a 60-foot steel bridge on Starbird Creek Lane and the second project, completed in 2021, was a 14-foot concrete bridge off Fremali Lane on private property. The 0.5-mile survey reach of Starbird Creek has some very large, old trees and good habitat for spawning and rearing salmon. The creek is fed by boggy wetlands and is dark with tannins (similar to Swede Creek), which make the creek difficult to survey due to poor visibility.

Starbird Creek saw only four coho salmon returning this season with no documented carcasses in the survey reach (Figure 33). The sightings all occurred between November 10 and 24 with just one or two fish sighted during those three surveys. When Starbird Creek began getting surveyed by SFEG, it initially saw larger returns with 81 and 89 coho documented in 2013 and 2016 respectively. However, since 2017 the sightings have dwindled to between zero and five live fish per season. The low, live fish counts have dropped all the FPM values after 2016 to values under one (Figure 32). Thus, the low FPM values are indicating consistently low, live fish numbers regardless of survey effort between years.

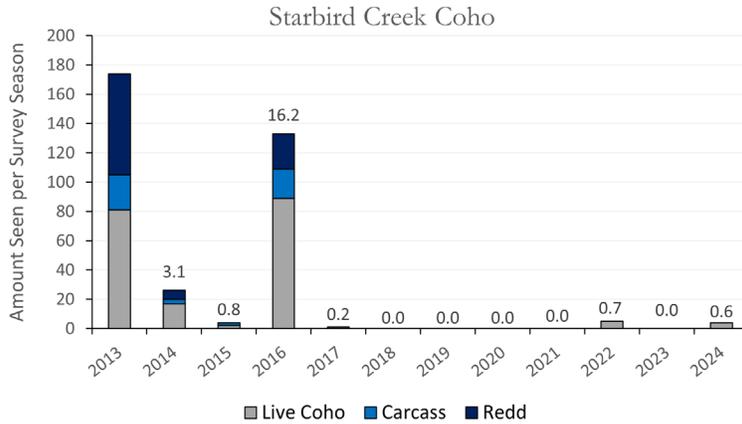


Figure 32

Total counts for coho seen in Starbird Creek for each yearly spawner survey season. Fish per mile (FPM) numbers are indicated above each column back to 2014. FPM numbers can be utilized to compare the relative abundance of fish between years by accounting for survey effort.

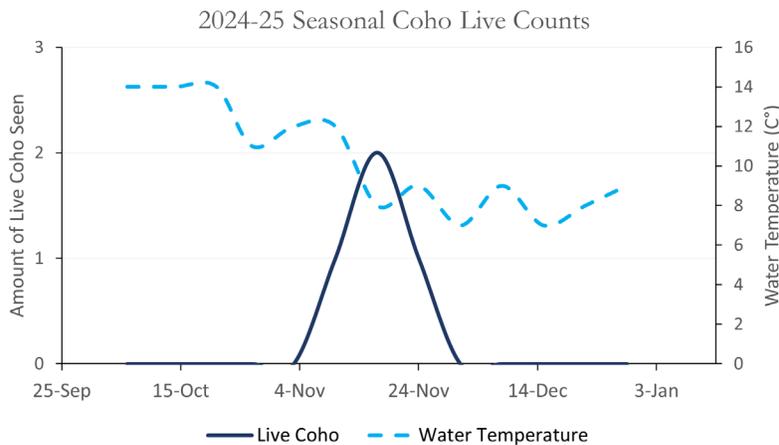


Figure 33

Total live counts for coho in Starbird Creek for the current spawner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

Gribble Creek

Gribble Creek is a tributary of West Fork Nookachamps Creek, a portion of the lower Skagit Watershed, and has been surveyed by SFEG volunteers since 2006. This creek supports coho runs and has seen an upward trend in its coho population in the last several years. As of 2021, cutthroat trout have also been observed on site. There have been several fish passage barriers removed on Gribble Creek, most recently in 2013 with Natural Resource Conservation Service (NRCS) funding.

Gribble Creek volunteers recorded a total of 128 spawning coho in the creek this season. The majority of these fish were sighted in a three-week period from November 6 to November 26 in which 91% of all live sightings were documented (Figure 35). Volunteers additionally documented

5 coastal cutthroat trout sightings demonstrating habitat use for purposes other than spawning by other *Oncorhynchus* species.

Gribble Creek saw 133 live salmon and there were 11 surveys completed on the 0.3-mile-long survey reach. This equates to an FPM value of 40.3 for the 2024 season (Figure 34). The FPM on Gribble Creek in 2024 was the second highest value seen in the last 10 years. In the last 10 years, the average FPM is 16.5 and has showed hints of an upwards trend in live fish abundance since 2018. However, more data will need to be collected to more accurately determine if this increase in FPM and live fish counts is to remain consistent in the coming years or if it is just representative of natural fluctuations.

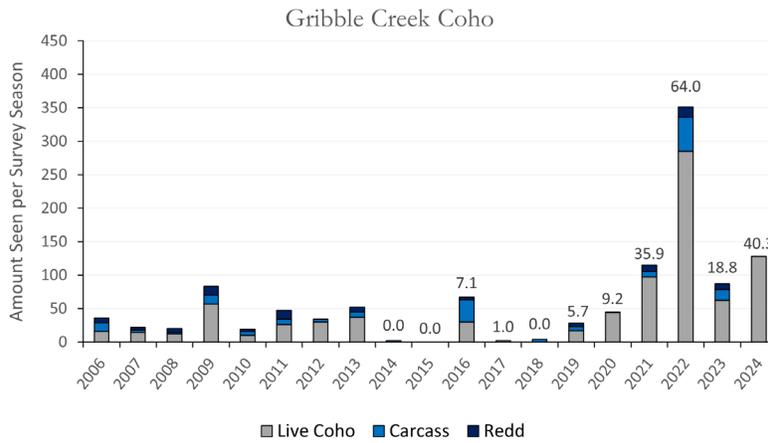


Figure 34

Total counts for coho seen in Gribble Creek for each yearly spawner survey season. Fish per mile (FPM) numbers are indicated above each column back to 2014. FPM numbers can be utilized to compare the relative abundance of fish between years by accounting for survey effort.

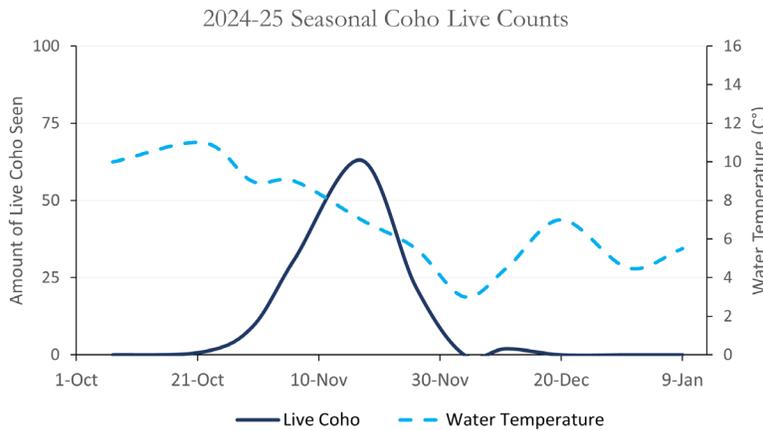


Figure 35

Total live counts for coho in Gribble Creek for the current spawner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

Little Carey's Creek

Little Carey's Creek is fed by Mount Josephine and flows into a wetland at the base of the mountains before entering the reach surveyed by SFEG volunteers. The riparian habitat transitions from low gradient stream down to the wetland which is full of cattail and reed canary grass. Farther downstream, the channel is incised and travels through a remnant legacy forest, into cattle grazed fields and then flows into Carey's Slough before entering the Skagit River (Figure 36).

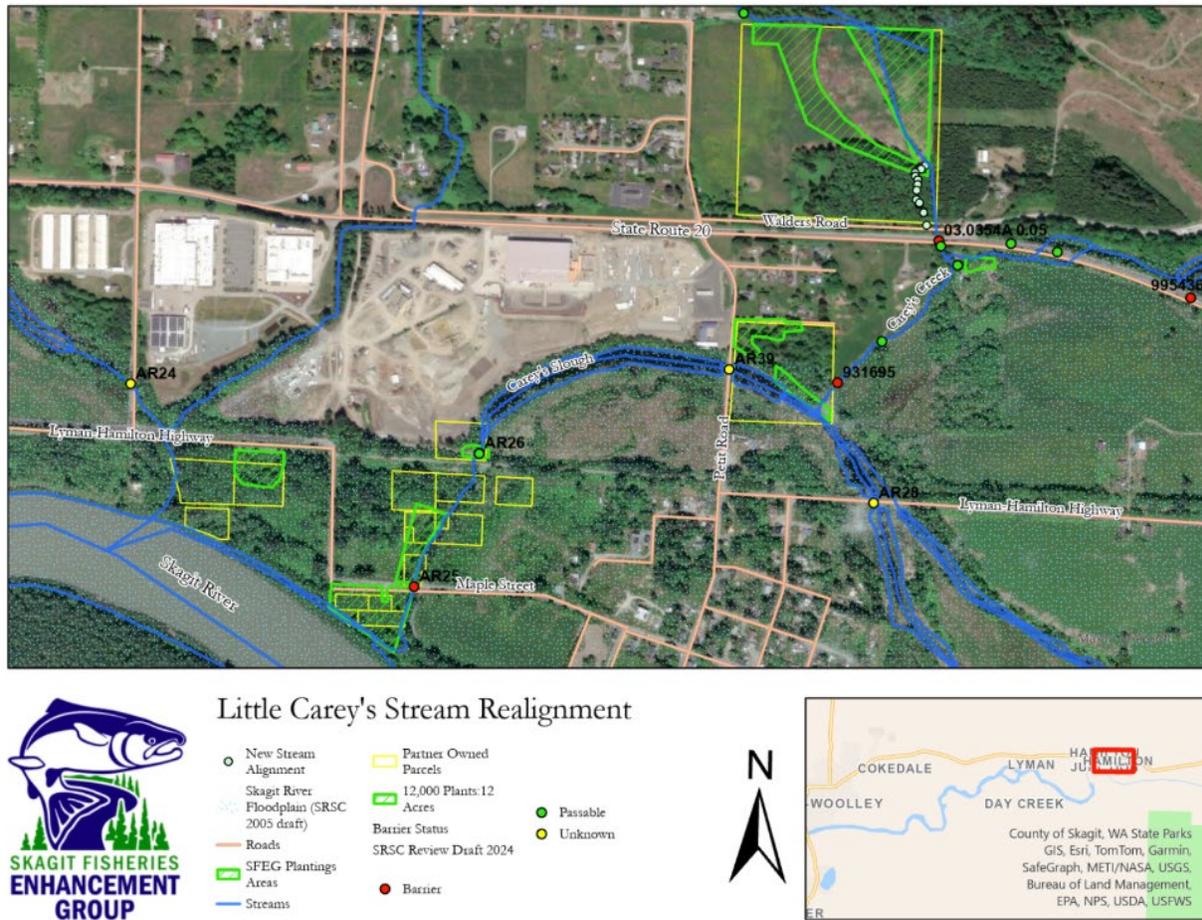


Figure 36

Hamilton Complex: showing planted areas enclosed by the green line and culverts along the creek with red, green, and yellow dots.

SFEG has worked in the Hamilton area for many years, completing both fish passage and riparian restoration. Figure 36 shows the “Hamilton Complex Map” in which you can see the area that SFEG has planted as a part of riparian restoration project. In Fall and Winter 2023/2024, SFEG and Washington Conservation Corps (WCC) planted over 12,000 native plants in the wetland and field area above Little Carey's Creek. In 2022, SFEG removed two culverts in Carey's Slough and abandoned the crossing as it was no longer in use. SFEG has plans to construct a stream realignment project upstream of SR 20 in the summer of 2025. This project will move the stream

from the incised channel that currently exists upstream of SR 20 and re-route it through the forest to follow the natural swales and contours of the forest. The stream had been artificially straightened and has caused severe erosion. Additionally, SFEG is working with an engineering firm to design a fish passage structure, likely a bridge, that would remove the culvert that is at the lowest end of the stream realignment area. SFEG is continuing to work with landowners and the Town of Hamilton to restore as much fish passage and riparian habitat as possible.

This season was the first year that data was collected on spawning abundance in Little Carey’s Creek and we had little hope that fish were going to be seen due to the barrier culverts in the reach. Despite the barriers, volunteers recorded dozens of fish in Little Carey’s Creek this season. The survey occurs in two reaches and all 46 sightings occurred in the upper reach, North of SR 20 (Figure 36). There were salmon recorded spawning downstream of SR 20 but they were not within the bounds of this survey and are not reflected in the data shown here. Sightings began on November 14 when two fish were seen, but then no fish were seen until December 5, when another two fish were spotted (Figure 38). Sightings continued through December with 44 of the total 46 sightings occurring between December 5 and December 26. The FPM value for Little Carey’s Creek was 10.2, but with no other years of data to compare to we will have to wait for more data to be collected before we are able to compare the relative abundance.

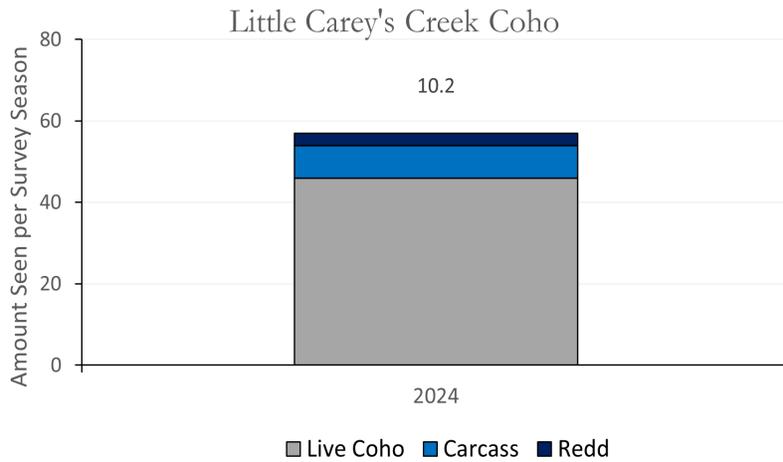


Figure 37

Total counts for coho seen in Little Carey’s Creek for each yearly spanner survey season. Fish per mile (FPM) numbers are indicated above each column. FPM numbers can be utilized to compare the relative abundance of fish between years by accounting for survey effort.

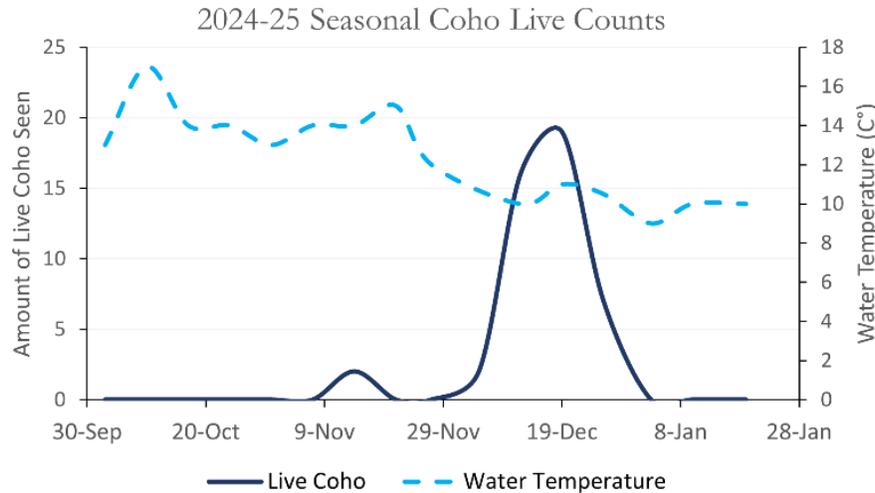


Figure 38

Total live counts for coho in Little Carey's Creek for the current spanner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

Little Cascade (Lyric Creek)

Little Cascade, also known as Lyric Creek by locals, is a tributary of the Cascade River that joins with the Skagit River. Little Cascade is the uppermost survey reach that the Spawner Survey Program monitors within the Skagit River Watershed and is located on Skagit Land Trust property (Figure 1). This creek is fed by Lookout Mountain east of Marblemount. Little Cascade Creek has documented all three (spring, summer, and fall) runs of Chinook, chum, and coho (*WDFW SalmonScape*, n.d.). In 2015, SFEG worked with volunteers and the Skagit Land Trust to remove a culvert that was a fish passage barrier and abandon the crossing providing unimpeded passage to all fish and aquatic life. During this project, native trees and shrubs were planted to aid in restoring natural riparian processes such as leaf litter and large woody debris recruitment, shade, and bank stabilization.

Little Cascade (Lyric Creek) saw a dramatic increase in live fish sightings from the last two years and this season saw the second most live fish in any year surveyed with a total of 319 coho observed. Sighting began on October 30, the earliest of any creek monitored by the Spawner Survey Program, and continued with consistent sightings until the final fish was seen on January 18 (Figure 40).

It is worth noting that Lyric Creek is situated just above the WDFW-operated Marblemount Hatchery and many of the carcasses that volunteers collected data about were of hatchery origin. Volunteers sampled a total of 197 coho carcasses with 81 documented as fin-clipped hatchery fish, 93 adipose intact wild fish, and 24 carcasses that were decomposed or eaten to a point that it was not possible to accurately identify the state of the adipose fin; this means that at least 41% of carcasses were of hatchery origin compared to at least 47% of carcasses being wild stock. While

these percentages only directly apply to the sampled carcasses and not the live fish sightings, it is the most significant hatchery influence documented on any creek surveyed this season.

The FPM for Little Cascade Creek this season was the second highest seen in the last 9 years with a value of 98.2. The numbers used to calculate the FPM for this year were as follows: total live fish was 319, there were 14 completed surveys, and the survey reach length was 0.25 miles. This year’s FPM was greater than the 9-year average of 35.3. Additionally, Little Cascade Creek had the highest FPM count of any creek surveyed this year due to its rich abundance in a relatively short survey length (i.e., 0.25 miles), thus resulting in a greater number of fish seen per mile walked overall.

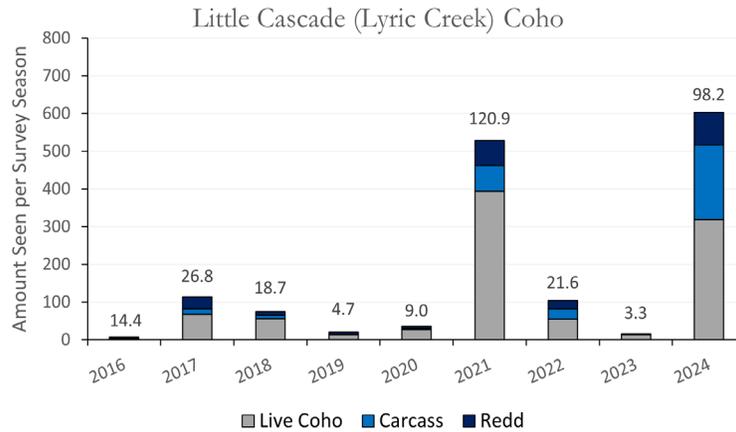


Figure 39

Total counts for coho seen in Little Cascade Creek for each yearly spawner survey season. Fish per mile (FPM) numbers are indicated above each column back to 2014. FPM numbers can be utilized to compare the relative abundance of fish between years by accounting for survey effort.

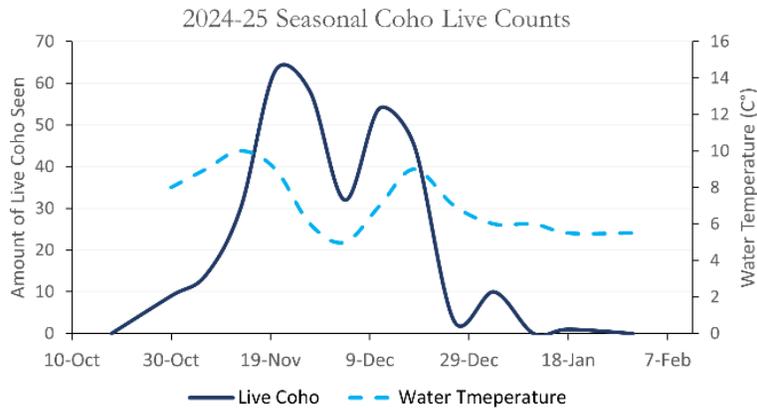


Figure 40

Total live counts for coho in Little Cascade Creek for the current spawner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

West Fork Trumpeter

The West Fork of Trumpeter Creek originates in the City of Mount Vernon, flowing north into the West Fork of the Nookachamps Creek and then into the Lower Skagit River. Along with Maddox Creek, West Fork Trumpeter is one of the most urban streams SFEG surveys with walking paths, roads, and houses within close proximity to the stream. Coho salmon are the primary species known to use this urban stream. SFEG completed a restoration project at Bakerview Park along West Fork Trumpeter Creek between 1995 and 1997 to recreate a historic stream channel through a filled wetland. The project was primarily funded by the Jobs for the Environment program. There were 90 instream structures placed along 3,000 feet of stream channel, including five rock weirs placed at the upper end of the project to provide fish access to 1,260 feet of upstream habitat. Large woody debris was installed along the stream channel and an off-channel pond was created to provide rearing habitat for juvenile salmon. Over 2,000 native trees and shrubs were planted by local community volunteers along 6,000 feet of the riparian zone on both stream banks. Community volunteers have been instrumental in monitoring and maintaining this project site over the past years. Since project completion, community volunteers have contributed thousands of hours toward planting, monitoring, and cleaning up this project site.

There were no identifiable adult salmon seen in West Fork Trumpeter Creek this season. Volunteers did report one adult fish of unknown species, and given the historical record of coho sightings in the creek, that fish was likely a coho. However, we are unable to confirm the species of this unidentified fish and it was excluded from the dataset. Low abundance is common in West Fork Trumpeter Creek with a 10-year average live sighting count of only 2.2 fish per year and an average FPM of 0.7 in this same time frame.

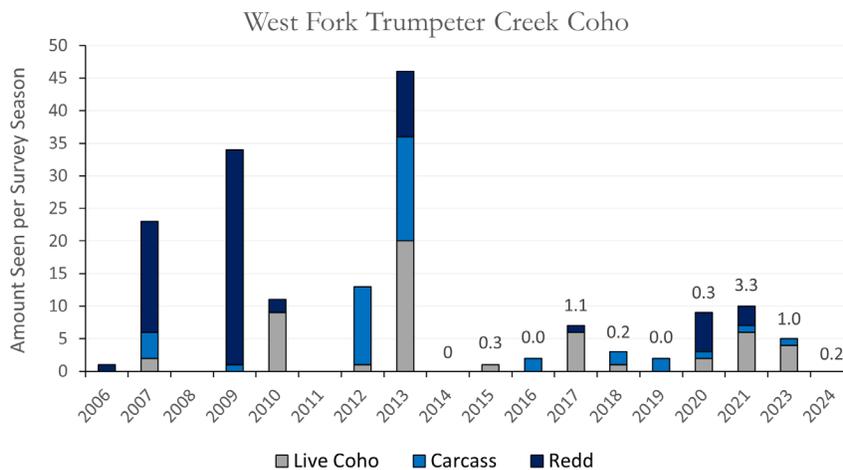


Figure 41

Total counts for coho seen in West Fork Trumpeter Creek for each yearly spawner survey season. Fish per mile (FPM) numbers are indicated above each column back to 2014. FPM numbers can be utilized to compare the relative abundance of fish between years by accounting for survey effort.

East Fork Walker

East Fork Walker is a tributary of East Fork Nookachamps Creek and flows down from the Cultus Mountains between Big Lake and Lake Challenge. The survey reach of East Fork Walker is 0.66 miles long and encompasses a portion of the stream that underwent construction and restoration in 2015 with upstream reaches monitoring pre-restoration and fish passage barrier removal sites. In 2015, with funding from the Family Forest Fish Passage Program (FFFPP), SFEG removed a culvert barrier that restricted fish passage and installed a 60-foot steel bridge restoring access to over a mile of upstream spawning and rearing habitat. Funding from the Washington Department of Ecology allowed SFEG, with help from volunteers, to plant 2.5 acres with native conifers and deciduous trees and shrubs. SFEG's Washington Conservation Crew (WCC) also completed a new planting upstream of the survey reach in fall 2023. SFEG staff are currently working to fix another fish passage barrier upstream of the current survey reach, construction is planned for the summer of 2025. There are documented Chinook, chum, coho, spring and winter steelhead, and resident cutthroat trout in this stream (*WDFW SalmonScape*, n.d.).

The surveys at East Fork Walker Creek were expanded upon from previous years with two additional reaches being added in upstream portions of the creek. Across all three reaches, there were a total of 547 adult salmon documented with 276 appearing in the first reach, 168 in the second, and 103 in the third (Figure 42). Analyzing this data in three distinct reaches is challenging due to the salmon's ability to potentially be documented in different reaches in different weeks making abundance between the reaches difficult to determine. In addition to complicating the documentation of live sightings, carcasses were the most abundant in the lowest reach and least abundant in the uppermost reach which poses the question of whether more salmon were dying in the lowest reach or if carcasses from upper reaches were being flushed downstream and documented by volunteers in the lowest reach. These complications serve as a reminder that the data presented in the report is a way to share what volunteers documented and provides only a snapshot of what salmon are doing in the creeks and does not necessarily account for all compounding variables.

Across all three reaches of East Fork Walker Creek, the peak return occurred between November 3 and November 24 with 81% of live sightings occurring in this three-week window (Figures 44-46). An additional 14% of the salmon were documented in the two weeks following this peak between November 30 and December 10. Any remaining sightings occurred in the earliest and latest weeks of surveying to account for the final 5% of the sightings.

Due to the addition of two new survey reaches, the calculation for FPM had to be adjusted to compare 2024's data to previous years. SFEG previously collected data on only "Reach One," but this year the seasonal mileage greatly increased due to the increase in length of the entire East Fork Walker survey system. This is a practical demonstration of the usefulness of a relative abundance index as opposed to live counts. The total live coho documented in 2024 was 144 fish more than the previous highest live count year and 389 fish higher than the 10-year average. When comparing just live counts this would appear that the return at East Fork Walker Creek was much higher than

average this year, but when adjusting for the increase in survey length a more accurate comparison of abundance can be made.

For this year (including all three reaches), there were 548 total live fish sightings on East Fork Walker Creek over 10 surveys on a reach length of 0.66 miles. The FPM came out to be 59.3 this season, which is higher than the 10-year average of 26.8. The 2024 FPM was the third highest recorded FPM on East Fork Walker Creek (Figure 43). Future surveys on the new survey reaches will be required in order to compare relative abundance across the full extent of the site.

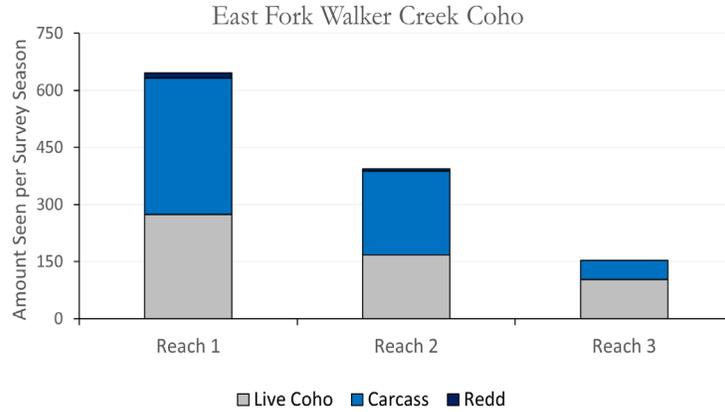


Figure 42

2024-2025 spawner survey season coho live counts. Data was collected by volunteers across the 3 separate reaches surveyed on East Fork Walker Creek. Each column represents a separate survey reach.

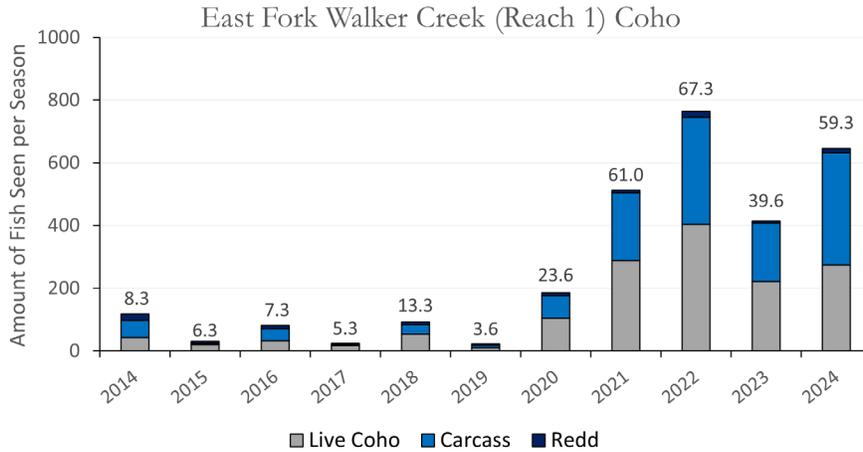


Figure 43

Total counts for coho seen in East Fork Walker Creek (Reach 1) for each yearly spawner survey season. Fish per mile (FPM) numbers are indicated above each column back to 2014. FPM numbers can be utilized to compare the relative abundance of fish between years by accounting for survey effort.

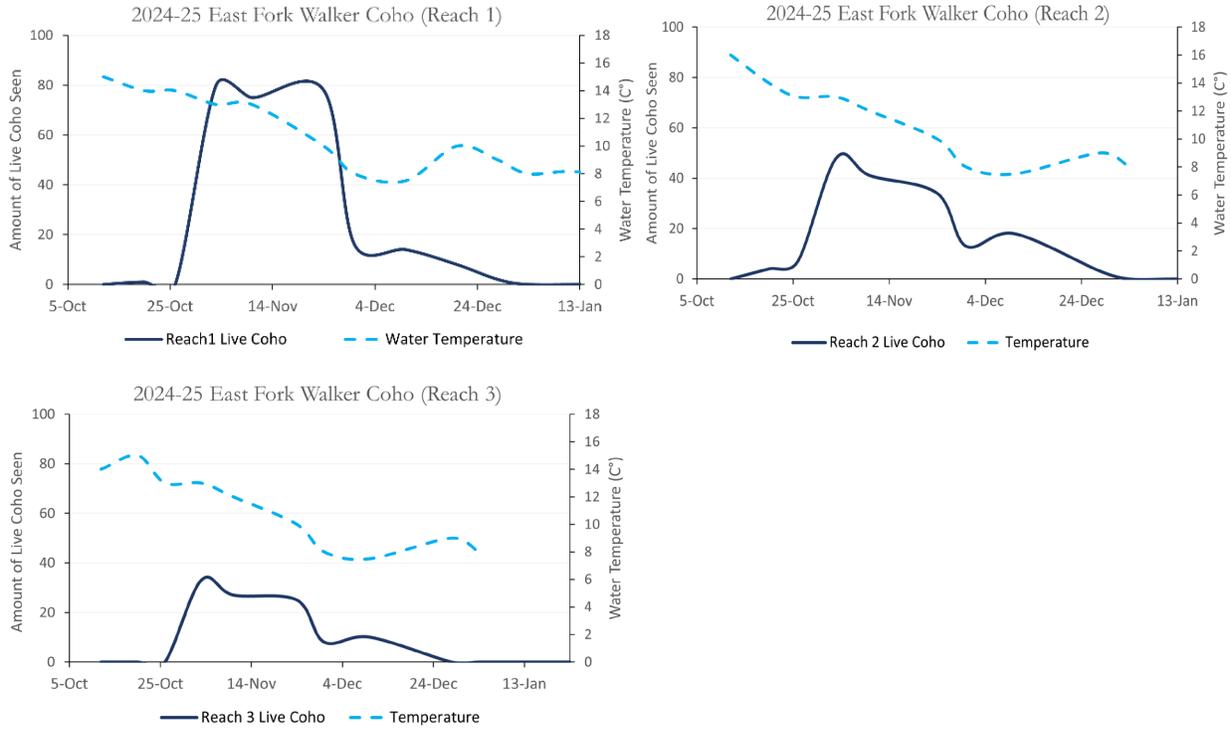


Figure 44-46 (left to right)

Separated by reach number, total live counts for coho in East Fork Walker Creek for the current spawner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

Presentin Side Channel

The Presentin Side Channel is a result of a very large-scale restoration project completed by SFEG in 2021. A 0.5-mile Skagit River side channel was constructed adjacent to Marblemount Channel in Presentin Park, and the entirety of this new channel is surveyed. Presentin Park is part of the Skagit County Parks system and is largely undeveloped, containing open space and hiking trails for residents. Side channel and floodplain habitat is severely lacking in the upper Skagit River and acts as a very important refuge to rearing juvenile salmon. Pre-project surveys of the nearby Marblemount Channel found high usage of this habitat by multiple species of adult and juvenile salmon including Chinook, chum, coho, and steelhead. The side channel usage by a rich diversity of species indicates the value present in the creation of additional side channel habitat in this region. Following the construction phase, SFEG staff and volunteers completed 10 acres of native plantings in areas disturbed by construction and previously occupied by invasive species. SFEG installed nearly 12,000 native plants along the side channel, created new trails, and a salmon viewing station for visitors to observe returning salmon. Just a few months after construction was finished, there were hundreds of pink salmon seen utilizing the side channel.

However, in November 2021, the Skagit River experienced historic rainfall and flooding, during which many of the newly planted native plants within the 10-acre planting site were washed away and large sediment deposition occurred. At one point during the floods, the entire constructed channel and planting area was submerged in several feet of water. The flood severely changed the sediment distribution in the recently established channel and is restricting water from flowing into the channel. The side channel habitat was replanted in the fall and winter of 2022 by Washington Conservation Corps, SFEG staff and Concrete Elementary 3rd Graders. However, it remains to be seen how the shift in sediment will affect the ability of salmon to use the channel.

Volunteers on the Presentin Side Channel observed a total of 18 live fish with three being coho and the remaining 15 being of unidentifiable species. These fish were all sighted on surveys between November 15 and December 8. Despite low live fish sightings, 42 carcasses were documented during the season providing evidence for spawning usage by coho and chum in the side channel. Of the 42 carcasses, 10 were coho, 23 were chum, and the remaining nine were unidentifiable due to predation and decomposition of the carcass (Figures 47-50; Figure 51).

The FPM was relatively low in the last three years of surveying with the highest FPM recorded in 2021. This peak in 2021 is due to the heavy stream usage by the pink salmon (Figure 50) every odd year and because it was before the major flood event. In comparison to the abnormally high 2021 FPM of 64.7, both 2022 and 2023 had FPM values of 0.2 and 2024 comes in slightly higher with an FPM of 0.6. The FPM was excluded from the graphs below to reduce confusion given the large outlier in 2021.

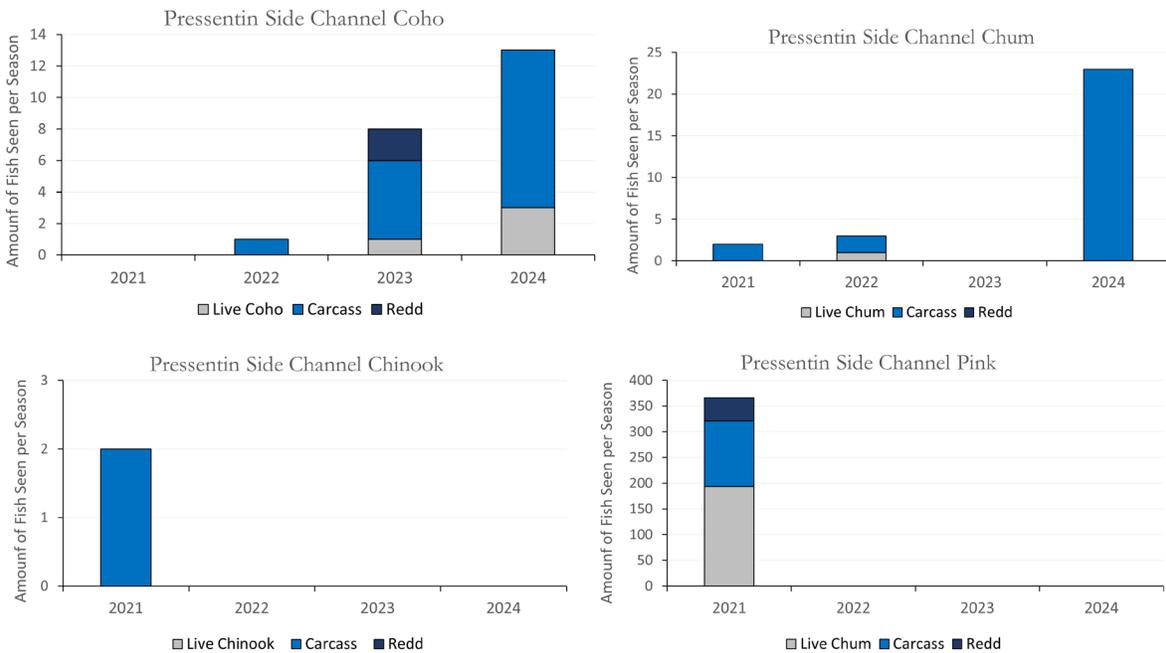


Figure 47-50 (left to right)

Total counts for coho, chum, Chinook, and pink seen in Presentin Side Channel for each yearly spawner survey season. Fish per mile (FPM) was excluded from this survey. FPM was highly distorted due to the large pink salmon run in 2021.

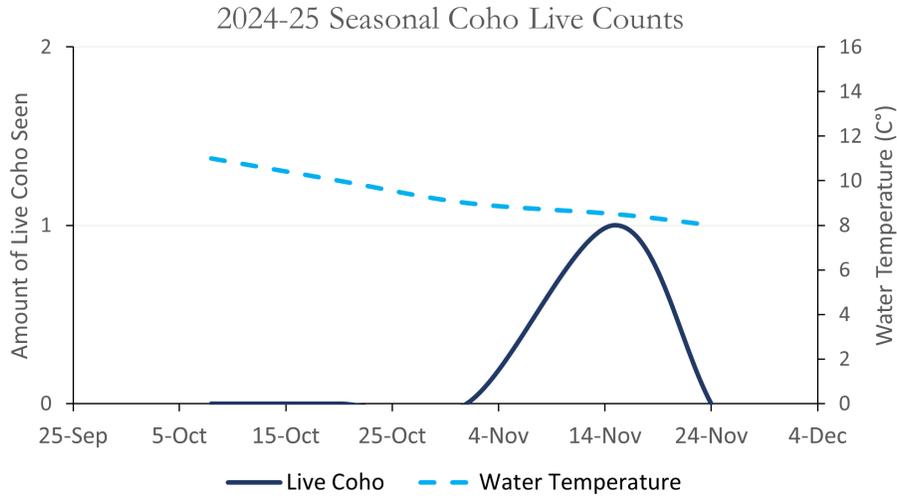


Figure 51

Total live counts for coho in Pressentin Side Channel for the current spawner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

Cumberland Creek Side Channel

Cumberland Creek Side Channel is a moderate sized side channel which flows parallel to the Skagit River through the Cumberland Creek Conservation Area. The conservation area is a 211-acre property, managed by the Skagit Land Trust, which consists of a mostly deciduous floodplain forest and is surrounded on three sides by the Skagit River. The area is described by the Skagit Land Trust as an “excellent example of how rich in diversity the deciduous forests of the Skagit River floodplain can be”(Cumberland Creek Property—Skagit Land Trust, 2018).

The main channel of Cumberland Creek drains from Coal and Iron Mountain, and is a tributary of the Skagit River, entering just south of Hamilton. In 2014, Cumberland Creek was re-routed and restored to its original channel, which opened over 4,000 feet of spawning habitat to several salmonid species. This project was completed by a joint effort by the Skagit Land Trust, the Army Corps of Engineers, Skagit River System Cooperative (SRSC), Skagit County, and Seattle City Light. SFEG began monitoring this creek in 2014, after the bridge construction and channel restoration were completed. Since the completion of the channel restoration, there have been hundreds of pink salmon observed in the channel, as well as many chum, coho, Chinook, steelhead, and cutthroat trout.

Cumberland Creek documented sightings of three species of salmon this year: Chinook, coho, and chum. This creek presents a challenge to volunteers by having extremely turbid water with limited visibility. So, there is a high potential to miss fish in the water. Volunteers frequently noted that the water had fair visibility with proper identification of species being impossible in deeper water. The difficult viewing conditions were reflected in the fact that 22 of the total 65 adult fish sightings were recorded as unknown species. While SFEG does not analyze the abundance of

unknown species, it is worth noting the potential increase in total abundance if one were to include these 22 unknown species, adult fish.

In total, there were 22 coho, 1 chinook, and 20 chum salmon spotted this year (Figures 52-55). Volunteers first recorded live fish sightings on October 29, but due to the viewing conditions were unable to determine the species of the fish. The next week the first and only live Chinook was documented. Salmon sightings continued throughout November and December with 72% of all sightings occurring in a three-week window from November 19 to December 4 (Figures 56-57). The three-week window between November 19 and December 4, represents 95% of all coho sightings (21 fish) and 60% of all chum sightings (12 fish).

Analyzing abundance on Cumberland Creek is complicated due to the high number of spawning pink salmon in odd years that create large spikes in abundance during those respective years. There was a total of 43 live fish seen on Cumberland Creek this year over 12 surveys with a survey reach length of 0.2 miles. The FPM this year came out to 17.9. Excluding pink salmon survey years, the average this year of 17.9 FPM is higher than the average of 8.4 FPM. The increase in relative abundance does not factor in the unknown species observations indicating that spawning abundance in Cumberland Creek may be slightly higher than we are aware of currently.

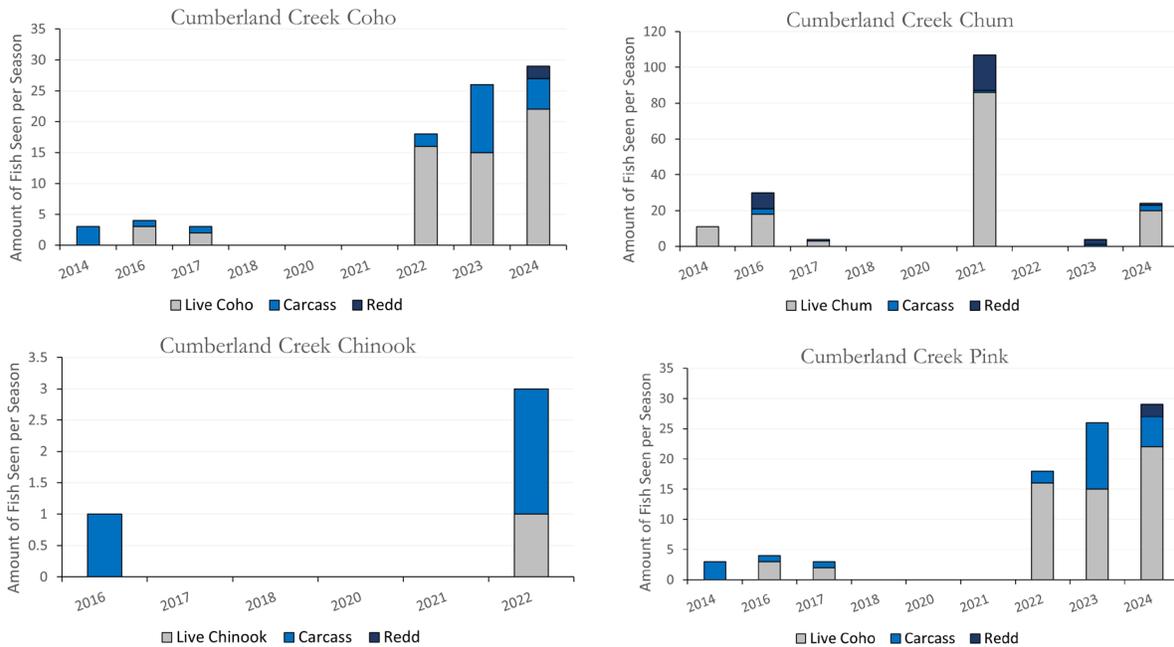


Figure 52-55 (left to right)

Total counts for coho, Chinook, chum, and pink seen in Cumberland Creek for each yearly spawner survey season. Fish per mile (FPM) numbers are indicated above each column back to 2014. FPM numbers can be utilized to compare the relative abundance of fish between years by accounting for survey effort.

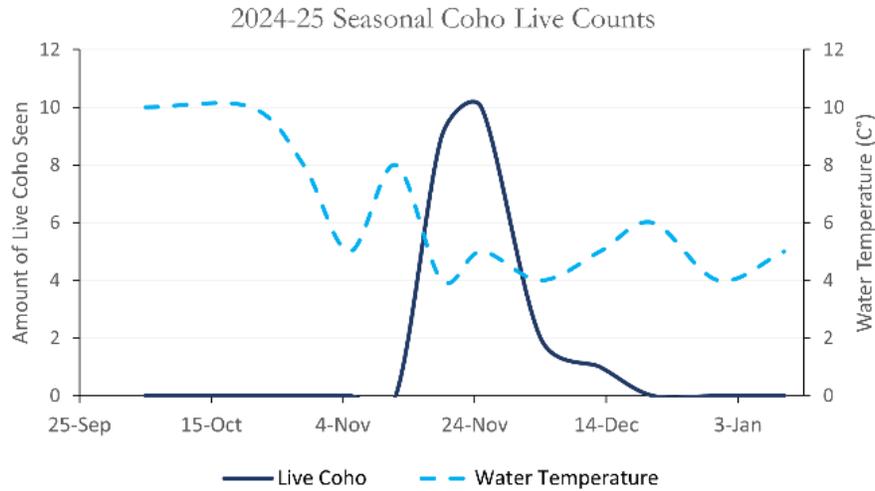


Figure 56

Total live counts for coho in Cumberland Creek for the current spanner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

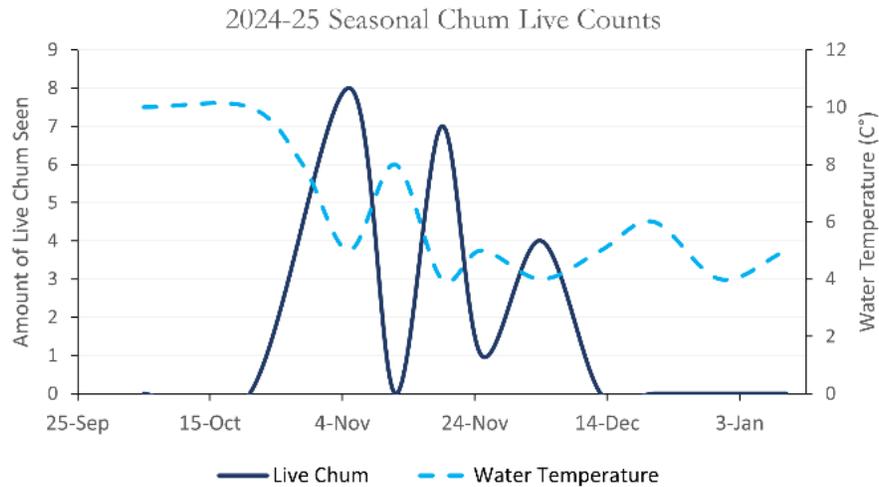


Figure 57

Total live counts for chum in Cumberland Creek for the current spanner survey season (2024-25). Live counts represent the number of live salmon seen by volunteers at each survey in a season. Water temperature data collected with handheld thermometers at the beginning of each survey.

References

- A Catalog of Washington Streams and Salmon Utilization. Volume 1, Puget Sound Region. R. W. Williams, R. M. Laramie, J. J. Ames. Washington Department of Fisheries, 1975.
- Bowerman, T., Roumasset, A., Keefer, M. L., Sharpe, C. S., & Caudill, C. C. (2017). Prespawn Mortality of Female Chinook Salmon Increases with Water Temperature and Percent Hatchery Origin. *Transactions of the American Fisheries Society*, 00028487.2017.1377110. <https://doi.org/10.1080/00028487.2017.1377110>
- Bankfull width Definition*. (n.d.). Law Insider. Retrieved April 21, 2025, from <https://www.lawinsider.com/dictionary/bankfull-width>
- Cumberland Creek Property—Skagit Land Trust*. (2018). Retrieved May 16, 2025, from <https://www.skagitlandtrust.org/properties/cumberland-creek.aspx>
- Chamberlin, J. (2022). Chinook Salmon Use of Tidal Delta Habitats: Synthesis for Snohomish Recovery Plan Revision. U.S. Department of Commerce, NOAA Contract Report NMFS-NWFSC-CR-2022-01.
- Fausch, K. D., Torgersen, C. E., Baxter, C. V., & Li, H. W. (2002). Landscapes to Riverscapes: Bridging the Gap between Research and Conservation of Stream Fishes: A Continuous View of the River is Needed to Understand How Processes Interacting among Scales Set the Context for Stream Fishes and Their Habitat. *BioScience*, 52(6), 483–498. [https://doi.org/10.1641/0006-3568\(2002\)052\[0483:LTRBTG\]2.0.CO;2](https://doi.org/10.1641/0006-3568(2002)052[0483:LTRBTG]2.0.CO;2)
- Feist, B. E., Buhle, E. R., Baldwin, D. H., Spromberg, J. A., Damm, S. E., Davis, J. W., & Scholz, N. L. (2017). Roads to ruin: Conservation threats to a sentinel species across an urban gradient. *Ecological Applications*, 27(8), 2382–2396. <https://doi.org/10.1002/eap.1615>
- Hubert, W. A., & Fabrizio, M. C. (2007). Relative abundance and catch per unit effort. *Analysis and interpretation of freshwater fisheries data. American Fisheries Society, Bethesda, Maryland*, 279-325.
- LovellFord, R. M., Flitcroft, R. L., Lewis, S. L., Santelmann, M. V., & Grant, G. E. (2020). Patterns of River Discharge and Temperature Differentially Influence Migration and Spawn Timing for Coho Salmon in the Umpqua River Basin, Oregon. *Transactions of the American Fisheries Society*, 149(6), 695–708. <https://doi.org/10.1002/tafs.10264>
- McIntyre, J. K., Prat, J., Cameron, J., Wetzels, J., Mudrock, E., Peter, K. T., Tian, Z., Mackenzie, C., Lundin, J., Stark, J. D., King, K., Davis, J. W., Kolodziej, E. P., & Scholz, N. L. (2021). Treading Water: Tire Wear Particle Leachate Recreates an Urban Runoff Mortality Syndrome in Coho but Not Chum Salmon. *Environmental Science & Technology*, 55(17), 11767–11774. <https://doi.org/10.1021/acs.est.1c03569>
- Scholz, N. L., Myers, M. S., McCarthy, S. G., Labenia, J. S., McIntyre, J. K., Ylitalo, G. M., Rhodes, L. D., Laetz, C. A., Stehr, C. M., French, B. L., McMillan, B., Wilson, D., Reed, L., Lynch, K. D., Damm, S., Davis, J. W., & Collier, T. K. (2011). Recurrent Die-Offs of Adult Coho Salmon Returning to Spawn in Puget Sound Lowland Urban Streams. *PLoS ONE*, 6(12), e28013. <https://doi.org/10.1371/journal.pone.0028013>
- Spromberg, J.A., Scholz, N.L., (2011). Estimating the future decline of wild coho salmon populations due to early spawner die-offs in urbanizing watersheds of the Pacific Northwest. *Integr. Environ. Assess. Manag.* 7 (4), 648. <https://doi.org/10.1002/ieam.219>

- Skagit Fisheries Spawner Survey Program. (2024). *Skagit Fisheries Enhancement Group*. Retrieved April 21, 2025, from <https://www.skagitfisheries.org/habitat-restoration/monitoring/spawner-surveys/>
- Statewide Washington Integrated Fish Distribution*. (2024). Retrieved April 21, 2025, from <https://geo.wa.gov/datasets/wdfw::statewide-washington-integrated-fish-distribution/about>
- Tian, Z. Y.; Zhao, H.; Peter, K. T.; Gonzalez, M.; Wetzel, J.; Wu, C.; Hu, X.; Prat, J.; Mudrock, E.; Hettinger, R.; Cortina, A. E.; Biswas, R. G.; Kock, F. V. C.; Soong, R.; Jenee, A.; Du, B.; Hou, F.; He, H.; Lundeen, R.; Gilbreath, A.; Sutton, R.; Scholz, N. L.; David, J. W.; Dodd, M. C.; Simpson, A.; McIntyre, J. K.; Kolodziej, E. P. *Ubiquitous tire rubber-derived chemical induces acute mortality in coho salmon*. *Science* (2021), 371 (6525), 185–189.
- WDFW. (2024) *Forecasts, Model Runs, and Management Objectives | Washington Department of Fish & Wildlife* . Retrieved April 21, 2025, from <https://wdfw.wa.gov/fishing/management/north-falcon/forecasts>
- WDFW. (2024). *Managing Fish Populations | Washington Department of Fish & Wildlife*. Retrieved April 21, 2025, from <https://wdfw.wa.gov/fishing/management>
- WDFW. (2024). *Statewide hatchery trout and kokanee stocking plan | Washington Department of Fish & Wildlife*. <https://wdfw.wa.gov/fishing/reports/stocking/statewide>
- WDFW *SalmonScape*. (n.d.). Retrieved May 16, 2025, from <https://apps.wdfw.wa.gov/salmonscape/>

Appendices

1. Data Sheet

SKAGIT FISHERIES ENHANCEMENT GROUP
Spawning Survey Data Sheets

Stream Name: _____ Crew Members: _____ Date: _____

I certify that all team members have all required PPE necessary for today's survey including high visibility vests.

Start Time: _____ End Time: _____

TOTAL COUNTS

Species	Live	Carcass	Redd*
Chinook (CK)			
Chum (CH)			
Coho (CO)			
Pink (PK)			
Sockeye (SO)			
Kokanee (KK)			
Other			
Unknown Species			

*Data collection will be on redds that have fish on them. Please mark species as unknown for redds without fish.

Stream Temperature: _____ Time of Recording: _____

FLOW TYPE:

VISIBILITY

_____ 1 - Dry	_____ 1 - Excellent
_____ 2 - Low	_____ 2 - Very Good
_____ 3 - Medium	_____ 3 - Good
_____ 4 - High	_____ 4 - Fair
_____ 5 - Flooding	_____ 5 - Poor
_____ 6 - Medium-low	_____ 6 - Not Survey-able
_____ 7 - Medium-high	

*Mark Flagging for Redds with: *SFEG*, *Species Code (CK, CH, CO, etc.) Redd*, *Date*.

WATER CONDITIONS:

VIEWING CONDITIONS:

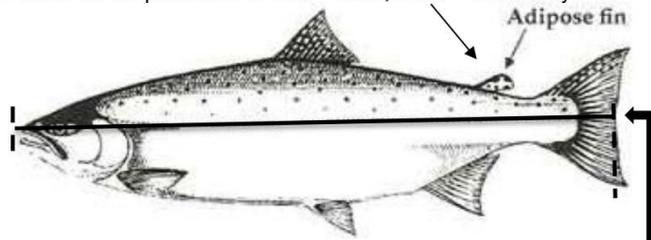
_____ 20 - Low - Clear	_____ 30 - Dark
_____ 21 - Low - Med Color	_____ 31 - Dark in pools
_____ 22 - Low - Muddy	_____ 32 - High Glare
_____ 23 - Med - Clear	_____ 33 - Some Glare
_____ 24 - Med - Med Color	_____ 34 - Raining
_____ 25 - Med - Muddy	_____ 35 - Snowing
_____ 26 - High - Clear	_____ 36 - Frozen
_____ 27 - High - Med Color	_____ 37 - Partly Frozen
_____ 28 - High - Muddy	_____ 38 - Water Turbid
	_____ 39 - Other: _____

CONDITION NOTES:

ADDITIONAL NOTES:

[Empty box for additional notes]

Does this fish have an adipose fin? If Yes = Wild, if No = Hatchery

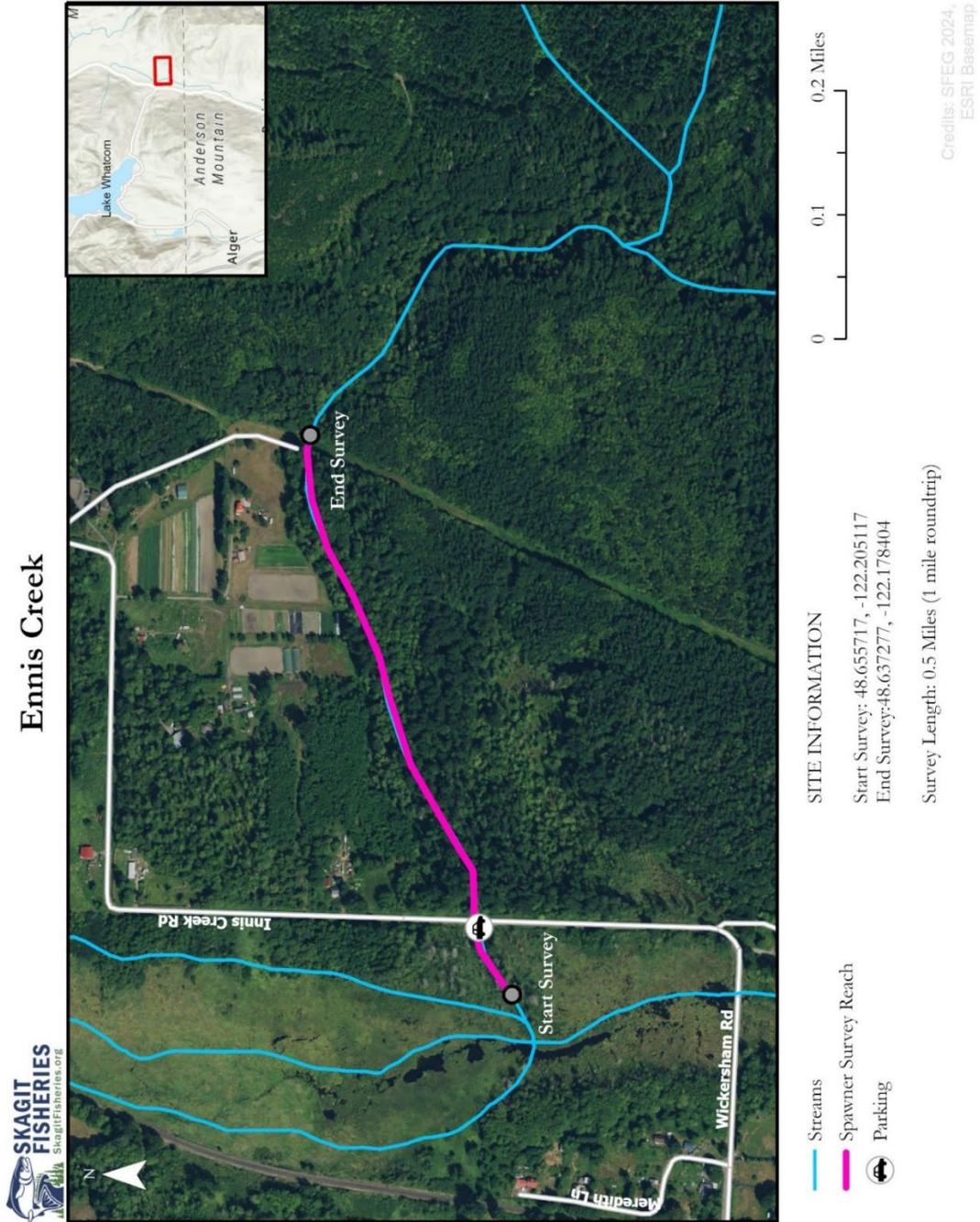


Fork Length (m)

Measure to the center divot of the caudle fin not the tip of the fin - this may be damaged.

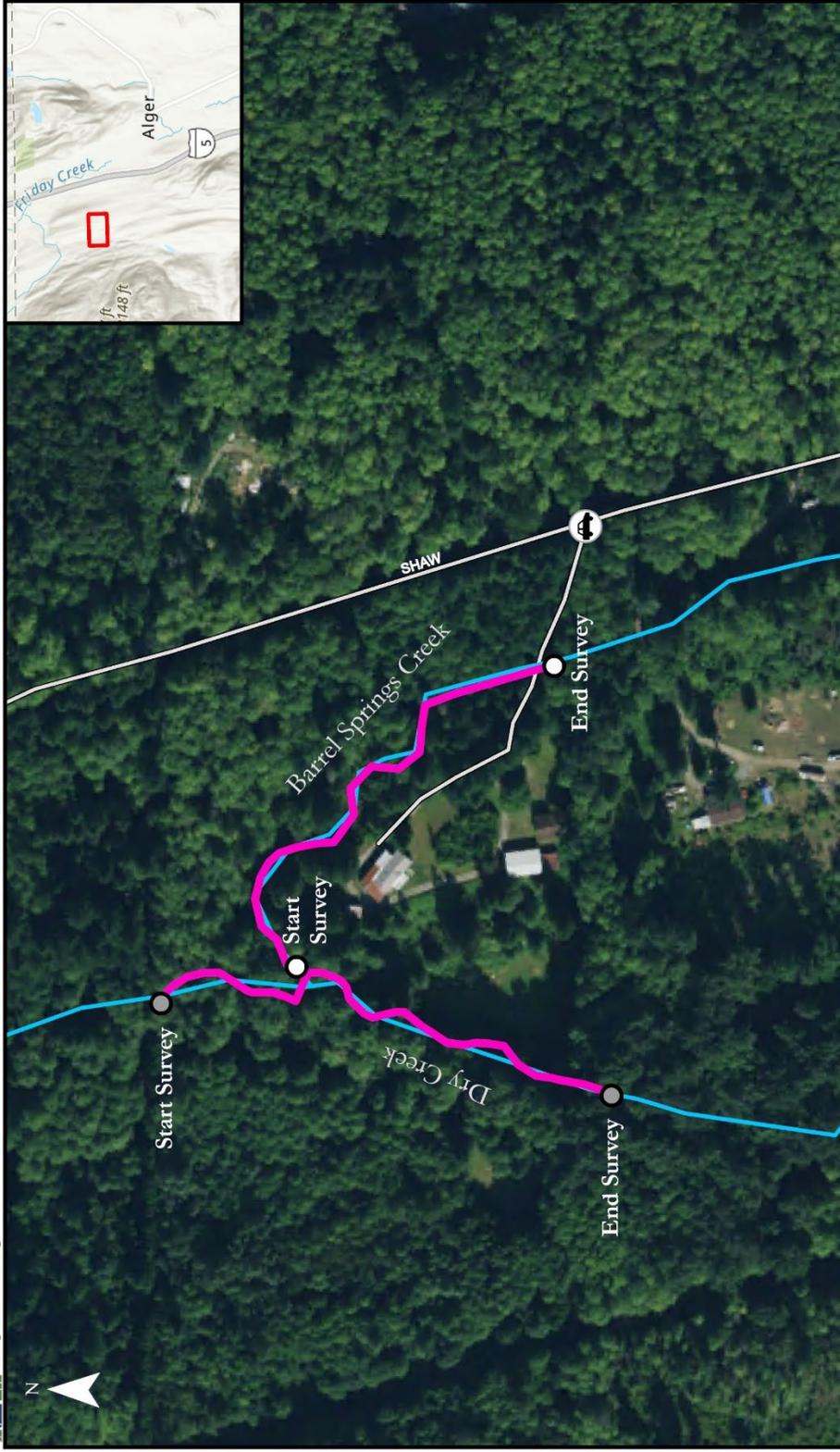
2. Creek Maps

2.a Samish Watershed





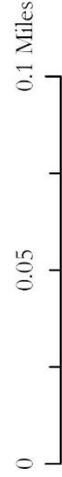
Dry Creek and Barrel Springs Creek



- Streams
- Spawner Survey Reach
- Parking

SITE INFORMATION

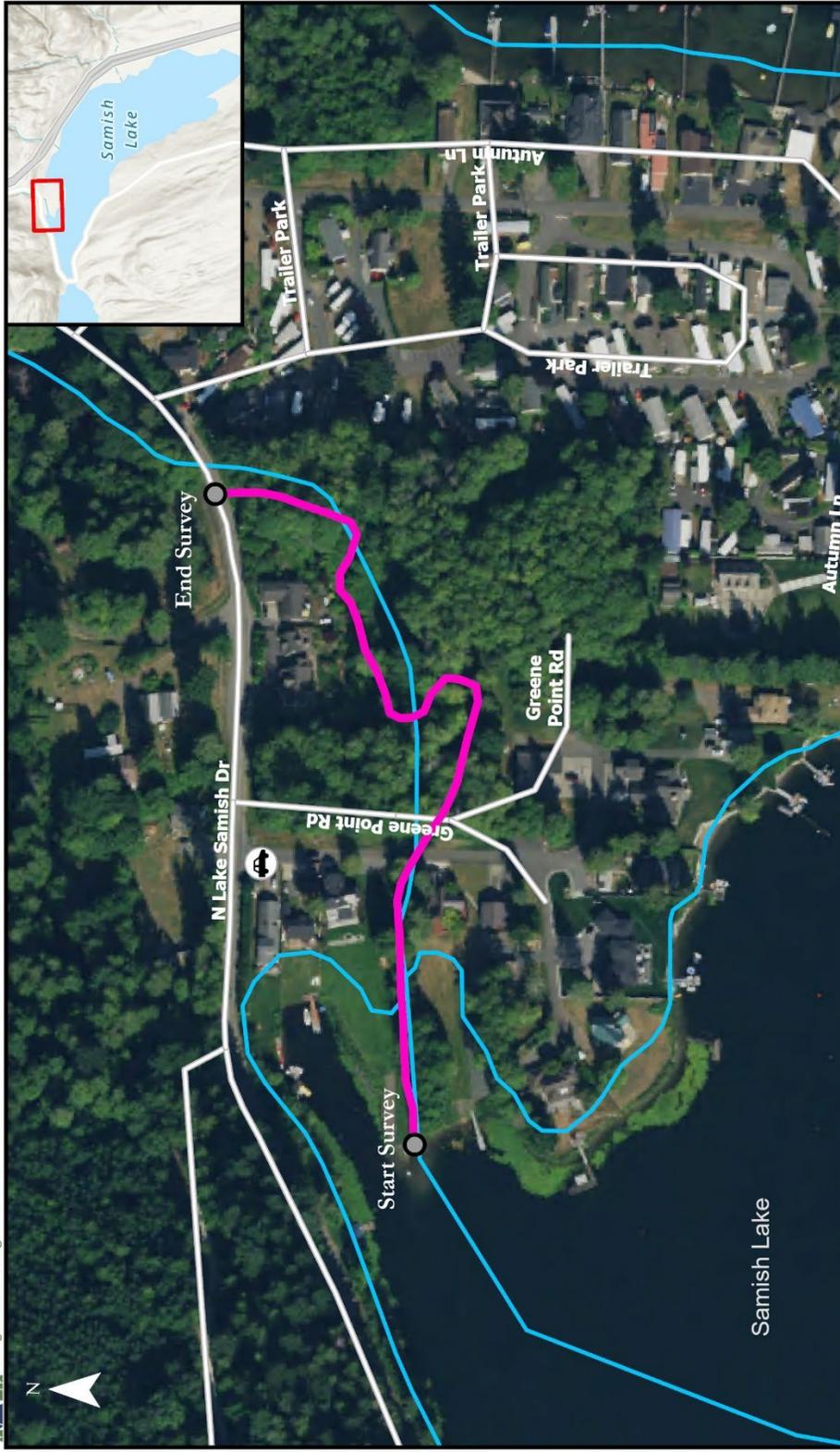
Barrel Springs	Start Survey: 48.630641, -122.373851 End Survey: 48.629581, -122.371810
Dry Creek	Start Survey: 48.631017, -122.374276 End Survey: 48.629288, -122.374718
Survey Length: 0.3 Miles (Combined)	



Credits: SFEG 2024,
ESRI Basemap



Finnegan Creek

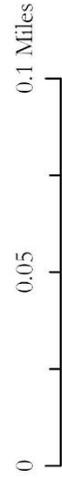


- Streams
- Spawner Survey Reach
- Parking

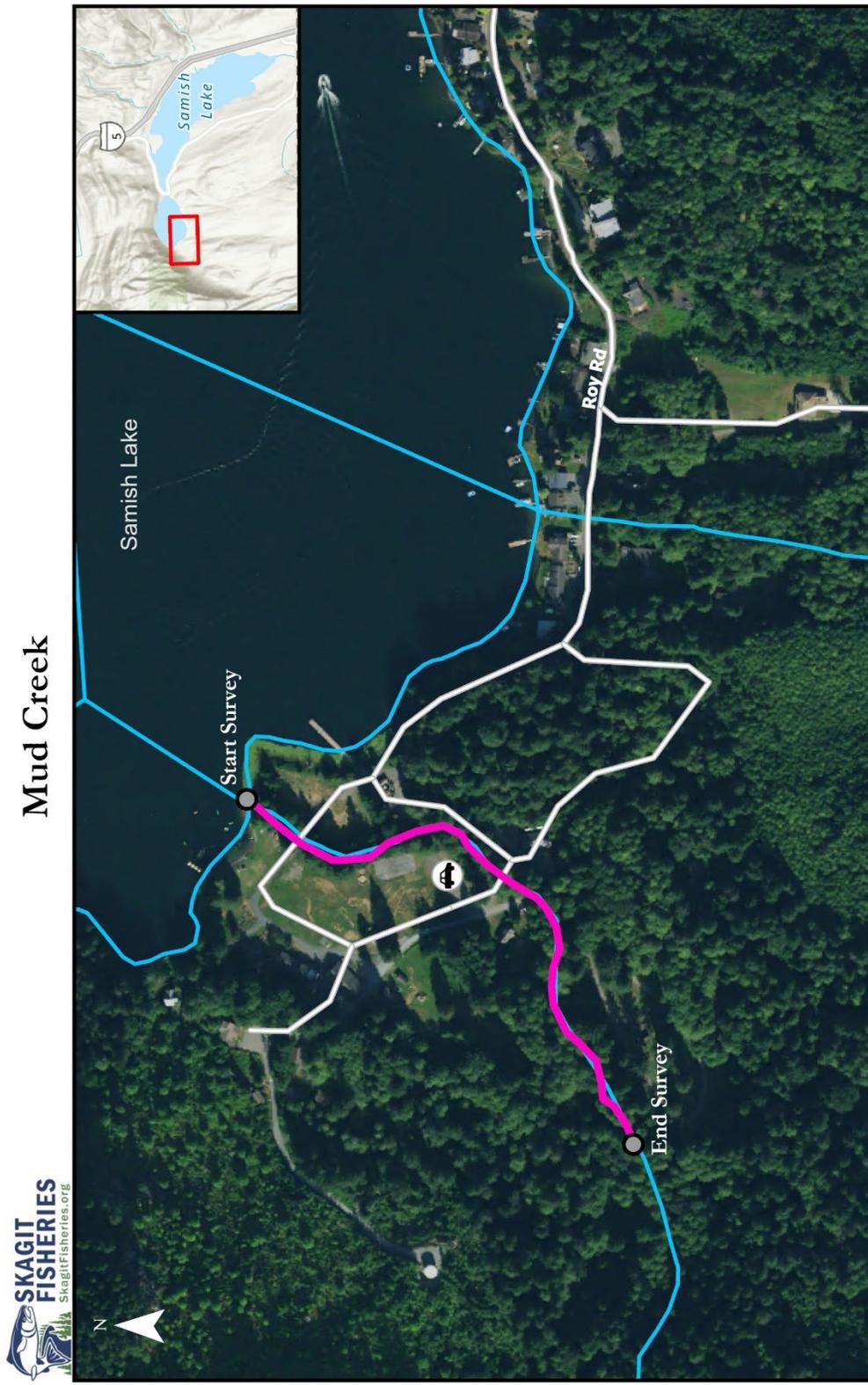
SITE INFORMATION

Start Survey: 48.673433, -122.400950
 End Survey: 48.674250, -122.397017

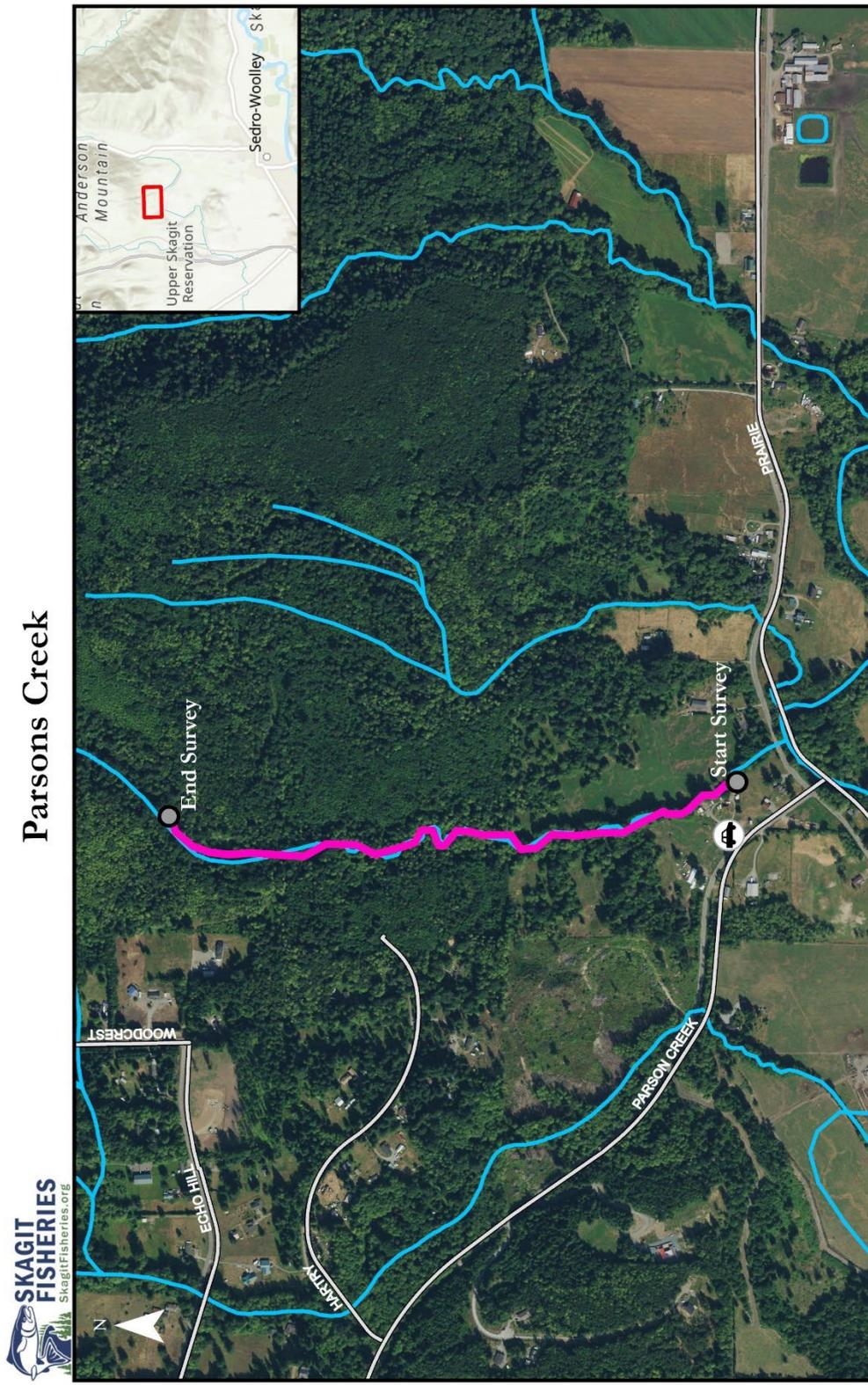
Survey Length: 0.3 Miles



Credits: SFEG 2024,
 ESRI Basemap



SITE INFORMATION
Start Survey: 48.668822, -122.426794
End Survey: 48.666733, -122.431275
Survey Length: 0.5 Miles



Parsons Creek



SITE INFORMATION

Start Survey: 48.583944, -122.286500
End Survey: 48.592792, -122.287763

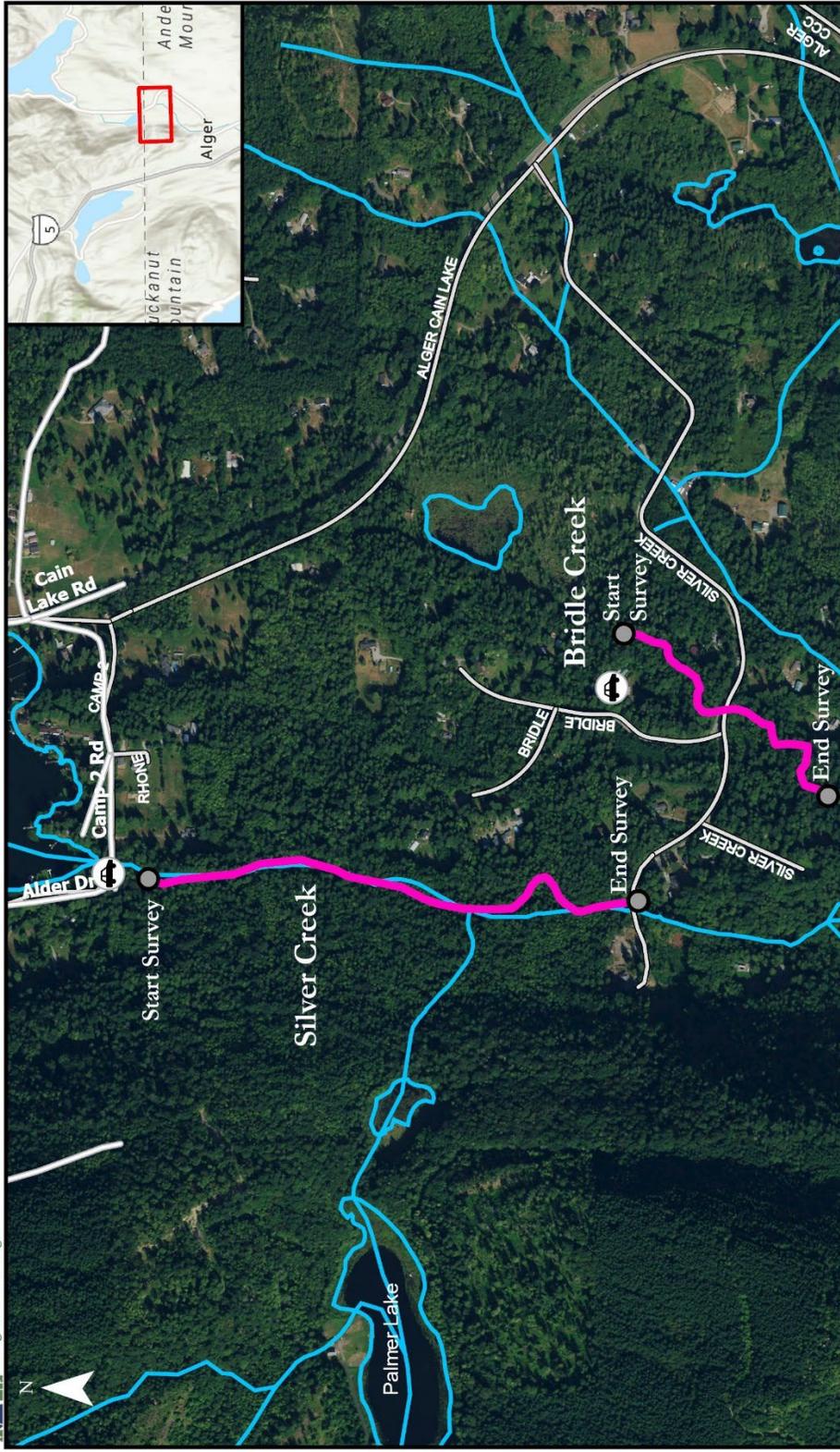
Survey Length: 1.7 Miles

- Streams
- Spawner Survey Reach
- Parking

Credits: SFEG 2024, ESRI Basemap



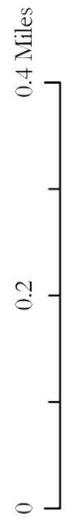
Silver Creek and Bridle Creek



- Streams
- Spawner Survey Reach
- Parking

SITE INFORMATION
 Silver (0.6 miles)
 Start Survey: 48.637867, -122.330067
 End Survey: 48.644267, -122.329750

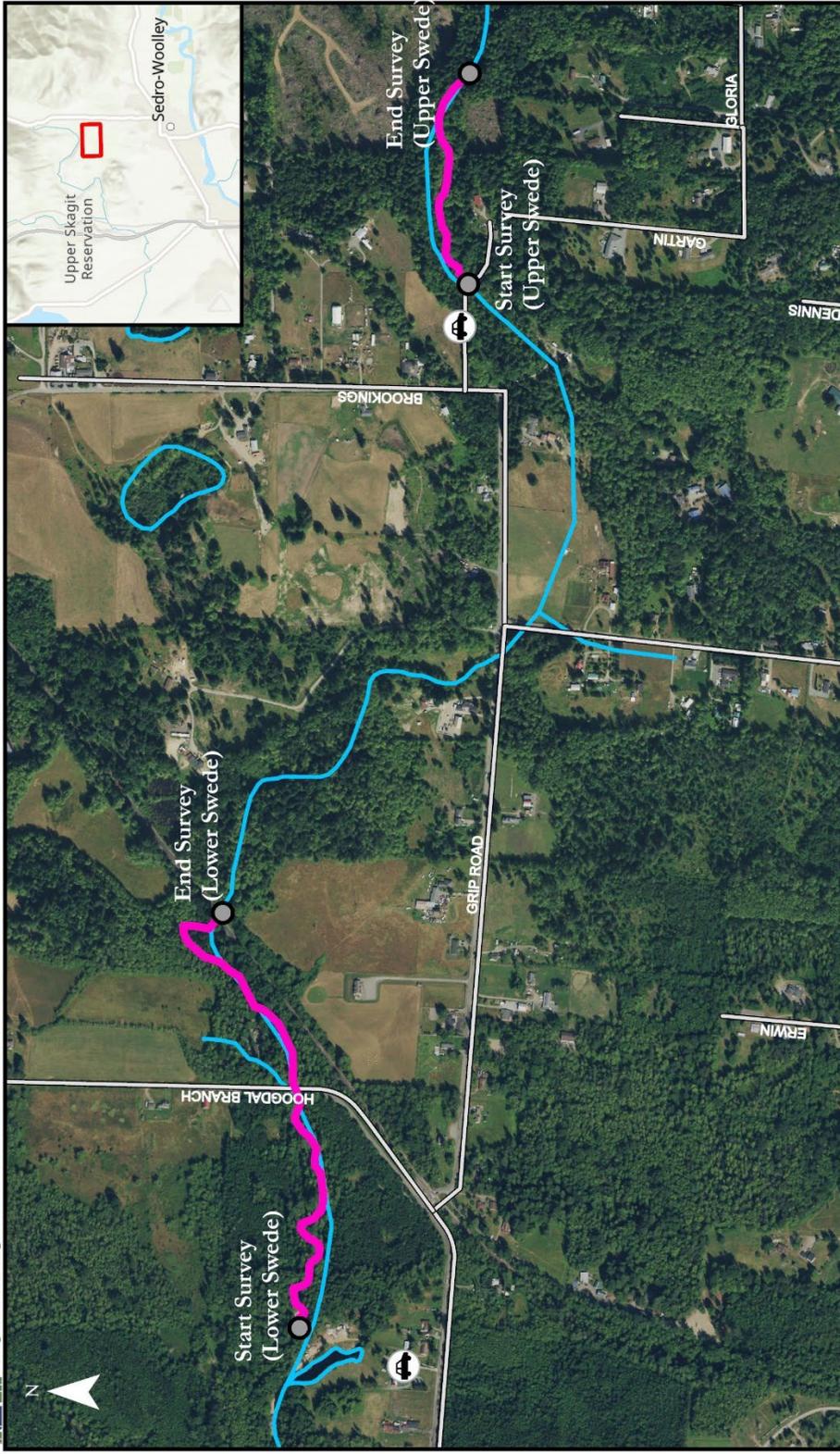
Bridle (0.2 miles)
 Start Survey: 48.634950, -122.327533
 End Survey: 48.637833, -122.324306



Credits: SFEG 2024,
 ESRI Basemap



Swede Creek



- Streams
- Spawner Survey Reach
- Parking

SITE INFORMATION

- (Lower) Start Survey: 48.560417, -122.262694
- (Lower) End Survey: 48.561833, -122.253278
- (Upper) Start Survey: 48.558167, -122.238806
- (Upper) End Survey: 48.55821, -122.23369 (approximately)

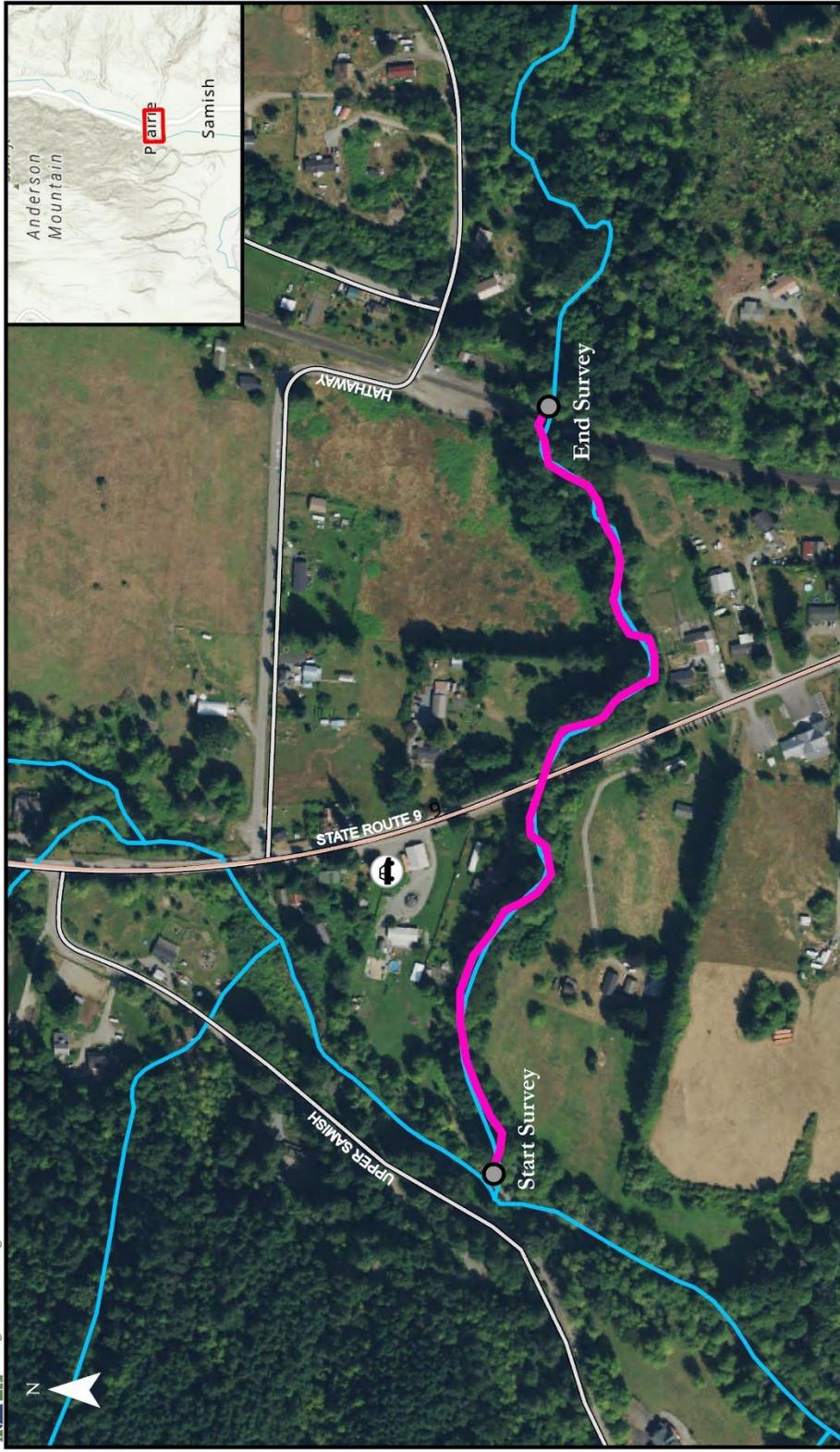
Survey Length: ~0.7 miles



Credits: SFEG 2024,
ESRI Basemap



Thunder Creek



- Streams
- Spawner Survey Reach
- Parking

SITE INFORMATION

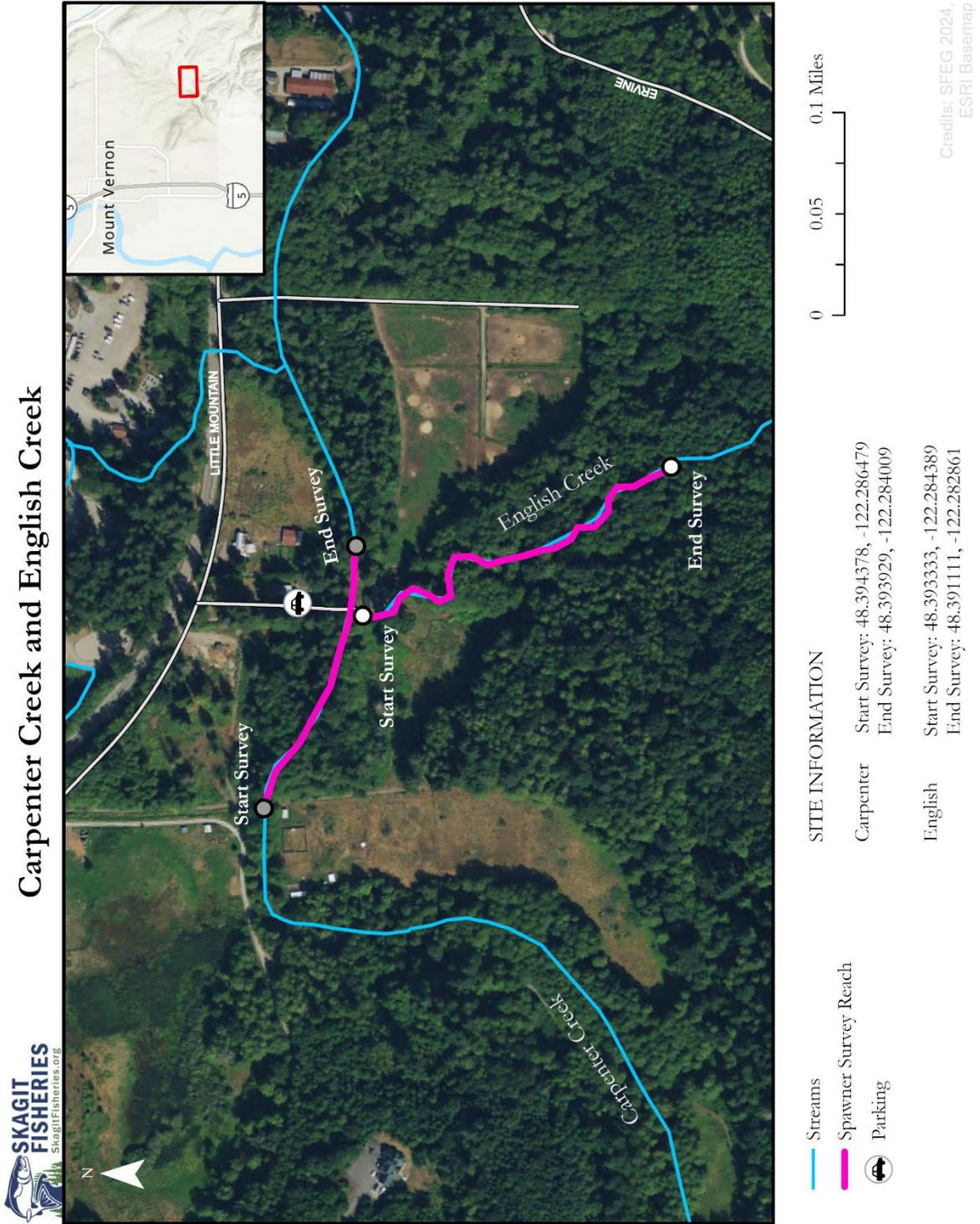
Start Survey: 48.600083, -122.235750
End Survey: 48.599900, -122.228567

Survey Length: 0.3 Miles



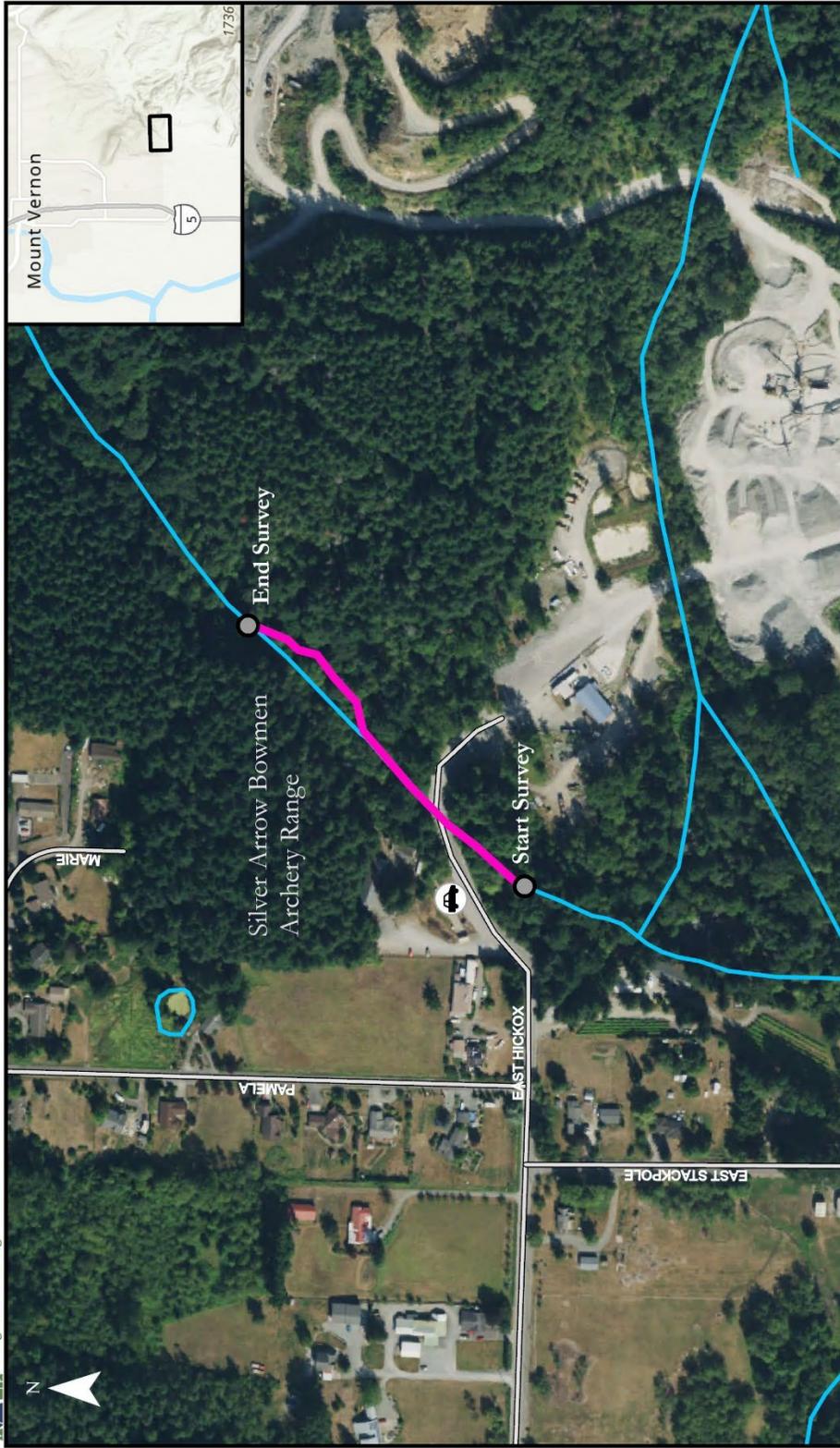
Credits: SFEG 2024,
ESRI Basemap

2.b Skagit Watershed





Carpenter Creek (East Hickox Rd)



- Streams
- Spawner Survey Reach
- Parking

SITE INFORMATION

Start Survey: 48.384603, -122.304327
 End Survey: 48.385531, -122.303338

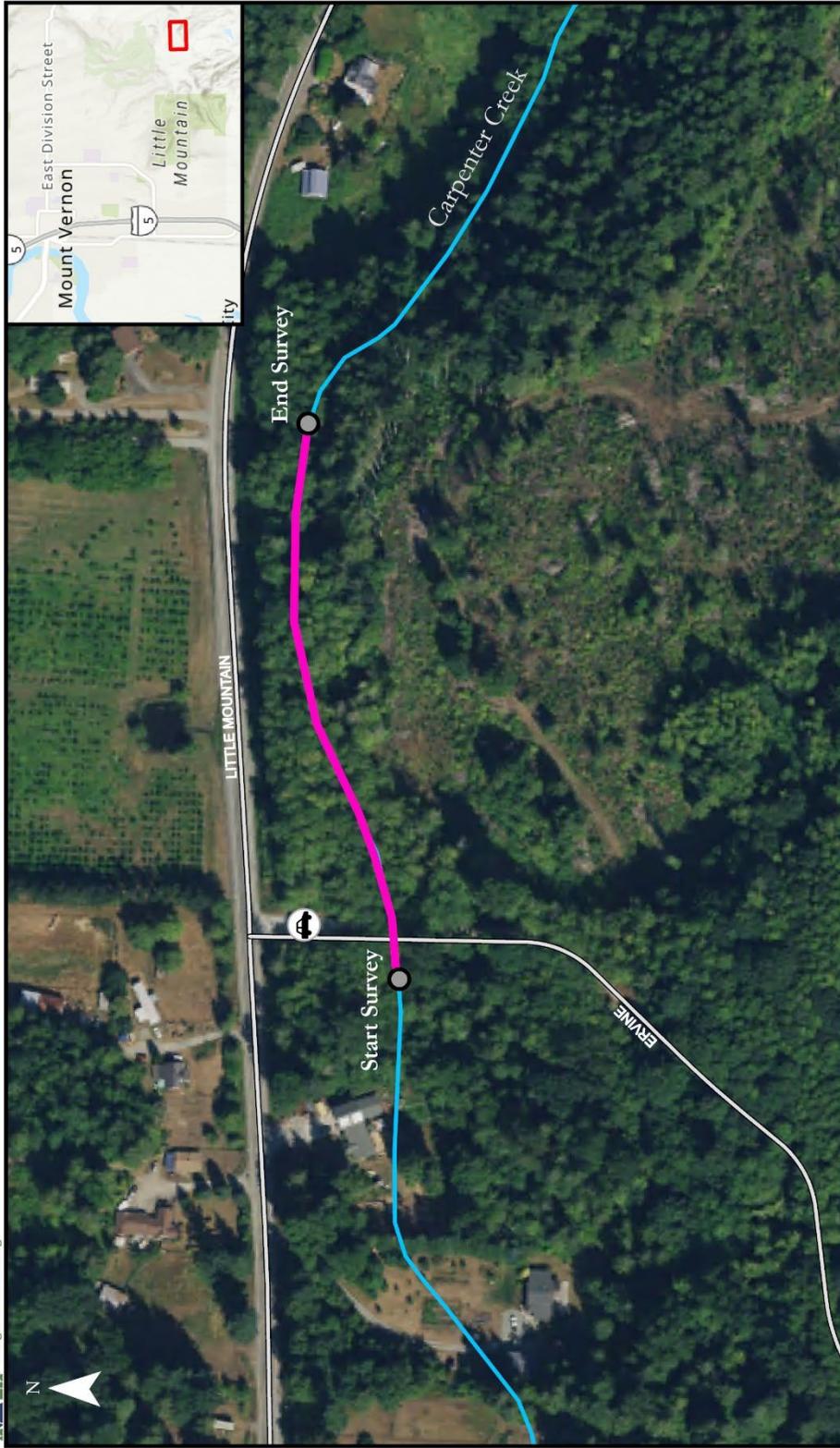
Survey Length: 0.15 Miles



Credits: SFEG 2024,
 ESRI Basemap



Carpenter Creek (Sheffield)



- Streams
- Spawner Survey Reach
- Parking

SITE INFORMATION

Start Survey: 48.394255, -122.275661
End Survey: 48.394715, -122.27324

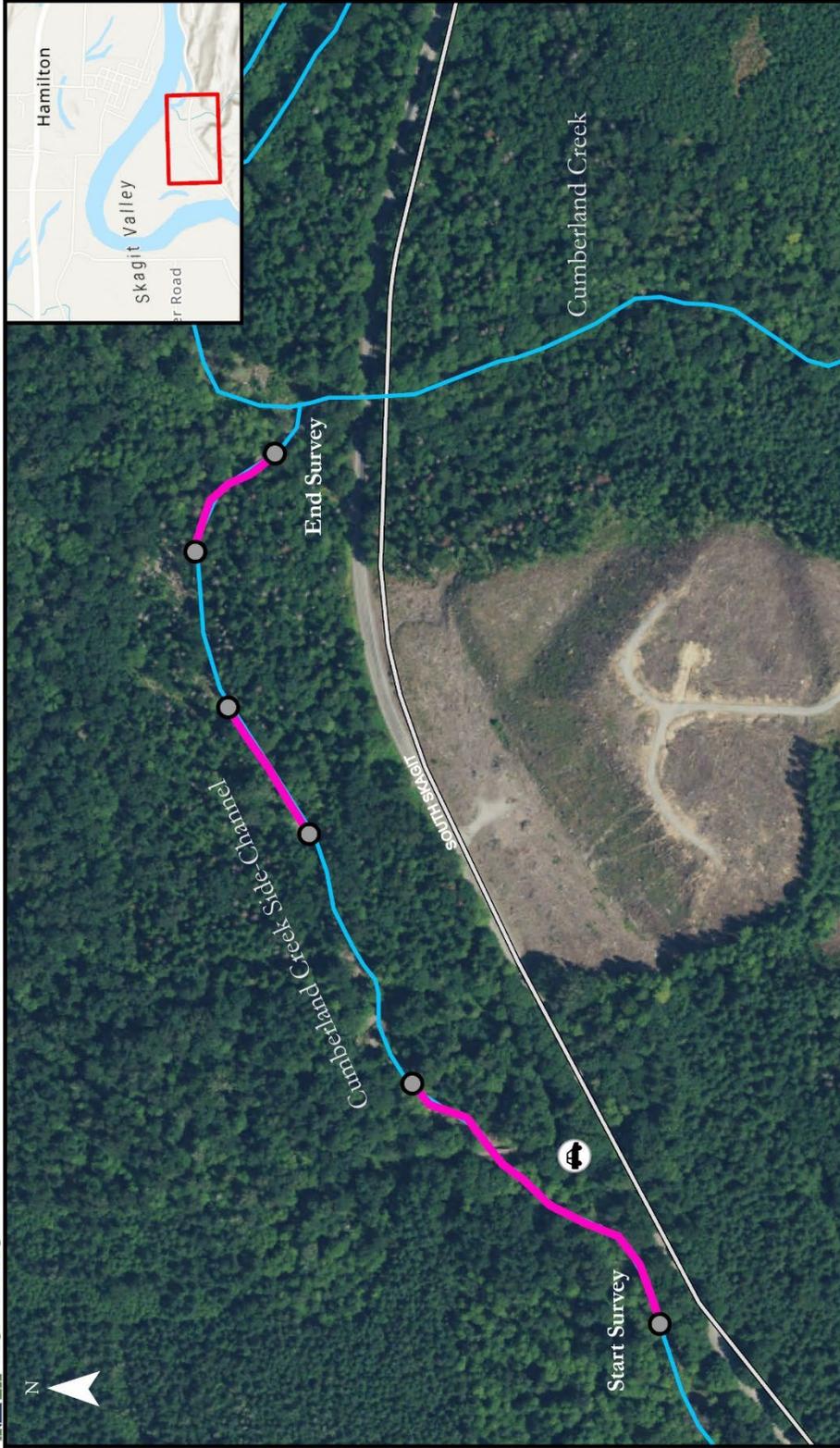
Survey Length: 0.25 Miles



Credits: SFEG 2024,
ESRI Basemap



Cumberland Creek Side Channel



- Streams
- Spawner Survey Reach
- Parking

SITE INFORMATION

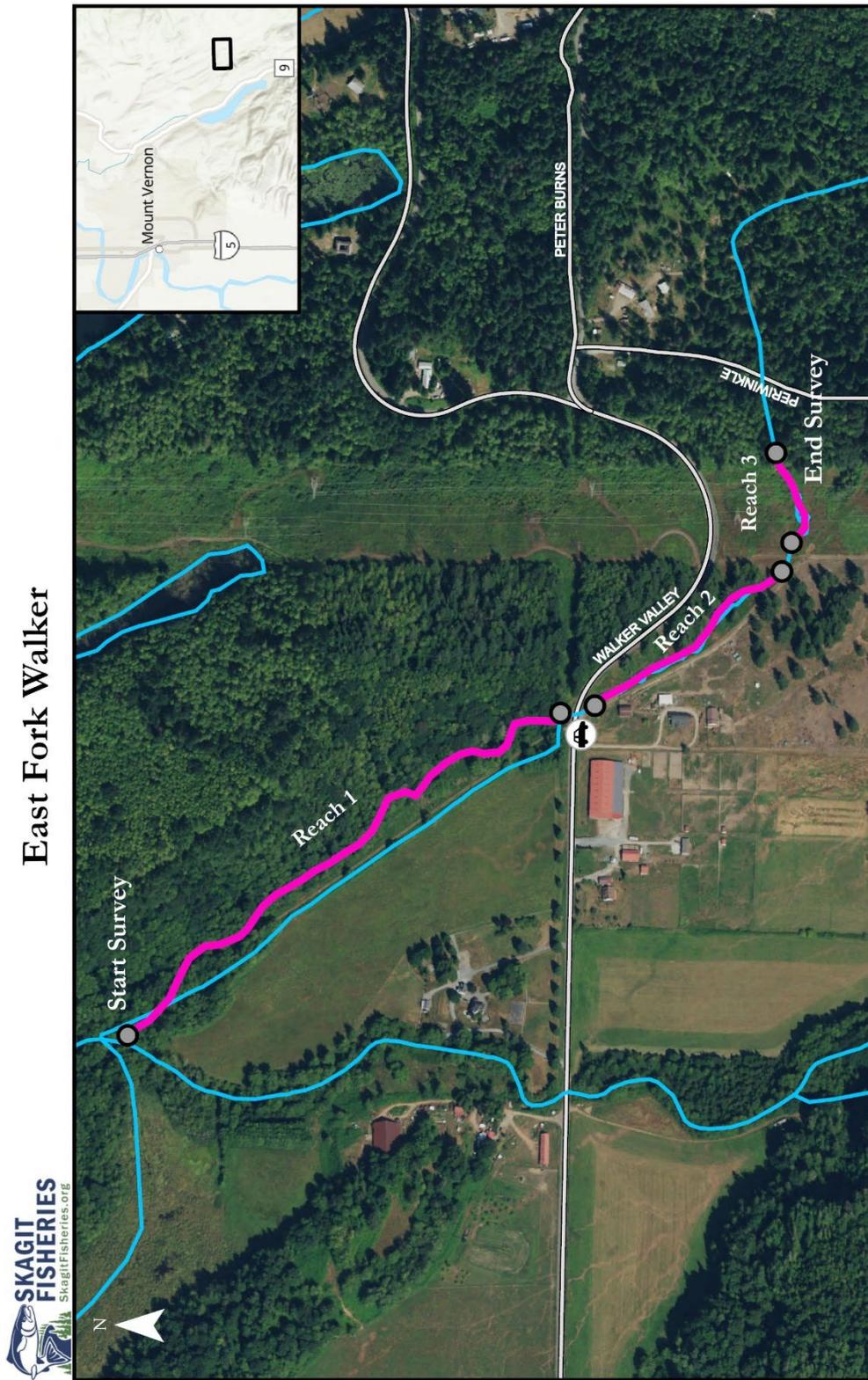
Start Survey: 48.512167, -122.004000
End Survey: 48.514750, -121.996117

*See site description for updated section breakdowns and coordinates. All sections are recorded as one survey.

Survey Length: 0.2 Miles



Credits: SFEG 2024,
ESRI Basemap

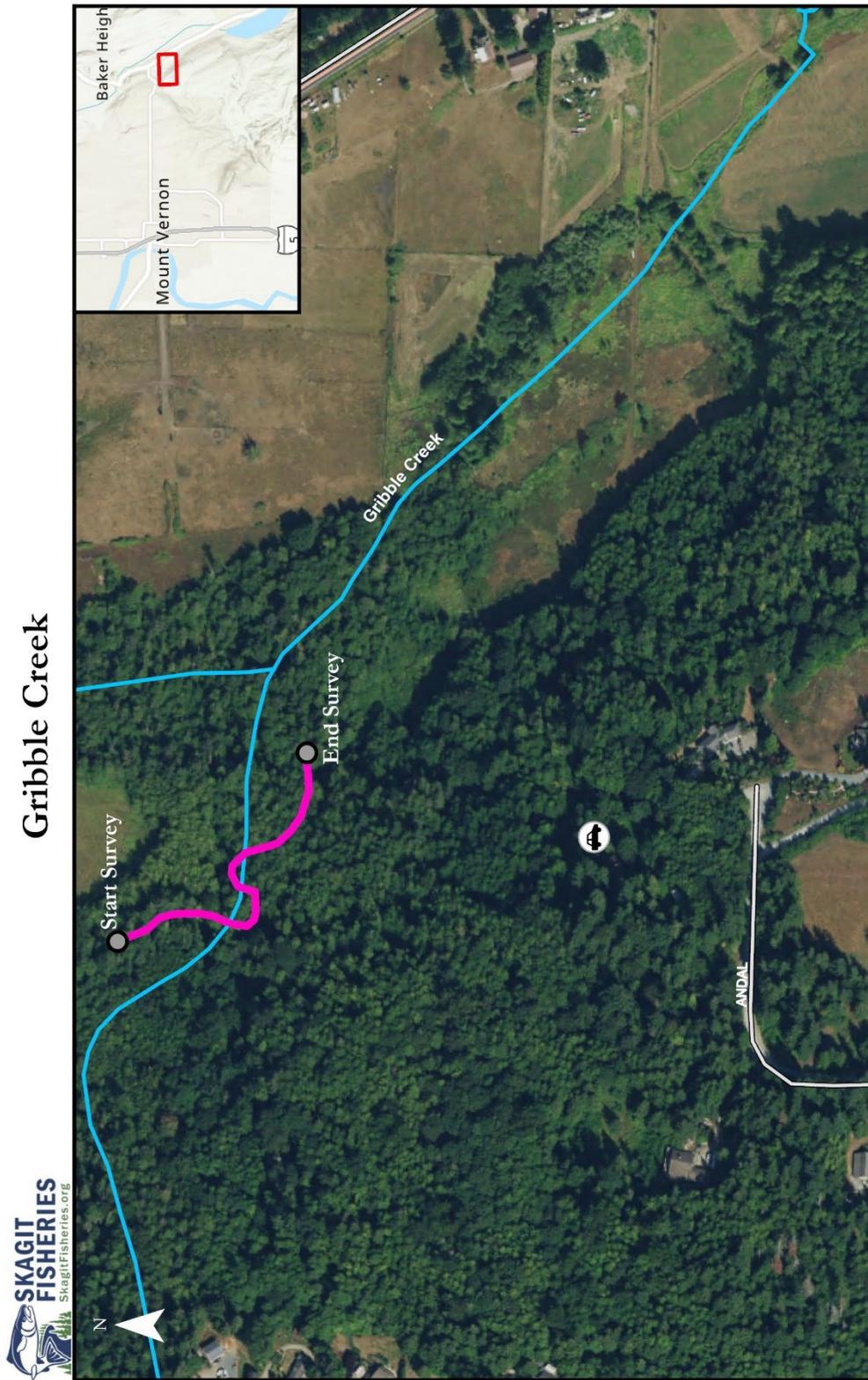


0 0.1 0.2 Miles

SITE INFORMATION

Reach	Start	End
Reach 1	48.389550, -122.198483	48.384867, -122.193517
Reach 2	48.384867, -122.193517	48.382620, -122.190958
Reach 3	48.382614, -122.190890	48.382683, -122.189659

Credits: SFEG 2024,
ESRI Basemap

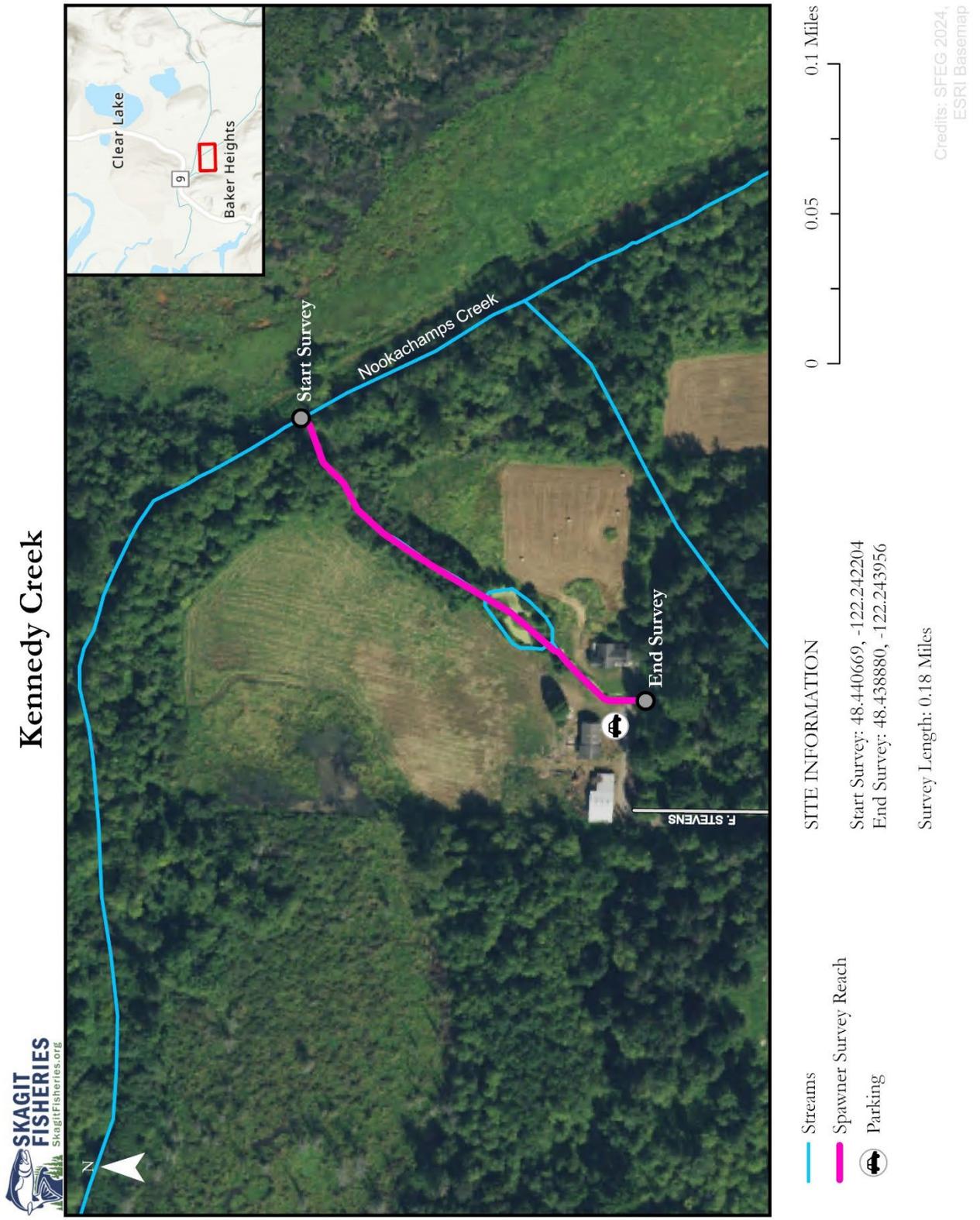


SITE INFORMATION

Start Survey: 48.418284, -122.260915 (approx.)
End Survey: 48.416642, -122.258835 (approx.)

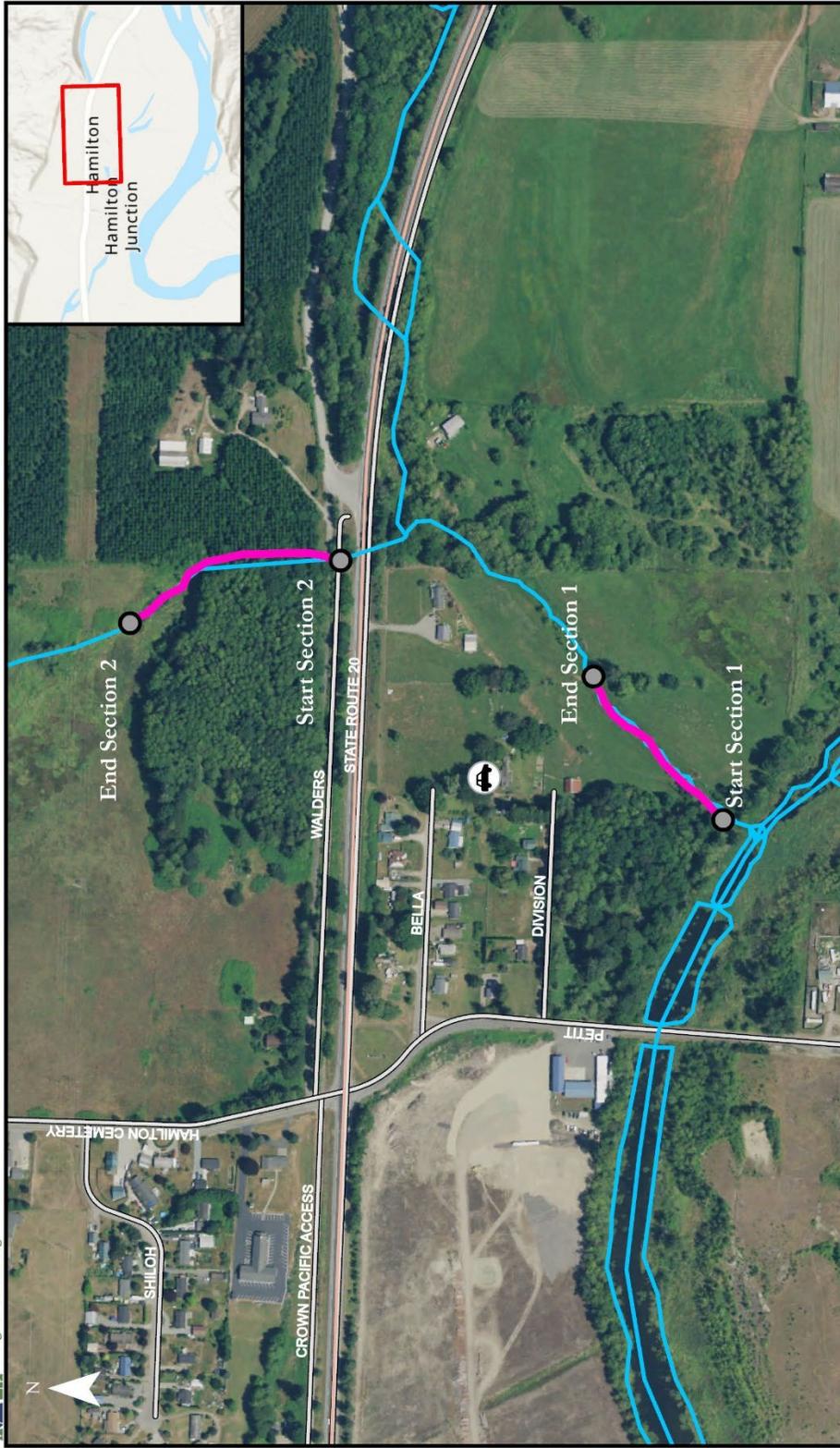
Survey Length: 0.3

Credits: SFEG 2024,
ESRI Basemap





Little Carey's Creek



SITE INFORMATION

- Streams
- Spawner Survey Reach
- Parking

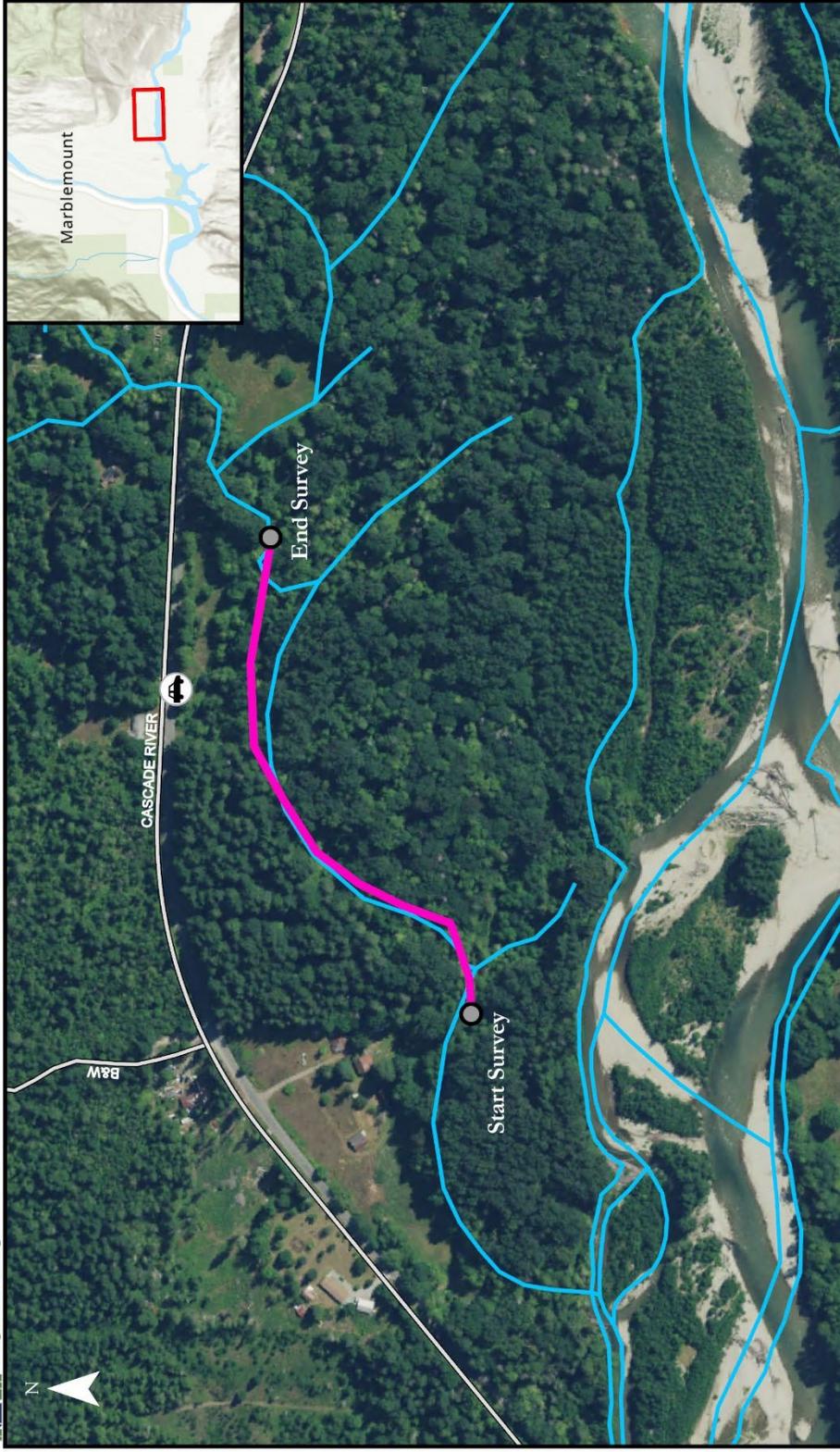
Section 1 Start Survey: 48.526743, -121.987519
 End Survey: 48.527906, -121.985884

Section 2 Start Survey: 48.529812, -121.984405
 End Survey: 48.531057, -121.984634

Credits: SFEG 2024,
 ESRI Basemap



Little Cascade Creek (Lyric)



- Streams
- Spawner Survey Reach
- Parking

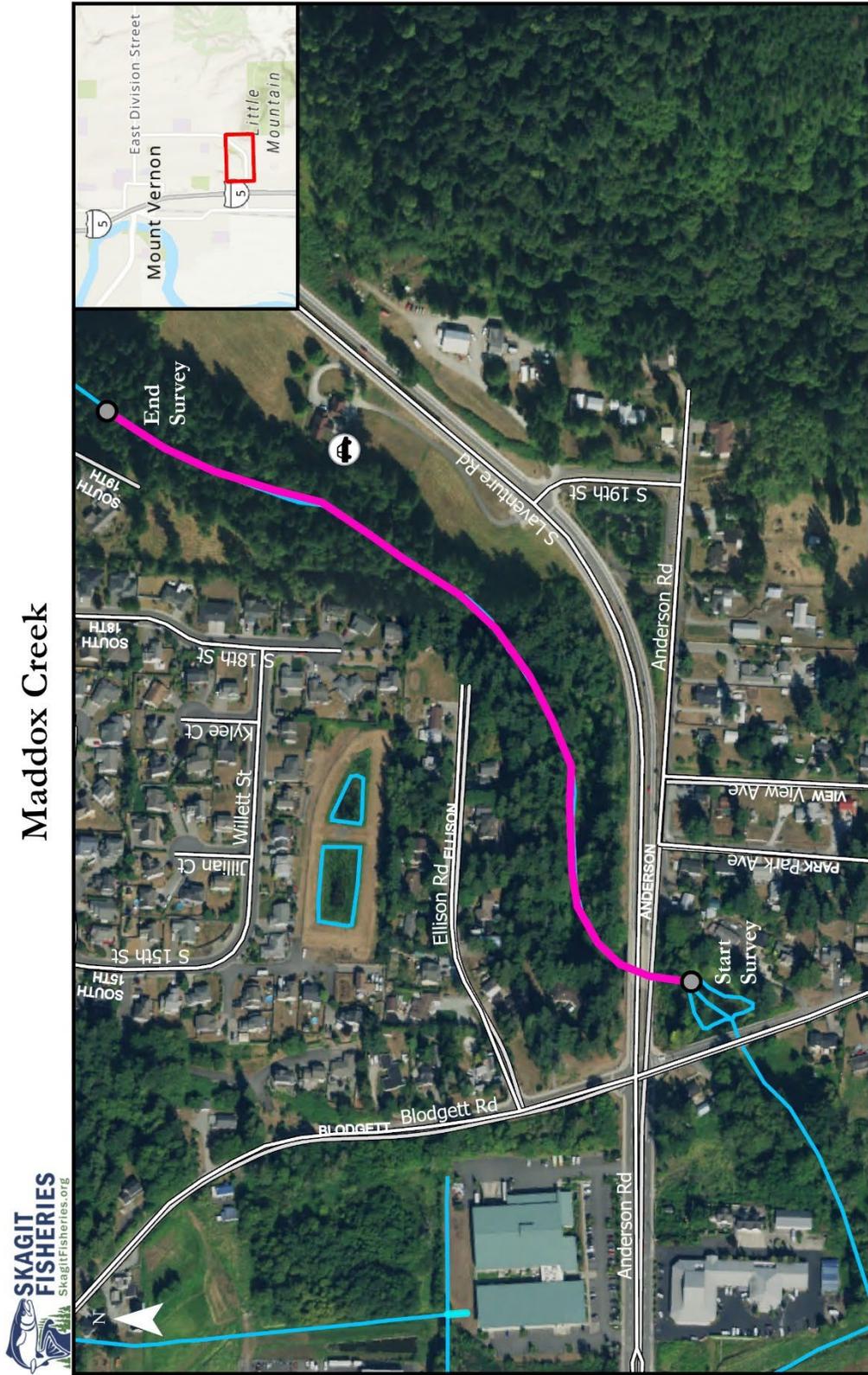
SITE INFORMATION

Start Survey: 48.529081, -121.407580 (approx.)
End Survey: 48.530374, -121.403762 (approx.)

Survey Length: 0.25 Miles



Credits: SFEG 2024,
ESRI Basemap



SITE INFORMATION

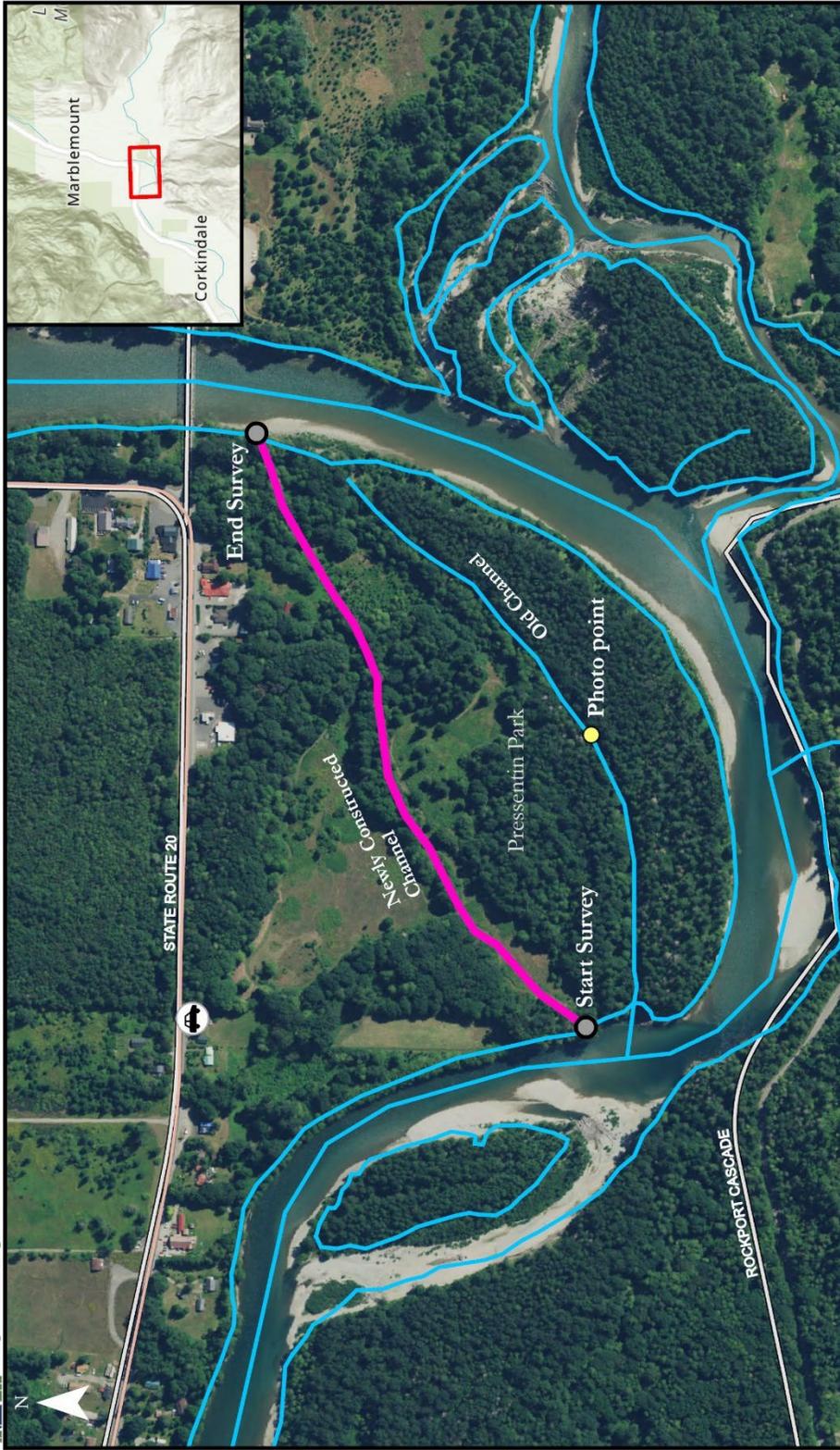
Start Survey: 48.399200, -122.323283
 End Survey: 48.402722, -122.317631

Survey Length: 0.8 Miles

Credits: SFEG 2024,
 ESRI Basemap



Pressentin Side Channel



- Streams
- Spawner Survey Reach
- Parking

SITE INFORMATION

Only Survey New Channel For Salmon

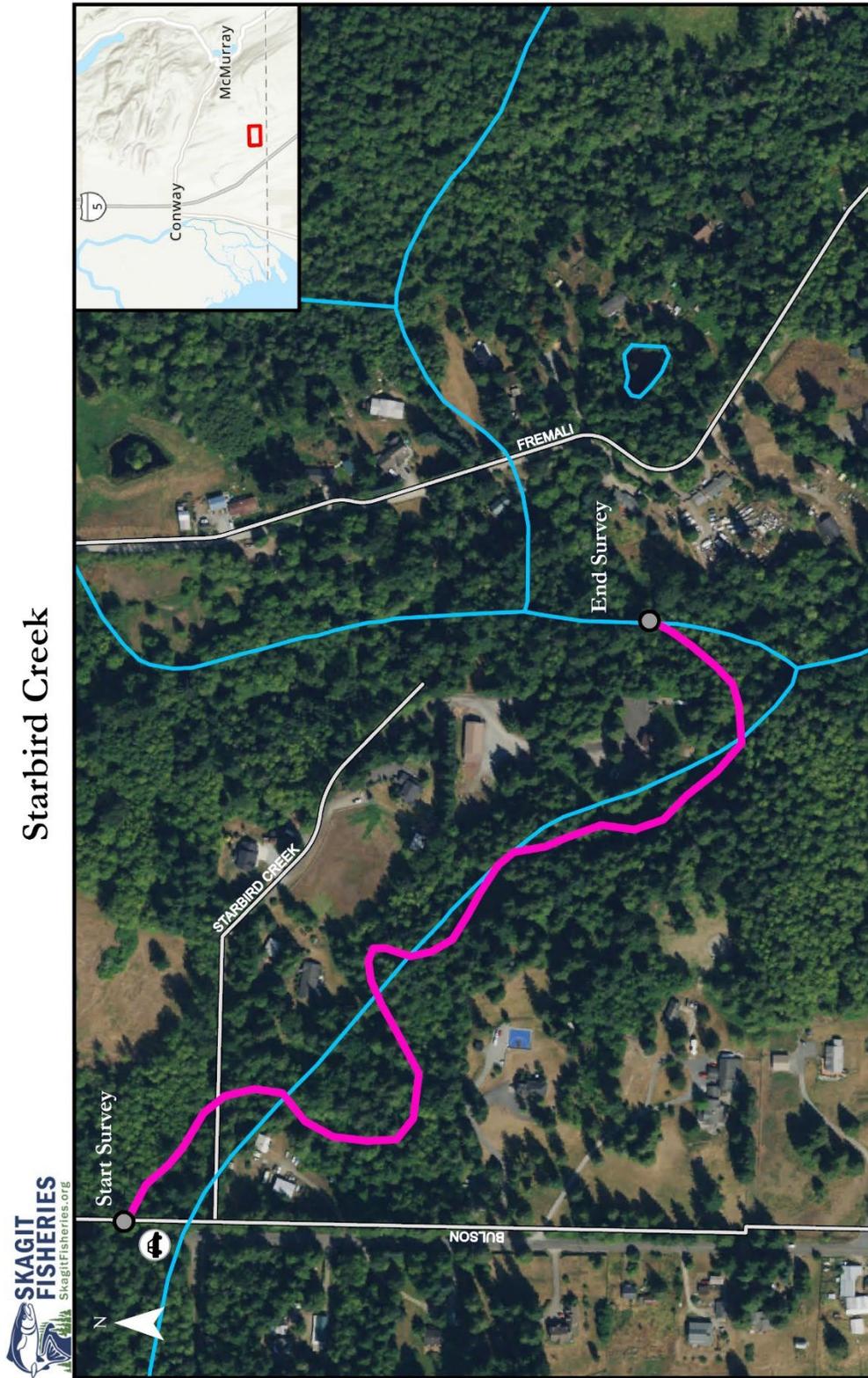
Start Survey: 48.522647, -121.438718

End Survey: 48.525155, -121.430339

Survey Length: 0.5 Miles



Credits: SFEG 2024,
ESRI Basemap



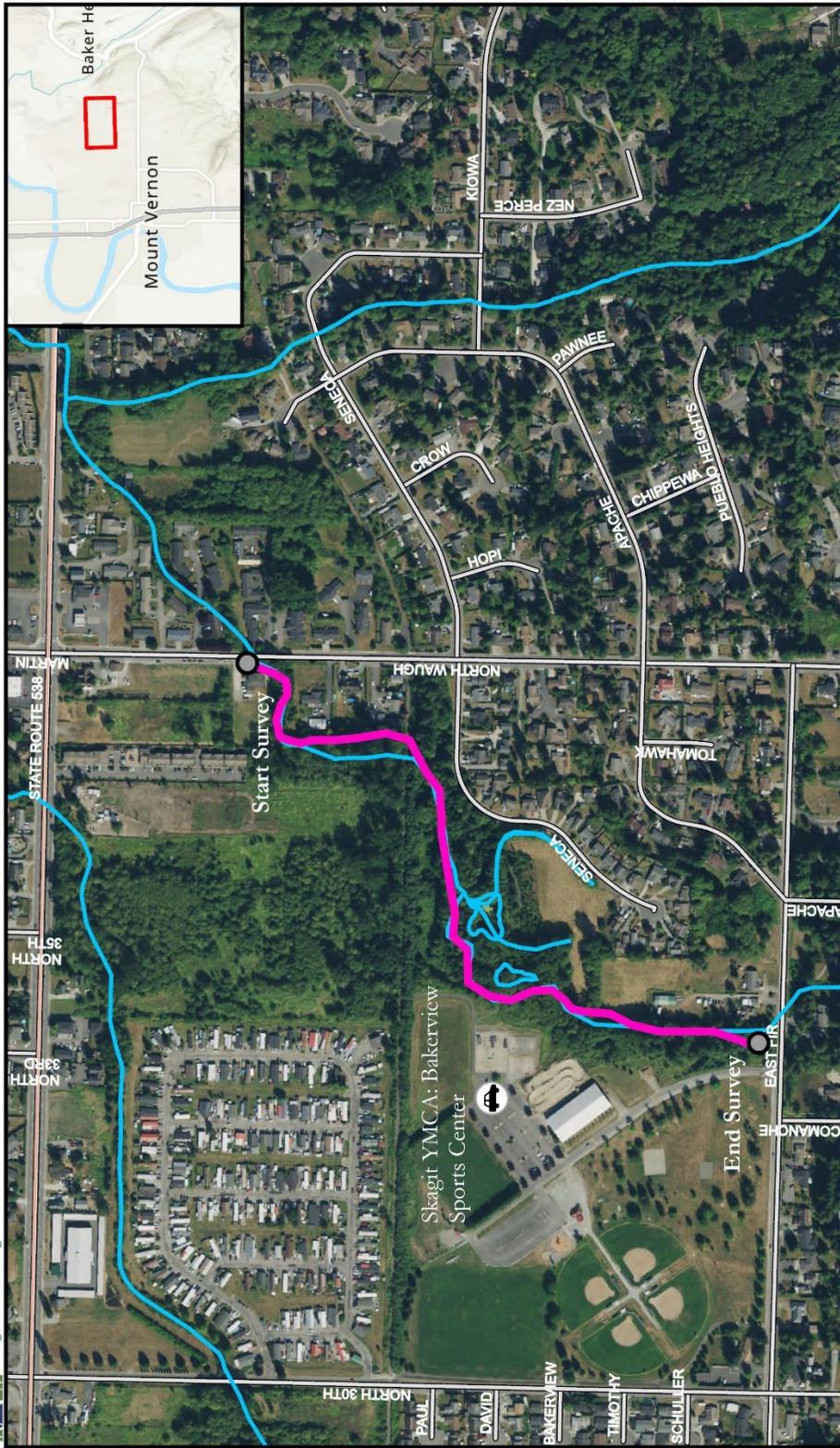
SITE INFORMATION

Start Survey: 48.305401, -122.292037
End Survey: 48.301995, -122.285769

Survey Length: 0.5 Miles



West Fork Trumpeter



- Streams
- Spawner Survey Reach
- Parking

SITE INFORMATION
 Start Survey: 48.433611, -122.291917
 End Survey: 48.428111, -122.297250
 Survey Length: 0.6 Miles



Credits: SFEG 2024,
 ESRI Basemap