

2022-2023 Funded Projects



This table summarizes approved 2022-2023 funding allocations for technical committee projects.

Supporting Committee: Small Lakes

of Projects: 20

Status	Project #	Title	Delivery Region	Allocated \$
Delivered	S2302	West Coast Region Lake Angling Questionnaire Survey	1- West Coast	15,000
Delivered	S2201	West Coast Region Small Lake Fertilization Program	1- West Coast	19,285
Delivered	S2303	West Coast Region Small Lake Stock Assessments	1- West Coast	16,060
Delivered	S2313	R2 Small Lakes Camera-based Angler Effort Study	2 - South Coast	10,670
Delivered	S2307	R2 Priority Lake Stock Assessment	2 - South Coast	13,350
Delivered	S2301	Thompson Small Lakes Stock Assessment	3 - Thompson	27,741
Delivered	S2309	Kootenay Region Small Lakes Creel Surveys	4 - Kootenay	7,000
Delivered	L2203	Koocanusa kokanee enumeration (shared with LL)	4 - Kootenay	6,856
Delivered	S2304	Upper Columbia - FLIGHTLINE	4 - Kootenay	15,750
Delivered	S2305	Small Lakes Assessments Kootenays	4 - Kootenay	23,400
Delivered	S2112	Dragon Lake Goldfish Control - Boat Electrofishing	5 - Cariboo	15,000
Delivered	S2210	Cariboo Snow Removal	5 - Cariboo	5,000
Delivered	S2208	Cariboo 100 Mile House FLIGHTLINE	5 - Cariboo	27,000
Delivered	S2312	Cariboo Region Small Lakes Assessments	5 - Cariboo	31,350
Delivered	S2310	Omineca Small Lakes Stock Assessment	7a - Omineca	23,000
Delivered	L2205	Omineca Angler and non-Angler Preference and Diversity Survey (shared with LL and R)	7a - Omineca	5,833
Delivered	S2306	Okanagan FLIGHTLINE	8 - Okanagan	25,000
Delivered	S2308	Okanagan Small Lakes Assessment	8 - Okanagan	17,880
Delivered	S2311	Northeast Small Lakes Assessments	7b - Peace	9,150
Delivered	L2101	Genomic tools for Kokanee stock assesment and broodstock ID in changing environments (shared with LL)	Provincial	26,350
				340,675

Delivery Region Locations



1. Region 1 West Coast
2. Region 2 South Coast
3. Region 3 Thompson
4. Region 4 Kootenay Boundary
5. Region 5 Cariboo
6. Region 6 Skeena
7. Region 7a Omineca
8. Region 7b North East (Peace)
9. Region 8 Okanagan

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Small Lakes Funded Project Categories	Allocated \$
Angler Access & Infrastructure	\$5,000
Angler Effort, Catch & Satisfaction	\$100,420
Aquatic Invasive Species	\$15,000
Research & Development	\$32,183
Stock Assessment	\$168,787
Stock Recovery & Enhancement	\$19,285
	\$340,675

2022-2023 Project Summaries

The following section provides a summary of activities of each project delivered for this fiscal year. In addition, the total expenditure to date is provided for all years of project delivery.

West Coast Region Small Lake Fertilization Program

Status: Delivered Tracking # S2201 Year 2 of 5

Executive Summary:

Year two of the current five-year cycle of the Small Lake Enrichment Program on Vancouver Island was successful. COVID-19 again limited some volunteer involvement, however, four lakes were enriched in 2022 including Rowbotham, Nimnim, Reginald and Shelton lakes. Similar to previous years, liquid nutrients were added to each lake using established fertilization techniques to enhance trophy fisheries for rainbow trout and Kokanee Salmon (Ashley 2011). Over 23 weeks between late April and September, approximately 5,000 L of liquid nutrients were added to the four lakes. Water quality sampling was conducted monthly to ensure target conditions were met at each lake. Additionally, automated time-lapse cameras were used to assess angler effort at all lakes. Stocking of all-female triploid (AF3N) Kokanee Salmon into Shelton Lake and AF3N Rainbow Trout into Reginald Lake occurred in May 2022 by the Freshwater Fisheries Society of BC (FFSBC).

Stocking of AF3N Rainbow Trout at Nimnim Lake and Rowbotham Lake occurred in June of 2022. Stocked fish are differentially marked by release group to reduce/eliminate the necessity for otolith/scale ageing during efficacy monitoring. The recent stocking of Kokanee Salmon in Shelton Lake in conjunction with nutrient applications is aimed to produce a new Kokanee fishery for anglers on Vancouver Island (Damborg 2021). Fish growth monitoring in the fall of 2022 occurred at both Shelton and Rowbotham lakes. Preliminary results showed very positive survival of the stocked kokanee in Shelton Lake as the densities appeared high. This likely limited growth as the oldest age class of fish were smaller in size than expected. In an effort to increase fish size, reduced Kokanee stocking is planned in 2023. Benefits of the nutrient enrichment program were noted at Rowbotham Lake as the growth and size of the stocked rainbow trout was very positive. Data is continuing to be analyzed and final results will be known once the aging data is received. In addition to the funding from the small lakes committee, grant funding from HCTF of \$41,926 was also acquired. Substantial in-kind support was also received, including \$5,000 from the Ministry of Forests, as well as volunteer time from a few local fish and game members (~\$2,000). Total project value for 2022-23 was approximately \$66,822.

West Coast Region Lake Angling Questionnaire Survey

Status: Delivered Tracking # S2302 Year 1 of 2

Executive Summary:

On Vancouver Island, historical assessments of angling effort and catch on small and large lakes have been completed by mail out questionnaire survey (1986, 1989, 1992, 2002, 2006, 2011 and 2017). The Vancouver Island Lakes Questionnaire (VILQ) survey is used to sample a percentage of licensed Vancouver Island anglers and from their responses, derive estimates of angler effort and catch regionally and at the lake specific level. Unlike other areas in the province, this is possible as nearly 90% of the lake anglers in Region 1 are residents of Vancouver Island (Sjolund 1981, Fisheries and Oceans Canada 2003). Results from previous VILQ surveys have been used extensively in the management of small and large lakes on Vancouver Island (Aitzhanova and Rimmer 2003, Law 1990).

The time and cost required to complete a mail out questionnaire survey is considerable. The cost for the 2006 VILQ including the development and printing of mail out cards, reminder notices and envelopes, as well as postage, data collection and tabulation, and report preparation exceeded \$30,000.00. With limited resources regionally and provincially, the ability to complete future lake surveys on Vancouver Island is at risk. To address the high cost of completing mail out surveys, regional fisheries staff completed a mixed mode survey in 2011 and 2017 using a combination of a historical mail out survey and an online/web-based digital survey. Outcomes of the work in 2011 and 2017 noted a high correlation between the two surveys, indicating that a digital survey alone would work well and replicate results generated using the historical mail out survey. Significant benefits were noted in the digital survey in the form of cost savings and time for data entry/analysis. For the 2022 survey, regional staff will use only a web/online based survey and will include Haida Gwaii again as was done in 2017. Very little effort and catch data exists for Haida Gwaii and this survey will help to build on the information that was collected in the 2017 survey. Results to date include acquisition of the angling license database and selection of survey recipients. Also completed was development of the online survey using the internal government Common Hosted Forms software (CHEFS). The ability to use CHEFS saved on project time and expense as purchasing or licensing a stand alone survey software program was not required. The survey was emailed out on January 19, 2023 to 21,500 recipients. A reminder notice was sent to those participants that had not yet completed the survey on March 2, 2023. As of March 31, more than 9,000 responses to the survey had been collected. The survey will officially close on April 14, 2023 (~3 months long).

West Coast Region Small Lake Stock Assessments

Status: Delivered Tracking # S2303 Year 1 of 1

Executive Summary:

No report provided

R2 Priority Lake Stock Assessment

Status: Delivered Tracking # S2307 Year 1 of 1

Executive Summary:

Standard stock assessments were completed in the fall of 2022 on six small lakes in Region 2: Rolley, Salsbury, Blackwater, Ivey, Mosquito, and Alta Lakes. These lakes were assessed to determine the current state of native and stocked trout (size, condition, density), while also monitored for the presence of invasive species (e.g., bass, pumpkinseed sunfish, goldfish). The assessments were conducted under specific collection protocols, following the Lake Assessment Standards for Small Lakes in British Columbia (FFSBC and MoE 2007). Ageing structures were sent to the FFSBC ageing lab and results are pending at the time of reporting. Invasive species (Brown bullhead) were captured in Rolley Lake. In general, mean condition factor and size ranges of target species was good. A review and analysis of length at age once age data is received will provide more insight. Change to stocking prescriptions were recommended for two lakes (Salsbury Lake and potentially Alta Lake).

R2 Small Lakes Camera-based Angler Effort Study

Status: Delivered Tracking # S2313 Year 1 of 1

Executive Summary:

Angling effort data is essential for making informed fisheries management decisions, directing fisheries program efforts, and maintaining a satisfied angling community. Angler effort data is significantly lacking or outdated in Region 2. Four stocked lakes (Browning, Brohm, Alta, and Ivey) were identified for this study based on site-specific concerns warranting an assessment of angling effort. Time lapse cameras (Reconyx HyperFire 2) were installed and maintained at the four lakes (Browning, Brohm, Alta, Ivey) from April to December 2022 to capture anglers immediately following spring (early April) and fall (early October) stocking. Ivey Lake and Browning Lake received the highest confirmed angling pressure of the four lakes during the assessment period. Alta Lake received a moderate amount of angling pressure but was the most heavily visited lake by non-angling recreation users. Brohm Lake received the lowest number of anglers. This camera-based angler effort study provided valuable information to guide methods used for future camera-based angler assessments. Finding a camera location that could capture a large portion of the lake while maintaining adequate resolution to accurately assess if users were fishing or not was a challenge. The new/updated information collected on angler effort in these four stocked lakes will assist with fisheries management decisions that will help sustain the fishery and maintain angler satisfaction (e.g., stocking prescriptions, angling regulations).

Thompson Small Lakes Stock Assessment

Status: Delivered Tracking # S2301 Year 1 of 1

Executive Summary:

The primary function of the small lakes stock assessment is to help fisheries managers maintain or enhance the appeal of individual lakes to the angling public. Annual fall surveys follow standardized RISC (Resource Inventory Standards Committee, 1997) methodology and give biologists the ability to determine if current stocking rates, species, strains, ploidy and/or regulations are achieving fishery management goals on any given lake. While anecdotal information is considered, data collected during the stock assessment project is the primary information biologists use to inform management decisions on small lake fisheries in the Thompson region.

Seventeen lakes were assessed in the Thompson region during the fall of 2022. Data collected during the project resulted in stocking changes on five lakes, consideration for future stocking changes on four lakes, consideration for regulation changes on two lakes and no changes on four lakes. It also highlighted two potential new stocking opportunities at Moose Lake (00365BONP) and Middle Leroy Lake (00558GUIC). These changes, future considerations and new stocking opportunities reflect ongoing efforts to deliver on the diversity of angling of opportunity policy laid out in the 2007 Provincial Freshwater Fisheries Program Plan. The stock assessment project is critical for maintaining these efforts in the Thompson Region where small lake fisheries play an outsized role in providing recreational fishing opportunity and support to the rural economy.

Koocanusa kokanee enumeration (shared with LL)

Status: Delivered **Tracking #** L2203 **Year** 2 **of** 5

Executive Summary:

Koocanusa kokanee are a keystone species in the novel upper Kootenay ecosystem, recently colonizing the Koocanusa Reservoir, and spawning throughout the upper Kootenay watershed. This population supports a popular kokanee fishery, Bull Trout fishery, and egg collections for the provincial stocking program of kokanee. At the inception of this study in 1996, an aerial enumeration was completed throughout the Upper Kootenay River watershed to identify the streams supporting the highest numbers of spawning Kokanee. A total of 7 streams were selected for long-term monitoring, including the Lussier River, which is often the most important spawning stream, and a major collection egg collection area for the Freshwater Fisheries Society of BC. This project will continue the long-term monitoring of the Koocanusa kokanee spawning population.

The overall objectives of this project are to continue monitoring of Koocanusa spawners in the Lussier River and up to six other index sites according to long-term methods. Data will be used to determine the sustainability of the current and future FFSC egg collection practices to inform future egg collection guidance.

By comparing the stock and recruitment data for control streams and the historic dataset to the Lussier River, we will be able to determine if there are recruitment effects of the current egg collection protocols, and make recommendations for future egg collection guidance specific to the Lussier River and a more generic assessment of how current egg collection guidance impacts recruitment and future egg supply in wild, feral large lake kokanee populations in general. The data will also be useful in more generic monitoring of the Koocanusa kokanee population, which may help with management of Bull Trout or kokanee in the future.

In 2022, flights were completed on September 21 and 22. The 7 index streams were flown, for a total count of 50,455 kokanee spawners. This spawner abundance is 42% of the pre-study 10-year average spawner abundance (120,711), and 49% of the median spawner abundance (102,950). The Lussier River spawner abundance was 47% of the total watershed spawner abundance, which is similar to the pre-study 10 year average (48%).

Upper Columbia - FLIGHTLINE

Status: Delivered **Tracking #** S2304 **Year** 1 **of** 2

Executive Summary:

Year 1 of 2 of the Small Lake Index Monitoring (SLIM) project was conducted in 2022 on the Upper Columbia Flight Line (KFL). Aerial angler counts were conducted at 38 lakes over 20 days during the spring and summer. The objective of the survey is to estimate annual angling effort. Two years of data is collected and averaged across years to best present current angling effort on lakes.

Four lakes were ice covered for the first 4 counts and 3 of these remained ice covered for 5 counts, which will affect estimates. 2022 remained fairly cool throughout the spring and summer and wildfires were not a large concern.

Small Lakes Assessments Kootenays

Status: Delivered Tracking # S2305 Year 1 of 1

Executive Summary:

No report provided

Kootenay Region Small Lakes Creel Surveys

Status: Delivered Tracking # S2309 Year 1 of 3

Executive Summary:

Fourteen lakes were monitored in winter 2022-2023 to target fisheries objectives, and to determine angler demographics, satisfaction, effort and catch rates. 308 winter creel surveys were completed from November 29, 2022 to March 22, 2023. 120 creel surveys were also completed at Whiteswan Lake in spring 2022. A minimum of 30 interviews per month was targeted at Premier and Whiteswan Lakes.

Whiteswan Lake:

168 interviews were conducted at Whiteswan Lake in winter 2022-2023. There was a total of 148 harvested fish sampled in winter 2022-2023, with the size ranging from 290 to 501 mm in length, and the average length approximately equaling 397.9 mm (standard deviation (SD)= 44.1). The maximum and average lengths of harvested fish have increased from last year. Since 1989, Whiteswan Lake spawner counts have been conducted yearly at Outlet Creek during May and June. Using the 2003-2022 spawner count data collected from Outlet Creek, a linear regression analysis was completed for the peak number of spawners versus year, and the Julian day of the spawner peak versus year. Both analyses returned results of an insignificant decline, suggesting that the peak number of spawners and the associated Julian day have not significantly decreased in the past twenty years. For these reasons, the liberalized regulations at Whiteswan Lake will remain in place for the next synopsis cycle, with continual monitoring efforts implemented.

Premier Lake:

In winter 2022-2023, the average length of the Rainbow Trout harvested by anglers at Premier Lake was approximately 335.8 mm (SD = 57.2). Although the size of the Rainbow Trout harvested from Premier Lake were smaller than the average in 2018-2019 (369.4 mm, SD = 47.1), the consensus from anglers is that they were happy to be catching fish again. To encourage higher stocking survival rates, the average size of yearling stocked has increased from 6.67 g in 2021 to 18.92 g in 2022 (FFSBC, 2023). Based on the fish sampled during this winter creel season, it appears that the increased size has encouraged 2022 stocking survival, however, the lake should continue to be monitored as the size classes recover.

Dragon Lake Goldfish Control - Boat Electrofishing

Status: Delivered Tracking # S2112 Year 3 of 3

Executive Summary:

Dragon Lake is highly productive and supported only rainbow trout up until the recent past. Goldfish were first detected in 2009 and now present a threat to the sport fishery and hatchery operations. Preliminary investigations in 2019 suggest the lake supports thousands of mature goldfish (up to 30 cm in length) and their diet overlaps significantly with rainbow trout. Risk assessments have been initiated and although the likelihood of substantial impacts to the rainbow trout population are uncertain, there remains possibility that this valuable fishery could be significantly impacted.

The current management approach uses information from angler effort surveys, gillnetting, annual updates from hatchery operations, and angler reports to monitor potential impacts of goldfish to the rainbow trout population. Detailed assessment of the goldfish population has not occurred to date. The aforementioned information sources suggest the fishery in Dragon Lake remained relatively stable and healthy up until spring 2018 when angler reports suggest fishing quality declined dramatically, resulting in many complaints to Regional and Provincial fishery managers. Although reports suggest the fishery did show signs of improvement in fall 2018, concerns over goldfish impacts remained and stakeholders requested action to control goldfish numbers. Assessing the goldfish population directly in Dragon Lake has not been conducted prior to 2019 and does not seem cost-effective for government staff unless partnership funds are acquired.

In 2020, 2021 and 2022 a contract crew of three staff operated an electrofishing boat for four 10-hour days each year. In 2020 a total 2,629 goldfish were captured and killed, of which 246 were sampled to collect biological data (length, weight, sex, maturity, age). In 2021 and 1,865 goldfish were caught and killed, of which 488 were sampled. In 2022, 1,556 goldfish were captured and 104 were sampled. Age estimates have been provided and preliminary analysis has been conducted to evaluate maturity schedules, growth rates, and presence of age classes. Electrofishing efforts from 2020 to 2022 have reduced the number of goldfish in Dragon lake by an estimated 25%. It is predicted that reducing the population by 80% would take at least another 5 years and \$75,000.

Cariboo 100 Mile House FLIGHTLINE

Status: Delivered Tracking # S2208 Year 2 of 2

Executive Summary:

Recreational fishing is a valuable way of life for the people of British Columbia and an important contributor to local and provincial economies. British Columbia's freshwater fisheries are managed with the overarching goal of balancing the need to conserve wild stocks while optimizing recreational opportunities. The current small lakes stocking program provides an excellent opportunity to pursue this goal given the popularity of these fisheries, the ability to develop high quality fisheries, and the indirect benefit of diverting fishing pressure away from more sensitive wild populations.

Stocked lakes in the Cariboo Region are typically assessed in two ways, by evaluating fish communities through lake assessments and by tracking angler use through aerial effort surveys. This approach allows adaptive management whereby changes in angler use or the fish population associated with management actions (changes to stocking regime, angling regulations, or lake access can be evaluated) can be evaluated. The action can be retained if it had the desired effect such as increased fish size or increase angler use, or canceled if the effect is undesirable. Through time the value of the resource can be enhanced by applying effective management actions.

This study evaluated levels of angler use during the open water fishery on 49 small lakes in the areas of Williams Lake and 100 Mile House, British Columbia. Twenty-four lakes had an increase on at least 30%, six lakes had a decrease in effort by at least 30%, and angling effort on the remaining lakes did not change more than 30%. Total angling effort across the 49 lakes increased by 33,164 angler days or 29%. Biggest increases occurred at Sheridan, Simon, Bridge, Big Bar, Irish, Hathaway, Ruth, Sulphurous, Greeny, Horse, and Howard, in that order and these lakes all had increases of at least 1,000 angler days. Lakes with significant effort increases will be prioritized for fish community assessment to evaluate if fish abundance and size has decreased and make corrective actions such as changes in the stocking prescription or angling regulations.

Cariboo Snow Removal

Status: Delivered Tracking # S2210 Year 2 of 3

Executive Summary:

This project aims to secure funding for snow removal at ice fishing parking areas. The intent is to provide consistent snow removal for three years to help establish ice fisheries than pass the responsibility off to Recreation Sites and Trails or BC Parks. Getting these partners to process the invoices and recognize the importance of winter use should help them request and set aside a budget for snow removal in the future. In the interim, BC Parks and Rec Sites and Trails say they do not have a budget for snow removal for most of these sites.

Removed snow at Beaverdam, Crystal, Chimney, and Tyee Lakes in 2022/23.

Cariboo Region Small Lakes Assessments

Status: Delivered Tracking # S2312 Year 1 of 1

Executive Summary:

Awarded funds were used to assess priority stocked lakes in the Cariboo Region in 2022. Provincial standard overnight gillnetting was conducted on Dog and Elk Lakes to collect large sample sizes to compare the performance of Horsefly versus Blackwater strains of rainbow trout. Overnight gillnetting was also conducted on Irish Lake. Smaller sample sizes were collected from Ruth, Little Green, 108 Mile, and Helena Lakes using short-set gillnetting. Length, weight, sex, and maturity were assessed for captured fish. Age structures were collected for age estimation. Once age data is available, a technical report will be drafted which will include estimates of growth, mortality, and abundance which will be used to recommend corrective actions if size-based objectives were not being met at each lake. Management actions may include changes in stocking regime or angling regulations. Recommended management actions may also aim to improve cost effectiveness of hatchery resources.

Omineca Angler and non-Angler Preference and Diversity Survey (shared with LL and R)

Status: Delivered Tracking # L2205 Year 2 of 3

Executive Summary:

The purpose of my study is threefold: to assess anglers' satisfaction with their recreational fishing experiences; to understand anglers' and non-anglers' perceptions and experiences of drivers and constraints to recreational fishing participation; and to provide insight for fisheries management about creating inclusive recreational spaces based on non-angler responses, current angler preferences, and their levels of satisfaction. To address these aims, I have conducted 3 out of the 6 proposed focus group interviews with anglers and non-anglers and have conducted 4 individual interviews with Community Champions. Community Champions are avid anglers and/or have additional expert insight into the topics of gender, race, and sexuality. Once the interviews are completed, transcribed, and analyzed, I will circulate a digital survey to the Omineca Region to assess anglers' and non-anglers' fishing preferences, drivers of participation, leisure constraints, and barriers to access, equity, and inclusion.

Objective 1: Contextualize drivers of participation as well as inclusionary and exclusionary practices (i.e., language and discourse, social groups, gatekeeping, gear and equipment) in recreational fishery in the region.

Completed in June 2022 with writeup of Literature Review.

Objective 2: Characterize the current demographic and angler satisfaction in the region.

This is ongoing as I conduct the interviews and survey.

Objective 3: Identify inclusionary and exclusionary practices as well as constraints and opportunities to encourage current non-anglers (and/or non-avid anglers) participation in regional recreational fisheries.

Data collection through interviews and focus groups to date have begun to highlight: a desire among fishers to be welcoming, the possibility of asymmetrical perception of the problem, specific constraints and opportunities facing identity groups, expressions of racism and sexism among fishers, as well as general perceptions of fishing among non-fishers.

Ongoing: Ethics Review Board (ERB) approval was received in December 2022 and recruiting for interviews and focus groups began at that time. The recruitment poster was sent to 16 local groups/organizations and was hung at UNBC and local shops in Prince George, and it has been shared repeatedly and broadly via social media. I recruited in person at the 2023 BHA & TWS Ice Fishing Derby at Eena Lake, and at a Spruce City Wildlife Society meeting. I have organized and conducted four interviews with Community Champions and held three focus groups. Interviews have been approximately 45 minutes and focus groups have been approximately 1.5 hours in duration. In total, I have engaged 14 people, and have transcribed all interviews and focus groups, resulting in roughly 8 hours of recording and 123 pages of narrative data so far. Thematic analysis of transcripts has begun to compile and track recurring themes and examine them in relation to the literature reviewed.

Omineca Small Lakes Stock Assessment

Status: Delivered Tracking # S2310 Year 1 of 1

Executive Summary:

Between September 15th and October 14th, 2022, resource technologists from BCCF and biologists from MoF performed a series of gillnet surveys on eight small lakes in the Omineca Region (7a). Seven of the sampled lakes are managed as stocked regional fisheries (Nelson, Witney, Portal, Sawmill, Teardrop, Cobb, and Burden lakes), while Francis Lake is a wild fishery. Sampling procedures were modeled after the RIC7 small lakes assessment standard. Biometrics of captured fish were recorded, and aging structures of game fish were sampled and submitted to the BC Provincial Aging Laboratory. Limnological data was collected from each sampled body of water, including temperature and levels of dissolved oxygen.

Okanagan FLIGHTLINE

Status: Delivered Tracking # S2306 Year 1 of 2

Executive Summary:

Aerial boat counts were completed for 87 Okanagan small lakes fisheries.

Okanagan Small Lakes Assessment

Status: Delivered Tracking # S2308 Year 1 of 1

Executive Summary:

Beginning in 2019, the Okanagan Region implemented a significant number of changes to its small lakes stocking program. In 2022, the primary objective was to assess fisheries where stocking had been suspended, based on assumed or confirmed natural recruitment. After three years, it should be apparent if renewed stocking is required to support a fishery. The proposed list also represents fisheries that have never been assessed, have been the subject of persistent poor angling reports, or have been subject to stocking changes in the last 5 years.

Northeast Small Lakes Assessments

Status: Delivered Tracking # S2311 Year 1 of 1

Executive Summary:

On August 29, 2022 two RIC 7-panel gillnets (1 floating and 1 sinking) were set overnight on Inga Lake. A total of 315 rainbow trout were captured between both nets, with an average fork length of 272 mm and an average mass of 269 g. Thirty ageing structures (otoliths) were collected from a range of size classes and submitted to the Provincial ageing lab. The results from the 2022 survey show that white suckers have been completely removed from the lake due to the winter kill in 2017, and subsequently stocked Rainbow trout are exhibiting healthy growth rates. Inga lake is currently functioning properly as a family fishery.

Genomic tools for Kokanee stock assessment and broodstock ID in changing environments (shared with LL)

Status: Delivered Tracking # L2101 Year 2 of 2

Executive Summary:

Kokanee represent one of BC's most important freshwater recreational fisheries, and are also an important prey species supporting piscivore fisheries. However, wild Kokanee populations have a long history of being highly volatile, leading to substantial recreational fishery consequences. As Kokanee represent a species of strategic importance for supporting lucrative recreational fisheries, the need to ramp up hatchery production of stocks robust to changing environments is a high priority. This urgency is further punctuated by the collapse of the Meadow Creek stock, which was the historical source for stocking throughout western North America. Accordingly, the key management issue is that Kokanee will continue to be stocked within recovery initiatives as well as purely to support small lakes recreational fisheries. In either case, we need to have a better understanding of how stocking different Kokanee sources could influence wild stock recovery and/or of fishery quality.

This project is led by UBC researchers, with DFO and University of California researchers as co-applicants. The Province of BC (MoF), the Freshwater Fisheries Society of BC (FFSBC) and Parks Canada are end-user collaborators. The project is funded in majority through Genome BC's GeneSolve program, with financial and in-kind contributions from MoF and FFSBC. The project is focussed on improving our understanding of the kokanee genome, developing cost effective genetic assessment tools to identify discrete stocks and their specific adaptations, and identifying stocks with the highest likelihood to succeed in a changing environment (relevant to both wild stock and hatchery stock productivity/outcomes). These tools will have broad utility in furthering our understanding of wild stock systems and how our management actions affect outcomes related to fisheries and conservation/ecosystem function. The project will also contribute to hatchery stock development, which is intended to improve brood source productivity potential as the impacts of climate change intensify. Ultimately, the project will further our understanding of the Kokanee genome and genotype/phenotype relationships that will have a lasting impact on understanding and prioritizing critical wild populations and habitats.

The project was intended to span 2 years. Year 1 activities were completed as planned and involved characterizing sequence and structural genomic variation from 224 whole genomes from 22 lakes from British Columbia and Yukon. Analysis integrated standing genetic variation, genotype-environment associations and climate modeling to assess climate change vulnerability. The results of this work are nearing completion and will result in two primary literature publications. Year 2 activities focused on physiological genomics and involved successful field-based respirometry and thermal tolerance experiments conducted on Mission and Coldwater Creek populations. The key outputs of Activity 2 will include physiological characterization of Kokanee related to environmental stress, as well as a high-throughput Kokanee Fit-Chip containing curated biomarker assays to determine how environmental conditions affect physiologically important stock specific metrics. However, COVID related laboratory backlogs have resulted in a one-year (no cost) delay in completing these outputs.