

2019-2020 Funded Projects



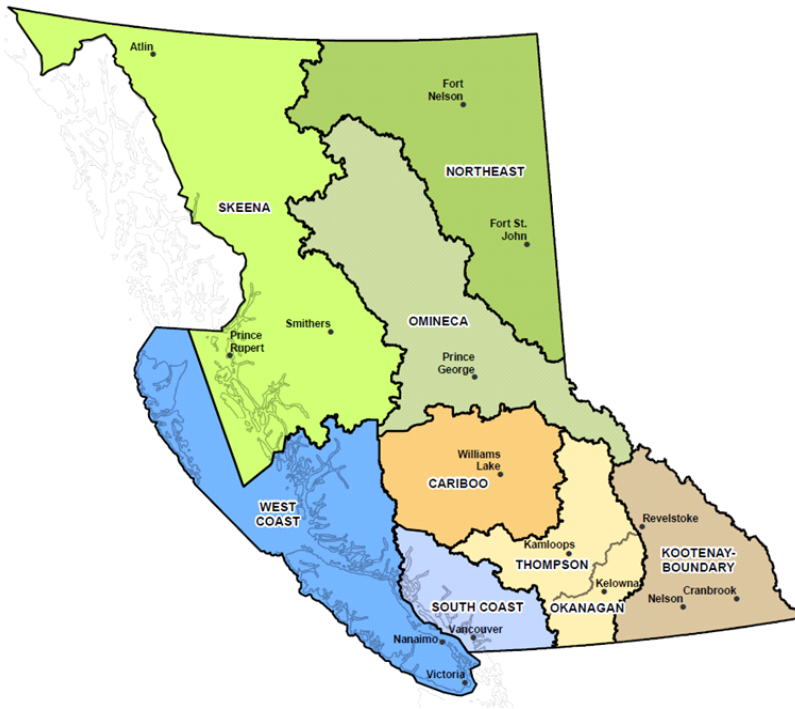
This table summarizes approved 2019-2020 funding allocations for technical committee projects.

Supporting Committee: Rivers

of Projects: 16

Status	Project #	Title	Delivery Region	Allocated \$
Ongoing	R2001	West Coast Steelhead Index Stream Monitoring	1 - West Coast	23,000
Completed	R2003	Upper Pitt River bull Trout Assessment	2 - South Coast	7,400
Completed	R1705	Seymour Barrier Removal	2 - South Coast	20,000
Ongoing	R1903	Chilliwack Winter Steelhead Stock Assessment	2 - South Coast	17,500
Ongoing	R1807	Lower Fraser River Guardian Program	2 - South Coast	20,500
Ongoing	R1902	Chilliwack River Guardians	2 - South Coast	18,125
Completed	R1611	Thompson Region Guardian	3 - Thompson	42,858
Completed	R1615	Kootenay River Guardian Program (Non-CW)	4 - Kootenay	52,500
Ongoing	R2002	Outlet Creek Barrier Refurbishment	4 - Kootenay	3,000
Completed	R1617	Dean River Steelhead Juvenile Assessment	5 - Cariboo	20,000
Completed	R1618	Quesnel River Watershed Bull Trout Assessment	5 - Cariboo	10,500
Completed	R1610	Skeena Region Bull Trout Monitoring Program	6 - Skeena	30,000
Completed	R1905	Parsnip Watershed Arctic Grayling Monitoring	7a - Omineca	34,690
Completed	R1904	Upper Fraser River Bull Trout Management Evaluation	7a - Omineca	17,500
Ongoing	R1907	Okanagan River Guardian Program	8 - Okanagan	17,500
Ongoing	R1908	Steelhead Questionnaire	Provincial	28,000
				363,073

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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Project Categories	Allocated \$
Angler Effort, Catch & Satisfaction	\$35,400
Guardian Programs	\$151,483
Habitat Maintenance, Restoration & Enhancement	\$23,000
Research & Development	\$17,500
Stock Assessment	\$135,690
	\$363,073

2019 - 2020 Project Summaries

The following section provides a summary of activities of each project delivered in 2019-2020. In addition, the total expenditure to date is provided for all years of project delivery.

West Coast Steelhead Index Stream Monitoring

Status: Ongoing

Steelhead abundance is highly variable between years and watersheds. During periods of reduced marine and freshwater survival, steelhead stock sizes routinely decline to levels that warrant fishery management actions including fishery closure. Rates of decline or recovery appear to be different between Ecoregions and ecotypes due to stream and stock specific productivity and harvest pressures. Assessing steelhead stock strength and prescribing appropriate management strategies demands an active monitoring approach informed by local data.

A number of steelhead fisheries on Vancouver Island have been closed or severely curtailed using a combination of time and area closures, starting in the late 1990's concurrent with a precipitous decline in adult steelhead abundance. The Region is interested in monitoring the necessity of these continued closures and collecting data to across key streams to inform broader management actions.

Due to the very large number of steelhead stocks within the West Coast Region a sub-sample have been selected for long-term monitor and assessment. Summer steelhead index streams include the Heber and Tsitika rivers while winter steelhead streams include the Englishman and Cowichan rivers. Study intensity varies from a single snorkel survey on both the Heber and include the Heber and Tsitika rivers while winter steelhead streams include the Englishman and Cowichan rivers. Study intensity varies from a single snorkel survey on both the Heber and Tsitika and up to three comprehensive surveys on the Englishman River. Additional opportunistic surveys have been completed in sites where a long term data exist and results can help to inform local abundance trends or identify specific management actions. These activities occurred in conjunction with Regional, First Nations and Federal partnerships. Standardized, closed site electrofishing occurred on the Englishman and Cowichan Rivers. The electrofishing data is used to corroborate snorkel survey counts of steelhead spawners in the Englishman River and as the primary index information for Cowichan River steelhead. The Cowichan River fry census includes a component of stream resident and adfluvial rainbow progeny. The otolith microchemistry component is aimed at informing the contribution of adfluvial and resident rainbow trout to trout fry currently assumed to be of steelhead origin.

The key objectives of this project included:

- Collect standardized steelhead fry density data from eight to ten index sites on two winter steelhead streams (Englishman and Cowichan Rivers).

Collect standardized steelhead fry density data from eight to ten index sites on two winter steelhead streams (Englishman and Cowichan Rivers).

- Estimate the proportion and distribution of Cowichan River rainbow trout fry derived from resident or steelhead origin.
- Estimate Englishman River steelhead population from repeated snorkel surveys to determine stock status using AUC or MLE methods, integrating prior knowledge from intensive surveys completed between 2011 – 2014.
- Survey the Heber River population and the Tsitika river index of abundance using snorkel surveys to continue the 43 year time series of adult abundance.
- Additional key streams including the Nimpkish, Salmon and Gordon will be completed to inform if additional funds and trends of abundance and address local migration, predation and fishery management actions using partner funds or internal staff and resources.

Tracking No. R2001

Year 1 of 5

Total Spent to Date \$23,000

Upper Pitt River bull Trout Assessment

Status: Completed

Reconnaissance surveys were conducted September 23-26, 2019 on the Upper Pitt River tributaries. The survey was conducted from the known barrier ~7 km upstream on Iceworm Creek to the confluence with the upper Pitt River. On September 24, 2019, a redd survey was implemented on Iceworm Creek within the Garbaldi Provincial Park using helicopter access. It was proven that survey conditions were too difficult to continue and that developing an index within the Upper Pitt River will be problematic. and is recommended that these activities be discontinued.

Guided angling days captured 48 Bull Trout that were uniquely tagged in 2019, of which, 28 were tagged with high rewards (\$100 +\$10) and remainder were tagged with no reward. To date 3 of the 28 high reward tagged fish have been returned from anglers and have received their reward. Based on this information the relative exploitation of <11% and based on limited violations of the mark-recapture assumptions. The majority of Bull trout were intercepted (May-August) as they migrated into the Upper Pitt River prior to spawning in October. Captured and tagged fish ranged from 48-85 cm in size, with median size of 56 cm.

In addition, one of the selected guides volunteered to provide boat counts over 58 days during his guided trips on the river (May-August). A total of 172 boats were observed during the selected time period, indicating 3 boats per day were utilizing the river during those days. A total of 94 were jetboats angling, 55 were non-angling jetboats and 33 were angling rafters.

Project is on track and budget has expended its allowance of ~\$45,000 from HCTF and \$7,500 from FFSSBC for 2019.

Tracking No.	R2003	Year 1 of 5	Total Spent to Date	\$4,909
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Lower Fraser River Guardian Program

Status: Ongoing

No report provided

Tracking No.	R1807	Year 3 of 3	Total Spent to Date	\$35,226
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Chilliwack River Guardians

Status: Ongoing

No report provided

Tracking No. R1902 Year 2 of 5 Total Spent to Date \$50,304

Chilliwack Winter Steelhead Stock Assessment

Status: Ongoing

The Chilliwack River supports the most intensive steelhead fishery in BC and the largest populations of wild and hatchery winter steelhead in the South Coast Region. The high fish and fishery values warrant collection of a strong set of data to monitor trends, assess conservation status and inform regional management decisions such as angling regulation changes and hatchery program adjustments.

A good understanding of adult steelhead abundance is necessary to effectively manage a hatchery-augmented steelhead stream. This is particularly important at times of lower ocean productivity which has been the case recently. Currently, Chilliwack River adult steelhead abundance is inferred from juvenile density index surveys, steelhead licence mailout questionnaire data, steelhead angling derby results and anecdotal reports of angler satisfaction. A current regional steelhead management strategy is to explore cost-effective methods to improve understanding of adult wild and hatchery steelhead populations of the Chilliwack River.

This report is for the second of a three year project to assess, 1) the logistical feasibility of undertaking an annual series of standardized snorkel float index surveys and 2) the utility of index survey results as a management tool for the Chilliwack River, particularly the usefulness of results as indices of abundance and ratio of hatchery to wild adults and the ability to compare results within and between seasons.

In the second year of surveys, the contractors were only able to undertake and complete 3 of the targeted 4 two-day index surveys. High river flows following the third survey on April 2 and 3 prevented completion of a mid-April survey.

Steelhead counts for the completed surveys were similar to those of year 1 (i.e. low but not alarmingly so) but highly variable conditions between surveys and the absence of observer efficiency data limit the ability to make comparisons within and between survey years. Also, the lack of a 4th survey made it impossible to identify a peak of abundance.

The difficulties with poor water visibility in reach 3 due to turbid runoff from a clay bank slide site and high flows throughout the index reaches due to snowmelt freshet after early April continue to interfere with the project. There will probably be some revision to target dates and potentially to survey areas next year to attempt to gain additional understanding of the potential utility of snorkel surveys on the Chilliwack River.

Tracking No. R1903 Year 2 of 3 Total Spent to Date \$21,809

Thompson Region Guardian

Status: Completed

The Thompson-Nicola region attracts the most trout angling in any region of B.C with the majority of angling focused on stocked small lake fisheries. In addition to the exceptional small lakes fishery, the region has several unique river and large lake fisheries that provide opportunities for wild stocks of Rainbow Trout and Char. These fisheries include the Thompson, South Thompson, North Thompson, Mahood and Clearwater rivers and Shuswap and Kamloops lake. To ensure the sustainable management of these unique fisheries a guardian program was developed to inform fishery managers on the current status of the stocks and the fisheries which will help to direct future studies and regulatory changes.

The guardian program was designed to meet objectives of both the Freshwater Fisheries Society of BC and the Province. The FFSSBC objectives were to (1) increase angler satisfaction, (2) maintain a strong angler base, (3) maintain and improve the diversity of freshwater fishing opportunities, and (4) maintain and improve wild and enhanced fish stocks to support freshwater fisheries. The Province's objectives were to (1) provide a river guardian presence to assist with fishery implementation through improving compliance on angling regulation and guiding restrictions in addition to promoting angler knowledge and best handling practices; (2) better understand how the fisheries are being used, the composition of those using the fishery, and the quality of the fishing and fishing experience; and (3) to assess the state of the fish resource in these fisheries.

Tracking No. R1611

Year 5 of 5

Total Spent to Date \$177,966

Kootenay River Guardian Program (Non-CW)

Status: Completed

This report summarizes five years (2015-2019) of the non-classified waters Kootenay River Guardian Program (KRGP) and includes angler survey, angler compliance and population/inventory data summary components.

This project was an extension of the classified waters KRGP, funded in Kootenay Region through HCTF classified waters licence surcharges since 2002. In 2015, through FFSBC funding, the KRGP was extended to six priority non-classified systems in Kootenay Region to address specific management concerns on these fisheries. The six systems included in this project were: Findlay Creek, Flathead River, Lussier River, Salmo River, Wildhorse River and upper Kootenay River (non-classified).

The non-classified KRGP operated annually from March through November over the five-year study period. During this period, River Guardians interviewed 1,149 anglers through spring, summer and fall non-classified fisheries. A total of 1,606 fish were caught by anglers interviewed over this study, with an overall catch per unit effort (CPUE) of 0.47 fish per rod hour. Total catch by species composition was: 741 bull trout, 589 westslope cutthroat trout, 160 rainbow trout, 75 mountain whitefish and 41 eastern brook trout. A majority of anglers interviewed were targeting bull trout during their angling trips (67%) with the remaining 33% targeting westslope cutthroat trout, rainbow trout, eastern brook trout and mountain whitefish.

Social science data was collected over the study to gauge the quality of specific fisheries and angler experience. Overall, anglers indicated that they had an enjoyable experience, with 64% of responses classifying the quality of their angling experience as good-excellent. Primary contributing factors to the quality of angling experience response included surrounding scenery, water conditions and quality of fish caught. Crowding did not seem to be an issue for the anglers interviewed, as 90% of anglers indicated they saw 5 or fewer anglers during their trip and 97% of anglers indicated that the systems fished were "not at all - slightly crowded".

Of the 1,149 anglers checked fishing by River Guardians, 197 anglers were non-compliant with regulations (17% non-compliance rate), adding to a total of 275 violations (24% violation rate). The systems with the highest violation rates were the Salmo, Findlay and Wild Horse Rivers (56%, 37%, 30%, respectively). Angler non-compliance trends improved over the study period from a high of 45% in 2015 to a low of 11% in 2019.

River Guardians also conducted population/inventory work for bull trout and westslope cutthroat trout on Findlay Creek, Lussier River and Wildhorse River during this study. Population estimates were completed on the Lussier River for westslope cutthroat trout and system redd count/spawning escapement estimates were completed for bull trout on the Wildhorse River. Additional inventory data collected on the respective systems was utilized to gauge fishery performance, evaluate current stock status and inform future population assessments for both species.

All components of this 5-year KRGP project balanced two primary KRGP objectives: maintain or improve recreational fisheries and ensure the conservation and protection of native sport fish species. The data gathered in the course of this project will inform future management strategies and decisions specific to these fisheries in order to safeguard long term population stability while improving recreational opportunities and benefits. Several regulation changes are pending as a result of this work and may be implemented in the 2021 regulation cycle.

Tracking No. R1615 Year 5 of 5 Total Spent to Date \$179,844

Outlet Creek Barrier Refurbishment

Status: Ongoing

This project funded the refurbishment of the Outlet Creek barrier for \$3,000. The barrier was constructed in 2015 through FFSBC funding to limit outmigration of non native rainbow trout to adjoining Westslope cutthroat trout habitat (WCT). WCT are precluded from moving upstream of an impassable waterfall on Outlet Creek and into Whiteswan Lake.

During freshet, water backed up and flowed over the barrier for several days each year, making the barrier less effective in stopping downstream movement of rainbow trout. Northwest Hydraulic Consultants (NHC), who had designed and oversaw initial construction of the barrier, developed a plan to refurbish the barrier. This included removing back bars on the screens, heightening the cribbing, and reinforcing the banks and downstream stream bed with rip.

The work was completed in April of 2019. The renovated barrier worked well throughout the 2019 season with no overflows.

This project contributes to native WCT conservation, which are threatened throughout their range from hybridization with introduced (stocked) rainbow trout. Genetic testing of trout below the waterfall in Outlet Creek in 2014 showed that fish were predominantly rainbow trout (WCT allele frequency 0.01), and highly admixed in the White River downstream of Outlet Creek (WCT allele frequency 0.41 with 67% of the fish being admixed). Upstream of Outlet Creek in the White River, WCT had slightly higher purity (0.900 allele frequency) with 48% of the fish sampled having RB admixture. Both sites in the White River, downstream and upstream of Outlet Creek had first generation hybrids, indicative of rainbow trout movement from Whiteswan or Outlet Creek. Genetic hybridization sampling was conducted throughout BC in the native WCT distribution and the White River below Outlet Creek had the highest hybridization rates of any site examine. These genetic results exemplify the importance of the barrier and this project.

Tracking No.	R2002	Year	1 of 1	Total Spent to Date	\$3,000
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Dean River Steelhead Juvenile Assessment

Status: Completed

The Dean River supports a high value summer run steelhead fishery. The fishery is monitored via an annual river guardian program. Through the guardian program, a long time series of catch and effort data has been recorded. Historically, catch data alone has been utilized to monitor stock status. While this was sufficient through the 80s and 90s when escapements were consistently high, returns have been increasingly variable over the last decade. Given the high value of the fishery and well documented issues with using catch data to monitor stock status, there is a need to collect fishery independent data to calibrate the annual creel.

Thus, a juvenile study was proposed in 2015 as a cost effective method to calibrate the annual creel and develop biologically based conservation reference points. Specifically, the relationship between catch recorded in the creel and subsequent fry and parr densities was evaluated. The information gathered over the course of this study is being used in conjunction with existing juvenile and creel data from previous years to achieve the objective of calibrating the annual creel.

The same methods successfully utilized to develop conservation reference points for Bella Coola steelhead were used on the Dean. Twelve to sixteen index sites were assessed annually. For each index site, standard two pass removal electroshocking methodology was used to develop HSI adjusted fry and parr densities. Results of the assessment indicate juvenile steelhead densities in the Dean River are at capacity and that there is a direct relationship between catch recorded in the guardian creel survey and juvenile density. The guardian program will continue be utilized to evaluate angler effort, implementation of the Angler Management Plan and provide an index of steelhead escapement.

Tracking No. R1617 **Year 5 of 5** **Total Spent to Date \$73,516**

Quesnel River Watershed Bull Trout Assessment

Status: Completed

This project capitalized on investments currently being made through the ongoing HCTF/ FLNRORD/ MOE/ FFSBC Quesnel Lake exploitation project. An acoustic array was set up which includes a total of 47 receivers distributed throughout Quesnel River watershed, including: Quesnel Lake, Horsefly River, Mitchell River, Quesnel River and Cariboo River. While the Quesnel and Cariboo rivers have known bull trout populations, very little is known with regards to habitat use, distribution or migratory behaviour. In addition, despite the presence of recreational fisheries that support both guided and unguided effort, there is a general lack of information with regards to current exploitation.

Preliminary results from the Quesnel Lake exploitation project indicated bull trout stocks within the Quesnel River watershed are being exploited across a range of lake and stream fisheries, which includes the Quesnel and Cariboo rivers. In many instances, current angling regulations are not consistent across these fisheries. Thus, this project was initiated to provide the basic baseline information required to inform management of blue listed bull trout within the watershed. Results of this project have been used to inform development of a larger scale multi-year bull trout study which will be initiated in spring 2020.

Project funding was specifically utilized to extend the Quesnel Lake acoustic array into the Quesnel and Cariboo rivers as bull trout previously tagged in the lake were documented leaving the system via the Quesnel River. In addition to extending the acoustic array, 30 bull trout were implanted with acoustic and high reward floy tags to get a coarse understanding of distribution, migratory behaviour and exploitation. The high reward tags provide an incentive for anglers to report re-captured bull trout and ultimately improve our understanding of exploitation dynamics within the system.

This project was successful in improving our understanding of bull trout distribution, behaviour and exploitation. This work has provided the foundation required to inform development of a larger scale bull trout study that will be implemented in 2020 and will direct the future of bull trout management across the watershed.

Tracking No.	R1618	Year	5 of 5	Total Spent to Date	\$62,998
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Skeena Region Bull Trout Monitoring Program

Status: Completed

The project explored multiple monitoring options for Bull Trout populations in the Skeena Region. Firstly, we explored using redd counts to develop an index of abundance for Morice and Gitnadoiks River Bull Trout populations. We explored eight potential redd survey reaches, and finally prioritized three for long-term monitoring: Gosnell Creek, Denys Creek and Magar East Creek (with a caveat). In general, redd surveys to monitor Bull Trout populations in the Skeena Region will be challenged primarily by survey timing (temperature-related spawn timing as well as detectability of redds over time due to changes in flow) and species composition (coho overlap with spawning).

We also sought to refine the abundance estimates for fluvial char (Dolly Varden and Bull Trout) in the Kitwanga watershed by conducting species composition tests using genetic analysis. Historically, these two species had been enumerated in aggregate, and this data was of low/moderate value for fisheries management decision making, as any decision made must consider the relative risk to the species of lesser abundance. Results to date indicate that fluvial and possibly anadromous Dolly Varden make up approximately 25% of the aggregate enumeration, Bull Trout approximately 70%, and F1 hybrids approximately 5%. Multiple recommendations are made to continue refining our knowledge of these populations and how they might be managed in the future.

We also explored potential monitoring options for Bull Trout in the upper Dease River watershed. Exploratory angling, snorkeling and floy tagging were conducted. Biodata and recommendations for management are presented.

Finally, we established multiple long term water temperature and flow monitoring sites across the study areas and region. These data helped refine methodologies and recommendations for future redd and Bull Trout population monitoring.

Ultimately, the results of the project have greatly improved our understanding of Bull Trout population monitoring priorities. Overall, we are well equipped to improve angler satisfaction with Bull Trout fisheries by improving the sustainability of our management actions.

Tracking No. R1610 Year 5 of 5 Total Spent to Date \$88,296

Upper Fraser River Bull Trout Management Evaluation

Status: Completed

Bull trout are an important component of many river systems because they are apex predators and because they have been shown to migrate over large distances to find prey and to return to their natal streams to spawn. However, bull trout are also highly vulnerable to overharvest because they are large, aggressive and highly aggregative, making them easy to target.

Many bull trout within the upper Fraser River overwinter in the Nechako River, where they are subject to a catch and release recreational fishery. Anglers have been requesting the population be open to harvest, prompting regional biologists to study the population using telemetry and mark-recapture. The goal was to understand the spatial extent of the population and risk to overfishing if harvest were to occur. Objectives of this project are analyse data collected by Region to estimate the seasonal distribution of the population, evaluate stock structure of the population and provide advice on whether and how to allow harvest in an effort to maintain angler satisfaction and sustain the population.

To date, we determined that the population that overwinters in the Nechako River is actually comprised of multiple spawning stocks, originating primarily from Goat River (26% of the population in the Nechako), and Chalco (21%) and Walker (15%) creeks, although other streams contribute as well. Any impacts to the overwinter population will therefore affect spawning populations hundreds of kilometers away.

We are currently estimating seasonal movement rates and will have that analysis done in the coming weeks. A simulation study will then be used to predict how different regulations will affect performance measures of the system.

Recreational benefits of this project will obviously relate to ensuring a vibrant and ongoing fishery for large-bodied bull trout well into the future. The upper Fraser River provides an important fishery to Prince George and the surrounding area; ensuring fishing opportunities for this unique fishery is important in satisfying a demand for diverse fishing opportunities in all parts of the province.

Tracking No.	R1904	Year	2 of 2	Total Spent to Date	\$32,400
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Parsnip Watershed Arctic Grayling Monitoring

Status: Completed

Over the 1995-2007 period, the Fish and Wildlife Compensation Program – Peace Region (FWCP) monitored Arctic Grayling abundance and trend in the Parsnip River watershed using August snorkeling surveys in two index reaches of the Table River and four index reaches of the Anzac River. The hiatus in monitoring since 2007 was identified in 2017 as a key information gap limiting the ability of FWCP and FLNRORD to conserve and manage Parsnip River Arctic Grayling. The most important component of our study has been to address this information gap by resuming snorkeling surveys in Anzac River and Table River index reaches beginning in 2018. This report presents snorkeling survey results from August 2019, the second consecutive year of surveys in these locations.

In 2019, snorkeling surveys in long-term index sites were conducted over the August 12-17 period using three independent crews. Snorkeling counts were replicated by all three crews in three long-term index reaches of the Anzac River: 47-45 km, 43-39 km, and 34-30 km. For the second consecutive year, repeatability of snorkeling counts of Arctic Grayling >20 cm was relatively high. The coefficient of variation (CV) ranged from 9.0% to 19.0% among the three locations averaging 13.2% ($\pm 3.0\%$). The remainder of the long-term index reaches (Anzac 16-12 km, Table 35-31 km, Table 26-22 km) received a single snorkeling pass.

Replicated count data exist for all years of the Arctic Grayling snorkeling program in the Parsnip River watershed. We conducted an exploratory statistical analysis in which we estimated population size N and snorkeling detection probability p at index sites based on the variability among replicated counts over the 1995-2019 period. In our approach, observed counts were assumed to be from a Binomial (Nit_i, p) distribution, where each Nit_i signifies population size N at site i and time t. Values for the Nit_i and p, given the count data, were then estimated using maximum likelihood methods. The best model among several alternatives was one which included SITE as a stratified predictor variable for p, i.e. p was site-specific. Values for p appear to be related to the stream size in index sites. Among sites, p ranged from 0.53 to 0.77. At a single site where validation data were available, the maximum likelihood estimate based on the 1995-2019 replicated count data exhibited good agreement with an independent mark-resight estimate of detection probability.

We utilized a linear mixed-effects model, in which Nit_i and YEAR were utilized as fixed effects and STREAM and SITE as nested random effects, to assess population trend for Arctic Grayling of the Parsnip River watershed. Our analysis indicated a significant increase in the abundance of Arctic Grayling >20 cm in the Parsnip River watershed ($P < 0.001$) over the 1995-2019 period. Model results suggest that since 1998 when monitoring was initiated in all six long term index sites in the Parsnip River watershed, the Nit_i have increased by roughly 60%.

A second component of our study addresses another high-priority knowledge gap: the lack of information delineating critical habitats and abundance in other sections of the Parsnip River watershed. In 2019, we utilized single-pass snorkeling surveys to identify critical summer rearing habitats and count Arctic Grayling in the Missinka River in the upper Parsnip River watershed. In contrast to the Anzac and Table Rivers, the Missinka River does not appear to be utilized by a large population of Arctic Grayling in August. Estimated mean densities for the three single-pass snorkeling survey sections were just 8.5, 1.0, and 0.25 Arctic Grayling >20 cm per km (based on unadjusted raw counts) for 33-29 km, 25-22 km, and 8-4 km, respectively. Even the best of these estimates is less than a third of the overall mean density for the Anzac River of 26.6 per km. Based on these results, we recommend this habitat in the Missinka River be considered a lower priority for habitat conservation and enhancement actions, relative to critical summer rearing habitats in the Table and Anzac sub-basins.

Tracking No.	R1905	Year	2 of 2	Total Spent to Date	\$67,412
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Okanagan River Guardian Program

Status: Ongoing

The objective of this project is to collect information on angler effort, catch, harvest, compliance rates and stock status in order to make scientifically-defensible management decisions for *Onchorhynchus mykiss* (rainbow/steelhead) sport fisheries, including the need for regulation changes and implementation of stock conservation or protection measures. Accomplishments for 2019 revolved mostly around enhancing the working relationships with local first nations and collaborating on a joint community approach for river guardianship in Region 8.

Significant time and resources were spent organizing community meetings with band representatives to develop a program where regional fisheries management concerns were in line with local first nations concerns and management priorities.

Continuation of the river guardian program in 2020 will help educate anglers, reduce the noncompliance rate by providing a continued enforcement presence, collect vital information on angler effort exploitation, and thereby help to maintain sustainable wild stock fisheries for steelhead and rainbow trout in the Okanagan Region. What's more, collaboration with first nations will ensure angling information from local band fishers, a component previously absent, will be included in the project scope.

Tracking No.	R1907	Year 2 of 3	Total Spent to Date	\$30,252
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Steelhead Questionnaire

Status: Ongoing

2019-2020 funded via internal government funds.

Tracking No.	R1908	Year 2 of 5	Total Spent to Date	\$0
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