HABITAT CONSERVATION TRUST FOUNDATION

2015-16 Enhancement Proposal (5-271)

Multi-Year Continuing Project: **Quesnel Lake Exploitation Study**

***(EDITOR'S NOTE:** Some names and facts have been altered for the sake of this example).*

Proponent: Senior Fisheries Biologist

Organization: Ministry of Forests, Lands and Natural Resource Operations

Amount Requested from HCTF in 2015-16: $88,187

This is Year 3 of 5

Project Description:

This is year three of a five year study to estimate the proportion of large rainbow trout, bull trout and lake trout caught in Quesnel Lake. Project results will provide management with science based data for revising regulations and harvest quotas for each species which may result in increased angler use on Quesnel Lake.

Project Location: Quesnel Lake

Species Enhanced: F-ONMY, F-SACO, F-SANA

This proposal links to HCTF project #:

Is this proposal resulting from a Seed project?: No

Have you discussed this project with the regional Ministry biologist?: Yes

Please provide the name of this person and any relevant comments:

Regional fisheries biologists. Provincial Large Lakes Committee.

Multi-Year Budget

Year	Funding Year	HCTF Requested or Projected	Total Other Funding	Project Total
1	2013-2014	$83,350	$72,300	$155,650
2	2014-2015	$88,187	$58,000	$146,187
3	2015-2016	$88,187	$35,000	$123,187
4	2016-2017	$88,187	$21,000	$109,187
5	2017-2018	$88,187	$21,000	$109,187
	Total =	$436,098	$207,350	$643,448

Multi-Year Budget Comments:

Budget estimates for Years 4 and 5 are based on the assumption that costs will remain the same through to the end of the project.

Project Progress To Date:

During the initial two years of this project, the MFLNRO has acquired and successfully deployed 28 acoustic receivers throughout Quesnel Lake and associated tributaries. The acoustic receivers were acquired through a combination of partnership funding from MFLNRO, industry, and borrowing receivers that were previously utilized for the Mabel Lake HCTF project completed in 2012. The MFLNRO provided funding required to cover costs of deployment (i.e., buoys, anchor rope, anchors, swivels, etc.).

As planned, an additional 75 acoustic tags were deployed in 2014. In total 26 lake trout, 14 bull trout and 35 rainbow trout were surgically implanted with V13-1L 81KHz acoustic tags. Each fish receiving an acoustic tag was also marked with high reward floy tags inserted along either side of the dorsal fin. Each tag was marked with the reward value (i.e., $100) and a phone number. Each fish was double tagged to provide information regarding potential tag loss. To increase sample size for the exploitation component, an additional 175 fish were tagged with high reward tags only. Additional floy tags were purchased with funds provided by the MFLNRO.

Acoustic receivers were serviced and downloaded three times during the summer to ensure proper function. The final download, prior to the winter season occurred on October 28th. This data will be analyzed during the winter and a summary report of the first two year's results will be submitted prior to HCTF's annual reporting deadline. Receivers were left in the lake to continue tracking movements of fish throughout the winter. The next downloading of data will occur in April 2015. The annual report will include a summary of life history information for each species, outline migration patterns as well as provide preliminary estimates of exploitation rate. The continuation of this project for multiple years is critical to not only understand movements and exploitation rates for each species but to obtain a greater understanding of the variability surrounding these estimates which is critical for effective management.

To maximize public awareness and support, MFLNRO fisheries staff consulted with all lodges and guide operators utilizing Quesnel Lake and associated tributaries. Signs outlining project objectives were distributed around the lake as well as at prominent locations in the towns of Horsefly and Likely. Fisheries staff also presented the project to the Regional Angling Advisory Committee which is comprised of a combination of angling guides, resident anglers and ecotourism operators. The angling advisory committee provided unanimous support for the project. The overall public response has been very positive.

All activities identified within the original proposal, that were scheduled for this point in Year 2 (i.e., prior to November 3), have been completed. Remaining activities for Year 2 (i.e., data analysis and summary report) are progressing as planned.

Year 2 project costs were $146,187.00 with $86,187.00 provided by HCTF. Partnership funding was secured to purchase and deploy an additional 13 acoustic receivers. These receivers addressed spatial gaps in acoustic coverage identified in year 1 of the study. In addition to completing the in lake acoustic array, additional receivers were also deployed in large tributary streams as well as the Quesnel River to further understand migrations in and out of these systems. Understanding behaviour of trout stocks within these streams is of particular importance for management of Quesnel Lake as these streams support substantial fisheries in which these stocks are exploited.

HCTF funding has been utilized to leverage considerable partnership support as well as considerable in-kind support from local volunteers.
The total project cost through Year 3 will be $425,074.00 of which HCTF will have provided $259,724.00.

This project continues to be on schedule and on budget. There have been no changes to the previously approved objectives, timelines or budget. As was the case for the 2014/2015 funding cycle the HCTF funding request for 2015/2016 is $88,187.00.

Is the Project Progressing as Planned?

The project is progressing as planned. All activities identified in the original proposal that were scheduled for the first two years have been completed or remain on track to be completed prior to March 31, 2015. In addition to the fifteen acoustic receivers that were deployed in 2013, partnership funding was secured and used to purchase and deploy an additional thirteen receivers in 2014. These receivers addressed geographic gaps in acoustic coverage identified during the 2013 field season. As planned, data collected during year's one and two will be analyzed during the winter and a summary report will be prepared and submitted prior to the HCTF annual reporting deadline.

All 75 acoustic tags, purchased in 2014, were distributed. An additional 175 fish were tagged with high reward tags only. Thirty-one high reward tagged fish were recaptured during the 2014 angling season. The first two years of tagging, recapture, and acoustic data will be utilized to generate preliminary exploitation rates for rainbow trout, lake trout and bull trout. These estimates will continue to improve as sample sizes increase in terms of tagged fish and recaptures. Data from acoustic tags will continue to inform fish behaviour and mortality rates.

Public support for the project remains high. All major resorts have been consulted and are highly supportive of the project. The Regional Angling Advisory Committee which is comprised of local anglers, angling guides, and ecotourism operators provided unanimous support for the project. Numerous anglers have contacted Regional fisheries staff to enquire about the project. All reports have been positive.

The MFLNRO will continue to provide fisheries staff time and equipment required to ensure tagging targets (i.e., sample size) are achieved, the acoustic array is maintained and public awareness and support for the project remains high.

There have been no changes to project objectives, activities, timelines or requested budget.

Objectives and Activities Summary:

#	Activities	Measures of Success	Timeline
Objective 1: Estimate exploitation and natural mortality rates for Quesnel Lake rainbow trout, bull trout and lake trout.			
1	Deploy 15 acoustic receivers throughout the lake	15 acoustic receivers successfully deployed	Spring 2013 (complete)
2	Deploy additional 13 receivers to fill geographic gaps identified in 2013	13 acoustic receivers successfully deployed	Spring 2014 (complete)
3	Each year tag 25 rainbow trout, bull trout and lake trout with acoustic tags and high reward floy tags.	Tagging completed for 25 fish of each species.	March 2013-2017 (successfully completed for 2013 and 2014)
4	MFLNRO fisheries staff meet with local fish and game clubs, Quesnel Lake resort owners and guides to spread awareness of the project and handling of captured tagged fish.	All captured fish reported; rewards administered	March 2013-2017
5	Downloading and analysis of data	Data downloaded; estimated exploitation rates for each species. Analysis completed.	Fall/winter 2013-2017
Objective 2: Identify movement and distribution of rainbow trout, bull trout and lake trout within the lake. Further define major spawning sites for rainbow trout and blue listed bull trout populations.			
1	Deploy 15 acoustic receivers throughout the lake	15 acoustic receivers deployed throughout lake	Spring 2013 (complete)
2	Deploy additional 13 receivers to fill geographic gaps identified in 2013	13 acoustic receivers successfully deployed	Spring 2014 (complete)

3	Each year tag 25 rainbow trout, bull trout and lake trout with high reward floy tags	25 fish of each species tagged each year	March-May 2013-2017
4	Receivers will be located throughout the lake as well as off suspected spawning systems (i.e., Horsefly River, Mitchell River, Blue Lead Creek, Quesnel River)	Acoustic receivers successfully deployed; high detection rates of tagged fish	March 2013 – March 2017
5	Download receivers each spring and fall	Successful recovery of receivers and downloading of data	Spring/fall 2014-2017
Objective 3: Increased level of participation and satisfaction in fishing on Quesnel Lake.			
1	Analysis of acoustic tag detections and angler floy tag returns	Reliable estimates of exploitation rate for each stock completed.	Data analyzed; final estimates and variability around exploitation rates (annual)
2	Evaluate all data collected and implement effective regulatory regime	Implementation of science based angling regulation regime; increased angler use; increased acceptance/compliance of regulatory regime for Quesnel Lake	March 2017 *note

*Note: Some measures of success may not be obtained until after project completion.

Objectives and Activities Details:

Objective 1: Estimate exploitation and natural mortality rates for Quesnel Lake rainbow trout, bull trout and lake trout.

The primary operational outcome of estimating exploitation rates of Quesnel Lake rainbow trout, bull trout and lake trout will be to implement angling regulations that effectively sustain these stocks while maximizing angler opportunity. The restrictive regulations currently in place are limiting use of the Quesnel Lake fishery. This project will provide the science based data required to develop these regulations.

Fifteen receivers were initially deployed throughout the lake in 2013. An additional 13 receivers were deployed in 2014 to address geographic gaps in the acoustic array identified during the

2013 field season. In addition to the lake, receivers have also been placed in major tributaries (i.e., Horsefly River, Mitchell River) and the Quesnel River to improve understanding of migration behaviour throughout the watershed. It's particularly important to understand migration behaviour throughout the Quesnel Lake system as the major tributaries to the lake also support significant sport fisheries that target Quesnel Lake trout.

The first objective will be achieved via the estimation of the natural and angling mortality rates of large rainbow trout, bull trout and lake trout in Quesnel Lake, over multiple years, along with the communication of results to fisheries managers, members of the MFLNRO large lakes committee and local residents and resorts. More specifically, this objective will be achieved by tagging 25 rainbow trout, bull trout and lake trout with acoustic tags and high reward floy tags. The data will be analyzed using survival analysis. The fish will be caught by the guide and tagged by trained fisheries biologists who participated in the Kootenay Lake project (Andrusak and Thorley 2011). Captured fish are placed in a large cooler filled with fresh water that is aerated by portable aerators. Recovered fish (usually within 10 minutes) are placed in a second cooler with fresh lake water and anesthetized using clove oil at a concentration of 50mg/L. A V13-1L 81 KHz acoustic tag is then implanted in the fish's body cavity using surgical equipment that has been disinfected by soaking in 80% ethanol for 10 minutes. The fish will be externally tagged using numbered orange ($100) and green ($10) floy tags before being placed in the original cooler to recover and released back into the lake. The external floy tags will have an identification number and MFLNRO phone number. All captured trout will be weighed, measured for fork length and scale sampled. It should be emphasized that use of volunteers was not successful on Kootenay Lake due to unacceptable handling and potential mortality while attempting to transfer live fish captured from one boat to another. High winds often precluded such transfers. Also, attempts to transfer live fish only resulted in considerable down time for the guided boat. The colored high reward tags ($100 reward) attached to acoustic tagged trout will ensure angler response (Pollock et al. 2001).

The project capitalizes on HCTF investments already made on Kootenay Lake as the same experienced team will be used on Quesnel Lake (i.e., experienced crew that knows how to catch trout and effectively surgically tag and release them in good condition). Equipment purchased for the Kootenay Lake project will be used on this project. In addition, this project is making use of 10 receivers previously utilized on the Mabel Lake HCTF project that finished in 2012; and partnership funding was secured to cover costs associated with purchasing and deployment of the additional 18 receivers.

Risks to trout stocks in Quesnel Lake will be minimal. Kootenay Lake work determined that informative natural and fishing mortality rates can be derived provided sufficient fish are tagged and the acoustic detection rate is high. That project also confirmed that sufficient fish can be caught (also confirmed by test angling by MFLNRO fisheries staff on Quesnel Lake in 2011 and 2012 as well as through first two years of this study), that the mortality effects of capture and acoustic tagging are acceptable and that the detection rate is high. Risk to the fish

can also be minimized by not tagging bleeding fish, not capturing fish once surface temperatures rise above 15C and not attempting to surgically tag fish in rough waters.

The main risk associated with this project is that anglers fail to report the capture of tagged fish bearing high reward tags. This can be minimized by involving local fish and game club, resort owners and guides in the reporting. Also, non-reporting is considered low since the project has been well publicized and the fish bear a tag with a contact telephone number and the text "$100 REWARD".

With regard to fish handling care; all fish will be handled by trained professional fisheries biologists.

Measures of Success: estimated exploitation rates for rainbow trout, bull trout and lake trout under the current management regime. Alter regulations after year 2 to allow increased opportunity, as anecdotal information indicates current regulations are unnecessarily restrictive and are limiting angler participation. This measure is being met as a variation order has been submitted to increase lake trout daily quota as first two years of study supports anecdotal information that current lake trout quota is unnecessarily restrictive. Initial results indicate rainbow trout exploitation rates may be unexpectedly high. As such, the rainbow trout quota will be one a day (none over 50cm) until further information is gathered to improve understanding of exploitation. Annual exploitation rates will be estimated under altered regulatory regime for multiple years to clearly discern how exploitation rates change in response to the change in regulations. Observed exploitation rates will be evaluated against optimal rates calculated for each species on other large lakes throughout BC and Ontario (Shuter et al. 1998; Bison et al. 2003; Andrusak and Thorley 2011; Andrusak and Thorley 2012; Andy Morris personal communication 2012). This approach will ensure sustainable angling regulations are in place at the end of the study. Ultimately, angling regulations for this high priority wild stock fishery will be science based and defensible.

Objective 2: Identify movement and distribution of rainbow trout, bull trout and lake trout within the lake. Further define major spawning sites for rainbow trout and blue listed bull trout populations.

Identifying the distribution and movement of trout in Quesnel Lake as well as further defining key spawning areas will provide the required science based information to ensure effective management of the Quesnel Lake sport fishery as well as provide the information required to protect important habitats from future resource development proposals within the watershed. This information will be used directly by the MFLNRO fisheries staff to manage this unique wild stock fishery.

Measures of Success: successfully tag 25 rainbow trout, bull trout and lake trout with acoustic tags. Successful deployment of acoustic receivers throughout the lake and key spawning tributaries (complete). High detection rates of tagged fish. Produce a detailed outline of trout migration patterns and habitat use throughout the lake. Ultimately, inform development of sustainable angling regulations as well as provide a scientific basis for effectively protecting important habitats from negative effects of present and future development within the watershed.

Objective 3: Increased level of participation and satisfaction in fishing on Quesnel Lake.

The current angling regulations on Quesnel Lake are amongst the most restrictive and controversial of any large lake in the province. These conservative regulations were implemented without the aid of detailed scientific data regarding the sport fishery. Stakeholders have clearly indicated these restrictive regulations are inhibiting angler use on Quesnel Lake. Anecdotal information indicates the trout populations in Quesnel Lake may be able to support a limited harvest opportunity which could increase angler effort substantially. An added benefit of this study is that the public will be involved through the capture and reporting of tagged fish. The MFLNRO fisheries staff has met with local fish and game clubs, lodge owners, and guides during the first two years of the study. MFLNRO fisheries staff will continue to meet with stakeholders regularly throughout the length of the study to ensure everyone concerned understands benefits of the project. The increased involvement of the angling public will result in increased acceptance and compliance of the regulatory regime implemented on Quesnel Lake.

Specifically, the third objective will be achieved through an angler tag reward scheme that includes $100 for each acoustic tagged fish reported. This objective relies heavily on angler and guide involvement. Over the previous two years, MFLNRO fisheries staff have been meeting with stakeholders to explain the entire project. If angler exploitation is responsible for the decline in size of rainbow trout then it is important that the angling community understand this and be supportive of any required regulatory changes. On the other hand, data collected may result in revision of the current regulations to permit increased retention. This will be well received by the majority of anglers. In addition, the adaptive management approach of implementing new regulations after the initial two years of study and allowing for multiple years of monitoring, after the change in regulations, will provide assurance to those with concerns regarding more liberal regulations, that the regulatory regime in effect at the end of this study is sustainable.

Measures of success: increased satisfaction and acceptance of Quesnel Lake regulatory regime from recreational anglers, guides and resort owners. MFLNRO fisheries staff will obtain a good understanding of stakeholder satisfaction through meetings with fish and game clubs, guides and resort owners that will occur throughout the study. Acceptance of angling regulations can

also be measured through comparison of compliance records from the Conservation Officer Service. In addition, while not required to directly meet objectives of this study, a complementary proposal to conduct creel studies in order to measure angler effort will be submitted to an alternative funding source.

Literature Cited

Andrusak, GF & Thorley. 2011. Kootenay Lake Exploitation Study: Fishing and Natural Mortality of Large Rainbow Trout and Bull Trout. A Poisson Consulting Ltd. and Redfish Consulting Ltd. Report prepared for the Habitat Conservation Trust Foundation.

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Bison, R., D. O'Brien, and S.J.D. Martell. 2003. An analysis of sustainable fishing options for Adams Lake bull trout using life history and telemetry data. BC Ministry of Water, Land and Air Protection, Fisheries Branch, Kamloops BC, February 2003.

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Sebastian, D.C. 1990. Juvenile rainbow trout production in the Horsefly River, the largest tributary to Quesnel Lake, BC. Ministry of Environment Recreational Fisheries Branch; Victoria BC. Fisheries project report No. FAIU-16.

Sebastian, D., R. Dolighan, H. Andrusak, J. Hume, P. Woodruff and G. Scholten. 2003. Summary of Quesnel Lake kokanee and rainbow trout biology with reference to sockeye salmon. Stock Management Report No. 17. Province of British Columbia.

Shuter, B.J., M.L. Jones, R.M. Korver and N.P. Lester. 1998. A general, life history based model for regional management of fish stocks: the inland lake trout (*Salvelinus namaycush*) fisheries of Ontario. Can. J. Fish. Aquat. Sci. 55: 2161-2177.

Thorley, J.L., R. Laughton and A.F. Youngson. 2007. Seasonal variation in rod recapture rates indicates differential exploitation of Atlantic salmon, Salmo salar, stock components. Fish. Manag. Ecol. 14: 191-198.

Personal Communications

Andy Morris. 2012. Fisheries Biologist. Ministry of Forests, Lands and Natural Resource Operations. Thompson Region.

Paul Askey. 2012. Fisheries Stock Assessment Biologist. Ministry of Forests, Lands and Natural Resource Operations. Okanagan Region.

Communications/Outreach

Project Communications Plan

This project will continue to be well publicized and receive considerable attention from local residents and media. This project has been long anticipated by a critical public that is becoming increasingly frustrated with conservative angling regulations that are not science based. A great deal of public good will is anticipated and local involvement of anglers, guides and resort operators will greatly enhance project success. In addition to MFLNRO fisheries staff meeting with local clubs, guides and resort owners, posters have been produced and distributed to angling shops and displayed in prominent locations around the lake. Results will also be presented to the provincial Large Lakes Committee.

HCTF Communications Plan

This project will help HCTF meet the goal of being a recognized leader in fish, wildlife and habitat conservation as there will be considerable interest from local resort owners, guides and general angling public as the current restrictive regulations in place for Quesnel Lake have remained controversial since being implemented in 2002/2003. The MFLNRO fisheries staff will engage resort owners, guides and angling clubs throughout the course of this study. In all meetings/presentations HCTF will be recognized as a primary partner in conducting this study focused on ensuring the long term sustainability of these wild stocks while also maximizing angling opportunities on Quesnel Lake. HCTF will also be prominently identified on all publications/posters developed for this study.

Budget A. Labour Costs

Human Resources: Wages & Salaries

Position	Total Days on Project	HCTF Person Days	Rate/Day	Total HCTF Amount
fisheries technician - monitor and maintain acoustic array (i.e., 25 receivers) 0	20	20	$250	$5,000

Subcontractors/consultants

Position	Total Days on Project	HCTF Person Days	Rate/Day	Total HCTF Amount
Guide & Boat & Gas	22	22	$700	$15,400
Biologist - fish capture, surgery	22	22	$500	$11,000
Data summary, analysis	10	10	$500	$5,000
Scale reading, otoliths	4	4	$300	$1,200
GIS, array downloads	10	10	$500	$5,000

Other

Description	Total Days on Project	HCTF Person Days

Sub-Total Labour Costs = $42,600

Budget B. Site/Project Costs

	Description	Total HCTF Amount
Travel	4600km @ $0.50/km ($2,300); per diems ($47/day); 44 days ($2,200); Motel (contractors, MFLNRO staff) - 52 nights @ $100/night ($5,200)	$9,700
Capital Expenditures/Equipment Purchase	Acoustic receivers 25 @ $1,510.00 each ($37,750.00) - Covered through partnership funding	$0
Site Supplies & Materials	50 V 13L @ $380/tag ($19,000); 25 Acoustic/Radio combination tags @ $395 each ($9,875); Surgical supplies ($1000)	$29,875
Rental (equipment, vehicle, helicopter)	2 VHF radios	$900

SubTotal Site/Project Costs = $40,475

Budget C. Overhead/Administration

	Description	Total HCTF Amount
Administration fee	admin fee (12% of $42,600)	$5,112

SubTotal Overhead/Administration Costs = $5,112

Administration Fees

Administration fee is 12%. 12% of $42,600 was charged.

Capital Expenditures and purchases over $1,000

Item Description	Cost

Budget D. HCTF Budget Request Summary

Labour Costs	**$42,600**
Project/Site Costs	**$40,475**
Overhead Costs	**$5,538**
Total Amount from HCTF:	**$88,613**

Budget E. Other Funding Partners

Name of Organization	In-Kind Amount($)	Cash Requested($)	Cash Confirmed (Yes or No)	Total
	$21,500	$10,500	Yes	$32,000
	$0	$3,000	Yes	$3,000
Total All Partners	**$21,500**	**$13,500**	**$13,500**	**$35,000**

Percent of Cash Request that is Confirmed = 100%

Total Project Costs

Total Partners Amount	Total HCTF Amount	Project Total
$35,000	$88,187	$123,187
28%	72%	100%

Response to Technical Committee and Board Comments

Last year the technical review committee provided the following:

"Recommended for funding. The committee is pleased to see that all technical comments from last year have been addressed".

"The committee recommends that the proponent engage with the Lake Trout group regarding regulation changes"

- The regulation changes were brought forward on the latest provincial large lakes committee call. All members of the lake trout group are on that committee. Lake trout regulations will also be further discussed at the next large lakes committee meeting this fall.

"The committee recommends putting radio receivers at key access points to detect CART tags which provide independent estimates of removal rates because tag returns are not guaranteed"

- At the committees request CART tags were purchased and are being inserted in lake trout. There was no funding available in 2013/2014 to purchase additional telemetry receivers. However, it has been included in the 2014/2015 MFLNRO capital request. I will also engage the large lakes committee to see if anyone else has a receiver available. If successful, receivers will be placed at key access points.

Attachments

Letter of Support

Map

Map

Budget