

## PART 2: CULTURAL INPUTS TO THE STRAIT OF GEORGIA ECOSYSTEM RECONSTRUCTION

### Aboriginal Knowledge and Ecosystem Reconstruction

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#### Abstract

The 'Back To The Future' (BTF) project uses ecosystem modelling and other information sources to visualize how the Strait of Georgia ecosystem might have been in the past. This paper explores the potential of integrating traditional environmental knowledge (TEK) of aboriginal people in ecosystem modeling. Methods include archival research and interviews with First Nation Elders from different regions of the Strait of Georgia. We describe the interview process from initial contact, facilitation, questionnaires and recording information for accreditation after review of written reports with interview subjects. Use of the resources, community arrangements and trading activities of aboriginal communities in the past in the corresponding areas are also presented. Strengths and weaknesses in the approach are discussed.

#### Introduction

Aboriginal people have their own ways of knowing and understanding their environment. From generation to generation, people have described and explained the origin of the land, its inhabitants and their relationship with animals. Fladmark (1986) stated that when one uses aboriginal oral history and modern archeology, the cultural perception of the flow of time and classification of natural phenomena agree and complement each other in important ways.

Thus, the TEK of aboriginal people could also be used to tune and validate models of reconstructed past ecosystems. In the BTF project an attempt was made to combine ecosystem modeling with to describe natural ecosystems as they might have been in the past.

The ecosystem reconstruction proffered by the

BTF project was based on archival research and interviews with Elders from Aboriginal communities. The main purpose of the interviews was to frame a picture of how the ecosystem might have been in the past, based on traditional knowledge of resource use by aboriginal people. This information was expected to validate and complement archival information was also describing the state of past natural system.

#### Methods

The BTF project involved the reconstruction of present and past ecosystems in the Strait of Georgia (SoG), based on a model constructed at a workshop held in November 1995 at the Fisheries Centre, the University of British Columbia, Canada (Pauly and Christensen, 1996). Different sources of information (see Wallace, this vol.) were used to tune and update that model. Reconstruction of the system as it might have been 100 ago was based on archival records, historic documents and written testimonies, as well as interviews carried out in three First Nations communities. Interviews with Elders from the Squamish, Musqueam and Burrard bands were carried out in November 1997. Contact with the Elders was arranged by the first author who also assisted with the interviews. The questionnaire is presented in Box 1. The present and past models of the SoG based on this work are presented in Dalsgaard *et al.* (this volume).

Our ability to cover the large area of SG was constrained by available funding and time. As a result, informants in only three communities were interviewed face to face (Squamish, Musqueam, and Burrard). Two of these, Squamish and Musqueam, were located near to inlet-river areas. The fourth case was based on written testimony from Saanich people, a sea-oriented people (see also Danko, this vol.). See figure 1 for the locations of the sites.

## Box 1. Questionnaire used in the interviews.

1. What were the main resources present in the area? Did you catch or hunt them? If so, how were they caught and preserved and what type of gear used? Please give details for:
  - . Salmon;
  - . Eulachons;
  - . Herring;
  - . Shellfish;
  - . Birds;
  - . Sturgeon;
  - . Marine mammals (including the possibility of presence of Sea otters and Sea cow)
  - . Other fishes: halibut, ling cod, rockfish.
2. If commercial fishing was in place, how much did you catch compared with local consumption?
3. Did you have community arrangements or rules to maintain a management system? Any kind of regulations like area, season or gear?
4. Did your ancestors belong to a fishing trading network?
5. How many people lived in the area and how many participated in fishing?
6. How was the local consumption in the area of sea life?
7. Have you observed decline in resources abundance and if so since when did this happen?
8. What do you think contributed to the loss of resources?

Information obtained as a result from the interviews is defined as: use of the resources, community arrangement and trading activities of aboriginal people. (Box 1).

### Results

There was overlap between information on the archival records published, oral histories and interviews, with few inconsistencies. Aboriginal people took advantage of the access to the resources depending upon the geographical location of the community and the climatic and seasonal conditions. Also, a wide range of resources was tapped (Table 1).

All the Elders interviewed confirmed that they always took only enough fish for food use, as was commonly done among all the tribes. They had ceremonies to thank the river and fish for what they got and they supplemented their seafood diet by hunting and plant gathering.

The Elders also confirmed that, long ago, people could move from one place to another following the salmon run. There was no competition among communities because there was plenty of salmon. At that time, permits were not needed to move from one area to another.

One informant (Simon) reported that:

*“People used to go to Chamainus, Galiano Island,*

*Pender Island, Main Islands and they stay there for some time fishing”.*

Another (Vincent) said:

*In the olden days, the water was pure, there was abundance of seafood, people were healthier. My grandmother lived over 100 years. There were no divisions in areas to fish or gather sea-life, people used nets to fish salmon, they shared the whole beach. There were no power boats at that time They also used to hunt in the mountains for mountain sheep, Elk and deer.*

The other statements we gathered are incorporated in our text or cited in italics and grouped by **resource type** and by informants in the different Nations. The first name of the informant immediately follows explicit quotations.

### Salmon

The salmon caught in the three river-inlet communities were: dog salmon (chum), spring salmon (chinook), humpback (pink salmon), sockeye and coho. Some communities, eg. the Squamish people, had direct access to the runs; in other cases, e.g. the Burrard people, had to travel and set up camps to stay during the run.

Group/Species	Squamish	Musqueam	Burrard	Saanich
Finfish				
Salmon	Yes	Yes	Yes	Yes
Herring	Yes (eggs)	No	No info	Yes (fish & eggs)
Halibut	No info	No info	No	Yes
Sturgeon	Present but not caught	Yes (soup)	No info	No info
Eulachons	Yes (smoked)	Yes (smoked)	No info	No
Trout	No info	No info	Yes	No
Rock fish	No info	No info	Yes	No info
Ling cod	No info	No info	Yes	Yes
Shellfish				
Clams				Yes
Crabs	Yes	Yes	Yes	Yes
Sea Urchin	No	No info	Yes	No info
Oyster	Yes	Yes	No info	Yes
Mussels	Yes	No info	No info	Yes
Seaweed	No info	No info	No info	Yes
Marine mammals				
Sea otters	Present but not caught	Present but not caught	No info	Yes
Whales	Present but not caught	Present but not caught	No	Yes
Black fish	No info	No info	Present but not caught	Yes
Seals	Present but not caught	Present but not caught	No info	Yes
Sea cow	No	No	No info	No
Birds				
Seagulls	Yes (eggs)	No info	No info	Yes (eggs)
Black duck	Yes	Yes	No info	Yes

**Table 1.** Historic presence (yes) and use, or absence (no) of resources in the Strait of Georgia.

*All the native people from B.C., Washington, Oregon, Montana lived on salmon (Simon).*

Traps and nets were the main methods used to catch salmon in the river. Spears and hooks were also common. People relied on drying and smoking the fish to preserve it and have a good supply for winter (Stewart 1982). First Nations people have a ritual consisting of throwing the salmon bones back into the river so that the salmon would return. (Ham 1982).

#### *Squamish Nation*

*During spring Chum salmon came to the Fraser and Squamish rivers to spawn. They were more abundant than nowadays, throughout the Strait of Georgia and Johnson Strait channels. Pink, Coho, and Sockeye were also more abundant in the past (Simon).*

*Chum was plentiful during the fall and still is now. They used to spawn near Stanley park and Beaver lake. Sockeye used to come back every four years. At that time, about 100 people fished for salmon (Simon).*

*In the olden days we could see salmon from Jerico*

*to Sand bars coming into False creek and over area around the PNE. In 1934 we set a net and got 1,000 fish, they even jumped into the boat (Columbia river boat). People could work 16 hr a day and get about 6000 humpbacks (Simon)*

#### *Musqueam*

*Sockeye were caught in the middle of June, using a winter spring gear, smaller than the average used this days (10-12 lb). March and April were the hardest months for people. During that time salmon was caught only for ceremonial purposes. One or two boats, mainly canoes, would go out fishing for food because there were few power boats. We only caught what we needed. In one set we could take millions of fishes. It was abundant at the mouth of the Fraser. Sometimes people went across Vancouver Island to fish and up North for the early run (Vincent).*

People used to can and smoke salmon to save it for winter. Salmon could lose about half of its weight when smoked. After smoking, salmon was preserved into holes in the ground, and covered with soil which kept it cool. Smoked fish could be maintained in there even for a full year.

*The holes or cool-bins were maintained by my*

*grandmother for the winter* (Vincent).

### **Burrard**

*People used to catch salmon at the head of the Inlet, using nets. There was a village with a dozen houses each with a smokehouse behind the main house. People would live there during the fishing season* (Bob).

### **Saanich**

*Saanich people used to catch salmon in the sea on the main route of Sockeye salmon migration during the early summer. They used to catch it using reef nets throughout San Juan Islands up around Boundary Bay and the other Islands* (Poth 1984).

Spring salmon was fished when it came along with the herring. Humpback arrived towards the mid-summer. This was the most plentiful of all salmon (thousands of fish in a school). Coho arrived in September and dog salmon arrived in early winter But people did not wait for this run; it was time to go back to their main camp (Poth 1984).

### **Herring**

Squamish people did not fish for herring, only the eggs were collected. Sometimes people would go to Vancouver Island to fish. The Musqueam people neither caught herring nor collected the eggs.

When the herring season was over Squamish people used to hang young cedar branches in the water to collect herring spawn. Afterwards they were dried, according to Mr. Stogan. In Bella Bella kelp was collected and hung in the water to collect herring spawn.

The Saanich people knew the tides so well that they could tell at what time the herring would arrive. They used the eggs and the fish. The eggs were collected on branches in the same way the Squamish people did. Herring was preserved by smoking in three different ways: whole, gutted and, boneless (Poth 1984)

### **Eulachon**

Eulachon has been a very important resource for aboriginal communities, not only for food, but for other uses (Drake and Wilson 1991, see also Hay, this vol.). It was also called 'candle fish' or 'salvation fish' since the dried body can

supposedly be used as a candle, and its arrival at the end of the winter provided aboriginal people with food (Stewart 1982). They were caught in the Fraser river using nets, and methods varied from different parts of the coast (Stewart, 1982).

*We use to go as far as New Westminster and Mission to fish because Eulachon move down there. Musqueam people used drift nets about 50 fathoms ( 6 ft to 1 fathom). Modern Eulachon nets are shorter now (15 fathoms) than in the olden days* (Vincent).

Squamish and Musqueam people preserved Eulachons by smoking But they did not make grease even though the run started in the Musqueam area, when the fish had a higher concentration of body fat. Eulachons were mainly gathered for food and were a very important food item in the Musqueam Potlatch.

### **Sturgeon**

Although sturgeon were plentiful in the Fraser river, they were not used much by First Nations people. Sturgeon seemed to have an spiritual meaning for some tribes. Sto:lo sturgeon fishers said people who fell from their canoes and those whose bodies were never found became or lived among sturgeons. Among the Scowlit band, old people consider themselves under the care of the spirit of the sturgeon (Glavin, 1994)

Sturgeon was considered 'evil' by the Squamish people They did not like it because it reminded them of snake (for the type of skin) and because it was hard to cut and cook. However, the Musqueam people liked to make sturgeon soup. Mr. Stogan recalls that the biggest fish on record caught at Ft. Langley weighed about 700 lb. Sturgeon was also traded with Chinese people who preferred sizes of around four to five feet.

### **Other Finfish**

King-fish, or white croaker (*Genyonemus lineatus*), was caught by the Musqueam people, but is not present anymore in the area. Flounder sole was common in Squamish area, but not Halibut (See Table 1). Halibut was important in the diet of Saanich people, as well as cod. They were caught in the time called PENAWEN, 'the harvest time' (Poth 1984). Lingcod, flounder, rock fish, bullhead were exploited by nets in the Burrard area. These species were also caught by Saanich people (Poth 1984):

*When the tides were high people caught the fishes. There was no halibut in here, but Rainbow trout*

*was found around the creek. Also Lingcod, Flounder, Rock fish and Bullhead were around the area. Rainbow trout used to be big, now there is not any (Bob).*

## Shellfish

Butter and other clams (littleneck cockle), oysters and mussels were the more common shellfish used by the three communities interviewed and also for Saanich people. Mr. Stogan mentioned that Vancouver Island was the area where more shellfish could be found. Clams were boiled for local consumption by Musqueam and Saanich people and dried by Burrard people.

*The Burrard people used to build fires on the beach and dry the clams and put them on cedar strings, which were taken by men when going hunting. On spring tides, people could dig every night for the whole week to get clams, but they never dragged (Bob).*

The Squamish people used to sell clams to a cannery in Sidney for two cents per pound:

*In winter we got butter clams (big clams). We used to dig and got one sack per night (20 lb.). In Capilano, when tides came people could get between three and four sacks per night (Simon).*

Crabs were abundant in the Saanich Peninsula and Capilano (Poth 1984), but not much in Burrard:

*Crabs were not plentiful in Burrard inlet, only some apple crab were found at low tide. Also in the olden days sea-urchin was eaten by some persons (Bob)*

## Marine mammals

Marine mammals were not an important component of the diet of the Musqueam, Squamish and Burrard communities. The Musqueam and Squamish people saw some otters in the area, but they did not hunt them:

*During the Fall close to Stanley park we saw Otters sometimes. One or two were shot but they did not usually take them. There are still some out there (Simon)*

However we cannot tell if these otters were sea or river otters. Inlets such as Saanich Inlet were used as nurseries for females to have their young. They would stay for several weeks before leaving (Poth 1984). Sea otters are not reported in the area by Poth (1994). Barnett (1955) stated that sea otters were extremely rare along the Salish coast (but see Pitcher, this vol.). Seals were also

seen but not hunted because people did not like the excessive fat of these animals. Mr. Stogan mentioned that Nisga'a people ate seals.

Our informant had never heard about the Steller's Sea-cow. Humpback whale were caught along the West coast to Alaska but they did not get into Squamish region; blackfish (killer whales) were hunted (Poth 1984):

*Some whales were sighted near Burrard Inlet sometimes in groups of three or four, some other time alone, usually in the main channel in the deeper area (Simon)*

*Blackfish came there sometimes. People believe they bring 'signs' to the family. My grandfather saw three of them and said to his wife 'a great chief is going to die', and next day he died (Bob).*

Marine mammals were hunted by Saanich people and some Halkomelem also took seals in the lower river and in Pitt Lake (Ham 1982; Poth 1984 ). Harpoons, nets and clubs were used for seals which were caught by two to three man crew in canoes at night during the mid-summer. Porpoises were hunted during the day, as was sea lion and killer whale (Poth 1984).

## Birds

Ducks were abundant in all the zones and seem to be a very important component in the diet of many First Nations communities (Ham 1982, Poth 1984). Black duck was one of the favorite dishes for many communities and were commonly served at Musqueam ceremonies. The Elders said that before people could hunt the ducks freely but that now they need a permit. Eggs were also collected.

*Half a dozen different types of ducks were present in the Burrard area: whistler, butterball, Mallard, long neck diver, black duck (delicious and hard to get it). People used to eat them all (Bob).*

*My mother used to gather seagull's eggs. She used to paddle to Squamish to sell them. Ducks were also abundant in the area. We used to shoot over 100 black ducks in Dead-man Island (Simon).*

Saanich people collected seagull eggs in spring. They would not take all the eggs in one nest; they have to leave at least one. The maximum number of eggs per nest was usually four. Geese and swans could be found on the mud flats and marsh beaches (Poth 1984).

## Discussion

The information collected suggested seasonal use

of the resources. The main seasons when resources from the Strait of Georgia were used by aboriginal people were late winter- spring and late summer-autumn. The latter catches were preserved for the winter.

Ham (1982) reports the species abundance and availability to which aboriginal people had access. The seasons agree with the information obtained from Musqueam community. The respect that people show to nature and the knowledge about this resources (cycles, patterns of behavior) is evident from all communities. They had defined their own rules to protect resources that were both source of food and of inspiration. There was a general concern about the reduction of abundance of some of these resources:

*In the last 10 years we have noticed a drastic drop in salmon. Nowadays there is limited period for fishing, it can go from 12 to 36 hours per season (Simon).*

Trading was a common activity among aboriginal people. For example, the Burrard people used to trade salmon with the inland Squamish people. The Musqueam traded with people from the Okanagan:

*People traded mainly salmon, but could sell other things gathered or hunted. My grandmother used to go to the West End and sold berries, clams, eggs, mats, baskets and get clothes or money as a trade (Simon).*

*Between 1940 and 1945 Musqueam people would fish from 8:00 A.M. to 6:00 P.M from Monday to Friday. Saturdays and Sundays were used to fix and prepare nets for the following week. Some people went up North for early running of salmon (Vincent)*

However, much of this changed with the advent of industrialisation. Around 1929-30 commercial fishing started for canneries, using sail boats mainly. Power boats were introduced in the 1950s (Vincent). Fish was processed by canneries, many owned by the B.C. Packers Company which supplied the nets. Most cannery workers were aboriginal people, or of Japanese ancestry.

## Conclusions

The foregoing illustrates that First Nation people of B.C. have a rich heritage and their knowledge has much to offer. Their TEK can be incorporated into environmental and ecosystem analysis. The other contributions in this report should be consulted in order to see how this was achieved. The use of this approach in the BTF project and the results obtained so far are encouraging.

However, it is important to remember that people should not be viewed only as providers of information. Also their perspectives, questions and suggestions on approaches to the problem being addressed by the researchers should also be considered. This shows respect for their knowledge and makes them feel part of the project. The growing involvement of aboriginal people will then tend to expand the interdisciplinary perspective.

TEK leads not only to the development of management strategies to rebuild ecosystems, but also to understand the users of the resources (how do people operate and under what conditions). TEK also fosters understanding of the changes occurring through time. Information about the use of the natural resources used by aboriginal people and information about their community arrangements are important elements in the development of management strategies.

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