Sarita and Pachena Watershed Renewal: 2017
Salmon Brood Stock Collection and Supporting Escapement Assessments

Prepared by LGL Limited

28 August 2018
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EXECUTIVE SUMMARY

The Sarita, Pachena, and Sugsaw watersheds are located on the west coast of Vancouver Island within the traditional territories of the Huu-ay-aht First Nations. Both watersheds have been heavily logged and most (greater than 90%) of the forest is second growth while approximately 2% is old growth. Past forestry practices have resulted in degradation of the fish and aquatic habitat in the watershed and estuary. In recent years, forest practices have greatly improved; however, the legacy of poor forest practices remains.

Based upon the Sarita and Pachena Watershed Renewal Framework, salmon management concerns have been and are being addressed through habitat restoration activities as well as stocking programs. The objectives of this study were to 1) conduct Chinook, Coho, and Chum brood stock collection for the Sarita, Pachena, and Sugsaw watersheds; 2) conduct assessments (snorkel survey, mark and re-sight survey, carcass survey) to support salmon escapement estimates in the Sarita Watershed; and 3) determine the distribution of Chinook Salmon in the South Sarita River and steelhead in Sabrina Creek.

The Chinook Salmon brood stock collection target of 305, as determined by Fisheries and Oceans Canada, was achieved for the Nitinat Hatchery. Brood stock egg collection was conducted for Chum Salmon in Sugsaw Creek and Coho Salmon in the Pachena River for the Huu-ay-aht First Nations hatchery. Snorkel surveys, mark and re-sight surveys, and carcass surveys were completed in the Sarita River. A Chinook Salmon population estimate could not be derived from the mark and re-sight data due to violations of the model assumptions. As such, the 2017 Chinook Salmon escapement estimate should be based upon the Fisheries and Oceans Canada area-under-the-curve escapement methods using the weekly snorkel survey data. Chinook Salmon residence timing in the Sarita River was at least 24 days with most spawning occurring downstream of the South Sarita River confluence. Chinook Salmon carcasses were observed in reach 22, upstream of the confined canyon, of the South Sarita River. Juvenile steelhead were observed upstream of the large woody debris jams above the canyon in Sabrina Creek proving that the log jam did not present a barrier to migration to reach high quality spawning habitat.
ACKNOWLEDGEMENTS

A team of dedicated people were involved in the successful completion of these studies. From Huu-ay-aht First Nation, we are grateful to Christine Gruman, Amelia Vos, and their fisheries staff who provided local information, support, and knowledge on the Sarita, Pachena, and Sugsaw watersheds. From LGL Limited, Elmar Plate and Christopher Burns managed the projects. Field assistance was provided by Stefan Ochman, Shannon Nookemus, Robert Seward, Amber Bowes, Linnea Bowes, Andrea Lucas, Nate DeWolfe, Richard Nookemus, and Cam McCulloch. Connie Kleckner and Joanne Dovey were essential in providing field logistics support. Dawn Keller provided reporting quality assurance and control. Lastly, we thank Bob Bocking for his senior review.

# TABLE OF CONTENTS

EXECUTIVE SUMMARY ................................................................................................................................... i

ACKNOWLEDGEMENTS ................................................................................................................................. ii

LIST OF TABLES ............................................................................................................................................. iv

LIST OF FIGURES ........................................................................................................................................... iv

ABBREVIATIONS ............................................................................................................................................ v

1 Introduction ......................................................................................................................................... 1
  1.1 Background ................................................................................................................................... 1
  1.2 Study Area ..................................................................................................................................... 1
  1.3 Objectives ...................................................................................................................................... 2

2 Methods ............................................................................................................................................... 2
  2.1 Sarita Watershed .......................................................................................................................... 2
    2.1.1 Sarita River Chinook Salmon Brood Stock Collection ........................................................... 2
    2.1.2 Sarita River Salmon Escapement Assessment ...................................................................... 3
    2.1.3 Sarita River Chinook Salmon Mark and Re-Sight Assessment .............................................. 3
    2.1.4 Sarita River Chinook Salmon Carcass Assessment ................................................................ 3
    2.1.5 South Sarita River Chinook Salmon Distribution Assessment............................................... 4
    2.1.6 Sabrina Creek Steelhead Distribution Assessment ................................................................... 4
  2.2 Pachena and Sugsaw Watersheds ................................................................................................ 4
    2.2.1 Chum and Coho Salmon Brood Stock Collection .................................................................. 4

3 Results and Discussion ......................................................................................................................... 4
  3.1 Sarita Watershed .......................................................................................................................... 4
  3.2 Pachena and Sugsaw Watersheds ............................................................................................... 5

REFERENCES .................................................................................................................................................. 6

TABLES ........................................................................................................................................................... 7

FIGURES ....................................................................................................................................................... 11
LIST OF TABLES

Table 1. South Sarita River survey segment locations ................................................................. 8
Table 2. Chinook Salmon tagging data for the Sarita River .......................................................... 8
Table 3. Chinook Salmon tag recaptures from seining in the Sarita River .................................... 8
Table 4. Chinook Salmon mark and re-sight survey conditions in the Sarita River ....................... 8
Table 5. Chinook Salmon tag re-sight data from snorkeling in the Sarita River............................ 9
Table 6. Chinook Salmon snorkel survey conditions in the South Sarita River ............................. 9
Table 7. South Sarita River snorkel survey data ........................................................................... 9
Table 8. Sabrina Creek minnow trapping data ............................................................................ 10

LIST OF FIGURES

Figure 1. Location of the Sarita, Pachena, and Sugsaw watersheds ............................................. 12
Figure 2. Waterbodies of the Sarita, Pachena, and Sugsaw watersheds ..................................... 13
Figure 3. Survey segments and pools within the Sarita River ..................................................... 14
Figure 4. Survey segments within the South Sarita River ............................................................ 15
Figure 5. Minnow trap locations within Sabrina Creek ............................................................... 16
ABBREVIATIONS

The following abbreviations are used in this report:

- **AUC**: area-under-the-curve
- **DFO**: Fisheries and Oceans Canada
- **GPS**: Global Positioning System
- **HFN**: Huu-ay-aht First Nation
- **NA**: not applicable
- **POHL**: postorbital to hypural plate
- **Sp**: species
- **UTM**: Universal Transverse Mercator
1 Introduction

1.1 Background
The Sarita, Pachena, and Sugsaw watersheds are located on the west coast of Vancouver Island within the traditional territories (the Haa-houlthee) of the Huu-ay-aht First Nations (HFN). Until the 1990s, road building and timber harvesting throughout much of the watersheds had been carried out on steep unstable slopes and up to the edge of watercourses. Roads were often poorly built and stream crossings poorly designed. This has resulted in numerous landslides, the mobilization of sediments to watercourses, increased peak and annual flows, changes in stream channel morphology, loss of fish habitat, fish passage restrictions, and the degradation of the Sarita River estuary. In recent years, forest practices have greatly improved; however, the legacy of poor forest practices remains (LGL 2017).

In 2017, HFN and LGL Limited developed a framework for renewal of the Sarita and Pachena watersheds (LGL 2017). The purpose of the Renewal Framework is to provide direction that will ultimately lead to the development of a comprehensive Renewal Plan. The Renewal Plan will incorporate a two-pronged strategy that prioritizes both long term objectives (10 years or greater) intended to restore ecosystem processes, and short-term objectives required for the management and conservation of high value species or the protection and enhancement of important fish and wildlife habitat. Monitoring and adaptive management will form part of the Renewal Plan which will be a living document for many decades.

This Renewal Framework identifies several assessments and inventories that can be conducted while the Renewal Plan is being prepared to address known information gaps relating to the condition of the Sarita and Pachena watersheds, the condition of fish and wildlife habitats, and the status of fish, wildlife, and species at risk in the watersheds (LGL 2017). The purpose of these assessments and inventories will be to specify where and what kinds of renewal actions are required to achieve short and long-term renewal goals, such as restoring watershed processes, fish habitat and productivity, estuary productivity, wildlife habitat and populations, and species at risk.

Within the Sarita River, the most abundant salmon species in recent years have been Chum Salmon (*Oncorhynchus keta*). However, historical information suggests that Chinook Salmon (*O. tshawytscha*) abundance used to be significantly higher than recent years (Barry 2010). The Chinook Salmon management concerns have been and are being addressed through habitat restoration activities as well as stocking programs. The Fisheries and Oceans Canada (DFO) Nitinat River Hatchery has been releasing juvenile Chinook Salmon into the Sarita River since 1985.

Impacts to fish and fish habitat in the Pachena and Sugsaw watersheds are likely similar to that of the Sarita Watershed given former forestry practices and an extensive road network in the Pachena Watershed. Within the Pachena River and Sugsaw Creek, the most abundant salmon species are Coho Salmon (*O. kisutch*) and Chum Salmon, respectively. Increasing abundance of these salmon populations has been and is being addressed through habitat restoration activities as well as stocking programs. The HFN Hatchery at mouth of Sugsaw Creek has been releasing juvenile Chum and Coho salmon into Sugsaw Creek and Pachena River for several years.

1.2 Study Area
The study area for these assessments included the Sarita, Pachena, and Sugsaw watersheds, which are located on the west coast of Vancouver Island adjacent to Barkley Sound (Figure 1).

The Sarita Watershed is 19,247 ha in area. The main watercourses of the Sarita Watershed include the Sarita River, South Sarita River, Sabrina Creek, and Frederick Creek. Smaller tributaries of the Upper Sarita
include: Central, Hunter, Thompson, and Miller creeks (Figure 2). Sarita Lake (147 ha) is located at the mid-point of the watershed. Fish passage is blocked by falls approximately 1 km downstream of Sarita Lake. Downstream of Sarita Lake, the width of the Sarita River varies between 15 and 30 meters until it reaches the estuary at Numukamus Bay in Trevor Channel. The South Sarita River discharges into the Sarita River half way between the estuary and Sarita Lake. Other lakes within the watershed include Frederick Lake (41 ha) and Bewlay Lake (11 ha).

The Pachena Watershed is 4,887 ha in area. The main watercourses of the Pachena Watershed include the Pachena River and Rosseau Creek. Lakes within the watershed include Pachena Lake (55 ha), Rosseau Lake (19 ha), and Calamity Lake (17 ha) (Figure 2).

The Sugsaw Watershed is 804 ha in area. Sugsaw Creek is the main watercourse in the watershed, which flows from Sugsaw Lake (52 ha) and discharges into Grappler Inlet (Figure 2).

1.3 Objectives
The objectives for these assessments were as follows:

**Sarita Watershed**

- Collect Chinook Salmon brood stock for the DFO Nitinat River Hatchery and assess population demographics;
- Assist with snorkel surveys led by HFN in the Sarita River to assess salmon escapement;
- Conduct mark- and re-sight snorkel surveys in the Sarita River to provide an abundance estimate independent of estimates derived by snorkel counts;
- Conduct salmon carcass surveys in the Sarita River to determine Chinook Salmon residence timing and assess population demographics;
- Confirm and determine the presence of Chinook Salmon in the South Sarita River; and
- Determine the presence of juvenile steelhead (*O. mykiss*) in Sabrina Creek.

**Pachena and Sugsaw watersheds**

- Collect Chum Salmon brood stock from Sugsaw Creek for the HFN Hatchery; and
- Collect Coho Salmon brood stock from the Pachena River for the HFN Hatchery.

2 Methods

2.1 Sarita Watershed

2.1.1 Sarita River Chinook Salmon Brood Stock Collection

Chinook Salmon brood stock collection was conducted once a week starting on September 13 and terminating on October 5. Brood stock collection was led by DFO fisheries staff and support was provided by LGL Limited and HFN fisheries staff. Brood stock collection was conducted at two locations: Hunter Creek Pool (UTM: 10V 355295 5417236) and Mine Pool (UTM: 10U 354083 5416955). These pools were selected because they had adequate numbers of Chinook Salmon holding in each pool.

Salmon were captured using a seine net and a flat bottom aluminum Jon boat. All captured fish species were enumerated. Near ripe Chinook Salmon were collected and transported to the DFO Nitinat River Hatchery. All other Chinook Salmon were sexed, Floy-tagged and tissue samples in the form of a fin punch were taken for genetic analysis before fish were released back to the river. Floy tag color (orange, pink,
blue, green) applied varied by survey week. In addition, genetic samples were taken from all Coho Salmon captured.

2.1.2 Sarita River Salmon Escapement Assessment
Snorkel surveys were conducted by HFN under contract to DFO according to the WCVI Snorkel Survey Protocols for Salmon Enumeration in West Coast Vancouver Island Streams (DFO 2015) to determine salmon escapement in the Sarita River (segments 0-12; Figure 3). Weekly snorkel surveys commenced on September 21 and were led by the HFN fisheries staff. Snorkel survey support was provided by LGL Limited staff on September 21 and 28.

2.1.3 Sarita River Chinook Salmon Mark and Re-Sight Assessment
Chinook Salmon mark-and-re-sight surveys were conducted on October 6 prior to the peak spawning period (Burns et al. 2018) and after adult tagging had terminated. The surveys were conducted at two locations: Hunter Creek pool (UTM: 10V 355295 5417236) and Stump Pool (UTM: 10U 354198 5417171). These pools were selected because they had adequate numbers of Chinook Salmon (i.e., > 200 adults) holding in each pool.

During the survey the following environmental parameters were recorded, which was based upon parameters identified in the WCVI Snorkel Survey Protocols for Salmon Enumeration in West Coast Vancouver Island Streams (DFO 2015):
- Date and time;
- Pool surveyed;
- Water clarity conditions (clear, tea, muddy, slightly turbid);
- Water level (extremely low, below normal, normal, above normal, flood);
- Cloud cover (clear – 0%, scattered – 25%, partly cloudy – 50%, cloudy – 75%, overcast – 100%);
- Light level (full, bright, medium, dark);
- Precipitation (none, rain, snow, light, medium, heavy); and
- Fish visibility (low, medium, high).

At each pool, one observer was placed at the downstream end of the pool to enumerate any Chinook Salmon that moved downstream during the survey. Two snorkelers swam downstream through the pool and counted all Chinook Salmon (regardless of Floy tag presence). The pool was then left to rest for 10 minutes for fish to resettle. Both snorkelers swam downstream through the pool again and only counted Floy tagged (by tag colour) Chinook Salmon.

2.1.4 Sarita River Chinook Salmon Carcass Assessment
Chinook Salmon carcass surveys were conducted on October 26 and 31 after the peak spawning period. On October 31, river segments 1.5 (Hunter Creek Pool) to 5.5 (Blenheim Bridge), including reach 20 of the South Sarita River were surveyed. On October 31, river segments 5.5 to 12 (falls) were surveyed. Carcass surveys were led by DFO fisheries staff and support was provided by LGL Limited staff. Surveys were conducted using a combination of flat bottomed Jon boat and on-foot. Surveys were generally conducted according to the Salmonid Field Protocols Handbook: Techniques for Assessing Status and Trends in Salmon and Trout Populations – Carcass Counts (Crawford et al. 2007). For each Chinook Salmon carcass, the following information was collected: sex, postorbital to hypural plate (POHL) length, scale samples, genetic tissue sample, Floy tag presence or absence, and Floy tag color.
2.1.5 South Sarita River Chinook Salmon Distribution Assessment
Snorkel and carcass surveys were conducted on October 26 and November 1 to confirm and determine the presence of Chinook Salmon in the South Sarita River. The selected survey dates were past the peak Chinook Salmon spawning period in the Sarita River mainstem (Burns et al. 2018). Due to access constraints, two sites were selected for the surveys, a lower site in reach 20 near the Bamfield Road and an upper site in reach 22 upstream of the confined canyon (Figure 4; Table 1). The lower survey site was 1,300 m in length. The upper survey site was 800 m in length.

Surveys were conducted according to the WCVI Snorkel Survey Protocols for Salmon Enumeration in West Coast Vancouver Island Streams (DFO 2015).

2.1.6 Sabrina Creek Steelhead Distribution Assessment
A large log jam had formed in the Sabrina Creek canyon approximately 1 km upstream from the confluence with the Sarita River in 2013 and 2014. Minnow traps were set on August 1 in Sabrina Creek to confirm the presence of juvenile steelhead upstream of the log jam that was perceived to block upstream adult migration. Galvanized steel wire minnow traps with a mesh size of 6 mm, length of 41 cm, and a height of 23 cm were baited with salted salmon eggs (roe). Minnow traps were set in preferred juvenile salmonid rearing locations, such as pools and areas with overhead cover. All minnow traps were soaked over night and their locations were geo-referenced with a handheld GPS unit.

2.2 Pachena and Sugsaw Watersheds

2.2.1 Chum and Coho Salmon Brood Stock Collection
Chum Salmon brood stock egg collection was conducted between October 23 and November 10 in Sugsaw Creek for the HFN hatchery. Coho Salmon brood stock egg collection was conducted in early to mid-November in the Pachena River for the HFN hatchery. Brood stock collections were led by HFN fisheries staff and support was provided by LGL Limited staff.

3 Results and Discussion

3.1 Sarita Watershed
The Chinook Salmon brood stock collection target, as determined by DFO, was achieved in 2017. A total of 305 Chinook Salmon were retained for brood stock. A total of 420 Chinook Salmon were captured and tagged, in addition to those taken for brood stock, over a 4-week period between September 13 and October 5 (Table 2). The sex ratio was 1.68 adult males to 1 female. A total of 82 Chinook Salmon were recaptured during the seining period (Table 3). All the recaptures occurred on September 27 in Hunter Creek pool and mostly tags applied on September 13 were recovered (i.e., orange tags observed 15 days after marking).

Survey conditions were optimal during the Chinook Salmon mark and re-sight survey. Water discharge was low with high visibility to enumerate salmon to species level (Table 4). Approximately 12% of the Chinook Salmon had tags in Hunter Creek pool, while 9% of the Chinook Salmon had tags in stump pool. The proportion (i.e., number) of tags by color are shown in Table 5. Despite optimal survey conditions it was difficult to identify the color of 15 tags due to the swarming behaviour of salmon in the pools. A Chinook Salmon population estimate could not be derived from the mark and re-sight data due to violations of the following model assumptions 1) incomplete stock mixing between mark and re-sight locations; and 2) stock emigration between the mark and re-sight locations. As such, the 2017 Chinook
Salmon escapement estimate should be calculated based upon the DFO area-under-the-curve (AUC) escapement methods using weekly snorkel survey data.

Weekly salmon escapement snorkel surveys commenced on September 21 and were led by the HFN fisheries staff. The survey data was compiled and submitted to DFO for AUC escapement estimate calculation.

Chinook Salmon carcass surveys were conducted on October 26 and 31 after the peak spawning period. High discharge immediately after peak spawning prevented safe and effective carcass surveys until the first carcass survey date. No tagged Chinook Salmon carcasses were sampled to determine residence timing; however, residence timing was at least 24 days based upon tags observed during the mark and re-sight survey. The survey data was provided to DFO for management purposes.

Survey conditions were optimal during the South Sarita River Chinook Salmon distribution surveys. Water discharge was above average but with high visibility to enumerate salmon to species level (Table 6). Chinook Salmon were observed in the lower segment on October 26 (Table 7). On November 1, Chinook Salmon carcasses were also observed in the upper segment in reach 22 upstream of the confined canyon (Table 7; Figure 4).

A total of eight juvenile steelhead ranging in length from 80-140 mm were caught upstream of the large log jam in Sabrina Creek (Table 8; Figure 5). Since juvenile steelhead do not have the ability to migrate upstream through fast riffles, cascades, or falls, this range in fork lengths is likely an indication of two age classes of steelhead that spawned in 2015 and in 2016 after the log jam formed in 2013 and 2014. Juvenile salmonid fry (< 30 mm fork length) were also visibly observed swimming at the time of survey, and if these fish were steelhead fry then three age classes were present upstream of the log jam. Therefore, the juveniles located upstream of the log jam are likely offspring of adult steelhead spawners that migrated past the logjam from 2014 to 2016, and therefore the log jam does not have to be removed.

3.2 Pachena and Sugsaw Watersheds

Chum Salmon brood stock egg collection was conducted in Sugsaw Creek for the HFN hatchery. Coho Salmon brood stock egg collection was conducted in the Pachena River for the HFN hatchery. Both brood stock egg collections were led by HFN Fisheries staff and fish were spawned in the field then fertilized in the HFN Sugsaw Hatchery.
REFERENCES

Barry, K. 2010. Habitat status report for the Sarita River watershed, Vancouver Island, BC. Prepared for Department of Fisheries and Oceans Canada, Nanaimo, BC.


DFO (Fisheries and Oceans Canada). 2015. WCVI snorkel survey protocols for salmon enumeration in west coast Vancouver Island streams. Nanaimo, BC.

Table 1. South Sarita River survey segment locations.

<table>
<thead>
<tr>
<th>Segment</th>
<th>Start Location</th>
<th>End Location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Chinook Salmon tagging data for the Sarita River.

<table>
<thead>
<tr>
<th>Tagging Date</th>
<th>Tag Color</th>
<th>Tag Location</th>
<th>No. Tagged</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Male - Adult</td>
</tr>
<tr>
<td>13-Sep-17</td>
<td>Orange</td>
<td>Hunter Creek Pool</td>
<td>102</td>
</tr>
<tr>
<td>19-Sep-17</td>
<td>Pink</td>
<td>Mine Pool</td>
<td>46</td>
</tr>
<tr>
<td>27-Sep-17</td>
<td>Blue</td>
<td>Hunter Creek Pool</td>
<td>35</td>
</tr>
<tr>
<td>05-Oct-17</td>
<td>Green</td>
<td>Mine Pool</td>
<td>41</td>
</tr>
</tbody>
</table>

Table 3. Chinook Salmon tag recaptures from seining in the Sarita River.

<table>
<thead>
<tr>
<th>Sampling Date</th>
<th>Recapture Tag Color</th>
<th>Recapture Location</th>
<th>No. Tagged Recaptures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Male - Adult</td>
</tr>
<tr>
<td>27-Sep-17</td>
<td>Orange</td>
<td>Hunter Creek Pool</td>
<td>32</td>
</tr>
<tr>
<td>27-Sep-17</td>
<td>Pink</td>
<td>Hunter Creek Pool</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 4. Chinook Salmon mark and re-sight survey conditions in the Sarita River.

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Water Condition</th>
<th>Water Level</th>
<th>Cloud Cover</th>
<th>Light Level</th>
<th>Precipitation</th>
<th>Fish Visibility</th>
<th>Water Temperature (°C)</th>
<th>Water Discharge (m³/s)</th>
<th>Water Level (m)</th>
</tr>
</thead>
</table>
Table 5. Chinook Salmon tag re-sight data from snorkeling in the Sarita River.

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Chinook Count (No.)</th>
<th>Floy Tag Color (No.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Adult</td>
<td>Jack</td>
</tr>
<tr>
<td>06-Oct-17</td>
<td>Hunter Creek Pool</td>
<td>340</td>
<td>50</td>
</tr>
<tr>
<td>06-Oct-17</td>
<td>Stump Pool</td>
<td>200</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 6. Chinook Salmon snorkel survey conditions in the South Sarita River.

<table>
<thead>
<tr>
<th>Date</th>
<th>Segment</th>
<th>Water Condition</th>
<th>Water Level</th>
<th>Cloud Cover</th>
<th>Light Level</th>
<th>Precipitation</th>
<th>Fish Visibility</th>
<th>Water Temperature (°C)</th>
<th>Horizontal Visibility (m)</th>
<th>Vertical Visibility (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>26-Oct-17</td>
<td>Lower</td>
<td>Clear</td>
<td>Above Normal</td>
<td>Clear</td>
<td>Bright</td>
<td>None</td>
<td>High</td>
<td>9</td>
<td>4.5</td>
<td>2.5</td>
</tr>
<tr>
<td>30-Oct-17</td>
<td>Upper</td>
<td>Clear</td>
<td>Above Normal</td>
<td>Clear</td>
<td>Bright</td>
<td>None</td>
<td>High</td>
<td>9</td>
<td>4.5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Table 7. South Sarita River snorkel survey data.

<table>
<thead>
<tr>
<th>Date</th>
<th>Segment</th>
<th>% Habitat</th>
<th>Live/Dead</th>
<th>Coho Salmon (No.)</th>
<th>Chum Salmon (No.)</th>
<th>Chinook Salmon (No.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Seen</td>
<td></td>
<td>Adult</td>
<td>Jack</td>
<td>Adult</td>
</tr>
<tr>
<td>26-Oct-17</td>
<td>Lower</td>
<td>95</td>
<td>Live</td>
<td>1</td>
<td>1</td>
<td>162</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>% Sp</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dead</td>
<td>0</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>01-Nov-17</td>
<td>Upper</td>
<td>95</td>
<td>Live</td>
<td>35</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>% Sp</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dead</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
Table 8. Sabrina Creek minnow trapping data.

<table>
<thead>
<tr>
<th>Trap No.</th>
<th>Date In:Time In</th>
<th>Date Out:Time Out</th>
<th>Location (UTM Zone 10)</th>
<th>Species</th>
<th>Fork Length (mm)</th>
<th>Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>01-Aug-17:1431</td>
<td>02-Aug-17:1026</td>
<td>355880 5412054</td>
<td>No fish</td>
<td>NA</td>
<td>0.3 m depth by log</td>
</tr>
<tr>
<td>2</td>
<td>01-Aug-17:1435</td>
<td>02-Aug-17:1030</td>
<td>355866 5412047</td>
<td>Steelhead</td>
<td>120</td>
<td>1 m depth in pool</td>
</tr>
<tr>
<td>3</td>
<td>01-Aug-17:1438</td>
<td>02-Aug-17:1045</td>
<td>355855 5412037</td>
<td>Steelhead</td>
<td>95</td>
<td>1 m depth by log jam</td>
</tr>
<tr>
<td>4</td>
<td>01-Aug-17:1447</td>
<td>02-Aug-17:1055</td>
<td>355791 5412004</td>
<td>Steelhead</td>
<td>100</td>
<td>0.5 m depth in pool</td>
</tr>
<tr>
<td>5</td>
<td>01-Aug-17:1452</td>
<td>02-Aug-17:1105</td>
<td>355740 5411990</td>
<td>Steelhead</td>
<td>100</td>
<td>0.7 m depth under log</td>
</tr>
<tr>
<td>6</td>
<td>01-Aug-17:1505</td>
<td>02-Aug-17:1115</td>
<td>355730 5411922</td>
<td>No fish</td>
<td>NA</td>
<td>0.7 m depth under log</td>
</tr>
<tr>
<td>7</td>
<td>01-Aug-17:1515</td>
<td>02-Aug-17:0959</td>
<td>355895 5412123</td>
<td>No fish</td>
<td>NA</td>
<td>0.5 m depth in riffle</td>
</tr>
<tr>
<td>8</td>
<td>01-Aug-17:1536</td>
<td>02-Aug-17:1215</td>
<td>354541 5410817</td>
<td>No fish</td>
<td>NA</td>
<td>1.3 m depth in pool</td>
</tr>
<tr>
<td>9</td>
<td>01-Aug-17:1538</td>
<td>02-Aug-17:1225</td>
<td>354559 5410841</td>
<td>No fish</td>
<td>NA</td>
<td>0.3 m depth under bridge</td>
</tr>
<tr>
<td>10</td>
<td>01-Aug-17:1540</td>
<td>02-Aug-17:1230</td>
<td>354559 5410841</td>
<td>No fish</td>
<td>NA</td>
<td>0.3 m depth under bridge</td>
</tr>
</tbody>
</table>
Figure 1. Location of the Sarita, Pachena, and Sugsaw watersheds.
Figure 2. Waterbodies of the Sarita, Pachena, and Sugsaw watersheds.
Figure 3. Survey segments and pools within the Sarita River.
Figure 4. Survey segments within the South Sarita River.
Figure 5. Minnow trap locations within Sabrina Creek.