

A CONTINUED ASSESSMENT OF THE SALISH SUCKER (*CATOSTOMUS SP*)
POPULATION IN THE LITTLE CAMPBELL RIVER WATERSHED 2014

A ROCHA CANADA CONSERVATION SCIENCE SERIES



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Abstract

The Salish Sucker is an endangered freshwater fish found only in a small number of watersheds in southwest British Columbia, Canada, and northwest Washington State, United States. It is threatened mainly by severe hypoxia, associated with groundwater-fed rivers such as the Little Campbell River (LCR), where it has been studied by A Rocha Canada since its rediscovery in 2011. In spring and fall 2014 surveys aimed to map more of the Salish Sucker's presence throughout the LCR watershed, as well as revisit areas where individuals had been found in previous survey periods.

Trapping was conducted in March, April and November. Feddes traps were set one day and collected the next. All trapped fish, amphibians, and large crustaceans were identified to species, counted and then released. Salish Sucker sex and fork length were recorded. Water quality data were measured, including dissolved oxygen (mg/L), specific conductance ($\mu\text{S}/\text{cm}$), temperature ($^{\circ}\text{C}$) and pH.

A total of 24 Salish Suckers have been found in the Little Campbell River watershed since 2011. The furthest upstream individual was found in the river adjacent to the north lake at 235 Street and 8 Avenue. Between 172 and 176 Streets in an off-channel habitat was the furthest downstream a Sucker was caught. Juvenile Salish Suckers were found in the lake at 235 Street north of 8 Avenue in November 2014 and in the Brooksdale new wetland in April 2013.

Salish Suckers have been found in areas surrounded by or in the vicinity of native forest, however high habitat suitability didn't necessarily correlate with Salish Sucker presence. In 2014, Salish Suckers were found in more open water, and areas of the river that were surrounded by Reed Canary Grass, hay fields and shrubbery.

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Cover illustrations:

Photograph of male Salish Sucker found at Red Willow (La Bounty) Ranch, by Andrew Baylis

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Introduction

Background and Biology of the Salish Sucker

The Salish Sucker (*Catostomus sp.*) is a freshwater fish that is part of the family Catostomidae or “suckers” (Zevit & Pearson 2010; Pearson & Healey 2012). It is also a member of the “Chehalis fauna” which is a group of fish species believed to have survived the continental glaciations by taking refuge in an ice-free area in Washington State and accessing new watersheds as the glaciers were receding (Zevit & Pearson 2010; Pearson & Healey 2012; COSEWIC 2012). The Salish Sucker is listed as endangered (Schedule 1) by Canada’s *Species at Risk Act*, listed as threatened federally by COSEWIC (2012) due to an increase of known locations, and red-listed in British Columbia (Pearson & Healey 2012). The Salish Sucker is closely related to the more common Longnose Sucker (*Catostomus catostomus*) but the species diverged after the last ice age, 12,000 years ago, and have since had no gene flow (McPhail 1987; McPhail & Taylor 1999; Zevit & Pearson 2010). The Salish Sucker is genetically distinct from the Longnose Sucker, though a distinct species name has not yet been assigned (Harvey 2009).

The distinguishing features of the Salish Sucker include its smaller size of up to 25cm, elongated and cylindrical body shape with larger scales, a moderately forked tailfin, large anal fin, a dorsal fin with 9 to 11 rays, a toothless sub-terminal mouth with fleshy lips and a shorter rounded snout (Zevit & Pearson 2010; Pearson & Healey 2012). The Suckers forage for food consisting of mainly midge fly larvae and other aquatic insects, detritus and small decomposing animals and plants from the stream bottom (Zevit & Pearson 2010).

Salish Suckers develop a broad, rose-coloured band on their sides during the spawning season, which runs from April to July (Zevit & Pearson 2010). Spawning occurs in riffles (shallow and rocky areas) with water velocities of approximately 50cm/s (Zevit & Pearson 2010; Pearson & Healey 2012). The fish congregate in an appropriate area to broadcast spawn to which some fish may travel up to one kilometer and cross many obstructions in order to reach (Zevit & Pearson 2010). The eggs of Salish Sucker are adhesive and stick to rock surfaces in the stream (Zevit & Pearson 2010; COSEWIC 2012). The fry emerge about one month after spawning and reach sexual maturity at 2

years of age for males and 3 years for females (Zevit & Pearson 2010). The Salish Sucker is known to live for up to five years (Zevit & Pearson 2010).

Although riffles are needed for spawning, Salish Suckers also need slower moving sections of streams or sloughs, deep pools and off channels, such as marshes and beaver ponds for habitat (Pearson 2004; McPhail 2007; Zevit & Pearson 2010; COSEWIC 2012; Pearson & Healey 2012; Upcott et al. 2014). They also tend to prefer stream reaches with native riparian vegetation (Pearson 2007; Upcott et al. 2014). The Suckers are active in the streams mostly at night, and rest among heavily covered streamside vegetation during the day (COSEWIC 2012; Pearson & Healey 2012). Populations are threatened due to habitat loss and fragmentation due to urban and agricultural development, decreased flow of water, introduced predators, as well as the degradation of water quality including severe hypoxia (extremely low dissolved oxygen), sedimentation, and contamination (Cooke et al. 2005; Zevit & Pearson 2010; COSEWIC 2012; Pearson & Healey 2012). The largest threat is said to be hypoxia which is linked to low flow, higher temperature and eutrophication in the river (Zevit et al. 2008; Recovery Team for the Salish Sucker 2010).

Salish Suckers in the Little Campbell River Watershed

Salish Suckers are found in British Columbia and Washington State. In Canada, populations have been discovered in the Salmon River, Bertrand Creek, Pepin Creek, Fishtrap Creek, Salwein Creek, Miami Creek, Chilliwack Delta, Mountain Slough, Agassiz Slough, Elk Creek, Hope Slough, and the Little Campbell River (COSEWIC 2012). The Little Campbell River watershed population was considered extirpated since 1976 until its rediscovery in 2011 (McPhail 1987; Yip et al. 2012). From 2011 to the spring of 2014, surveys had successfully caught 20 individuals in the Little Campbell River watershed, ranging from the upper to lower reaches (Upcott et al. 2014). This population is clearly small and vulnerable to all of the previously mentioned threats. Hypoxia is one of the largest concerns for Salish Suckers as the Little Campbell River is groundwater-fed and historically has had consistently low dissolved oxygen concentrations. Though Salish Suckers are thought to prefer dissolved oxygen levels of 4mg/L or more, some areas of the watershed experience dissolved oxygen levels much lower, resulting in hypoxia (Recovery Team for the Salish Sucker 2010; Upcott & Juteau 2014).

Surveys will continue to be conducted in the Little Campbell River watershed in search of more Salish Suckers. The objective is to provide updated information on the presence of the Salish Sucker and the presence of other aquatic animals (fish, amphibians, crustaceans) in the watershed. The first priority is to survey areas along the Little Campbell River watershed with suitable habitat that have not previously been surveyed. The second priority for surveying is to visit sites where Salish Suckers have successfully been captured in the past, to determine consistency of occupancy. The third priority is to survey areas which have recorded higher dissolved oxygen levels. These surveys can give information about where Salish Suckers congregate, and what habitat and water quality parameters are preferred by the Sucker. Secondly, the surveys provide information on other prominent aquatic species populations.

Methods

Trapping Methods

Fish trapping surveys occurred in the months of March, April and November 2014. Sections of the Little Campbell River, its tributary Jacobsen Creek and ponds that are connected to the river were identified as priority areas to survey in the fall as they had not yet been surveyed (Figure 1). These two sections were from 16th Avenue south to the Hazelmere RV Park and Campground including Jacobsen Creek up to the culvert as well as the adjacent beaver pond, and from 237A Street to the Municipal Nature Park including an un-surveyed lake adjacent to the river.

Surveys were conducted every week for 3 to 5 consecutive days. Access to the water was gained by foot or by canoe, and all observers wore chest waders. Feddes traps (Pearson 2013) were used to allow entry of larger fish such as the Salish Sucker as well as salmonid parr and smolts. Traps were baited with a small handful of dried cat food and then set in the water. A total of 166 traps were set over the course of the spring (100) and fall (66) survey periods, and were placed approximately every 100m where suitable habitat was found. Sections of the Little Campbell River to be surveyed were planned prior to each trapping day. Once set, traps were left for approximately 24 hours before being checked. All animals captured were released at their point of capture.

1:

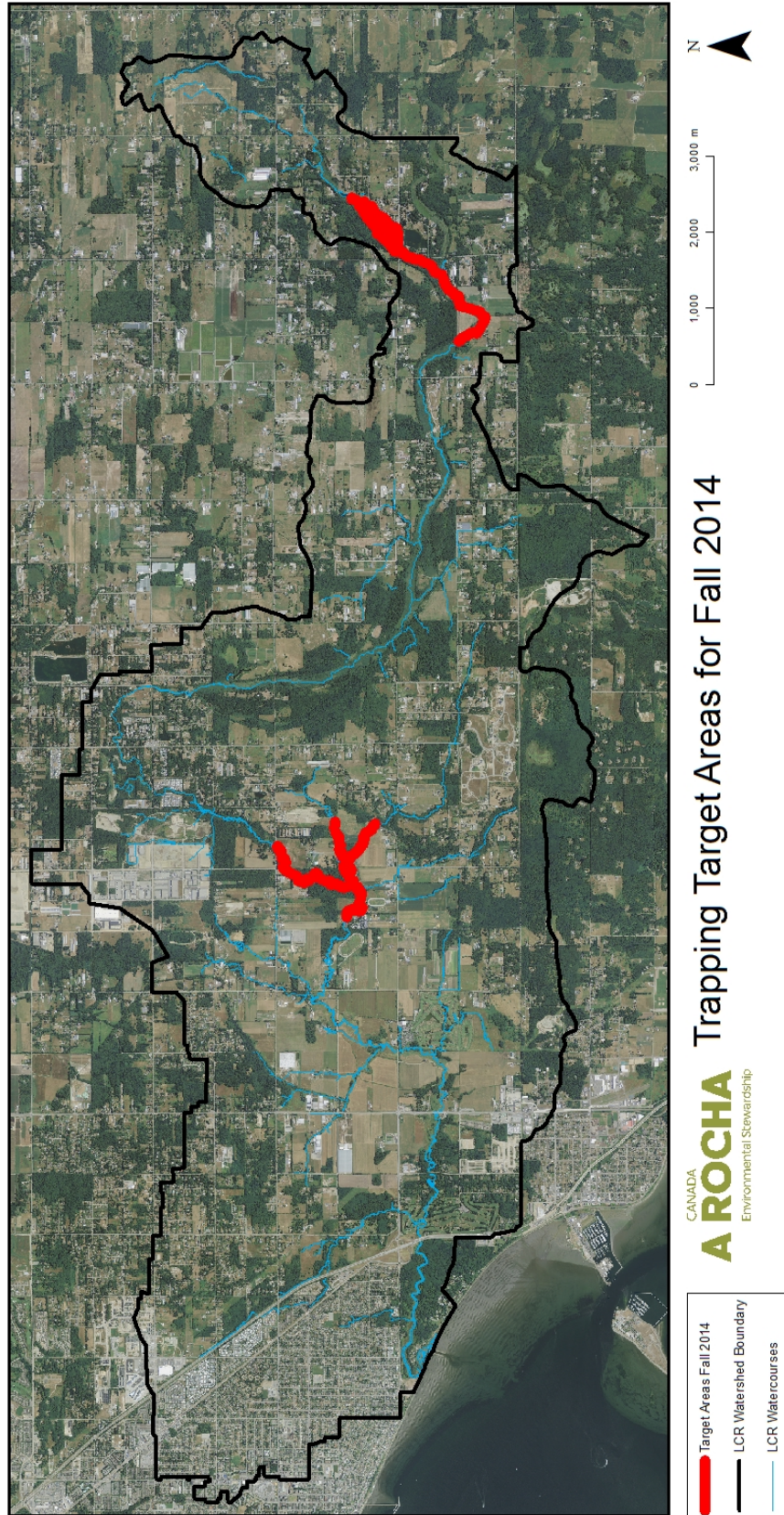


Figure
Map

Data collection

At the beginning of trapping and lifting sessions the following data were collected: the date, weather, site information and observers. At each trap setting, the trap number, waypoint number, easting, northing, time set, any comments and photos taken, as well as water quality measurements were recorded. Water quality measurements included temperature ($^{\circ}\text{C}$), dissolved oxygen (mg/L), specific conductivity ($\mu\text{S}/\text{cm}$) and pH. At each trap lifting, the trap number, waypoint number, lift time, species caught and their frequency, and any comments were recorded. If a Salish Sucker was caught its sex (if possible) and fork length to the nearest millimeter were recorded.

Results

Salish Suckers Caught in 2014

There were four Salish Suckers successfully captured in 2014, all in the month of November. These Suckers were found in areas that

have not been trapped previously, on private land off of 235 Street, 232 Street and 0 Avenue in Langley. There were two males (Figure 2a, 2b), a female and a juvenile (Figure 2c), showing that the Suckers are still breeding in the Little Campbell Watershed. The juvenile was found in a lake off of 235 Street and north of 8 Avenue,

which was a location of interest for Suckers because it is an old gravel pit that had a connection to the Little Campbell River. The three adults were found in the main stem of the Little Campbell River. One was in the river adjacent to the lake at the north end, and



Figure 2a: Male Salish Sucker 155mm



Figure 2b: Male Salish Sucker 180mm



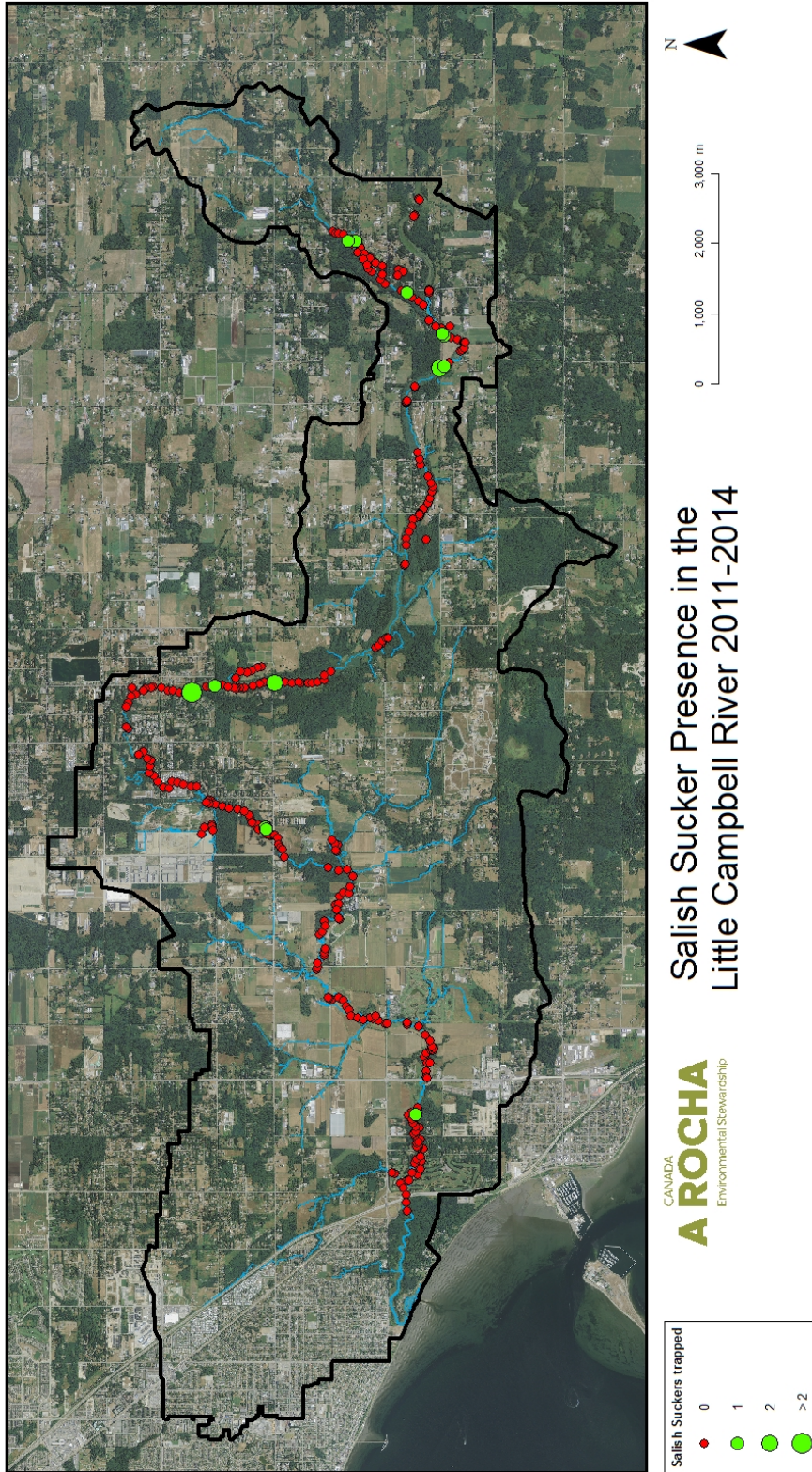
Figure 2c: Juvenile Salish Sucker 55mm

the other two were in a section of the river that goes through Red Willow Ranch (La Bounty), about 100m from the northeast entrance of the river onto the property, upstream of a broken beaver dam. The summary of all Salish Suckers found since 2011 can be found in Table 1. The map of Salish Sucker locations can be seen in Figure 3.

Table 1: Summary of Salish Sucker captures in the Little Campbell Watershed since 2011

#	Date	Easting	Northing	Location	Sex	Length (mm)
1	?-?-2011	522958	5431082	BROOKSDALE MAIN POND	?	?
2	October-04-11	529491	5428588	MUNICIPAL NATURE PARK	M	182
3	October-04-11	529491	5428588	MUNICIPAL NATURE PARK	M	150
4	April-05-13	529522	5428519	MUNICIPAL NATURE PARK	F	170
5	April-05-13	530567	5429051	232 ST/BRIDGE	M	168
6	April-06-13	522934	5431061	BROOKSDALE NEW WETLAND	juv	54
7	April-10-13	525011	5430939	16 AVE U/S	M	177
8	April-10-13	525011	5430939	16 AVE U/S	M	162
9	June-?-13	522934	5431061	BROOKSDALE NEW WETLAND	F	?
10	October-22-13	524880	5432129	U/S 24 AVE E	M	141
11	October-22-13	524880	5432129	U/S 24 AVE E	F	132
12	October-22-13	524880	5432129	U/S 24 AVE E	F	218
13	October-22-13	524880	5432129	U/S 24 AVE E	F	141
14	October-22-13	524880	5432129	U/S 24 AVE E	M	143
15	October-22-13	524880	5432129	U/S 24 AVE E	F	208
16	October-22-13	524880	5432129	U/S 24 AVE E	F	238
17	October-22-13	524975	5431806	U/S 24 AVE E	M	140
18	October-25-13	522934	5431061	BROOKSDALE NEW WETLAND	F	152
19	October-25-13	522932	5431065	BROOKSDALE NEW WETLAND	M	151
20	November-08-13	518873	5428932	U/S 8 AVE E	F	152
21	November-06-14	531296	5427543	North Lake @ 235 Street	juv	55
22	November-06-14	531295	5427543	LCR Adjacent Lake @ 235 Street	M	155
23	November-07-14	529955	5427536	D/S Horse Trail Bridge (La Bounty Ranch)	F	186
24	November-12-14	529985	5428543	LCR - La Bounty Ranch	M	180

Figure
Salish



3:

Sucker Presence in the Little Campbell River Watershed 2011-2014

Summary of Aquatic Species

In 2014 there were a total of 166 traps set in the Little Campbell Watershed, which caught a wide variety of species. Nine fish, five amphibian, one crustacean and two insect species were caught in the traps (Table 2). The most abundant species seen was the Pumpkinseed Sunfish, totaling 1547 individuals captured. A new species of invasive fish, the Brown Bullhead Catfish was found thriving in a lake in Langley off of 235 Street north of 8 Avenue. Juvenile metamorphosed American Bullfrogs were also caught for the first time in 2014. Green Frog tadpoles were most likely caught in previous surveys and counted as Bullfrog tadpoles because they are very similar in size and appearance. The distinguishing features between the two include that the Green Frog tadpoles are more wide than high appearing flattened and have a tail that is 2/3 the total length, while the Bullfrog tadpoles are more round, have a more yellowish belly and distinct dark spots on the top of body and tail, and a tail that is 3/5 the total length.

Table 2: Summary of aquatic species captured in traps in 2014.

Class	Species	Spring 2014	Fall 2014	Status in BC
Fish	Salish Sucker, <i>Catostomus sp.</i>	0	4	Native, red-listed
	Coho Salmon, <i>Onchorhynchus kisutch</i>	183	43	Native
	Coastal Cutthroat Trout, <i>Onchorhynchus clarkii clarkii</i>	5	5	Native, blue-listed
	Rainbow Trout, <i>Onchorhynchus mykiss</i>	12	8	Native
	Threespine Stickleback, <i>Gasterosteus aculeatus</i>	613	133	Native
	Prickly Sculpin, <i>Cottus asper</i>	159	18	Native
	Fathead Minnow, <i>Pimephales promelas</i>	55	82	Introduced
	Pumpkinseed Sunfish, <i>Lepomis gibbosus</i>	1040	507	Introduced
	Brown Bullhead Catfish, <i>Ameiurus nebulosus</i>	0	84	Introduced
Amphibian	Rough-skinned Newt, <i>Taricha granulosa</i>	12	0	Native
	Northwestern Salamander, <i>Ambystoma gracile</i>	67	4	Native
	Red-legged Frog, <i>Rana aurora</i>	13	0	Native, blue-listed
	Green Frog tadpole, <i>Lithobates clamitans</i>	0	194	Introduced
	American Bullfrog tadpole, <i>Lithobates catesbeianus</i>	1139	391	Introduced
American Bullfrog, <i>Lithobates catesbeianus</i>	0	3	Introduced	
Crustacean	Signal Crayfish, <i>Pacifastacus leniusculus</i>	7	0	Native
Insect	Giant Water Bug	0	1	Native
	Northern Case Maker Caddisfly Larva	0	25	Native

Discussion

Salish Sucker Presence

The main goals for the Salish Sucker surveys in November 2014 were to trap areas not previously trapped and areas where suckers had been found in the past. Trapping was successfully accomplished in the following un-trapped locations: south of 16th Avenue to the Hazelmere RV Park and Campground (not including the Paintball property), a pond near the mouth of Jacobsen Creek, and from 235 Street to Langley Municipal Nature Park including an un-surveyed lake adjacent to the river. Salish Suckers were found at the north end of the lake in a relatively shallow and heavily vegetated area, in the river adjacent to the lake at the north end in a small slower moving side-section in a Reed Canary Grass plain with large native shrubbery, and in the river south of the 4 Avenue horse trail bridge in a deep slow-moving section upstream of a small beaver dam that had been broken by the landowners. As requested, the landowners of these properties were given a fish survey information sheet describing what was caught in the waterways on their properties (Appendices 1 and 2). The lake, which was believed to have a permanent connection to the river, was found to only be completely connected when there is extremely high water.

Areas where Suckers were previously caught that were trapped again included Langley Municipal Nature Park, 232 Street Bridge, and Brooksdale main pond and new wetland. No Suckers were caught at these locations in 2014, though the Suckers caught were in the river approximately one kilometer upstream and downstream of the 232 Street Bridge, and approximately one kilometer upstream of Langley Municipal Nature Park.

Notable Fish Findings

A rather disappointing finding was that the lake at 235 Street and 8 Avenue was filled with predatory invasive Brown Bullhead Catfish (*Ameiurus nebulosus*). This is a fish native to eastern North America. Information on the introduction of this fish is unknown, but it is now abundant in British Columbia (Roberge et al. 2002; McPhail 2007). These fish were predominantly found in deeper areas of the lake, both near to shore and in the middle of the lake, where the water is slow moving and vegetated. The Brown Bullhead Catfish is a nightmare for native fish as it can tolerate a large range of

temperatures and oxygen levels, even having the ability to live out of water for long periods of time (Royal BC Museum 2011). It also has few natural predators and is not popular with fishermen (Royal BC Museum 2011). The worst thing is that it is a predatory fish that will eat anything that it comes across and can fit in its mouth which includes frogs, snakes, birds, and fish (McPhail 2007; Royal BC Museum 2011). They will eat the food of native fish, as well as the fish themselves. For these reasons it was really a surprise to find the juvenile Sucker in the lake that was infested with Brown Bullhead Catfish. This juvenile was the young of this year, meaning that it had either hatched in the lake or had somehow found its way into the lake. More trapping in the lake where this juvenile was caught might help in understanding this mystery.

Salish Suckers and Dissolved Oxygen

Since 2011, there has not been a consistent trend for the relationship between where Salish Suckers are found and the dissolved oxygen concentration (Upcott et al. 2014). This term there was also a wide range of dissolved oxygen concentrations where Suckers were found. Dissolved oxygen (DO) levels varied from 2.55mg/L in the lake where the Sucker was found, to 9.53mg/L in the river flowing through La Bounty Ranch. Water temperature had a role in this difference as the water in the lake was 11.5°C and the water in the river at La Bounty Ranch was 4.3°C. The stretch of river where the Suckers were found in November is known to become very slow moving and low or dry in the summer months, meaning these areas have drastic differences in DO over the year. During this fall season, the dissolved oxygen logger at the 232 Street road bridge (which is between this year's successful Sucker sites) recorded DO data that ranged from a low of 1.38mg/L at mid-September when it was not flowing to a maximum of 12.32mg/L in mid-November when it was flowing steadily. It would be interesting to know where these fish are living during other times of the year when the river is low and slow and depleted of oxygen.

Future Directions

Locations that should be trapped in 2015 include the Panther Paintball property, downstream of the Langley Municipal Nature Park bridge (in the park) and west of 224 Street, Jacobsen Creek and pond in higher spring water flows, the areas where Suckers have been successfully caught such as upstream of 24 Avenue east pond, and upstream of 16 Avenue in Campbell Valley Park. Continued trapping in the area from

Langley Municipal Nature Park to 235 Street would also be beneficial to see if Suckers are caught again. It may also be interesting to tag the Suckers with tracking devices to find out where they go during the summer months.

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Appendix 1: La Bounty Ranch – Fish Survey Results for Landowners

CANADA

A ROCHA

Environmental Stewardship

November 2014

Fish Survey Results for Landowners

Prepared by: Jennifer Rumley, B.Sc. | Conservation Science Intern

In November, biologists from A Rocha Canada conducted fish surveys in the main stem of the Little Campbell River at La Bounty Ranch, as well as in the pond next to the south bend in the river, and the irrigation pond. These surveys contributed to an ongoing inventory study of the fish species in our watershed. Our activities involved setting cylindrical fish traps at select locations along the River and in the lake (roughly every 100 metres), leaving them overnight, pulling them the following day, then identifying and counting all the trapped individuals (fish and amphibians) before immediately releasing them at the location of their capture.

The following tables outline what we caught on your property:

Table 1: Fish Survey of Little Campbell River on La Bounty Ranch - November 13/14, 2014

Species	#	Comments
Three Spine Stickleback	21	Native
Bullfrog/Green Frog Tadpoles	4	Introduced
Coho Salmon	4	Native
American Bullfrog	3	Introduced
Salish Sucker (adult M & F)	2	Native; BC red-list ²
Pumpkinseed Sunfish	1	Introduced

¹ BC blue-listed species are of *special concern* (or vulnerable) in British Columbia because they are particularly sensitive to human activities or natural events.

² BC red-listed species are *extirpated* (no longer exist in the wild in BC, but occur elsewhere), *endangered* (facing imminent extirpation or extinction) or *threatened* (likely to become endangered if limiting factors are not reversed) in British Columbia.

Table 2: Fish Survey of South Pond on La Bounty Ranch - November 14, 2014

Species	#	Comments
Pumpkinseed Sunfish	22	Introduced
Bullfrog/Green Frog Tadpole	11	Introduced
Fathead Minnow	8	Introduced
Three Spine Stickleback	2	Native

Table 3: Fish Survey of Irrigation Pond (North) on La Bounty Ranch - November 14, 2014

Species	#	Comments
Fathead Minnow	64	Introduced
Bullfrog/Green Frog Tadpole	57	Introduced
Pumpkinseed Sunfish	49	Introduced
Three Spine Stickleback	1	Native

Our most exciting findings were two Salish Suckers!

The **Salish Sucker** is a freshwater fish of particular interest because it was thought to be extirpated (no longer living in this watershed) since 1976. It was rediscovered in a pond at A Rocha Canada's Brooksdale Environmental Centre in South Surrey in 2011. The Salish Sucker is listed as **endangered** by Canada's *Species at Risk Act*, **threatened** federally by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and **red-listed** in British Columbia.

Populations are threatened by habitat loss and fragmentation due to urban and agricultural development, decreased flow of water, introduced predators, as well as the degradation of water quality including severe hypoxia (extremely low dissolved oxygen), sedimentation, and contamination. Salish Suckers need slower moving sections of water for habitat such as sloughs, deep pools, off channels, marshes and beaver ponds. They also tend to prefer waterways with native vegetation on the banks that are generally forested with shrubby understory.



Salish Suckers are only found in British Columbia and Washington State. In the last three weeks, our surveys successfully found four individuals, bringing the total to 23 since the Salish Sucker's rediscovery in 2011 in the Little Campbell River watershed. This population is clearly small and vulnerable to all of the previously mentioned threats.

Surveys are continually being conducted in the Little Campbell River watershed in search of more Salish Suckers. The objective is to provide updated information on the presence of the Salish Sucker and the presence of other aquatic animals in the watershed.

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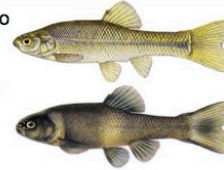
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Pumpkinseed Sunfish is native to eastern North America and was originally introduced to British Columbia to control other fish populations and as a food source for introduced Largemouth Bass. It has also been used as an aquarium fish because of its beautiful colouring, as well as for recreational fishing. They prefer to live in slow moving, shallow water with lots of vegetation, and were most abundant on the edges of the lake. They are a threat to native fish because they compete for habitat and food, and larger pumpkinseed may eat smaller fish. These fish are also highly adaptable and can tolerate a wide range of environmental conditions such as higher and lower temperatures and oxygen levels, in which native fish may not survive.



Fathead Minnows are one of the most widely distributed fishes in North America and range from Alberta to Quebec and from Southern Northwest Territories to Mexico, but are not native to British Columbia. They were introduced to BC as food for the introduced Bass. The Fathead Minnow is a small fish and eat plants and small insects. They tend to live in slow moving water, with lots of vegetation and low dissolved oxygen levels. This fish is considered a benign introduction to British Columbia waters, though the males (lower picture) are aggressive during breeding and may have a negative impact on other species spawning in the same area.



American Bullfrogs are native to eastern North America and were introduced to British Columbia for a source of meaty frog legs. Bullfrogs and their tadpoles are large and robust. They spend up to two years in the tadpole stage, and as adults they still seldom leave the water, therefore they need permanent water sources. They prefer fairly shallow, still water with lots of vegetation. Adults are predatory and eat anything that can fit in their large mouths which includes insects, birds, small mammals, snakes, other frogs, and fish. They are of most concern because of their appetite for the native frogs which are much smaller and have seen population decreases since the introduction of Bullfrogs.



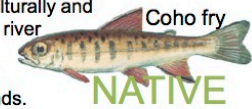
Green Frogs are native to eastern North America and were probably introduced to British Columbia through the fish bait or pet trade. They are similar to Bullfrogs though they are smaller and have skin folds on their back. They are also strongly aquatic in all life stages, and need permanent water to survive as tadpoles. They do not have as much of a negative impact as Bullfrogs do, but they do still compete with native frogs for food and habitat, and are considered invasive.



Threespine Stickleback is the most common native freshwater fish in British Columbia, and its range also extends to the colder Pacific coasts of North America and Asia. They are highly variable and are found in many forms across their range including anadromous (salt water/freshwater), marine resident, freshwater resident, bottom feeders and plankton feeders. The Threespine Stickleback is a small fish eaten by many other species, thus it is an important part of the ecosystem and food chains.



Coho Salmon are native to the Pacific coasts of North America and Asia. They are an economically, culturally and biologically valuable fish. Coho are an ocean-going fish species which spend the first 1 to 2 years in the river system before going out to the ocean, spending typically 18 months at sea before returning to their stream of origin. During their first years in the river, the Coho fry will swim and explore up and down the river; this explains why we have found fry in the Little Campbell River upstream of good spawning grounds.



If you want to know more about local aquatic species check out these sources:

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Appendix 2: Lake – Fish Survey Results for Landowners

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Environmental Stewardship

November 2014

Fish Survey Results for Landowners

Prepared by: Jennifer Rumley, B.Sc. | Conservation Science Intern

In November, biologists from A Rocha Canada conducted fish surveys in the lake at 8th Avenue and 235 Street in Langley, and along the main stem of the Little Campbell River adjacent to the lake. These surveys contributed to an ongoing inventory study of the fish species in our watershed. Our activities involved setting cylindrical fish traps at select locations along the River and in the lake (roughly every 100 metres), leaving them overnight, pulling them the following day, then identifying and counting all the trapped individuals (fish and amphibians) before immediately releasing them at the location of their capture.

The following tables outline what we caught near your property:

Table 1: Fish Survey of Northern Lake at 8th Ave and 235 Street - November 7, 2014

Species	#	Comments
Pumpkinseed Sunfish	219	Introduced
Brown Bullhead Catfish	84	Introduced
Green Frog Tadpole	64	Introduced
American Bullfrog Tadpole	52	Introduced
Threespine Stickleback	2	Native
Salish Sucker (Juvenile)	1	Native; BC red-list ²
Fathead Minnow	1	Introduced

Table 2: Fish Survey of Little Campbell River Adjacent to the Lake - November 7, 2014

Species	#	Comments
Green Frog Tadpole	91	Introduced
American Bullfrog Tadpole	19	Introduced
Threespine Stickleback	5	Native
Coastal Cutthroat Trout	4	Native; BC blue-list ¹
Salish Sucker (Adult Male)	1	Native; BC red-list ²
Coho Salmon	1	Native
Pumpkinseed Sunfish	1	Introduced
Fathead Minnow	1	Introduced

¹ BC blue-listed species are of *special concern* (or vulnerable) in British Columbia because they are particularly sensitive to human activities or natural events.

² BC red-listed species are *extirpated* (no longer exist in the wild in BC, but occur elsewhere), *endangered* (facing imminent extirpation or extinction) or *threatened* (likely to become endangered if limiting factors are not reversed) in British Columbia.

Our most exciting findings were two Salish Suckers!



The **Salish Sucker** is a freshwater fish of particular interest because it was thought to be extirpated (no longer living in this watershed) since 1976. It was rediscovered in a pond at A Rocha Canada's Brooksdale Environmental Centre in South Surrey in 2011. The Salish Sucker is listed as **endangered** by Canada's *Species at Risk Act*, **threatened** federally by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), and **red-listed** in British Columbia.

Populations are threatened by habitat loss and fragmentation due to urban and agricultural development, decreased flow of water, introduced predators, as well as the degradation of water quality including severe hypoxia (extremely low dissolved oxygen), sedimentation, and contamination. Salish Suckers need slower moving sections of water for habitat such as sloughs, deep pools, off channels, marshes and beaver ponds. They also tend to prefer waterways with native vegetation on the banks that are generally forested with shrubby understory.




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Brown Bullhead Catfish is native to eastern North America. Information on the introduction of this fish is unknown, but it is now abundant in British Columbia. These fish were predominantly found in deeper areas of your lake, both near to shore and in the middle of the lake, where the water is slow moving and vegetated. It is a nightmare for native fish as it can tolerate a large range of temperatures and oxygen levels (it can even live out of water for a long period of time), it has few natural predators and is not popular with fishermen. The worst thing about it is that it is a predatory fish that will eat anything that it comes across and can fit in its mouth which includes frogs, snakes, birds, and fish. They will eat the food of native fish, as well as the fish themselves.



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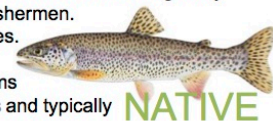
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Coastal Cutthroat Trout range natively from northern California to Alaska. There are three forms of these trout: non-migratory freshwater resident, migratory freshwater resident and anadromous. These fish are popular among fishermen. It is blue-listed (of special concern) in British Columbia because they are vulnerable to human activities. Some populations have been extirpated and more are at risk. This trout is threatened by habitat degradation through urbanization, as well as the "enhancement" of Coho Salmon production in streams that Cutthroat inhabits. The larger Coho fry are known to displace Cutthroat into less suitable habitats and typically Cutthroat populations decline in Coho "enhanced" waterways.



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