Clayoquot Biosphere Trust
Final Report Template for Grant Recipients

The CBT wants to know about the success of your project!

Final reports are due twelve months from receipt of funds. Once complete, please submit electronically to rebecca@clayoquotbiosphere.org. In addition, please attach any press materials or other appropriate materials such as scientific reports, brochures and newspaper articles. Photos are greatly appreciated! All reports and photos may be posted on the CBT website and used in outher communcations. Proponents are strongly urged to present their project results at CBT sponsored events in the region.

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1. Organization Information

Organization Name: Ucluelet First Nations

Address: PO Box 699 Ucluelet, B.C. V0R 3A0

Contact person: Tad Williams

Job Title: Fisheries Manager

Telephone: 250-726-7342

Fax:

E-mail: fisheries@ukeecable.net

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2. Project Details

Project Title: Searching for sustainable local foods: A study of the heavy metal toxicity of Ucluelet Harbou

CBT Funding received: $ 3416

Total Project Budget: $ 9716

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3. Final Report Questions: Please briefly answer the following questions in point form or paragraph format.

a. If your project has changed from your original proposal, please describe how and why it has changed.

b. What was the impact of your project at the individual, community and regional level?

The project promoted community stewardship and resource awareness. The summer clam survey was the basis for teaming up with Ucluelet Aquarium Society, Uu-a-thluk, West Coast Aquatic, and Ocean Planet Adventures and doing a Ucluelet Harbour Appreciation Day, which involved a dive and shoreline cleanup, education and hands on clam digging, and a seafood feast in Ittatsoo. Community members from both sides of the harbour took part in activities and relationships between the communities were fostered.

The study renewed interest in clams as part of the diet of Yuu-chulth-aht members. The community location was partially chosen for its proximity to good clam beds, but because of contamination, many community members have not eaten clams in decades. It also renewed interest in digging clams (in uncontaminated areas) which provides a small income for diggers.

The study also showed interesting patterns of contamination in the harbour, including hotspots in front of the Yuu-cluth-aht's Ittatsoo community. All in all, it did show that clams from Ucluelet Harbour have relatively low levels of heavy metal contamination and that the biggest threat to eating those clams comes from fecal coliform contamination, most of which originates in Millstream. According to a Yuu-cluth-aht members, "hopefully, one day we'll be able to eat clams from the harbour again".

c. Describe the community involvement and collaboration with other organizations.

The Ucluelet Harbour Appreciation Day, which was organized around the summer clam dig, involved partnership with Yuu-cluth-aht, Uu-a-thluk, the Ucluelet Aquarium Society, Ocean Planet Adventures, and West Coast Aquatic. Ucluelet elementary and highschool classes were invited for the fall clam dig, but unfortunately daytime tides did not cooperate.

d. What lessons were learned along the way that should be shared with other groups and/or projects?

Involvement of other organizations helped to make the event a success. We invited other organizations to join in celebrating Ucluelet Harbour, and each group brought something to the table that helped make the day a success. The clam dig itself was very informative and provided a good opportunity for education and stewardship of Ucluelet Harbour. We would recommend it to other groups to try to put on a similar study centered around community involvement.

e. How have you communicated the results of your project to local residents?

Four different articles were submitted to the Westerly and Ha-shilth-sa to communicate about the project, about the Ucluelet Harbour Appreciation Day, and the results of the project.

f. How did your project help to achieve the CBT's *Mission*?

By supporting this project, CBT contributed to local research into local environmental concerns. This project would not have otherwise been possible if this funding had not been provided because most government funding is geared towards addressing immediate crises and not towards understanding long term health of resources and communities. This project also opened dialogue on the health of Ucluelet Harbour (and Tofino Harbour for that matter) and raised awareness about garbage and pollution and its long term impacts. It also promoted training and capacity building by involving Uu-a-thluk summer students and Ucluelet's fisheries manager.

g. How did your project contribute to the CBT's *Measuring Community Health* Initiative and/or our Core Priorities of *Healthy Food, Healthy Communities* or *Youth and the Biosphere*? Please see our website for a description of these projects, including a list of indicators that we are interested in.

Knowing the health of Ucluelet Harbour and its food resources helps to educate community members about the need for conservation and care and about the toxicological threats of pollution to traditional food sources. If food sources could be made available in the harbour, it could help to promote healthy eating and sustainable food practices, as was a tradition of the Ucluelet First Nations. On-going pollution sources in the harbour should not be ignored. We should quantify the pollution and remediate to help all species and ecosystem integrity. This project provided a baseline about the toxicological integrity of Ucluelet Harbour clams and will link with a former CBT funded project that looked at the toxicology crabs. This complemented past efforts of the Ucluelet Harbour Project that identified challenges and worked towards some solutions (such as pulling out 280 tons of debris in 1997).

The project encouraged youth participation in researching the health of their local harbour. Although the students were not able to participate, Ucluelet Fisheries Manager and Uu-a-thluk biologist will visit the highschool in the springtime to teach about traditional harvest of clams and perhaps do a demonstration clam dig.

The project also educated people about a traditional food source of the Ucluelet First Nations.

4. Project Budget

We require a detailed budget reconciliation . Please provide explainations for large variances between the orignal budget and actual expenses. Please include contributions from all other sources of funding.

Item & Description	Budget	CBT funded expenses	Expenses funded from other sources	Total Actual Expenses
Salaries & Benefits				
Coordinator; 7 days at $300/day	2100		2100	2100
Uu-a-thluk biologist; 7 days at $300	2100		2100	2100
Volunteer time to prep and harvest	1000		1000	1000
Facilities Rental				
Office space and telephone	500		500	500
Hall rental for feast	0		200	200
Boat/truck transportation ($150x2 da	300		300	300
Materials & Supplies				
Refreshments and snacks for partici	150	50	100	150
Sampling supplies (quadrants, bags	200		200	200
Other (please specify)				
Lab analysis for full scan of 33 metals	3306	3306	535.50	3841.50
Courier costs of samples to Surrey ($30x2)	60	60	8.72	68.72
Total	9716	3416	7044.22	10460.22

Ucluelet Harbour Clams: Safe to Eat?

Submitted by Shannon Cowan, Uu-a-thluk

Ask local residents about eating clams from Ucluelet Harbour and you may get raised eyebrows and looks of dismay. After all, the area has been closed to clam harvesting since 1972, when Environment Canada determined the soft-bodied molluscs were no longer fit for human consumption.

But some members of Yuu-cluth-aht First Nation want to change all that, and bring back the days when harvesting didn't require a motorboat or a trip to the grocery store. Thanks to a new study surveying harbour clam toxicity, they are one step closer to making that a reality.

"Uu-a-thluk and Ucluth Fisheries surveyed clams in the harbour to find out whether or not they were still contaminated by heavy metals," said biologist Katie Beach, who headed up a study that tested harbour clams for things like arsenic, lead, mercury, and cadmium. "What we found was encouraging. The levels are pretty low."

Once home to canneries, fish buying stations, reduction plants, and processing facilities, Ucluelet Harbour has a long history of operations known to contaminate shellfish. Next to fecal contamination, the harmful substances most likely to be present in the harbour are the heavy metals associated with industry.

Until now, no one was sure how much contamination persisted from the days when lead and aluminium routinely found their way into the sea. Funded by the Clayoquot Biosphere Trust, the Ucluelet study looked at four sites around the harbour and determined that although some contamination still exists, it's not enough to stop people from eating clams.

"Because people aren't eating clams for every meal, periodic exposure to heavy metal contamination is not harmful according to Health Canada," Beach said. "To put things in perspective, a cigarette would contain much more heavy metals than these clams."

With heavy metal contamination considered, the only stumbling block to a renewed clam harvest is fecal contamination. Last tested by Environment Canada in 2002, the fecal contamination in Ucluelet Harbour has several possible sources. These include leaky septic tanks and septic fields in the Millstream area.

"If everyone was hooked up the sewer line, that would cut down all the raw sewage that goes into the harbour and bring the counts way down," said Ucluth Fisheries Officer, Tad Williams. "The village [of Ucluelet] is run by tourism nowadays, so it's in their best interest to have a clean harbour as well."

Growing up in Ittatsoo, Williams remembers the taste of local clams and is motivated to see the harbour re-opened. "People used to be able to go out on the beach, right in front of our office here...that used to be a prime clam beach, and it still is."

Except that the clams aren't edible, Williams adds. "It's like looking through a glass window—the clams are there but we can't get any."

To bring Environment Canada back for monitoring, known sources of pollution must first be addressed and halted. Following this mitigation, current bacteria levels in the water must then be reduced. Environment Canada staff believe that the head of the inlet is the most likely place for successful remediation and mitigation.

"When the official [heavy metal] study comes in, we'll look at it and if there's anything we can possibly do, I'm sure we'll do it," Williams said.

In the meantime, Williams and Beach will continue to sample harbour clams for heavy metals to get a clearer picture of clam safety.

"I think these studies are important, especially at this time in our Nation's history when we can make a difference, and not just be quiet about it. It's important that we take the first step. Doing the survey is part of that first step," Williams said.

In the meanwhile, Yuu-cluth-aht members will have to rely on memory to satisfy their appetite for fresh clams, since few people own the boats required to get to open clam beaches. Says Williams, "I'm one of the people who really misses it. I used to walk down the beach with my grandfather and eat raw clams right out of the sand."

With the hard work and motivation shown by the partners on this project, that day just might come again.

Working Towards Healthy Clams for Ucluelet Harbour

Further studies on Ucluelet Harbour clams could pave the way to local clam digging, says Uu-a-thluk biologist, Katie Beach. Or at least that's the goal of a partnership forged to reopen the case on local clams.

Closed to harvesting since 1972, Ucluelet Harbour is the site of ongoing sampling for heavy metals led by Uu-a-thluk and Yuu-cluth-aht First Nation staff. Says Beach, "Until we started testing the clams, no one was sure how much contamination remained from past activity or uses in the harbour. Now a clearer picture is starting to emerge."

Referring to the canneries, processing plants, and fish buying stations that used to operate in the harbour, Beach notes that traces of heavy metals still linger. More recent pollution sources may also cause contamination, Beach adds, such as derelict boats or buried motors and other materials that continue to leach chemicals into the water.

"Arsenic continues to be above the standard in all sites except for in front of the aquarium," she says. "The beach in front of the Ittatsoo community also continues to show contamination."

Like previous studies conducted by the team, the latest findings show curiously high levels of titanium. "We're not yet sure what that means," says Beach. "But we'll continue asking questions until we can understand where it's coming from."

Unlike the summer studies, however, the findings from samples taken in November show higher levels of aluminum, arsenic, cadmium, copper, iron, and lead. Understandable, Beach says, given the increased seasonal runoff.

Overall, the latest study confirms what Beach and members of Ucluth Fisheries have suspected for some time: heavy metal contamination is not the main problem affecting the clams in Ucluelet Harbour.

Says Beach, "The studies do show some contamination from heavy metals, but the clams would be relatively safe to eat if they weren't also contaminated by fecal sources. The cleanest site in terms of metals was at the head of the harbour. But that's also a site of known fecal contamination due to leaking septic fields."

To help improve the situation, Beach and others would like to see the Alberni Clayoquot Regional District deal with the fecal pollution that falls outside the municipality. She also points out that the studies help identify areas where cleanup or remediation may be necessary for lingering heavy metals.

"By shining some light on the problem areas, we can start to put together a plan for addressing all the issues that affect the safety of clams in the harbour. This study is just one step towards reclaiming an activity that used to be an important part of people's lives."

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Report Transmission Cover Page

Bill To:	Ucluelet First Nation	Project:		Lot ID:	**775578**
Report To:	Ucluelet First Nation	ID:	Clam Toxicology Fall Sample	Control Number:	
	PO Box 1108	Name:		Date Received:	Nov 22, 2010
	Tofino, BC, Canada	Location:	Ucluelet Harbour, BC	Date Reported:	Dec 17, 2010
	V0R 2Z0	LSD:		Report Number:	1390214
Attn:	Katie Beach	P.O.:			
Sampled By:		Acct code:			
Company:					

Contact & Affiliation	Address	Delivery Commitments	
Katie Beach Ucluelet First Nation	, PO Box 1108 Tofino, British Columbia V0R 2Z0 Phone: (250) 726-5229 Fax: Email: kbeach@nuuchahnulth.org	On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Lot Approval and Final Test Report Approval] send (Invoice) by Post On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report	M

Notes To Clients:

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Sample Custody

Bill To:	Ucluelet First Nation	Project:		Lot ID:	**775578**
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	V0R 2Z0	LSD:		Report Number:	1390214
Attn:	Katie Beach	P.O.:			
Sampled By:		Acct code:			
Company:					

Sample Disposal Date: January 16, 2011

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the top of this page.

☐ Extend Sample Storage Until _____ (MM/DD/YY)

The following charges apply to extended sample storage:

Storage for an additional 30 days	$ 2.50 per sample
Storage for an additional 60 days	$ 5.00 per sample
Storage for an additional 90 days	$ 7.50 per sample

☐ Return Sample, collect, to the address below via:

- ☐ Greyhound
- ☐ DHL
- ☐ Purolator
- ☐ Other (specify) _____

Name _____
Company _____
Address _____
_____
Phone _____
Fax _____

Signature _____

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Analytical Report

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Attn:	Katie Beach	P.O.:			
Sampled By:		Acct code:			
Company:					

		Reference Number	775578-1	775578-2	775578-3	
		Sample Date				
		Sample Time				
		Sample Location				
		Sample Description	1-1	1-2	1-3	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	180	306	27	1
Antimony	Total (wet weight)	ug/g	<0.5	<0.5	<0.5	0.5
Arsenic	Total (wet weight)	ug/g	5.33	3.9	2.6	0.2
Barium	Total (wet weight)	ug/g	0.600	0.700	0.33	0.03
Beryllium	Total (wet weight)	ug/g	<0.01	<0.01	<0.01	0.01
Bismuth	Total (wet weight)	ug/g	<0.5	<0.5	<0.5	0.5
Cadmium	Total (wet weight)	ug/g	0.1	0.3	0.4	0.05
Calcium	Total (wet weight)	ug/g	5960	3170	1120	2
Chromium	Total (wet weight)	ug/g	0.45	0.896	0.20	0.04
Cobalt	Total (wet weight)	ug/g	0.2	0.2	0.06	0.05
Copper	Total (wet weight)	ug/g	8.30	8.78	1.6	0.05
Iron	Total (wet weight)	ug/g	222	335	42	1
Lead	Total (wet weight)	ug/g	0.95	0.82	0.3	0.3
Lithium	Total (wet weight)	ug/g	0.4	0.54	0.1	0.1
Magnesium	Total (wet weight)	ug/g	410	474	305	1
Manganese	Total (wet weight)	ug/g	3.4	5.72	0.89	0.3
Mercury	Total (wet weight)	ug/g	0.024	0.028	0.0085	0.003
Molybdenum	Total (wet weight)	ug/g	0.69	0.67	0.1	0.05
Nickel	Total (wet weight)	ug/g	0.75	0.97	0.2	0.1
Phosphorus	Total (wet weight)	ug/g	1540	1350	1230	0.5
Potassium	Total (wet weight)	ug/g	3520	3540	2770	5
Selenium	Total (wet weight)	ug/g	0.94	0.78	0.95	0.3
Silver	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.2
Sodium	Total (wet weight)	ug/g	1680	1970	1740	1
Strontium	Total (wet weight)	ug/g	35.8	22.8	8.50	0.02
Thallium	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.3
Titanium	Total (wet weight)	ug/g	13.7	25.0	1.9	0.05
Vanadium	Total (wet weight)	ug/g	0.76	1.1	0.2	0.1
Zinc	Total (wet weight)	ug/g	31.7	25.6	11.3	0.1
Zirconium	Total (wet weight)	ug/g	<0.05	0.06	<0.05	0.05

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Sampled By:		Acct code:			
Company:					

		Reference Number	775578-4	775578-5	775578-6	
		Sample Date				
		Sample Time				
		Sample Location				
		Sample Description	1-4	2-1	2-2	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	47	15	123	1
Antimony	Total (wet weight)	ug/g	<0.5	<0.4	<0.5	0.5
Arsenic	Total (wet weight)	ug/g	2.9	4.0	3.5	0.2
Barium	Total (wet weight)	ug/g	0.957	0.099	0.28	0.03
Beryllium	Total (wet weight)	ug/g	<0.01	<0.01	<0.01	0.01
Bismuth	Total (wet weight)	ug/g	<0.5	<0.4	<0.5	0.5
Cadmium	Total (wet weight)	ug/g	0.5	0.4	0.52	0.05
Calcium	Total (wet weight)	ug/g	637	2530	1270	2
Chromium	Total (wet weight)	ug/g	0.11	0.637	0.857	0.04
Cobalt	Total (wet weight)	ug/g	0.1	0.07	0.1	0.05
Copper	Total (wet weight)	ug/g	2.5	1.2	2.2	0.05
Iron	Total (wet weight)	ug/g	163	30	203	1
Lead	Total (wet weight)	ug/g	0.4	0.3	0.3	0.3
Lithium	Total (wet weight)	ug/g	0.2	0.1	0.4	0.1
Magnesium	Total (wet weight)	ug/g	366	300	435	1
Manganese	Total (wet weight)	ug/g	2.4	0.69	2.9	0.3
Mercury	Total (wet weight)	ug/g	0.016	0.012	0.014	0.003
Molybdenum	Total (wet weight)	ug/g	0.1	0.09	0.07	0.05
Nickel	Total (wet weight)	ug/g	0.2	0.49	0.58	0.1
Phosphorus	Total (wet weight)	ug/g	1490	1210	1380	0.5
Potassium	Total (wet weight)	ug/g	3170	2600	2990	5
Selenium	Total (wet weight)	ug/g	1.2	0.81	1.0	0.3
Silver	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.2
Sodium	Total (wet weight)	ug/g	1580	1360	2190	1
Strontium	Total (wet weight)	ug/g	7.12	16.9	11.6	0.02
Thallium	Total (wet weight)	ug/g	<0.2	<0.2	<0.2	0.3
Titanium	Total (wet weight)	ug/g	4.2	0.57	9.27	0.05
Vanadium	Total (wet weight)	ug/g	0.4	<0.1	0.53	0.1
Zinc	Total (wet weight)	ug/g	30.2	9.81	12.1	0.1
Zirconium	Total (wet weight)	ug/g	<0.05	<0.04	0.05	0.05

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			Reference Number	775578-7	775578-8	775578-9	
			Sample Date				
			Sample Time				
			Sample Location				
			Sample Description	2-3	2-4	3-1	
			Matrix	Tissue	Tissue	Tissue	
Analyte			**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total							
Aluminum	Total (wet weight)		ug/g	33	45.5	50.9	1
Antimony	Total (wet weight)		ug/g	<0.5	<0.4	<0.5	0.5
Arsenic	Total (wet weight)		ug/g	2.6	3.0	6.58	0.2
Barium	Total (wet weight)		ug/g	0.12	0.33	0.13	0.03
Beryllium	Total (wet weight)		ug/g	<0.01	<0.01	<0.01	0.01
Bismuth	Total (wet weight)		ug/g	<0.5	<0.4	<0.5	0.5
Cadmium	Total (wet weight)		ug/g	0.4	0.3	0.4	0.05
Calcium	Total (wet weight)		ug/g	3170	310	2320	2
Chromium	Total (wet weight)		ug/g	0.660	0.16	0.26	0.04
Cobalt	Total (wet weight)		ug/g	0.1	0.1	0.2	0.05
Copper	Total (wet weight)		ug/g	0.96	2.9	1.5	0.05
Iron	Total (wet weight)		ug/g	94.7	112	130	1
Lead	Total (wet weight)		ug/g	0.3	0.3	0.65	0.3
Lithium	Total (wet weight)		ug/g	0.2	0.1	0.2	0.1
Magnesium	Total (wet weight)		ug/g	418	314	494	1
Manganese	Total (wet weight)		ug/g	1.2	1.4	1.1	0.3
Mercury	Total (wet weight)		ug/g	0.014	0.019	0.021	0.003
Molybdenum	Total (wet weight)		ug/g	0.08	0.2	0.09	0.05
Nickel	Total (wet weight)		ug/g	0.81	0.2	0.4	0.1
Phosphorus	Total (wet weight)		ug/g	1390	1510	1560	0.5
Potassium	Total (wet weight)		ug/g	2850	2880	2880	5
Selenium	Total (wet weight)		ug/g	0.80	1.3	0.79	0.3
Silver	Total (wet weight)		ug/g	<0.1	<0.1	<0.1	0.2
Sodium	Total (wet weight)		ug/g	2280	1320	2580	1
Strontium	Total (wet weight)		ug/g	20.1	3.85	18.6	0.02
Thallium	Total (wet weight)		ug/g	<0.2	<0.2	<0.2	0.3
Titanium	Total (wet weight)		ug/g	1.6	2.0	2.8	0.05
Vanadium	Total (wet weight)		ug/g	0.2	0.2	0.3	0.1
Zinc	Total (wet weight)		ug/g	16.0	39.7	10.3	0.1
Zirconium	Total (wet weight)		ug/g	<0.05	<0.04	<0.05	0.05

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Report To:	Ucluelet First Nation	ID:	Clam Toxicology Fall Sample	Control Number:	
	PO Box 1108	Name:		Date Received:	Nov 22, 2010
	Tofino, BC, Canada	Location:	Ucluelet Harbour, BC	Date Reported:	Dec 17, 2010
	V0R 2Z0	LSD:		Report Number:	1390214
Attn:	Katie Beach	P.O.:			
Sampled By:		Acct code:			
Company:					

		Reference Number	775578-10	775578-11	775578-12	
		Sample Date				
		Sample Time				
		Sample Location				
		Sample Description	3-2	3-3	3-4	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	17	28	13	1
Antimony	Total (wet weight)	ug/g	<0.5	<0.4	<0.5	0.5
Arsenic	Total (wet weight)	ug/g	5.11	5.69	3.2	0.2
Barium	Total (wet weight)	ug/g	0.02	0.050	<0.02	0.03
Beryllium	Total (wet weight)	ug/g	<0.01	<0.01	<0.01	0.01
Bismuth	Total (wet weight)	ug/g	<0.5	<0.4	<0.5	0.5
Cadmium	Total (wet weight)	ug/g	0.4	0.4	0.2	0.05
Calcium	Total (wet weight)	ug/g	511	1040	366	2
Chromium	Total (wet weight)	ug/g	0.12	0.18	0.18	0.04
Cobalt	Total (wet weight)	ug/g	0.1	0.1	0.09	0.05
Copper	Total (wet weight)	ug/g	1.3	3.0	1.3	0.05
Iron	Total (wet weight)	ug/g	74.6	90.4	51.0	1
Lead	Total (wet weight)	ug/g	<0.2	0.4	0.3	0.3
Lithium	Total (wet weight)	ug/g	0.1	0.1	<0.1	0.1
Magnesium	Total (wet weight)	ug/g	387	506	308	1
Manganese	Total (wet weight)	ug/g	0.71	0.87	0.72	0.3
Mercury	Total (wet weight)	ug/g	0.019	0.017	0.015	0.003
Molybdenum	Total (wet weight)	ug/g	0.08	0.1	<0.05	0.05
Nickel	Total (wet weight)	ug/g	0.2	0.3	0.2	0.1
Phosphorus	Total (wet weight)	ug/g	1410	1740	1310	0.5
Potassium	Total (wet weight)	ug/g	2560	3160	2400	5
Selenium	Total (wet weight)	ug/g	0.99	1.1	0.95	0.3
Silver	Total (wet weight)	ug/g	<0.1	<0.1	<0.1	0.2
Sodium	Total (wet weight)	ug/g	1800	2660	1680	1
Strontium	Total (wet weight)	ug/g	4.95	8.70	3.38	0.02
Thallium	Total (wet weight)	ug/g	0.2	<0.2	<0.2	0.3
Titanium	Total (wet weight)	ug/g	1.2	1.3	0.53	0.05
Vanadium	Total (wet weight)	ug/g	0.2	0.2	<0.1	0.1
Zinc	Total (wet weight)	ug/g	9.80	11.4	9.00	0.1
Zirconium	Total (wet weight)	ug/g	<0.05	<0.04	<0.05	0.05

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Analytical Report

Bill To: Ucluelet First Nation
Report To: Ucluelet First Nation
PO Box 1108
Tofino, BC, Canada
V0R 2Z0
Attn: Katie Beach
Sampled By:
Company:

Project:
ID: Clam Toxicology Fall Sample
Name:
Location: Ucluelet Harbour, BC
LSD:
P.O.:
Acct code:

Lot ID: **775578**
Control Number:
Date Received: Nov 22, 2010
Date Reported: Dec 17, 2010
Report Number: 1390214

Reference Number	775578-13
Sample Date	
Sample Time	
Sample Location	
Sample Description	4-4
Matrix	Tissue

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	20			1
Antimony	Total (wet weight)	ug/g	<0.4			0.5
Arsenic	Total (wet weight)	ug/g	3.4			0.2
Barium	Total (wet weight)	ug/g	0.04			0.03
Beryllium	Total (wet weight)	ug/g	<0.01			0.01
Bismuth	Total (wet weight)	ug/g	<0.4			0.5
Cadmium	Total (wet weight)	ug/g	0.2			0.05
Calcium	Total (wet weight)	ug/g	621			2
Chromium	Total (wet weight)	ug/g	0.29			0.04
Cobalt	Total (wet weight)	ug/g	0.1			0.05
Copper	Total (wet weight)	ug/g	1.3			0.05
Iron	Total (wet weight)	ug/g	40			1
Lead	Total (wet weight)	ug/g	0.54			0.3
Lithium	Total (wet weight)	ug/g	0.1			0.1
Magnesium	Total (wet weight)	ug/g	338			1
Manganese	Total (wet weight)	ug/g	1.1			0.3
Mercury	Total (wet weight)	ug/g	0.016			0.003
Molybdenum	Total (wet weight)	ug/g	<0.04			0.05
Nickel	Total (wet weight)	ug/g	0.3			0.1
Phosphorus	Total (wet weight)	ug/g	1440			0.5
Potassium	Total (wet weight)	ug/g	2970			5
Selenium	Total (wet weight)	ug/g	0.81			0.3
Silver	Total (wet weight)	ug/g	<0.1			0.2
Sodium	Total (wet weight)	ug/g	1720			1
Strontium	Total (wet weight)	ug/g	5.74			0.02
Thallium	Total (wet weight)	ug/g	<0.2			0.3
Titanium	Total (wet weight)	ug/g	1.0			0.05
Vanadium	Total (wet weight)	ug/g	<0.1			0.1
Zinc	Total (wet weight)	ug/g	11.3			0.1
Zirconium	Total (wet weight)	ug/g	<0.04			0.05

Approved by: Andrew Garrard

Andrew Garrard, BSc
General Manager

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Methodology and Notes

Bill To:	Ucluelet First Nation	Project:		Lot ID:	**775578**
Report To:	Ucluelet First Nation	ID:	Clam Toxicology Fall Sample	Control Number:	
	PO Box 1108	Name:		Date Received:	Nov 22, 2010
	Tofino, BC, Canada	Location:	Ucluelet Harbour, BC	Date Reported:	Dec 17, 2010
	V0R 2Z0	LSD:		Report Number:	1390214
Attn:	Katie Beach	P.O.:			
Sampled By:		Acct code:			
Company:					

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Metals (Total) wet weight	US EPA	*	Mercury in Solid and Semi-Solid Wastes (Cold Vapour), 7471B	29-Nov-10	Exova Surrey
Metals (Total) wet weight	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	29-Nov-10	Exova Surrey

** Reference Method Modified*

References

US EPA	US Environmental Protection Agency Test Methods

Comments:

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Report Transmission Cover Page

Bill To:	Ucluelet First Nation	Project:		Lot ID:	**754533**
Report To:	Ucluelet First Nation	ID:	July 15, 2010	Control Number:	
	PO Box 1108	Name:	Clam Toxicology Study	Date Received:	Jul 29, 2010
	Tofino, BC, Canada	Location:	Ucluelet Harbour	Date Reported:	Aug 9, 2010
	V0R 2Z0	LSD:		Report Number:	1345554
Attn:	Katie Beach	P.O.:			
Sampled By:		Acct code:			
Company:					

Contact & Affiliation	Address	Delivery Commitments
Katie Beach Ucluelet First Nation	, PO Box 1108 Tofino, British Columbia V0R 2Z0 Phone: (250) 726-5229 Fax: Email: kbeach@nuuchahnulth.org	On [Lot Verification] send (COA) by Email - Single Report On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Lot Approval and Final Test Report Approval] send (COC, Test Report, Invoice) by Post M

Notes To Clients:

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Sample Custody

Bill To:	Ucluelet First Nation	Project:		Lot ID:	**754533**
Report To:	Ucluelet First Nation	ID:	July 15, 2010	Control Number:	
	PO Box 1108	Name:	Clam Toxicology Study	Date Received:	Jul 29, 2010
	Tofino, BC, Canada	Location:	Ucluelet Harbour	Date Reported:	Aug 9, 2010
	V0R 2Z0	LSD:		Report Number:	1345554
Attn:	Katie Beach	P.O.:			
Sampled By:		Acct code:			
Company:					

Sample Disposal Date: September 08, 2010

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the top of this page.

☐ Extend Sample Storage Until _____ (MM/DD/YY)

The following charges apply to extended sample storage:

Storage for an additional 30 days	$ 2.50 per sample
Storage for an additional 60 days	$ 5.00 per sample
Storage for an additional 90 days	$ 7.50 per sample

☐ Return Sample, collect, to the address below via:

- ☐ Greyhound
- ☐ DHL
- ☐ Purolator
- ☐ Other (specify) _____

Name _____
Company _____
Address _____
_____
Phone _____
Fax _____

Signature _____

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Analytical Report

Bill To:	Ucluelet First Nation	Project:		Lot ID:	**754533**
Report To:	Ucluelet First Nation	ID:	July 15, 2010	Control Number:	
	PO Box 1108	Name:	Clam Toxicology Study	Date Received:	Jul 29, 2010
	Tofino, BC, Canada	Location:	Ucluelet Harbour	Date Reported:	Aug 9, 2010
	V0R 2Z0	LSD:		Report Number:	1345554
Attn:	Katie Beach	P.O.:			
Sampled By:		Acct code:			
Company:					

		Reference Number	754533-1	754533-2	754533-3	
		Sample Date				
		Sample Time				
		Sample Location				
		Sample Description	Beach - 1-1	Beach - 1-2	Beach - 1-3	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	72.9	47.7	263	1
Antimony	Total (wet weight)	ug/g	<0.1	<0.1	<0.09	0.5
Arsenic	Total (wet weight)	ug/g	3.42	9.79	3.62	0.2
Barium	Total (wet weight)	ug/g	0.161	0.142	0.712	0.03
Beryllium	Total (wet weight)	ug/g	<0.003	<0.003	0.004	0.01
Bismuth	Total (wet weight)	ug/g	<0.1	0.15	<0.09	0.5
Cadmium	Total (wet weight)	ug/g	0.19	0.26	0.18	0.05
Calcium	Total (wet weight)	ug/g	751	1730	1470	2
Chromium	Total (wet weight)	ug/g	0.612	1.31	1.97	0.04
Cobalt	Total (wet weight)	ug/g	0.14	0.24	0.27	0.05
Copper	Total (wet weight)	ug/g	3.96	2.91	6.86	0.05
Iron	Total (wet weight)	ug/g	126	132	416	1
Lead	Total (wet weight)	ug/g	0.31	0.29	0.58	0.3
Lithium	Total (wet weight)	ug/g	0.33	0.49	0.71	0.1
Magnesium	Total (wet weight)	ug/g	610	623	658	1
Manganese	Total (wet weight)	ug/g	2.17	2.02	5.83	0.3
Mercury	Total (wet weight)	ug/g	0.0126	0.0193	0.0172	0.003
Molybdenum	Total (wet weight)	ug/g	0.23	0.14	0.85	0.05
Nickel	Total (wet weight)	ug/g	0.67	0.82	1.42	0.1
Phosphorus	Total (wet weight)	ug/g	1930	1600	1620	0.5
Potassium	Total (wet weight)	ug/g	2720	2440	2500	5
Selenium	Total (wet weight)	ug/g	0.51	0.54	0.66	0.3
Silver	Total (wet weight)	ug/g	0.31	0.13	<0.03	0.2
Sodium	Total (wet weight)	ug/g	3410	3520	3360	1
Strontium	Total (wet weight)	ug/g	7.49	11.6	11.6	0.02
Thallium	Total (wet weight)	ug/g	0.52	0.42	0.40	0.3
Titanium	Total (wet weight)	ug/g	3.59	1.72	12.8	0.05
Vanadium	Total (wet weight)	ug/g	0.35	0.32	1.04	0.1
Zinc	Total (wet weight)	ug/g	18.3	16.2	39.2	0.1
Zirconium	Total (wet weight)	ug/g	<0.01	<0.01	0.02	0.05

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Analytical Report

Bill To: Ucluelet First Nation
Report To: Ucluelet First Nation
PO Box 1108
Tofino, BC, Canada
V0R 2Z0
Attn: Katie Beach
Sampled By:
Company:

Project:
ID: July 15, 2010
Name: Clam Toxicology Study
Location: Ucluelet Harbour
LSD:
P.O.:
Acct code:

Lot ID: **754533**
Control Number:
Date Received: Jul 29, 2010
Date Reported: Aug 9, 2010
Report Number: 1345554

		Reference Number	754533-4	754533-5	754533-6	
		Sample Date				
		Sample Time				
		Sample Location				
		Sample Description	Beach - 2-1	Beach - 2-2	Beach - 2-3	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	238	42.3	120	1
Antimony	Total (wet weight)	ug/g	<0.1	<0.1	<0.09	0.5
Arsenic	Total (wet weight)	ug/g	4.28	6.25	4.59	0.2
Barium	Total (wet weight)	ug/g	0.575	0.075	0.245	0.03
Beryllium	Total (wet weight)	ug/g	0.003	<0.003	<0.003	0.01
Bismuth	Total (wet weight)	ug/g	<0.1	<0.1	<0.09	0.5
Cadmium	Total (wet weight)	ug/g	0.16	0.24	0.26	0.05
Calcium	Total (wet weight)	ug/g	1080	721	1120	2
Chromium	Total (wet weight)	ug/g	1.71	0.914	0.975	0.04
Cobalt	Total (wet weight)	ug/g	0.28	0.20	0.20	0.05
Copper	Total (wet weight)	ug/g	6.21	2.72	3.31	0.05
Iron	Total (wet weight)	ug/g	370	90.4	189	1
Lead	Total (wet weight)	ug/g	0.52	0.19	0.22	0.3
Lithium	Total (wet weight)	ug/g	0.62	0.28	0.48	0.1
Magnesium	Total (wet weight)	ug/g	652	617	655	1
Manganese	Total (wet weight)	ug/g	5.66	1.70	3.21	0.3
Mercury	Total (wet weight)	ug/g	0.0178	0.0136	0.0114	0.003
Molybdenum	Total (wet weight)	ug/g	0.74	0.11	0.22	0.05
Nickel	Total (wet weight)	ug/g	1.21	0.60	0.89	0.1
Phosphorus	Total (wet weight)	ug/g	1460	1690	1820	0.5
Potassium	Total (wet weight)	ug/g	2290	2530	2600	5
Selenium	Total (wet weight)	ug/g	0.55	0.57	0.52	0.3
Silver	Total (wet weight)	ug/g	0.40	1.39	0.41	0.2
Sodium	Total (wet weight)	ug/g	3090	3320	3360	1
Strontium	Total (wet weight)	ug/g	9.30	7.13	8.25	0.02
Thallium	Total (wet weight)	ug/g	0.46	0.53	0.54	0.3
Titanium	Total (wet weight)	ug/g	12.1	2.19	4.86	0.05
Vanadium	Total (wet weight)	ug/g	1.00	0.30	0.50	0.1
Zinc	Total (wet weight)	ug/g	22.0	13.6	17.9	0.1
Zirconium	Total (wet weight)	ug/g	0.02	<0.01	0.01	0.05

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Analytical Report

Bill To: Ucluelet First Nation
Report To: Ucluelet First Nation
PO Box 1108
Tofino, BC, Canada
V0R 2Z0
Attn: Katie Beach
Sampled By:
Company:

Project:
ID: July 15, 2010
Name: Clam Toxicology Study
Location: Ucluelet Harbour
LSD:
P.O.:
Acct code:

Lot ID: **754533**
Control Number:
Date Received: Jul 29, 2010
Date Reported: Aug 9, 2010
Report Number: 1345554

		Reference Number	754533-7	754533-8	754533-9	
		Sample Date				
		Sample Time				
		Sample Location				
		Sample Description	Beach - 3-1	Beach - 3-2	Beach - 3-3	
		Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total						
Aluminum	Total (wet weight)	ug/g	43.8	27.2	42.6	1
Antimony	Total (wet weight)	ug/g	<0.1	<0.09	<0.09	0.5
Arsenic	Total (wet weight)	ug/g	4.54	2.95	2.26	0.2
Barium	Total (wet weight)	ug/g	0.053	0.060	0.078	0.03
Beryllium	Total (wet weight)	ug/g	<0.003	<0.003	<0.003	0.01
Bismuth	Total (wet weight)	ug/g	<0.1	<0.09	<0.09	0.5
Cadmium	Total (wet weight)	ug/g	0.38	0.21	0.19	0.05
Calcium	Total (wet weight)	ug/g	2230	569	543	2
Chromium	Total (wet weight)	ug/g	0.644	0.249	0.368	0.04
Cobalt	Total (wet weight)	ug/g	0.12	0.11	0.12	0.05
Copper	Total (wet weight)	ug/g	1.92	1.19	1.20	0.05
Iron	Total (wet weight)	ug/g	118	72.5	88.3	1
Lead	Total (wet weight)	ug/g	<0.05	<0.04	0.07	0.3
Lithium	Total (wet weight)	ug/g	0.50	0.24	0.23	0.1
Magnesium	Total (wet weight)	ug/g	590	774	759	1
Manganese	Total (wet weight)	ug/g	1.49	0.81	1.21	0.3
Mercury	Total (wet weight)	ug/g	0.0145	0.0084	0.0068	0.003
Molybdenum	Total (wet weight)	ug/g	0.1	0.08	0.091	0.05
Nickel	Total (wet weight)	ug/g	0.55	0.52	0.66	0.1
Phosphorus	Total (wet weight)	ug/g	2440	1680	1490	0.5
Potassium	Total (wet weight)	ug/g	2440	1420	1540	5
Selenium	Total (wet weight)	ug/g	0.76	0.51	0.46	0.3
Silver	Total (wet weight)	ug/g	0.07	0.06	<0.03	0.2
Sodium	Total (wet weight)	ug/g	3310	5060	4860	1
Strontium	Total (wet weight)	ug/g	11.4	8.13	6.96	0.02
Thallium	Total (wet weight)	ug/g	0.48	0.41	0.39	0.3
Titanium	Total (wet weight)	ug/g	1.60	0.907	1.75	0.05
Vanadium	Total (wet weight)	ug/g	0.18	0.11	0.16	0.1
Zinc	Total (wet weight)	ug/g	14.8	11.8	14.5	0.1
Zirconium	Total (wet weight)	ug/g	0.02	<0.009	<0.009	0.05

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Analytical Report

Bill To: Ucluelet First Nation
Report To: Ucluelet First Nation
PO Box 1108
Tofino, BC, Canada
V0R 2Z0
Attn: Katie Beach
Sampled By:
Company:

Project:
ID: July 15, 2010
Name: Clam Toxicology Study
Location: Ucluelet Harbour
LSD:
P.O.:
Acct code:

Lot ID: **754533**
Control Number:
Date Received: Jul 29, 2010
Date Reported: Aug 9, 2010
Report Number: 1345554

			Reference Number	754533-10	754533-11	754533-12	
			Sample Date				
			Sample Time				
			Sample Location				
			Sample Description	Beach - 4-1	Beach - 4-2	Beach - 4-3	
			Matrix	Tissue	Tissue	Tissue	
Analyte		**Units**		**Results**	**Results**	**Results**	Nominal Detection Limit
Metals Total							
Aluminum	Total (wet weight)	ug/g		38.6	276	53.3	1
Antimony	Total (wet weight)	ug/g		<0.07	<0.09	<0.1	0.5
Arsenic	Total (wet weight)	ug/g		5.37	1.38	1.51	0.2
Barium	Total (wet weight)	ug/g		0.0944	0.534	0.154	0.03
Beryllium	Total (wet weight)	ug/g		<0.002	0.005	<0.003	0.01
Bismuth	Total (wet weight)	ug/g		0.13	<0.09	<0.1	0.5
Cadmium	Total (wet weight)	ug/g		0.21	0.13	0.1	0.05
Calcium	Total (wet weight)	ug/g		693	1460	523	2
Chromium	Total (wet weight)	ug/g		0.746	1.09	0.424	0.04
Cobalt	Total (wet weight)	ug/g		0.18	0.22	0.07	0.05
Copper	Total (wet weight)	ug/g		1.98	2.83	1.49	0.05
Iron	Total (wet weight)	ug/g		70.6	624	94.8	1
Lead	Total (wet weight)	ug/g		0.13	0.38	0.15	0.3
Lithium	Total (wet weight)	ug/g		0.24	0.984	0.28	0.1
Magnesium	Total (wet weight)	ug/g		711	727	592	1
Manganese	Total (wet weight)	ug/g		1.32	16.9	1.64	0.3
Mercury	Total (wet weight)	ug/g		0.0125	0.0129	0.010	0.003
Molybdenum	Total (wet weight)	ug/g		0.12	0.10	0.08	0.05
Nickel	Total (wet weight)	ug/g		1.09	0.920	0.51	0.1
Phosphorus	Total (wet weight)	ug/g		1370	1560	1510	0.5
Potassium	Total (wet weight)	ug/g		1910	2300	2090	5
Selenium	Total (wet weight)	ug/g		0.37	0.55	0.47	0.3
Silver	Total (wet weight)	ug/g		0.893	<0.03	<0.03	0.2
Sodium	Total (wet weight)	ug/g		4260	3600	3530	1
Strontium	Total (wet weight)	ug/g		7.85	10.3	4.86	0.02
Thallium	Total (wet weight)	ug/g		0.47	0.44	0.43	0.3
Titanium	Total (wet weight)	ug/g		1.54	8.76	2.16	0.05
Vanadium	Total (wet weight)	ug/g		0.23	1.16	0.26	0.1
Zinc	Total (wet weight)	ug/g		18.2	13.4	15.4	0.1
Zirconium	Total (wet weight)	ug/g		<0.007	0.01	<0.01	0.05

Approved by:

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Methodology and Notes

Bill To:	Ucluelet First Nation	Project:		Lot ID:	**754533**
Report To:	Ucluelet First Nation	ID:	July 15, 2010	Control Number:	
	PO Box 1108	Name:	Clam Toxicology Study	Date Received:	Jul 29, 2010
	Tofino, BC, Canada	Location:	Ucluelet Harbour	Date Reported:	Aug 9, 2010
	V0R 2Z0	LSD:		Report Number:	1345554
Attn:	Katie Beach	P.O.:			
Sampled By:		Acct code:			
Company:					

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Metals (Total) wet weight	US EPA	*	Mercury in Solid and Semi-Solid Wastes (Cold Vapour), 7471B	30-Jul-10	Exova Surrey
Metals (Total) wet weight	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	30-Jul-10	Exova Surrey

** Reference Method Modified*

References

US EPA	US Environmental Protection Agency Test Methods

Comments:

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.