The Development and Evaluation of "Salmon – the Lifeline to Our Culture"

Curriculum Project

By

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B.G.S., Simon Fraser University, 1997

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ABSTRACT

This paper proposes a science curriculum that was aimed at making changes in the student awareness regarding our effect on the Pacific wild salmon of the Northwest Coast. It was geared at developing an understanding the importance the salmon is to our culture – our way of living. Another important task in which this particular curriculum focuses on was conservation strategies in which students developed on a personal level. Everything is connected and for sure as the world turns, our culture will surely diminish if the salmon diminishes.

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Chapter One. The Development and Evaluation of "The Salmon – Lifeline to the Kwakwaka`wakw Culture" Curriculum Project

Introduction

I am from a large family located in a small native community. I was born in Alert Bay, B.C., which is a very small island off of the northern end of Vancouver Island. The island is divided into two areas, the reserve and the "white" end; the very nature of living is distinctly separated by your race. I lived most of my life on the reserve and I am an active member of the `Namgis First Nations band. The only time I left my village was for educational purposes.

The tribe I am from is the `Namgis, which is one part of the whole Kwakwaka`wakw people of the BC coast. The villages/tribes are ranked in a very specific order following a rigid criterion, with the Kwagu'ł being the first and foremost important tribe. When attending potlatches or feasts (which are our sacred rituals), the Kwagu'ł people will be seated in the best section in the bighouse, given the best gifts, and always fed first, after the chiefs and hamat`sa's of course. The Kwakwaka`wakw people consists of several villages located on the coast of British Columbia. They are:

The Kwakwaka`wakw

Fort Rupert	Kwagu'ł
Village Island	Mamalilikala
Alert Bay	`Namgis
Turnour Island	Ławit`sis

Knight Inlet	A`wa`etłala
New Vancouver	Da`naxda`xw
Kingcome Inlet	Dzawada`enuxw
Gilford Island	Kwikwasut`inuxw
Hope Town	Gwawa`enuxw
Blunden Harbour	`Nakwaxda`xw
Quatsino	Gusgimukw
Winter Harbour	Gwat`sinuxw
Cape Mudge	Ligwiłda`xw

The wild salmon are important to the survival of our Kwakwaka`wakw culture, and are intertwined into every aspect of the Northwest Coast native community. As Joseph E. and Anne D. Forester states (1975), "long before the arrival of Europeans of the north Pacific Coast, the Indians of the region had developed an elaborate, complex culture based on the abundance of the marine environment" (p. 38). We need the salmon for our survival as a distinct people. It is so connected into our lives that if the salmon disappear, so will we. We use the salmon for our rituals, food and trade, and in return we pay homage to the salmon.

A Prayer to the Salmon as told by James Wallace.

We have come to meet alive, Swimmer. Do not feel wrong about what I/have done to you, friend Swimmer, for that is

> the reason why you come that I may spear you, that I may eat you. Supernatural One, you, Long-Life-Giver,/you, Swimmer. Now protect us, (me) and my /wife, that we may keep well, that nothing may be difficult for us / that we wish to get from you, Rich-Maker-Woman. Now / call after you your father and your mother and uncles and aunts and elder brothers and sisters to come to me also, you, / Swimmers, you satiater, says he.
>
> (Whitaker, 1989, p.130)

Twins being born in our culture are automatically given the salmon dance. They are held in high regard. Stewart (1977) concurs that twins have an important connection with the salmon such as they were thought to come from the salmon villages under the sea or that they have the ability to call the salmon. The main staple when we potlatch or feast is the salmon, which is prepared in abundance and in a variety of delectable ways.

Our main food supply comes from the salmon. Every home on the reservation would stock up on salmon to aide them through the long winter months. The salmon was never taken for granted; every part of the salmon was used, right down to the eyeballs. Our people still rely on the salmon as a main staple in our diet, and with the salmon becoming a scarce commodity many unwelcome changes will unfortunately result, such as the diets of our people will have to change. The change will no doubt be a negative change because

with the fishing industry gone from the villages there are almost no jobs, thus our people will not be able to afford quality food in place of the salmon.

My traditions are ingrained in me that I cannot do anything without doing it the traditional way, the way I was taught. I can remember as a youngster traveling over to the Gwan`i River on my dad's seine boat the "M.V. Camenita", slowly winding our way up the mouth of the intricate river to set out the net to food fish. We would climb into our river boat, loaded down with the river net and we would make set after set after set, until we caught enough salmon for our whole family, which included extended family and friends. However, my dad never just worried about his family, he would make sure he caught enough for the rest of the community who were in need of the salmon. It was hard work, but it was also so much fun being a part of a group, working together to sight the fish, get the net out, wait, wait, and wait some more, then pull the net in by hand, which was usually filled with silvery, strong salmon.

When my dad figured that we caught enough for everyone on his list, we would then head back home, wet and cold, but also feeling quite content and elated. It always amazed me how quickly the word spread through the village that our fish boats were coming. The docks would be packed with people carrying every available container they could from their home, waiting patiently for my dad to give them the fish they needed.

My dad made sure that my mom received her fish first, which was into the hundreds, and the amount became larger the older she got. She was in "the zone" (which means that was all she had on the brain) and at her best during salmon harvesting time. She did not dictate what needed to be done; she delegated jobs that were appropriate to our abilities. My mother was very specific as to how her fish was processed; you dare not jump a step or try to introduce some new fang dangled gadget to speed up the process – it would just irritate her and make her lose valuable time explaining to you that by no means, her way was the only way. She would start by getting into her fish working clothes, when she had her fish working clothes on you knew she meant business and you had better be ready to work. The preparation started well before we went over to the river, she sharpened the knives, bought out the store of salt and cases of cans, had the wood cut, and organized the work area. Everything had to be done quickly so that the fish did not spoil. She had us doing the menial tasks, such as cleaning the cans, or washing out the inside of the fish, or adding the teaspoon of salt, or cutting the heads off. My mother would do the rest. She would cut the fish to size so that it would fit into the cans, fill the cans, put the lids on the cans, (which she would do manually for many, many years), and add wood to the fire during all hours of the night. The things she used to do would just go on and on. This work was never ending during harvesting. While she was watching the cans boil over the open fire, she would slip into the smoke house and make sure everything was running smoothly in

there. She would preserve fish for every member of her family (which was huge) because she believed in taking care of her family and the cost to her physically and financially was never ever an issue.

Having the right to fish our rivers for food has never been taken for granted, on the contrary, we treasured it. Today we manage the river the way our ancestors taught us, by taking only what we need and sharing what we have with the rest of the village. However, because of the decline of the salmon going through the river systems, we now have to fish the ocean for our food fish; nonetheless, we still conduct this process in the same manner as we were taught. Things may change, but our traditions still hold strong.

> The importance of the salmon to the native economy was such that a "first salmon" ceremony was held each year in the belief that the salmon voluntarily sacrificed themselves so that people could live. They were to be received with respect because the fish were immortal and would not return the following year if they were offended by lack of proper treatment. The elaborate welcome ensured bountiful harvest of salmon in the future and was the most important group religious activity. (Forester, 1975, p. 38)

My mother, Nora descended from the Łigwiłda`xw Nation and my father, Norman descended from the Ławit`sis Nation. My father was removed from Ławit`sis when the non-Natives thought that it was in their best interest to

amalgamate the Natives “into civilization”. Therefore, he was brought to St. Michael’s residential school located in Alert Bay on Cormorant Island, where he worked the farm part time and attended school until grade seven.

From that time forth, my father lived in Alert Bay, transferring from the Ławit`sis Nation to the `Namgis First Nations. There was no choice. If there was, I am sure that he would have selected to stay with the Ławit`sis Nation. Although he was not in contact with his parents much, he still made it important to keep connected to his traditional grounds. He would take all of us on weekend trips back to Ławit`sis to reminisce, to hunt, to clam dig, and to hold on to his/our heritage.

Before I was even born, my father was a proclaimed fisherman. He worked as a deckhand on his father’s owned gillnet vessel, the “M.V. Sea Angel”. When his father decided my father was ready to try his hand at running his own boat, my grandfather made connections with the local fishing company and got my father a boat to use, the “M.V. Joan F3”, whilst my grandfather ran his newly purchased seiner, the “M.V. Camenita”. After a few years, my grandfather gave my dad the “M.V. Camenita”, which, my father made his name renowned as one of the greatest fishermen on the West Coast.

I can remember when I was very, very young, probably three years old, going fishing with my parents during the summer salmon season. They took all their children fishing during these months. Being the second youngest out of

fourteen children, I had no real job on the boat per se, except maybe staying out of the way. It was crowded and busy on the boat, we did not have much room to move, but we managed to get along and get things done.

When I turned fifteen, my father took me on the boat as a cook. My older brothers, my dad's old family friend, as well as my mother's grandson, were all part of the crew. We would start fishing in May and fish the whole coast, from Prince Rupert to Barkley Sound ending the season in the fall fishing dog salmon (Chum). I fished for my father until I had my children, after which, I fished for my brother who in turn took over the "M.V. Camenita" whilst my father vesselled his new purchase, the "M.V. Numas".

My father worked for many fishing companies, all located in Alert Bay, but owned by wealthy white people outside of the vicinity who treated the company as an asset to themselves and not to the community. There was the ABC Fishing Co., the Nelson Bros, Fishing Co., The Central Native Fishing Co., the BC packers Fishing Co., and the Canadian Fishing Co., all of whom made millions of dollars off of the local fisherman and fisheries resources. Just recently the BC Packers Fishing Co. building in Alert Bay was torn down, which made me realize that one more aspect of our livelihood has just disappeared.

At one point, my father owned as many as six seine boats, one of them being previously owned by the environmental activists "Green Peace". However, the one he cherished the most was the first boat he ever owned,

which he received from his father, the “M.V. Camenita". When he was not fishing or hunting or clam digging, he would ritually wake up early every morning, have his cup of coffee and his breakfast then head down to the dock to check on his boats, always making sure everything was in its' place and in working condition so that when he needed to, he had access to partake in his traditional activities.

Being brought up in a rural community makes me realize the importance of the salmon, especially now since the seine boats/licenses are cleverly being bought up through government by-backs, and our food fish catch is to now be accounted into the allocated quota for the coastal fishing industry, and as well as the fish farms being permitted to move in and pollute our water systems with chemicals, unwanted Atlantic salmon their accompanying sea lice. The consequences will be detrimental to the local Native communities who relied on the Pacific wild salmon to take them through the long winter months. Our people depend on the salmon, it is our bloodline to our survival, and now the wild salmon are becoming a scarce commodity.

With my love for our traditional ways of life, living off of the land and sea, I feel the need to bring our Pacific wild salmon back to life. The Kwakwaka`wakw people need to refocus their attention to what is important and what helped them become the people that they are, “the salmon people”. We need to take

action to breathe life back into the Pacific wild salmon stocks and make all our people and future generations aware of its' importance to us as a people.

Rationale

Aboriginal people are very hesitant to participate in science, especially the Westernized science programs because these programs are not compatible to their learning styles. Snively and Williams (2006) state that "this situation arises from a type of science education in which Aboriginal knowledge and wisdom is rarely acknowledged and Aboriginal content is seldom if ever legitimized, or is considered a token addition" (p. 1). They go on to state that, "unless science classrooms and teaching materials provide a meaningful context for Aboriginal students (as defined by their local communities), and unless Aboriginal knowledge coexists with Western science in the science classroom, many Aboriginal students will continue to find the science curriculum inaccessible and culturally irrelevant" (p. 2). With many Aboriginal students, low self-esteem is a major factor that related to what subjects they choose in school and what they do in life. If for example, a science program is too difficult and not related to what they know, they will simply not participate in it. Simpson (2002) agrees that "despite advances in the past decade in graduating Aboriginal students in post-secondary education programs, the lowest participation rates for Aboriginal students occur in agriculture, biological sciences, mathematics, and the physical sciences" (pp. 20 – 21). Aboriginal people have been shamed so

much in the past and with that on their shoulders, Aboriginal people tend to walk lightly and only on grounds that are safe. Therefore, I believe that science programs need to be developed that are appropriate to location and to what knowledge and experience is important to the Aboriginal people in that area.

It is crucial that our children learn the importance the salmon has to our community as well as the effects that will happen if the salmon disappear, such as the dietary aspects of not eating salmon, or the loss of togetherness and community when harvesting, etc... A relevant community based science curriculum needs to be fashioned that develops an understanding of the importance of salmon both as a resource and as a cultural symbol to the Kwakwaka`wakw people of the Northwest Coast.

By making changes in the students' way of thinking regarding our impact on the environment and by exploring the connection the salmon has to our native culture, it is hoped that students will be able to gain the required knowledge to make effective changes for the future. Confronting a problem that is connected to us, that is real, which the students can gain physical concrete experiences from should empower them to make wise decisions and take the appropriate positive actions that could help save the wild salmon.

In many Native communities, the local schools lack quality science programs which incorporate local traditional knowledge and wisdom. What is being taught is surface teaching, which means the teacher will teach

something that is safe and predictable and is often not relevant to the environment or local community and is not meaningful to the lives of students. This is being done either because the teacher does not have the ability to teach science or the teacher does not want to become too involved in critical environmental or cultural issues. The Kwakwaka`wakw peoples have the means to teach a wonderful traditional science curriculum because the resources are right at our doorsteps, we just need the teachers to develop the passion and accept responsibility and leadership in teaching traditional science knowledge.

It has been noticed that the children enjoy participating and learning when they are actively involved with topics familiar to them. David Sobel states in the article *Thinking Like an Ocean: Marine and Environmental Education Principles that Ensure Coexistence between People and Nature* by Gloria Snively (2002) that "knowledge without love will not stick. But if love comes first, knowledge is sure to follow" (p. 2). If the students can feel connected to a topic of interest and can develop a passion about this particular topic, they will be eager to learn more about it, such as I have done with the salmon. However, the students cannot learn about our culture and resources on their own and this is where the teacher can step in with guidance and direction and assist the students to delve farther and deeper into the topics and issues they feel fervent about.

With the depletion of the salmon in our waters, the importance of the salmon to our Native Community will become widely apparent. We need the salmon for our survival as a distinct people. The salmon are so intertwined into our lives that it is widely believed that if the salmon disappear, so will we.

Purpose

The primary purpose of this project was to develop, pilot test and evaluate a traditional science curriculum for grades K – 5 that focused on the importance of salmon both as a resource and as a cultural symbol to the Kwakwaka`wakw people. It was to develop awareness and understanding of the environmental impacts that affect the salmon, which, in turn will affect the people of the Northwest Coast. A long-term goal was to bring a consciousness to the Native communities in regards to the rapidly dwindling runs of the wild salmon, what was happening to the salmon, why it was happening, and what needs to be done to save wildlife stocks. It was hoped that this curriculum would give present and future generations of the Kwakwaka`wakw people a starting point to develop plausible solutions to this dilemma.

Research Questions

1. What are the Kwakwaka`wakw traditional methods of gathering, preparing and processing salmon?
2. What components of the Kwak`wala language can be incorporated into the salmon curriculum?

3. What do the elders think is important to teach the students; e.g., a) the importance of the salmon to the Kwakwa̲ka̲`wakw culture, b) traditional methods of gathering and harvesting salmon, c) language additions, and d) reasons the salmon are declining?

4. What examples of traditional knowledge and wisdom can be integrated into a science curriculum?

5. What issues are important to the Kwakwa̲ka̲`wakw peoples that are related to the depletion of the wild salmon on the Pacific Northwest Coast?

6. What are simple evaluative techniques for analyzing students' knowledge (understanding), skills (observing, predicting, questioning, inferring, identifying,...), and attitudes (behavior, respect)?

Setting

The school that I selected to implement my traditional salmon science curriculum in was the T`łisa̲lagi`lakw School in Alert Bay. This band run school has been in existence for over thirty years now with the emphasis on educating Aboriginal students. The school was first put into place when parents realized that the district school was not meeting the needs of their children. At first the students worked out of the St. Michaels Mission School because of space, or lack thereof. Then the students (and teachers) were promoted to portables. After twenty years of struggling to learn, the `Na̲mg̲is First Nations were able to find the funding to build a new school, which has been up and running for fourteen successful years with many of the staff members belonging to the `Na̲mg̲is band.

The T`łisalagi`lakw School is located high on a hill directly across from the `Namgis First Nations band building. There has been between one hundred and twenty to one hundred and fifty students enrolled every year. Most of the students resided on the `Namgis reserve, but there were a few students who come from the Whe`la`la`u band which consisted of a combination of bands who were displaced after being removed from their original village sites. Therefore, the `Namgis First Nations allotted them some property within the reserve with the understanding that they will be separate and independent from the `Namgis First Nations.

The parents were adamant about their children's education. Most of the parents were young, between the ages of nineteen and twenty-five with many of them not being able to obtain a job because of many reasons, one being the lack of education and another being a lack of available jobs. At one time or another throughout their schooling, many parents were not equipped to understand the purpose or process of an education and chose to quit school prior to graduating. However, now that they have children of their own, most parents are demonstrating an interest and a dedication to their children's education.

Grade level

Although the salmon science curriculum was developed as a resource guide for teachers at the grade 1-5 level, the pilot-testing and evaluations of the curriculum was conducted at the primary level (grades K-3), in the

T`łisalagi`lakw Band School, in Alert Bay, BC. Two primary teachers from the `Namgis First Nations Band and were more than willing to open up the classroom for innovative educational purposes. The classes consisted primarily of Native children who were living within the school's perimeter. Once in awhile, we were blessed with a non-Native student whose parents were willing to forget where their tax dollars were going and were willing to give their child a unique cultural, but also highly academic experience.

Description: Curriculum for Traditional Ecological Science

The topic of the wild salmon is relevant because of the significant decline of the wild salmon population taking place within the many Native fishing communities along the coastal regions. Through fishing restrictions, global warming, fish farming, various sources of contaminants, and logging, the wild salmon populations have started on the road to possible extinction. Actions taken by humans also affect the animals (Brooks, 2002). Questions arise such as, what will happen to our communities if the salmon populations decline so severely that they do not return to the rivers and the nearby fishing grounds disappear altogether? As educators, how can we develop an awareness of the importance of the wild salmon? How can we help restore the balance in the traditional ways of life for our people?

This curriculum explored many aspects of the wild salmon; the ecology of wild salmon, traditional and modern harvesting methods, the reasons for the wild salmons' demise, the role the wild salmon has in our culture, conflicts

between Western science and Aboriginal science knowledge, and methods that can be taken to revive the wild salmon in order to preserve both the wild salmon and it's place in our cultural traditions.

I have developed this topic into a unit that can be taught throughout the year, or as I teach it, as an integrated monthly theme, identifying specific areas to explore on a daily basis. It is connected to the current Ministry of Education through the science and social studies sections, but realistically it is integrated together with all of the subjects.

It was hoped that through observing, communicating, classifying, interpreting, predicting, and questioning, the class would be able to gain a clearer understanding and awareness of the critical state the wild salmon is in from which they could brainstorm and develop some reasonable solutions to assist in the return of the wild salmon. It is relevant to them because what is happening to the wild salmon is happening right outside their door and not somewhere halfway around the world in unknown territories. Snively (2002) suggests that ecological consciousness should begin at home. It is important that children have many opportunities to connect with the natural world, to learn to love it and feel comfortable in it, before being asked to heal its' wounds.

This unit was divided into seven sections, with the possibility to expand and explore in more detail many more aspects related to this unit depending on

time, accessibility, and passion. Specific sections incorporated Traditional Ecological Knowledge and Wisdom as well as the local kwakwala language as possible.

Section 1 **The Life History of the Wild Salmon** introduced the species through many activities, such as body parts, life cycle, salmon habitat, food relationships, the hazards of migration, and all living things have needs.

Section 2 **The Connection the Wild Salmon Has to Our Culture** examined how our people used the wild salmon on a daily basis, such as bartering with neighbours, or preserving it for the winter months, as well as the importance of the wild salmon in our potlatches, for example, we looked at the salmon dance as well as the many dishes that are made from the wild salmon.

Section 3 **Traditional Fishing Techniques** investigated the way Natives in the past have fished the wild salmon, the materials they used and how they made the equipment. It also gave the opportunity to reconstruct such equipment to test against what is now our modern fishing equipment.

Section 4 **Preparing and Harvesting the Wild Salmon** demonstrated the

processing techniques that Native people in the past used to preserve food. Opportunities were provided to practice many of the tried and used techniques comparing it to today's advancements in this specific area.

Section 5 **The Decline of the Pacific Wild Salmon** looked at the reasons why the salmon are disappearing, such as the effects of fish farms, over-fishing, logging, and global warming have on the wild salmon.

Section 6 **Reviving the Wild Salmon** researched the possibilities that we can consider to bring the wild salmon back. We looked at the ways the Kwakwaka`wakw people have attempted to protect the salmon and the salmon habitats in the past and distinguish whether or not to re-establish and integrate some of these techniques with what is available now.

Section 7 **The Salmon Celebration** brought closure to this unit. We gathered as a cohesive group (the primary teachers, the Elders, and myself) and developed a suitable closure to a rich and rewarding effort of learning. We invited the parents of each class involved and had each student demonstrate in a form they were comfortable with what they had learned about the wild salmon. Then we had a salmon and seafood luncheon, in which the students assisted with the preparations.

In addition to the above lessons which were developed prior to conducting interviews with the Elders, I incorporated additional lessons and activities that the Elders suggested. The total set of lessons is described in the appendix.

Methodology

With so many methodologies available, the one that tends to fit with the research I have conducted is Qualitative Research. Denzin and Lincoln (1994) describe this process as:

> Qualitative research is multimethod in focus, involving an interpretive, Naturalistic approach to its subject matter. This means that qualitative researchers study things in their natural settings, attempting to make sense of or interpret phenomena in terms of the meanings people bring to them. Qualitative research involves the studied use and collection of a variety of empirical materials – case study, personal experience, introspective, life story, interview, observational, historical, interactional, and visual texts (p. 2).

Creswell (1997) concurs with Denzin and Lincoln. He states:

> Qualitative research is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. The researcher builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting. (p. 15)

Resources

Being a part of a small Native fishing community it was with relative ease that I was able to find support and information on this topic. The resources were located throughout the community. The methodology approach that was most beneficial included qualitative research, interviews/observations, and archival searches– videos, photos, and maps. Specifically, the following resource sources were utilized in the development of the salmon curriculum:

1. The **local band** has been in the process of treaty negotiations and was used as a resource for maps of previous fishing sites, and for information regarding water and land rights.
2. Our band developed a **Salmon Enhancement Project** at the mouth of the Gwan`i River which was accessed as a source to obtain information. A group of `Namgis people currently work at the Gwan`i Hatchery rebuilding the salmon stock in the river system.
3. The **local museum** was used to gather information as well. At the U'mista Cultural Center permission was obtained to gather old and current photographs of fishing techniques, equipment and boats. Information pertaining to legends, masks and dances was also obtained at the center.
4. The **Native Brotherhood of BC**, which is an organization that was put into place by Aboriginal peoples of the Northwest Coast who had an interest in fishing, was able to offer a vast amount of information

relating to the damages done by logging and fish farming as well as information concerning the Fisheries Department and the roll they play.

5. The **local Native Fishermen** who were always willing to take part in rebuilding the salmon stocks for both subsistence fishing and commercial fishing.

6. The **elders**, with their knowledge and wisdom on traditions past and present shared their stories and experiences of the harvesting processes as well as retelling the history of our connection to the salmon. With their uncanny insight into the future, they enlightened us with solutions that could save the plight of the wild salmon. Appendix A has a list of questions that were used when interviews were conducted with selected elders.

7. **Fisheries and Oceans Canada** was another source of applicable resources. They had posters and teaching materials that were used in the classroom setting.

8. Specific **Research Stations** located throughout British Columbia contained important statistics, documents, photographs and archival information from which materials were obtained.

9. **Myself** was used at a source of information. Growing up in Alert Bay and being connected to the wild salmon throughout my life gave

me insight to many of the changes that are occurring with the wild salmon stocks.

Strategies for Interviewing an Elder

Either strategy needed to be handled delicately and with minimal interference. Thus, I needed to make sure that the elder who was selected was given his/her consent and that the recording equipment was in working order and not so intrusive because Native people tend to shy away or get very nervous when put in front of technical equipment. It was considered wise and less stressful for the elder to select a family member who could be present during the formal or informal interview to ease the tension and if necessary act as the liaison. Also the researcher attempted to enable the elder to select a time and a place in which he/she would like the interview to occur. This makes them feel more at ease because they are in somewhat control of the situation and it was considered wise to confirm my time before the actual event, because many Native people prioritize their time to what is happening at the moment and not so much to an agenda. Thus is the saying, "running on Indian time". It was considered wise to bring a small token or gift to give to the elder I was interviewing to demonstrate my appreciation for their time, effort, and their gift of knowledge.

To enhance my lessons I interviewed three very selective Elders located within the vicinity of Alert Bay who were able to share their traditional ecological knowledge for the benefit of generations to come. I was able to use their

information within several of the lessons I developed by taking fascinating quotes that would intrigue the students curiosity to delve deeper into the lesson.

I had a difficult decision as to whom I was going to interview. I used such criteria as their age: being too young would mean that the person would not have the old knowledge that I was seeking which could be implemented into my curriculum project. However, the interviewee still needed to be young enough to be in control of his/her senses and memories. The person would had to have experience with catching and preserving salmon, and preferably, the person I selected would still be practicing traditional ecological knowledge within his/her environment.

With so many of the elders passing on to the next world, it was important to record interviews so that the vital information that they were willing to share would not be lost. There were two possible techniques to gain the valuable knowledge and wisdom that these Elders and resource persons hold. I could either ask permission to question them, which would guide them and keep them focused. However, elders usually "clam up" when probed or pushed to reveal their knowledge. Or I could ask permission to let them tell me what they thought or felt in their own time and space. The latter took time and patience but was extremely valuable because when the elders are feeling comfortable, they will tell you what you want to know and usually a whole lot more.

With the first interview strategy, I developed a set of questions that the elders would be able to clearly understand and respond to. Possible suggestions of questions which were used in the interviews were:

1. Why are the wild salmon important to the Kwakwala speaking people?
2. What do you remember about some of the old techniques used in fishing?
3. Has anything changed as to how you prepare the salmon?
4. Who brought in the salmon when it was time for winter preparation?
5. How much salmon did you need to last you through the winter months?
6. What can you tell me about the salmon dance? Who is chosen? Why?
7. What was it like during winter preparation?
8. How did/do you show respect for the salmon?
9. What do you think is important to teach our children about the salmon?
10. Why do you think the salmon are disappearing?
11. What do you think can be done to save the wild salmon stocks?
12. What are some signs you use that will indicate there will be an abundance of salmon?
13. Do you have anything else to add?

The latter strategy would only need a specific task that I would partake in with the elder to get them to start conversing, such as bringing a salmon for them to cut, or showing them a picture of the river, etc… However, using this strategy, I had to hone my memory because that was the only way I recorded the information.

Language

Our language is quickly being lost. There are not many people left from the Kwakwaka`wakw territory that are capable of speaking our language. The Kwakwaka`wakw people of the BC coast are known as the Kwak`wala speaking people. This is how we are defined, this is who we are. But who are the Kwakwaka`wakw people if we do not have our language? Whenever I would listen to elders talk in their Native tongue, there would be so much laughter and hand movement, which would get me intrigued. But when I asked what they were talking about, they were not able to translate the emotion or the feelings, just the main points of the conversation. The late Ethel Alfred (July 18, 2000), a fluent Kwak`wala speaker said in a personal communication that "you lose much of the meaning when you translate Kwak`wala to English". Keeping our language alive and in use is important because that is how we are identified, we are the Kwakwaka`wakw, the Kwak`wala speaking people.

Within the Traditional Salmon science curriculum I intended to incorporate the Native language into the lessons. With guidance from the elders who speak Kwak`wala fluently, I incorporated as many of the key words and phrases

connected to this unit in the daily lessons. Kwak`wala is the spoken language of the Kwakwaka`wakw peoples of the Northwest Coast of British Columbia. Many of the elders who were fluent in this beautiful oral language have passed on to the next world. However, we do have a few available knowledgeable elders willing to contribute their wisdom and time for the sake of our children, with the intent to keep our language and our culture alive.

I myself have taken many language courses throughout my life. I completed a three-year Kwak`wala Teacher's Training Project that was led by Jay Powell, a well-known linguistic professor from UBC. There were Kwak`wala classes taught at night by great, fluent teachers such as Pauline Alfred and Vera Newman. I also had a fluent person situated in my classroom for two years, exposing me to as much of the language as possible. Throughout all my experiences with the Kwak`wala language, there is one thing I have learned which keeps me pushing the language, and that is, if you do not use it on a continuous basis, you lose it.

Evaluation

My evaluation plan was two-fold. First, using a rubric with the aid of check- lists, journaling and a variety of simple activity sheets and/or activities, I planned to assess the students by participation, attendance, understanding of key concepts, a completion of assignments and how they respected elders, the salmon and our cultural teachings. I observed the students to see if they were staying on task, if they were interested and taking part in the activities, and I used their completed work to demonstrate their understandings of the concepts

being taught. Then when the students were involved with hands-on activities led by the Elders, the second part of my assessment plan was for the Elders to also develop and describe their own ways to assess the students. For example, they could decide whether or not a student can identify the body parts of the salmon using Kwak`wala words, or maybe they could assess the students' behaviour and interest by observing the students whilst s/he is telling a story, or possible whether they could demonstrate the proper way to do a salmon dance.

Together, as a cohesive team with the Elders, we hoped to conduct assessments through observational and informal discussions on each students' abilities using completed student activity sheets and pictures. We intended to focus on the positive and not so much on what the students could not do, which in turn we hoped would develop self-esteem and confidence in their abilities. The important aspect of teaching this unit was to have the students gain knowledge through active participation in classroom lessons. The study was connected to their lives.

The overall goal in working with these units was to bring awareness, knowledge, and appreciation to the students regarding the environment that is surrounding them. To point out that we are all inter-connected and that if something is out of balance then the whole coastal ecosystem, including the humans who inhabit it will not be in sync. It was hoped that working with this unit would also develop self-esteem and confidence in the students through

activities that are related to their history via family and home-place surroundings.

Limitations of the Study

This paper explored the importance of salmon in relationship to our culture, community life, personal life, knowledge past and present, and family. It has also taken a closer look at some possible solutions to the decline of cultural knowledge that can be implemented within the community to assist with the revival of the salmon.

Although there will be obvious limitations to every study, including this one, I tried to stay neutral with the intent of developing a strong unit for teachers to implement in their classroom. One of the potential limitations is the possibility of personal biases. Biases are undoubtedly difficult to avoid when a researcher, curriculum developer, and/or a long-time teacher is passionate about a specific issue. Being from a small Native fishing community, along-time fisherwoman, and a local Native teacher, teaching in a band run school does lend to some apparent possibilities for biases. However, this unit was developed in collaboration with elders, biologists, and other teachers. I attempted to teach all sides of and viewpoint associated with the decline of salmon runs. My goal was to bring awareness to others regarding the survival of the salmon, and encourage enthusiasm and interest in the students to further pursue my twin purpose of reviving both our cultural traditions and the salmon runs.

As stated previously, a significant aspect of this research was the documenting of elder knowledge and the use of elders as mentors. In the last year or so, we have lost so many elders that I am concerned with the knowledge dying before I am able to make the connection. It is a fact that so much of our traditional knowledge is in holding with our elders, they are the wise ones, the logical thinkers and their knowledge and spiritual teachings need be documented, used and kept alive.

Summary

My philosophy is to help the students become responsible citizens of this world. The strategies that I put into practice in my classroom were combined with traditional knowledge and western education. I wanted to help our children to grow and develop respect for our land, our resources, ourselves and our culture. They need to know how to nurture themselves and the world around them, which will eventually bring them to more fully understand the way the world works. No one stands alone, we are all part of the global environment, and we all need to take positive action to care for our local environment and the planet. I want everyone to know that Native people have so much knowledge and wisdom revolving around how to take care of mother earth and we are willing to share this knowledge and spiritual teachings with others.

Chapter 2 – Literature Review

Overview

This chapter pertains to the North Pacific Coast wild salmon and the importance the wild salmon really is to the coastal communities. This chapter is divided into four sections that taken together, explore the many reasons for the salmon's demise, the possible solutions and the conclusions to specific factors, which are having an impact on the wild salmon. The first section describes the Kwakwaka`wakw culture**,** its' history and interaction with the wild salmon. The second section defines traditional ecological knowledge as a form of science, which needs to be brought into the education system, and provides examples of traditional science knowledge and wisdom. The third section describes the current state of education for Aboriginal students and makes a case for the preservation and revitalization of 'endogenous' approaches. The fourth section reviews the affects of commercial exploitation and inappropriate and ineffective regulations on the wild salmon and the importance of keeping the salmon alive.

The Kwakwaka`wakw People and Their Ways

The Kwakwaka`wakw culture is rich in the knowledge and understanding of the land in which they were given. The Kwakwaka`wakw consist of several groups located on the northern and eastern side of Vancouver Island as far south as Campbell River. Each group within the Kwakwaka`wakw used the land

and rivers in which they were given with respect (or as translated into kwakwala 'mayaxala') and reciprocity. These people commemorated life through potlatches. Jonaitis (1991) states that:

> Their potlatch....celebrated as an uninterrupted tradition from precontact times until the present, is the occasion on which a noble family invites guests who witness the display of the host's status. In the late nineteenth and early twentieth centuries, various grades of potlatches were given, ranging from relatively minor events for children at various times in their life cycle, through the more significant festivals s celebrating the assumption of dance privileges, to the most important, called "Doing a Great Thing." This last type of potlatch could celebrate several different activities: the assumption of a chiefly name and position, the exchange of coppers [objects of great value to these people], marriages, the erection of totem poles, and the building of houses. On each of these occasions, guests received payment from the host for their service as witnesses; their acceptance of these payments signified their validation of the host's claims of status. (p. 11)

Through their potlatches, the Kwakwaka'wakw people were able to demonstrate the importance in which every living thing had in their lives. They honoured the animals, the trees, the lands, the rivers, the past and the present. Everything had a connection to their lives and they never took anything for granted.

Through a history of observing and transferring of information via oral language, they have learned how to be a part of Mother Earth, how to care for all living and non-living entities, and how to replace what was taken, whether it be real (such as the bones of the first salmon caught being returned to the river)

or spiritual, (such as a prayer to the salmon), so that there will be something for their future generation. Fixico (2003) states that:

> "Indian Thinking" is "seeing" things from a perspective emphasizing that circles and cycles are central to the world and that all things are related within the universe. For Indian people who are close to their tribal traditions and native values, they think within a native reality consisting of a physical and metaphysical world. Full bloods and people raised in the traditional ways of their peoples see things in this combined manner.
>
> Seeing things in this special way is thinking like an Indian who has been raised in a tribal community operating according to tribal beliefs.... Seeing is visualizing the connection between two or more entities or beings and trying to understand the relationship between them within the full context of things identified within a cultural based system. (pp. 1-2)

According to Kawagley (1995), "the original Yupiaq based their philosophy and lifeways on maintaining and sustaining a balance among the human, natural, and spiritual worlds", which is similar to the Kwakwa̲ka̲`wakw culture (p. 15). With regards to the salmon, the Kwakwa̲ka̲`wakw people show the utmost respect for what the salmon has to offer. Kawagley (1999) states that,"Fienup-Riordan has called the Alaska natives and other indigenous peoples the 'original ecologists'"(1999, p 32). He adds that, "one reason for this is that their (Alaskan Natives and other Indigenous peoples') worldviews are dependent upon reciprocity – do unto others as you would have them do unto you. All life is considered recyclable and therefore requires certain ways of caring in order to maintain the cycle" (p. 9).

It takes time to develop a relationship between oneself and nature and each cultural unit has developed their own system of doing so. Cajete (1999) identifies that, "The ethnoscience of each tribe or cultural region is unique and characteristic of that group or geological area in that it reflects adaptation to a certain place" (p. 16). Furthermore, the relationship cannot be just a give-take where only nature is giving, but a true interconnected bond on each side willing to give some in order to take some. When one has achieved this balance, then they have Indigenous knowledge. Battiste and Youngblood Henderson (2000) assert that, "Indigenous peoples regard all products of human mind and heart as interrelated within Indigenous knowledge" (p. 41). Battiste and Youngblood Henderson continue to define Indigenous knowledge in that it "is based on awareness, familiarity, conceptualization, and beliefs acquired about an ecosystem" (p.48). They go on further to state that "Indigenous knowledge is not static, but, like the shifting dynamics of particular ecologies, change over time. It is a learned way of looking at the world that may have different forms of acquisition, transmission, and manifestation for different Indigenous peoples" (p. 48).

Traditional Ecological Knowledge and Indigenous People

A fundamental aspect of Indigenous knowledge, which needs to be brought into the education system, is Traditional Ecological Knowledge and Wisdom. Corsiglia and Snively (1997) describe this method of resource management as an "interpretive study on how the world works from the cultural

perspectives unique to particular indigenous peoples" (p. 22). Emery (1997) also states:

> Traditional environmental (ecological knowledge [TEK] is a body of knowledge and beliefs transmitted through oral tradition and first-hand observation. It includes a system of classification, a set of empirical observations about the local environment, and a system of self-management that governs resource use. Ecological aspects are closely tied to social and spiritual aspects of the knowledge system. The quantity and quality of TEK varies among community members, depending on gender, age, social status, intellectual capability, and profession (hunter, spiritual leader, healer, etc…). With its roots firmly in the past, TEK is both cumulative and dynamic, building upon the experience of earlier generations and adapting to the new technological and socioeconomic changes of the present. (pp. 5-6)

Battiste and Youngblood Henderson (2000) further state that "the traditional ecological knowledge of Indigenous peoples is scientific in the sense that it is empirical, experimental, and systematic. It differs in two important respects from Western science, however: traditional ecological knowledge is highly localized and it is social (p. 44).

Traditional Ecological knowledge and Wisdom is now being reintroduced at the global level. It is the next new trend in science that needs to be explored by people who can see no other alternative to saving the world from total disaster. It is a concept that Aboriginal peoples worldwide practiced their whole lives and the lives before them. Snively and Corsiglia (2000) define TEK as "an experience acquired over thousands of years of direct human contact with the environment" (p. 11). Aboriginal people have a tendency to stay in one place for most of their lives, this gives them the opportunity to become familiar

with their surroundings in great detail. Julie Cruikshank (1991) as quoted in Snively and Corsiglia (2000) notes:

> Observations are made over a lifetime. Hunting peoples carefully study animal and plant life cycles, topography, seasonal changes and mineral resources. Elders speaking about landscape, climate and ecological changes are usually basing their observations on a life-time of experience. (p. 13)

This however, is a concept that will be difficult to implement with many adults. Everyone is so busy chasing the perpetual notion of power and money that they have no time to waste. Berger (1976) as quoted in Kawagley (1995) re-enforces this view and states that "the 'modern' view tends to be oriented toward the manipulation of the world's resources – including the people – to make political, social, and economic 'progress,' with the presumed end result being an advanced quality of life (p. 1).

The majority of adults would not be able to contemplate the idea of taking the time to watch how a bee moves or observe how a flower grows. It is too time consuming. Therefore, we need to focus our energy and hopeful theories of saving the world on the children who have not yet been formed and fitted into the Westernized way of living.

Aboriginal Students and Education

The British Columbia Ministry of Education Report (2000), which is documented in Snively and Williams (2008), has found that "…in British Columbia, Canada schools the majority of students of Aboriginal ancestry are underrepresented in science courses and underrepresented in the sciences"(in

press). Many Aboriginal peoples do not have the confidence to jump into the Western world of living and learning. As Bodley (1982) states, "the Western way of life is considered superior to those of traditional societies" (p. 2). The Aboriginal peoples tend to agree with Bodley even though they are more than capable to succeed in the Western education system if the programs are designed for their way of learning. Although, recently there has been an increase in Aboriginal people completing their Grade 12 education, which Snively and Williams (2008), have noted that, "36% -42% of Aboriginal students graduate from grade 12" (p. 2). However, Snively and Williams have evidence that once these students graduate, they are reluctant to take part in any further science courses that might assist them in their future profession. It is sad that Aboriginal people do not take advantage of science opportunities that are being offered. With the knowledge the traditional Aboriginal people hold in the area of science it would seem that they certainly would be able to soar. Simpson (2002) has noticed that "despite advances in the past decade in graduating Aboriginal students in post-secondary education programs, the lowest participation rates for Aboriginal students occur in agriculture, biological sciences, mathematics, and the physical sciences" (p. 2).

Aboriginal people are coming to the realization that they need an education in order to keep up with the rest of the world but more importantly to be recognized as equals in the westernized society. It is a difficult task to attain

because they would be crossing over into another world. According to Aikenhead (1997):

> ...the subculture of Western science can conflict with the cultures of First Nation students, learning Western science is recognized as culture acquisition that requires Aboriginal students to cross cultural boarders from the everyday subcultures of their peers, family and tribe to the subcultures of school, school science, and science itself. (p. 2)

To assist the Aboriginal people many organizations undertook educational programs and attempted to adapt it to the needs of the people. Cajete (1999) notes that:

> In 1974 the General Conference of UNESCO proposed a program of concentrated research '...stressing the preservation of cultural identity, authenticity and dignity possessed by each national group.' The conference recommended that transfer of knowledge endeavors be predicated on these realizations: 1) an obvious imbalance between the world's producers of knowledge and its consumers which reflects relationships between developed and developing countries; 2) the transfer of knowledge as a base for political power, as the origins and flow of scientific and technical knowledge directly affect political policies and cultural identities, authenticity and dignity; and 3) preservation or revitalization of 'endogenous' approaches. (p. 24)

However, many Aboriginal groups are reluctant to share their knowledge because of past experiences, in which a non-Native representative of a specific group came along and took what s/he needed and then left with no thanks, no appreciation of the people and their knowledge, and with no acknowledgement attached to what was taken. But the overall success of an education outweighed the negative outcomes. Despite such efforts, westernized education and Aboriginal people still do not mix well. Cajete (1999) has noticed that:

> Historically, Native American students have had great difficulty completing their "education" in contemporary Euro-American classroom settings. Based on a longitudinal study of high school sophomores, the U.S. Department of Education (DOE) registers the high school dropout rate for Native American students at 50%, and on some reservations that figure reaches an astonishing 70%! A recent American Council on Education report states that Native Americans account for less that 1% of all college students, and more than 53% of these students drop out after their first year in post secondary education. Why? Is it because these students are less capable? Less inventive? Have less educational fortitude? No. It is primarily because North American education systems are not structured to be compatible with Native Americans' cultural heritage. (p. 8)

It is like trying to fit a circle peg into a square hole, it is not possible without distortion. Cajete further states that:

> Science in most American schools is presented from a perspective that is heavily oriented toward what McCarthy labels the 'type two left-brain learner,' a learner who is highly analytical, objective, verbal, structured, and parts oriented. I have observed that many native American students tend to be intuitive, subjective, non-verbal, synthesizing and oriented to wholes and practical in their application of learning. (p. 15)

Dr. Rayna Green (1981) summarizes, "…the lack of Indian participation in science is as much due to an alienation from the traditions of Western science as from a lack of access to science education, bad training in science, or any other reasons conventionally given for minority exclusion from scientific professionalism" (p. 8).

Aboriginal people are scientific people without the clipboard and the white coats. The traditional Aboriginal people have obtained the knowledge through past generations and built from it through the interaction with Mother Earth. They have so much to offer in the ways of science. Cajete (1999) agrees

that, “Indigenous people have applied sophisticated science thought processes for thousands of years” (p. 8). He delves further in and states that “the Indigenous perspective has the potential to give both great insight and guidance to the creation of the kind of environmental ethics and deep understanding which we must gain as we enter the critical times ahead” (p. 83). It [the knowledge] is there, the Indigenous people just need to learn how to transfer this knowledge.

However, when it comes to Westernized Science education, many Aboriginal people tend to shy away or fail, which Kawagley (1995) states is partly due to the fact that “the indigenous peoples of the world have experienced varying degrees of disruption or loss with regard to their traditional lifestyles and worldviews” (p.2). Bodley (1982) as quoted in Kawagley (1995) goes on to say that “the Western worldview with its aggressive educational practices and technoscience orientation has placed indigenous cultures in ‘harm’s way’” (p. 2).

The Aboriginal people do not function well as learners within a “box”; this method, which I refer to is as the Westernized school system has been tried and failed miserably several times in the past. From their past mistakes, which Cajete (1999) identifies, “early missionary and government teachers naively assumed that Native Americans had no education at all, and that their mission was to remedy this ‘great ignorance’” (p. 27). The Ministry of Education and the

education systems need to identify a science program which would promote success with the Aboriginal peoples. What Stairs (1995) believes is that:

> [Aboriginal students] need a teacher who is a 'culture-broker'. A culture-broker science teacher will help students move back and forth between their Indigenous culture and the culture of Western science and will help students deal with cultural conflicts that might arise. As with all reforms in science education, the teacher is the key to success. (p. 162)

The Aboriginal people would also have to take some responsibility and decide what needs they wish to have met then take the necessary steps to partake in the development of a cohesive science program that will encourage learning at both the elementary and secondary school levels. Cajete (1999) had experienced success when teaching a cultural education at the Institute of American Indian Arts, which he remarks that "for five to eight years it [the IAIA] was indeed a shining light in the world of Indian education" (p. 12). He was able to reach success because he was aware of the Aboriginal students' needs.

Being aware of Aboriginal student needs is definitely a strong area in which teachers need to be conscious of when teaching. However, integrating the local Native language into the school as part of the whole learning process would ignite the passion in Aboriginal students in becoming interested in science. Castellano, Davis and Lahache (2000) documented Elders thoughts regarding the importance of their languages:

> Our Native language embodies a value system about how we ought to live and relate to each other ... It gives a name to relations among kin, to roles and responsibilities among family members, to ties with the broader clan group. There are no English words for these relationships ... Now, if you destroy our languages, you not only break down these relationships,

> but you also destroy other aspects of our Indian way of live and culture, especially those that describe man's connection with nature, the Great spirit, and the order of things. Without our languages, we will cease to exist as a separate people. (Assembly of First Nations, 1993. p.63)

The authors go on further, stating:

> Aboriginal language education has collective, social, personal, and academic importance; languages are seen as having a dynamic, communicative, cognitive force that shapes knowledge, worldview, beliefs, and values; language use is seen as a form of self-government; and Indian language and culture are considered to be the source of pride in oneself and the foundation for self-identity - an essential element in a meaningful education that prepares students to assume social responsibility and to maintain cultural continuity. (p. 63)

Bringing the local Native language into the schools needs to be thought out carefully because the language is not just one part of a Native person's life, it is the whole. As Kawagley (1995) points out, "for Native people, teaching and learning was holistic and an integral part of everyday life (p. 23). Battiste and Youngblood Henderson (2000) tend to agree:

> Languages provide direct and powerful ways of understanding indigenous knowledge. They are the critical links between sacred knowledge and the skills required for survival….Indigenous peoples view their languages as forms of spiritual identity. Indigenous languages are thus sacred to Indigenous peoples. They provide the deep cognitive bonds that affect all aspects of indigenous life. Through their shared language, Indigenous people create a shared belief in how the world works and what constitutes proper action….Without Indigenous languages, the lessons and the knowledge are lost. (p. 49)

McKinley (2005) believes that with "the recovery of our indigenous histories, knowledges, experiences and identity is inextricably linked to the recovery of our languages because languages are our view of the world" (p. 232).

With English being the first and foremost language being implemented in the majority of British Columbia school systems including the band run schools, immersing children in their local language will be a difficult task especially when you take into account that almost everything that influences the teacher and the student's lives is spoken in English. Prakash and Esteva (1998) have noticed that:

> The five thousand languages that currently survive can be seen as threatened species--in danger of extinction. Within a generation or two, not many of these languages will survive, if current trends continue. Of the languages that are alive today, only one percent survive in Europe and educated North America. It is scarcely an accident that "the home of literacy as well as the nation-state' has only one percent of the languages that survive (Sachs 1992, 102). While languages are dying and disappearing, the academic industry for the mummification and preservation of "endangered tongues" continues to boom. Between 1950 and 1970, "about fifty languages have died each year; half of those still spoken in 1950 survive only as subjects for doctoral theses" (Illich 1977, 7). All it often takes are two generations of school-going offspring to send the language of their Elders up north to a corporate, State, or federally funded linguistic zoo. (p. 8)

There are many barriers set up in the school systems that prohibits adaptation to a particular location or peoples' language, such as racism, compartmentalizing the language in the school systems, the influx of teachers not from a particular area, and the lack of support from the community, just to name a few. However, the barriers need to be broken down so that the language can survive, because if the language dies, so do the cultural lives of the people.

The possibility is out there, someone needs to just reach out and grab it. With land claims issues nearing settlement in B.C., the Kwakwaka`wakw people

need to start accessing the valuable knowledge within the tribes and to draw on it for their future generations because in the near future the Aboriginal peoples of the Northwest coast will be self-reliant, with no ties to government hand outs.

The People and the Salmon

Aboriginal people such as the Kwakwaka`wakw people of the Northwest Coast still rely on the unity with Mother Nature, especially with the salmon. It is their right to use the salmon because that is what they have done since the beginning of time. According to Sharma (1998), "Aboriginal people regard fishing as a right, as a part of their history, culture, religion and tradition practiced from time immemorial" (p. 31). He further states:

> Aboriginal peoples view access to fisheries as an inherent Aboriginal right, which means they should be able to do with the fish as they wish. Fish was never been viewed as merely food by aboriginal peoples. Fish was a major commodity of trade among the various tribes and has played an integral role in Aboriginal culture, tradition and religious ceremonies. (p. 32)

The salmon are vital to the continuing of the Kwakwaka`wakw peoples' culture. Barsh, (1982) states that "historically, Indigenous peoples not only utilized the naturally occurring biodiversity of North America for food, medicine, materials, and ceremonial and cultural life, but they [Indigenous peoples] continue to harvest a variety of wildlife and plants for food and for materials...The role of harvesting is important in maintaining adequate nutrition" (p. 219). Robertson (1990) agrees that "traditional foods are also important in community feasts, in religious ceremonies, and in exchanges of gifts used to

reinforce kinship ties" (p. 185). There are many reasons why the salmon is important to the Kwakwaka`wakw people and if only one of these reasons is destroyed or hampered, it will have a detrimental affect on the people as a whole. Battiste and Youngblood Henderson state:

> The indigenous peoples of the North American Pacific Northwest are harvesters of the sea. Each clan or community has been associated, for centuries, with the subspecies (or "runs") of salmon that return annually to its territory and that are viewed as its kinfolk. The dignity and honor of each community depends on the ability to hold feast and share these fish with others, which in turn depends on wise management of the ecosystem. Salmon are a major part of these peoples' heritages – not just the eating or trading of salmon, but the sharing, which would come to an end if a particular subspecies were to disappear. The songs, stories, designs, artworks, and ecological wisdom connected with salmon are all interrelated elements of this heritage. (p. 66)

The salmon are so intertwined into every aspect of their daily living that if the salmon disappear, so will their culture. As Joseph E. and Anne D. Forester state (1975), "long before the arrival of Europeans on the north pacific Coast, the Indians of the region had developed an elaborate, complex culture based on the abundance of the marine environment" (p. 38). The Kwakwaka`wakw were always able to sustain themselves on what Mother Nature had supplied from the sea. Additionally, McFeat (1966) is able to identify that:

> The staple food of the Indians is, ...furnished by the sea. Seals, sea lions, and whales are found in considerable numbers; but the people depend almost entirely upon various species of salmon... there is such an abundance of animal life in the sea that the Indians live almost solely upon it. (p. 3)

The resource was plentiful and was vigilantly replenished by the bountifulness of Mother Nature and through the actions the people took.

Mullens (2001) concurs "every culture and nation of people have a way in which they understand the world in which we live" (p. 8). The Kwakwaka`wakw people who are located throughout this resource rich coast had developed beliefs and customs related to the respect, protection and revival of the Pacific wild salmon. Stewart (1977) states that "the Indians of the Northwest Coast showed much reverence and caring for the natural resources that were important to their cultures. They recognized that all living things – plant, animal, bird or creature of the sea – were endowed with a conscious spirit and therefore could present themselves in abundance or not at all" (p. 161). The way the Kwakwaka`wakw people interpret the world was simple, everything was connected. If they were to keep things balanced through their rituals and beliefs, then the world would continue to turn. Stewart (1997) identifies that "the 'certain conditions' to be fulfilled were taboos, customs, and ceremonies that made an appeal to the spirit of the plant or creature to be harvested or caught. The ceremony might be simply a prayer – a supplication for success and abundance – and it showed humility, gratitude, and respect on the part of the human" (p. 162). These customs and ceremonies are still practiced to this day by many of the traditional tribes of the Kwakwaka`wakw. Nothing is taken for granted; nothing is wasted, as conveyed through the knowledge given to them by their ancestors.

Many of the small Native communities in and along the Northwest Coast of British Columbia survived on what the salmon had to offer:

> Wild salmon serve as a vital source of food and cultural identity for First nations; they provide jobs, income, and enjoyment for individuals, businesses, and communities; and they play a key role in natural ecosystems, nourishing a complex web of interconnected species. (Fisheries and Oceans Canada, 2004, p. 1)

In the summer months everyone participated in preserving the salmon in a number of delectable ways for the winter months. Every step was a communal effort, from the people going to the river to catch the salmon to the feasting of the salmon and to the ceremonial aspects that went along with the salmon; it was always a joint effort by the Native communities. Presently, with the shortage of salmon travelling through our waters, and the lack of fishing boats, there just is not enough wild salmon for large groups to undertake such mentioned activities now. The `Namgis First Nations has offered monies to the one or two owners of fishing boats to go out and catch as much Pacific wild salmon for the community, which is then dispersed upon the discretion of the band. The entire community is frantic at this time, worrying whether they will receive enough salmon to sustain them through the winter months.

The salmon are becoming scarce along the Northwest Coast of British Columbia for many reasons, but the Government is turning a blind eye. Carter (1992) indicates:

> The loss of salmon stocks already has been devastating, and prospects for recovering the lost stocks are not encouraging. The National Marine Fisheries Service has listed four salmon species as threatened under the Endangered Species Act. Environmental scientists are urging similar action for at least three more salmon species. Moreover, according to the American Fisheries Society, some 106 populations of West Coast salmon are extinct, and at least another 214 salmon stocks in the Pacific Northwest are at

risk of extinction. (p. 1)

Many people believe that a major reason for not giving one hundred percent effort to save the Pacific wild salmon is because the Government wants to drill for oil off the shore of the Northwest Coast, but is not able to as of yet because of the moratoriums and the efforts of the coastal communities and the commercial fishing industries to stop them. However, Government officials are forever scheming and lobbying to reach their objectives and they definitely want the profits from the offshore oil-drilling ventures. The David Suzuki Foundation newsletter states:

> Right now, federal and provincial governments are considering lifting the moratoria that have protected B.C.'s coastline from oil drilling for three decades.
>
> The B.C. government strongly supports offshore oil and gas drilling and can unilaterally lift its own moratorium. Without the federal moratorium, oil and gas companies would then have access to conduct exploration and drilling along most of the coast.
>
> Not all the potential drilling sites are in remote locations. There are even oil and gas leases off of Vancouver near the mouth of the Fraser River – the largest salmon-producing river in North America.
>
> Before production begins, seismic testing locates deposits of gas and oil underneath the sea floor. These bursts of high pressure air directed at the seabed has been shown to disrupt the migratory paths and feeding patterns of whales, damage fish with swim bladders, destroy fish eggs and larvae, and cause fish to leave an area. These effects could have a tremendous negative impact. (p. 1)

Right under the noses of the coast communities and the fishing groups, the Government is conducting viability oil tests within the waters of the Northwest coast. However, in order not to be targeted and to inadvertently put

the blame of the salmon demise on someone other than themselves, they have pointed the finger in the direction of the fishing fleet, stating that the large amount of fishing boats is what is causing the salmon's decline. Thus, the government with Federal Fisheries Minister, Fred Mifflin with his Pacific Salmon Revitalization Strategy, has taken appropriate and immediate actions and eliminated the amount of fishing boats permitted to fish the salmon on the Northwest coast, which really means that they have broken one of the barriers – if there is no fishing fleet, then there will be no one to pay close attention to what they are doing. Heltsuk hereditary chief Mr. Edwin Newman (Nulis), a long time fisherman and president of the Native Brotherhood of B.C., came to the conclusion during a class discussion (Personal Communications, 2004) that the Government of Canada did not think the Mifflin plan through as to the results on Native fishing. He concurs that we as Natives are indeed victims of the DFO and that it all has to do with power and money on behalf of the Government.

Another reason for the demise of the Pacific wild salmon is global warming. The coast of British Columbia had an abundance of salmon swimming through the waters, but with the effects of global warming, the waters are becoming warmer and warmer, which is detrimental to the survival of the Pacific wild salmon. In the Arctic Campaign newsletter (2006), Greenpeace has documented the change and has stated that:

> Fishermen on the west coast of Vancouver Island are already witnessing another impact of changing ocean temperatures – this time brought about by El Nino. The warm water current has brought with it a population of mackerel – a fish normally found

> in more southern ocean areas. The mackerel's arrival coincided with the out-migration of juvenile endangered Chinook salmon. The voracious mackerel consumed Chinook at a frightening rate. A more lasting change in ocean temperatures, brought about by climate change, could lead to a permanent stock of mackerel in B.C. waters, with devastating consequences for Pacific Salmon. (p. 1)

Yet another risk global warming poses for salmon survival has been mentioned in the Arctic Campaign newsletter.. In their paper, they imply that "...increases in precipitation will wash increased amounts of organic material through watersheds and into estuarine areas. Oxygen depletion caused by the decomposition of this material may cause large-scale fish die-offs" and/or may affect survival rates of (salmon)" (Greenpeace, 2006, p.1).

Global warming has definitely affected the Pacific wild salmon in the Northwest coast area. Many of the fishermen throughout the small communities located on the coast have noticed that the wild salmon of their area are choosing to migrate north where the waters are colder more suitable. Ozzie Wadhams, a Native resident of Alert Bay who has fished most of his life stated in a personal communication (July 25, 2006) that "you can bet your top dollar global warming has an effect on what is happening to our fish."

Yet another critical reason for the disappearance of the Pacific wild salmon is the introduction of in-water Fish Farms. With so many farms being set up every year on the Northwest coast, the waters are saturated with the amount of sea lice, contamination from the chemicals, and food pollutants, which are in

direct contact with the Pacific wild salmon migratory routes. A CBC news (2003) disclosures fact sheet states:

> The introduction of farmed fish to the Northwest coast area is yet another reason for the pacific wild salmon's disappearance. With so many sites being erected every year, the waters are being overcome with sea lice and contamination from the chemicals and food they use on the farmed fish that is being grown directly in the waters. Morton was convinced there was a link between the fish farms and the problems with the wild fish; 'When I went to a place where the fish had come from the river and not past a fish farm, they were fine. And then when I got closer to the fish farms you could see the lice numbers just exploded'.
>
> "Every single coastline that had salmon aquaculture [has] had big problems with their wild fish due to sea lice coming from the salmon farms," says Morton.

Finally the logging industry has to be accountable for the damage they are doing to the riverbeds in which the salmon migrate to and lay their eggs. Salmon have very specific habitat requirements as to where they lay their eggs and do not just randomly select any river. They have a genetic code that guides them to the same river that they were born in and only when they have completed their life cycle and are ready to spawn, do they navigate towards their home. However, logging has interceded with many of the rivers and this has devastated what was formerly the salmon's natural habitats. As Carter (1992) reports:

> Scientists and economists now tell us that if the ancient forests are lost, there's a good chance a majority of the salmon stocks in the Pacific Northwest will disappear, too.
>
> Several factors explain this decline, but perhaps the most universal and insidious is the decades of excessive logging on public lands

> throughout the region. Most of the spawning and rearing habitat for wild salmon in the Pacific Northwest is located on, or directly downstream from, national forests and other federal lands. Much of this habitat has been severely degraded by logging of old-growth forests and associated road building, which increase the amount of fine sediment in streams by as much as 1,000 times. This smothers spawning beds and severely disrupts the feeding patterns of the young salmon. Old growth is the anchor of healthy salmon streams, providing permanent sources of stability, shade and nutrients.

If these devastating factors are not addressed the salmon will likely become extinct. What will hurt the most especially to the Kwakwaka`wakw people as well as many other Aboriginal tribes in and along the Northwest coast is the fact that the salmon is a part of them. It is not just for nourishment, but a part of them just as their hands and hearts are a part of them. That is why it is important that the Kwakwaka`wakw people develop salmon curriculum in the hopes that their future generations will continue to understand and appreciate the cultural significance of the salmon, and seek solutions to the multiple hazards that threaten the salmon's ability to "present themselves in abundance" now and for future generations.

Chapter 3

Curriculum in Use

This chapter is intended to increase culturally appropriate science in Aboriginal schools and to give the students real experiences with Traditional Ecological Knowledge and Wisdom, which each community needs to take advantage of because the people who practice TEKW are slowly becoming a rarity. This chapter focuses on the students' experiences during instruction. It is presented in the order that the students actually received the lessons - sequential. Pictures, quotes, and personal experiences were used to enhance the objectives I was attempting to reach with this unit. This chapter describes the lessons as they unfolded including evaluations, which were accomplished through observations, student's participation in the classroom and during field trips, and student's completed work. I developed this curriculum for grades kindergarten to grade five, however, I field tested the curriculum in kindergarten because that is the grade level I teach. This unit has been developed to be used in Aboriginal schools, but with modifications it can be adapted to district schools as well.

It would be relatively facile to connect this theme to other areas in the curriculum. You can engage the students in activities that develop mathematical concepts by measuring and weighing the salmon, comparing the sizes of each species of salmon, or counting the fins, eggs, or scales on a salmon. There are also a variety of writing activities that go with this unit, such as

poems, songs, identification and action words. Mapping the routes the salmon travel can tie into Social Studies, the connections are limitless.

The Salmon unit was scheduled for November, the peak time for the Gwax̱`nis to begin their spawning rituals. Another important objective for having taught this unit to the Kindergarten class was for them to become familiar with the Salmon species and learn to appreciate all it has to offer to the Kwakwaka̱`wakw people. I truly believe that if we start teaching science to students at a very young age, they will grow to love science and all that it encompasses. They will develop a curiosity for the world and a willingness to explore, experiment, and learn.

For this specific unit I selected several words from a previously compiled Kwak`wala word bank which was relevant to the grade level I had taught. The list is as follows:

Kwak`wala Word Bank

The following list of words was compiled prior to interviewing the Elders.
(this will become more developed the more the curriculum is used)

Gwax̱sa̱m	- dog salmon time (name for the month of November)
Gwa̱`ni	- name of our river
K`uta̱la	- fish
K`a̱was	- dried fish
Ha̱`mas	- half-smoked fish
T`ɬubakw	- bar-be-qued fish

K`awayu - knife

Xums - head

Sams - mouth

K`wayus/patła - gills

Gabaluxstawe` - fish eyeball

Łamay`i - cheeks

Tak`akw - stomach of fish

K`adige`/K`adigay - dorsal fin

Hat`saxsde` - tail

K`adige` - top fin

Gubad - scales

Noke` - heart

Ga`yagas - eyes

Talgwiłbe` - soft part of the nose

Hixat`e - head of fish

Mamadigina - adiposi fin

Gwax`nis - Chum Salmon

Małik - Sockeye Salmon

Dza`wan - Coho Salmon

Hanu`n - Pink Salmon

Sat`sam - Chinook Salmon

Xwilawa - fertilization of the egg

Gi`ni - salmon egg

K`ama - salmon fry

Dzalak	- Spawning salmon

Kwak`wala Phrases Related to the Salmon Unit

K`inam k`utala	Lots of fish
Gayutłi da gwax`nis lax xa damsxi	The chum lives in the ocean
Gwax`nis idaka laxis gaydłas kas le` kwilawa	Chum return to the same place to spawn
Dzamxi xis gi`ni xa ło`yanx dłu Dzadzawanx	Eggs are covered with gravel in Dec to Feb
3,500 gi`nis sa gwax`nis	Chum have 3,500 eggs
Dzamxi sis gi`ni małgwa`nał dłu yudawx-Samgusto	Eggs are buried 8 – 30 cm

What We Did

To begin the "Salmon: The Lifeline to Our Culture" unit in the Kindergarten classroom, I collected several books related to salmon and made a colourful display to visually stimulate the students' interest. Part of the display included a container that has four separate vials of the first four stages of the salmon which I received from the Department of Fisheries many years ago, which I made available for the students to manipulate as part of their hands-on experience. One very inquisitive student asked me while inspecting the vials, "How come

they're [the salmon] not moving?" I responded with a question for her to ponder instead of stating the obvious, I said, "Why do you think they are not moving?" She thought for a moment, looking intently at the vials then said, "I think it's because they're so tiny." I left this conversation at that.

I had also found one toy salmon that the students were able to use as a tool to explore, play and learn with as well as many posters were hung around the classroom, which I adapted with appropriate Kwak`wala from the word bank (see figure 1).

Figure 1. Salmon display in the Kindergarten classroom, 2008.

I used the Kwak`wala term Gwaxsam which means "dog salmon time" for our calendar along with calendar cards for each salmon species on the front and Kwak`wala numbers on the back, which fit in with the unit I taught (see figure 2). Every morning the class sat on the carpet and I would ask, "What month is it?" They would answer, "Gwaxsam." Then whoever was the helper for the day would come up to the calendar and turn over the card for that specific

day with me guiding him/her by reading what species of salmon s/he was to turn. For example, I would say, “Daunte, come on up and turn over the Małik salmon card.” This gave the students repetitiveness with the Kwak`wala salmon names on a daily basis.

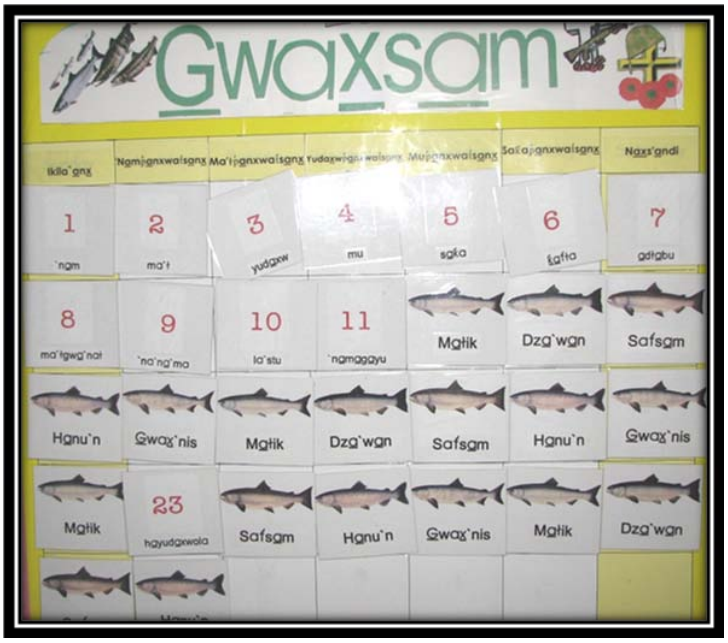

Figure 2. Kindergarten calendar for the month of November, 2008.

Salmon materials were in abundance in the classroom, you could not turn around without coming into contact with something related to the Salmon unit, which over-populated the classroom as the month progressed. All the salmon resources were returned into a tote when I completed the unit for other teachers to utilize in the future.

Our Treaty consultant, Ms. Diane Jacobson, had kindly given our class several maps of the `Namgis territory (figure 3), which encompassed the many rivers, streams and small tributaries the salmon were born in and ultimately would die in. These maps helped the students physically visualize our territory in which we rightfully belong.

Figure 3 – Map of `Namgis Territory, 2008.

On the first day of teaching this unit, I explained to the students the importance of recognizing what the salmon has to offer us and that we should not take advantage of this gift. I asked them to think of some ways we could show the salmon our gratitude for salmon's gift to us. Being five years old, they came up with several ideas such as, making the salmon a card and buying the salmon a present. I focused them by asking, "when you receive a gift, how do you show the person who gave you the gift your appreciation?" They thought and thought and finally responded by saying, "We have to say thank you." I then informed them that our ancestors before us would say thank you to the salmon by saying a Prayer, which the spirit of the salmon will hear and be happy. I then read the prayers listed in lesson three to the students and told the

students that we could either use one of these Prayers, or we could create our own Prayer. They selected to go with the second Prayer.

This unit took a month to complete, with a different lesson intended to be taught daily, each lesson lasting fifteen to thirty minutes. The theme was divided into seven stages. Section one – The History of the Pacific Wild Salmon; Section two – The Connection the Salmon Has to Our Culture; Section three – Traditional Fishing Techniques; Section four – Preparing and Harvesting the Wild Salmon ; Section five – The Decline of the Pacific Wild Salmon; Section six – Reviving the Pacific Wild Salmon; and Section seven – The Salmon Celebration. I retrieved lessons I felt were the most relevant to teach for this particular grade from each section.

I started by introducing the salmon using Section one – The History of the Pacific Wild Salmon. I focused much more time on this section because I believe that it laid the foundation for the rest of the unit. The students were quite excited and wanted to learn everything right away. However, the process was about pacing oneself so that the students did not get bored, but also did not get overwhelmed with too much information.

After introducing the salmon species, the body parts, and the life cycle (see figures 4 and 5) in both English and Kwak`wala to the students,

Kindergarten students (Figure 4) diligently working on the first stage of the Life cycle of the Pacific Wild Salmon, 2008.

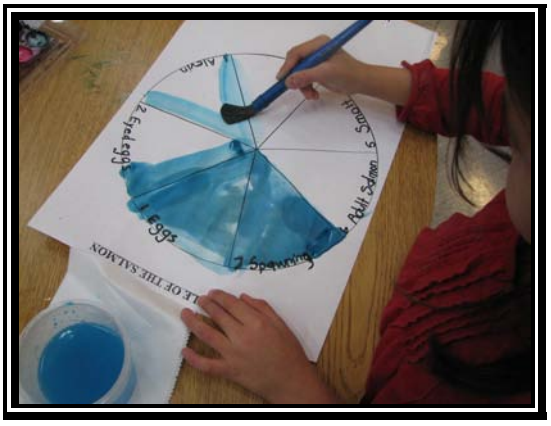

Figure 5. The students did not want to stop this activity even when the bell rang to end the school day. They were saying, "awwww, I don't want to leave," 2008.

we sang, "Five (sak`a) Little (amabidu) Fish (K`utala)" to the tune of "Five Little Ducks". The students quickly created their own salmon finger puppets and put much effort into singing and removing the salmon from their little fingers their first time. However, what ended up happening was the students became more engrossed in the finger puppets and were not able to stay on-task when asked to repeat the song.

Figure 6. Kindergarten student participating in "Five Little Salmon" song, 2008.

I eventually made arrangements with our local Department of Fisheries co-ordinator to come and do a presentation on salmon in the classroom. This activity became complicated because the original DFO co-ordinator resigned and moved onto more lucrative career opportunities. I had to do much digging to discover who the new co-ordinator was and to entice her into our classroom. With assistance from the previous co-ordinator, the new DFO Aquatic Education Program co-ordinator, Jennifer Sutherest, was able to fit our class into her schedule. This was an interesting lesson because she was new to Alert Bay, the students were not as comfortable with her and struggled to understand the "big words" Jennifer was using during her presentation. However, putting all that aside, Jennifer was able to catch the students' attention by using many manipulatives (see figure 7) and bringing in a real Sockeye salmon (dead, of course) which, she dissected in front of their eyes.

Figure 7. Department of Fisheries and Oceans: Aquatic Education Program. Jennifer Sutherest with one of her manipulatives she used in her demonstration, 2008.

While she dissected the salmon, she put each body part on a separate paper plate that was already labelled. She asked that I pass it around to the students so that they could get a close-up look at each organ (see figure 8). When I went around with the first plate, one of the students commented, "I'm not going to eat that!" I did not realize it until then that the students had made the connection between the plates and eating.

Figure 8. Students getting a closer look at the internal organs of a salmon, 2008.

The next day I made a request to Mr. Henry Nelson, manager of the Gwa`ni hatchery to bring two salmon into the classroom if they could possibly spare them. He replied that they were able to do so because they had just gone fishing for Gwaxnis the day before and had some male salmon to spare. Dealing with living matter, the next activities had to happen simultaneously because of rapid deterioration.

When the crew brought the salmon into the classroom, the salmon had only been out of the water for maybe ten minutes at the most. The two salmon were lying very still in a tote trying desperately to sustain their lives. The students did not realize that the fish were still alive and ran over to the tote and started touching and poking the fish. They were extremely startled when the fish started

to wriggle and gasp for its' last breath, especially one particular student. He has cerebral-Palsy and needed constant assistance with walking and moving from point A to point B. When he became aware that the fish were indeed alive, he scampered away so fast; you could not tell he had any physical impairments. It was priceless.

The students were given the opportunity to touch, look at and inspect the outside of a salmon, (see figure 9). They were totally engrossed in this activity so much so that I had to postpone my next activity for a few more minutes. There was a lot of "What's that?", and "Ewwww, that feels slippery, touch it." happening. Bringing the fish in the classroom made the lesson come alive and I was able to observe the students participate, interact, and discuss their findings. I listened to their conversations regarding the salmon and it was visible that there was indeed learning taking place.

Figure 9. Kindergarten students prodding, poking, and exploring the Chinook salmon, (Kindergarten 2008).

When the students were ready to move onto the next activity, there was neither hesitation nor apprehension. They were put into groups of two for this activity (see figure 10). The students were eager to take part in outlining the fish's body and labeling the body parts using Kwak`wala. However, because of the lingering odor of the fish on the students' work, (which, seemed to bother the teaching staff more than it actually bothered the students) we were not able to display their work within the school, instead the students had to remove their work from the classroom immediately.

Figure 10. Students labeling body parts of a Chinook salmon, (Kindergarten 2008).

Without further ado, following this activity we exited the school carrying the salmon and walked down to an Elder's home who had agreed to cut and cook the gwaxnis in front of the class so that they could observe and participate. Again, speed was a matter of importance because of

deterioration. This activity was done so that traditional knowledge could to be passed on to the next generation. With the students standing by watching, Norman Scow cut open the belly of the Chum salmon. The students were able to see, touch, smell, and manipulate the innards all the while discussing and guesstimating what the various organs and body parts were,, what functions they performed, etc... Norman gently took out specific internal organs and let the students hold them while he explained what they were. The students were engrossed in this activity because they were allowed to actively participate. When asked what he was going to do with all the guts, Norman replied, “I’m going to dump it back into the ocean because it will be food for the other animals”. This was a display of Traditional Ecological Knowledge and Wisdom, it was also a custom that Native people practice, returning the remains back to the water and letting the circle of life continue.

Figure 11. Norman Scow demonstrating How to cut a salmon for barbeque, 2008.

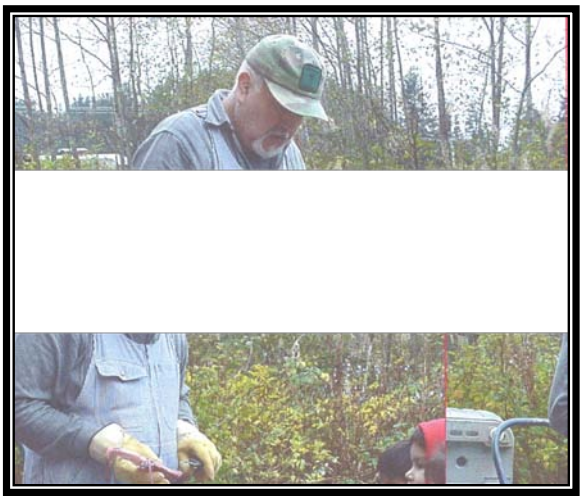

Figure 12. Norman Scow explaining the insides of a salmon to students, 2008.

When Norman noticed the students starting to stray a bit, he was quick to refocus them by getting the students to assist him in putting the fish onto a bar-be-que stick and preparing the fire to cook the fish. Norman was able to allow the students the freedom to take part in this activity even though there were possible dangers. He was cautious - but easygoing.

When the fish was cooked, we thanked Norman for his generosity of sharing his knowledge with the students and left the premise, bringing back the succulent cooked salmon to the school for the students to eat as part of their lunch. What became apparent at this point, was how many of the students did not eat salmon. It made me wonder if this was maybe the effect of the lack of salmon filtering into our community these past few years.

I moved into the next section of the unit, "The Connection the Salmon Has to Our Culture." I selected the learning outcome in which the students demonstrated an understanding of how dance is a very important aspect of the Kwak`waka`wakws' traditional method of documenting rites and rituals by recognizing and valuing the birth of twins.

To kick this section off in the right direction, I asked Mr. William Wasden, one of our local people with traditional knowledge in our culture to come into the classroom and tell the children a legend or two that was related to salmon, especially the "Origin" story and a story about the Salmon Twins. William gave a verbal presentation to the importance of the salmon to our culture and how the salmon is closely linked with our people since time began.

Figure 13. William Wasden telling a the legend relating to the salmon, 2008.

Figure 14. William Wasden being thanked by Kindergarten students, 2008.

William put his agenda aside for the day and came into the class using only his memories and a power point presentation which he put together especially for this class to parlay one of the many legends relating to the salmon called "Umeł Obtains Salmon". Umeł was a raven who was able to transform into a human. He was searching for a way to obtain food for his people. He knew that twins had a connection to the salmon world and he was able to find and marry a twin. She was able to provide many salmon for the tribe and the village began preparations for the long winter ahead of them. However, Umeł became angry at the twin because the salmon bones became entangled in his hair. This behavior from her husband upset the twin who thus, took all the salmon and left Umeł and the village. The pictures that William used were real, such as the picture of an old Native burial box which, he connected to the

legend at the point when Umeł went searching through the graveyard for a twin and William went into great detail how these burial boxes were used by our ancestors.

The students were enthralled with the legend, but more so with the verbal additives that William supplied to connect the pictures to the real world. They could not get enough. Just by watching their facial features and listening to their questions and answers in response to the presentation, I could tell they were immensely interested in what William was saying. After William departed, I reviewed the legends with the students to check for understanding and was impressed by how much information they were able to retain. I put forth three questions at this time to check for understanding, the questions were, "Why did Umeł want to marry a twin?", "I wonder what happened to make all the salmon and the twin disappear?" The last question was "what if...." questions so that they could think of different endings to the legend, such as "What if the salmon bones did not get caught in Umeł's hair?" Their responses exhibited their level of learning that had taken place.

Next, I approached our dance instructor and asked that she focus on the salmon dance for this month and she was happy to accommodate my request. While the students were learning the song and the movements to the salmon dance in the Cultural class, they were also busy making a piece of the regalia that is necessary to properly execute the salmon dance. The students were

eager to complete the head dresses so that they could use it whilst they practiced dancing. The instructor was quite adamant regarding regalia; she stated that the students needed to understand what they were doing before they could adorn themselves with the official ceremonial dress attire.

Figure 15. Kindergarten class posing for the Salmon Dance with their newly acquired regalia (salmon headdresses), 2008.

It did not take the students long to catch on to both the beat and lyrics of the song as well as the steps and movements involved in the salmon dance. By two weeks end they were fully clothed in regalia and ready to perform for an audience. When questioned what they were doing, (why do we hold feathers when performing this dance? What is the meaning you got from the song?) each student was able to give an adequate reply, which demonstrated an understanding of the lesson.

Moving on to the next section – "Traditional Fishing Techniques" I pulled out lessons pertaining to similarities and differences in fishing equipment of the

past and present. I had a dialogue with the administrator of the U`mista Cultural Center regarding traditional fishing equipment and she informed me that there is not much in storage at the center and that there is maybe one or two items on display that were used for traditional fishing but are so old and delicate that she would not want to have anyone use them for a physical demonstration. Therefore, I chose to use pictures from Hilary Stewarts' book "Indian Fishing: Early Methods of the Northwest Coast" (1977).

I Xeroxed several pictures of traditional fishing equipment from Hilary Stewarts' book and handed them to the students one picture at a time, asking, "Can you tell me what this is?", and "I wonder what it was used for?", and "Who made it?" etc… I think because it was not hands-on material, the students were not able to reach as deep an understanding as they could have with the real fishing equipment. The students were quick to look at the pictures and eagerly passed them on to the student next to them. In hindsight, I should have had one of our local carvers duplicate a replica of a couple of the traditional fishing equipment.

For the second part of this activity we made plans to go down to the wharf, with permission of course, to look at modern fishing equipment. The students packed drawing paper and pencils and were requested to draw a picture of the boat, making sure to add all the special equipment that fishermen now use to catch fish. Our first two attempts at getting down the dock were

cancelled because of the nasty weather conditions. When the rain and winds subsided we quickly dashed down and conducted the activity.

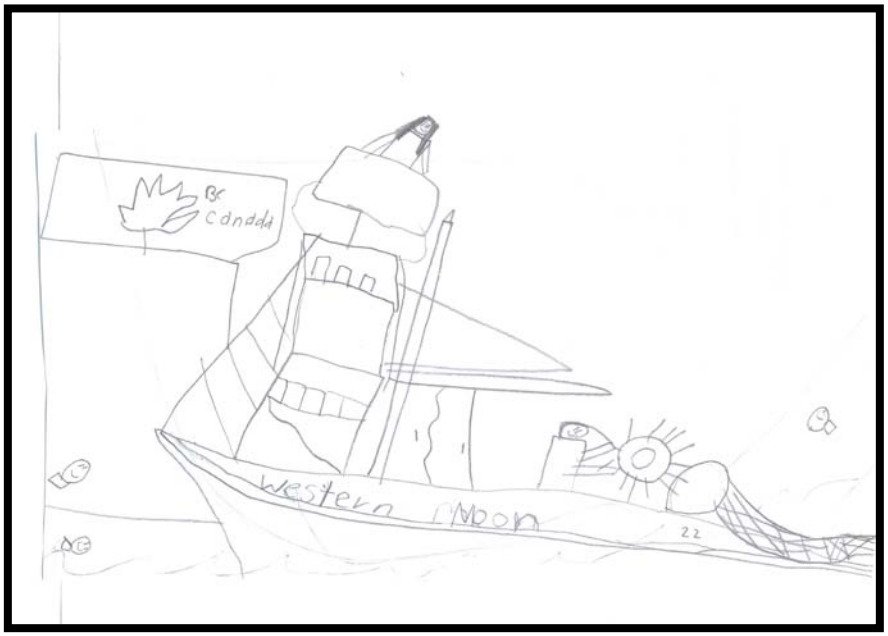

Figure 16. Picture of a present day fishing boat. Drawn by Destiny Speck, 2010.

Mr. Norman Stauffer, the skipper of the "M. V. Western Moon" was on the wharf to greet us and to talk about the equipment that he currently uses on his seine boat. The students were inquisitive and wanted to touch everything. We had to control them to some extent, but they were given some free reign to explore and learn.

When we left the wharf and returned back to school, I debriefed the students on what they learned using chart #4 (see figures 17a + b).

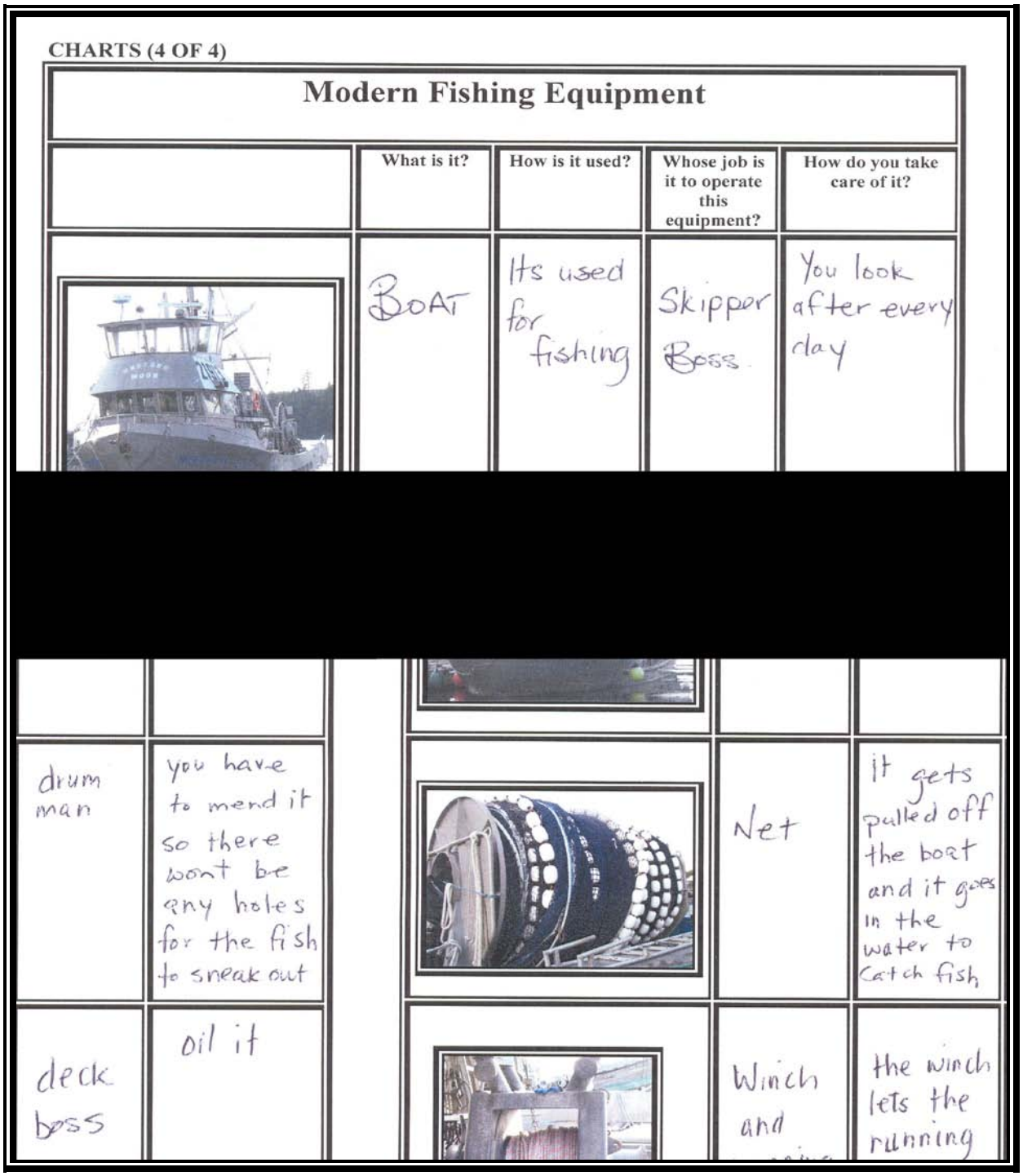

Figure 17a. Chart of Modern fishing Equipment, 2010.

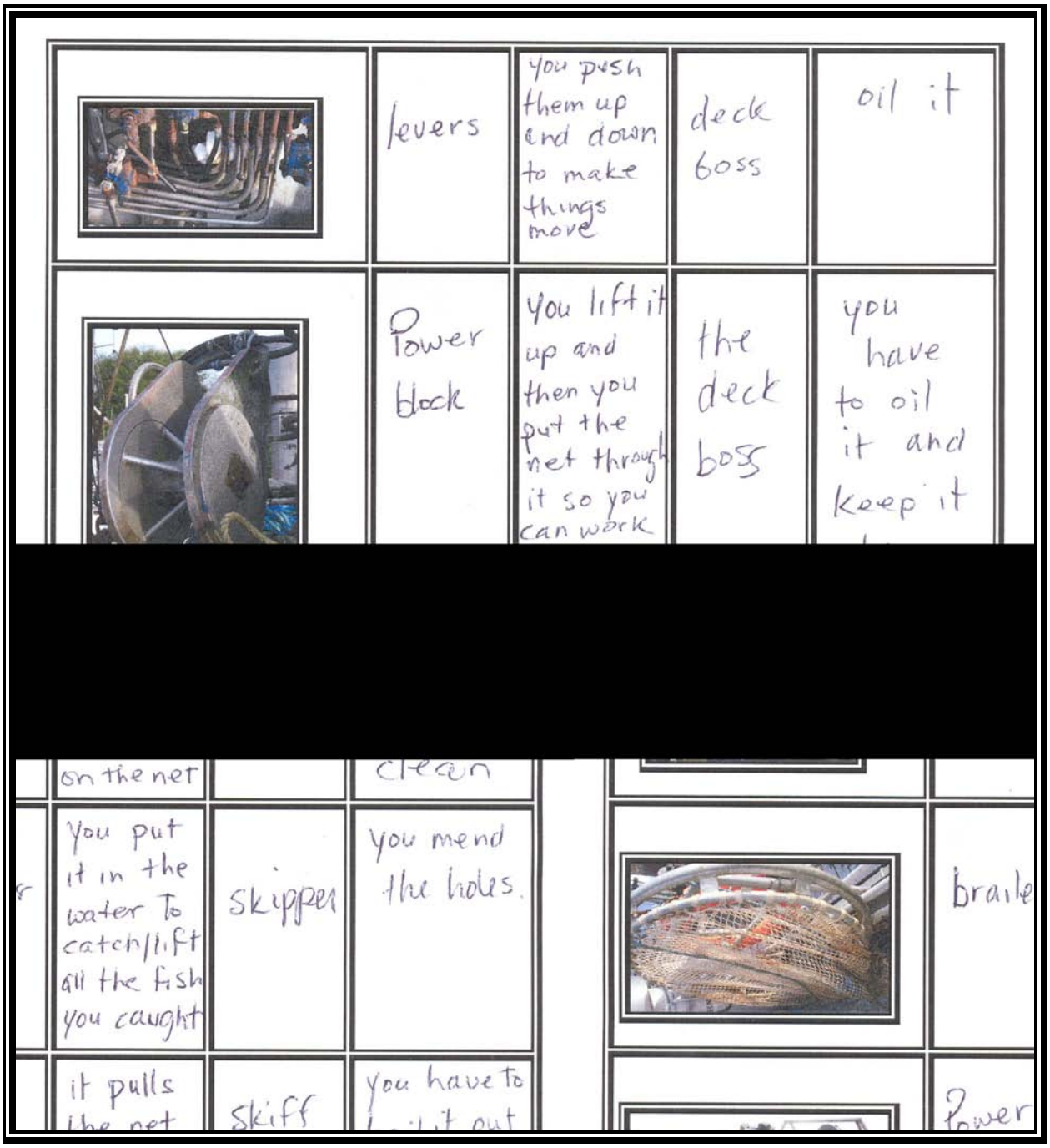

Figure 17b. Chart of Modern fishing Equipment, 2010.

My observations revealed that because the students were actively touching and climbing all over the boat it could have been mistaken for misbehavior, they nonetheless did learn to identify and describe many of the

modern day fishing equipment that is presently being used through hands-on exploring and interpreting.

For section four – “Preparing and Harvesting the Wild Salmon” I chose to expose the students to salmon preserving. We were fortunate to connect with an employee of the `Namgis band who was hired at this time to bring both the past (Elders) and the present (students) together through traditional ways. We were invited to participate in jarring, half-smoking (ha`mas), and making dried salmon (k`awas) under the guidance of a local Elder, Ms. Sharon Whonnock.

We went to the Elder’s residence, where she had everything set up and ready to go for the students. The `Namgis First Nations had supplied the fish; Ms. Whonnock supplied the knowledge of preserving salmon and the children supplied curiosity and the eagerness to learn. There were several totes loaded with the silvery fish, knives, sharpening tools, rags to cut the fish on, shirts to use as aprons, and children. The students were anxious to get their little hands dirty and to actually be permitted to use knives. With much assistance from the Elder, many of the students attempted to cut the salmon and for the most part did an adequate job. As seen in figures 18 and 19, the salmon took a beating, but eventually made it into the jars and the smoke house.

Figure 18. Kindergarten student making an attempt at cutting a wild salmon for future jarring purposes, 2008.

Figure 19. Kindergarten student cutting the head off of a salmon with close supervision from an elder, 2008.

This activity took three separate sessions to conclude. The first gathering, we focused on cutting the salmon for jarring. It took at least two hours of the group working together to complete the cleaning and cutting process, then three more hours the next day to fit the salmon into jars and boiling the jars. The second part was to prepare the salmon for half-smoking (ha`mas). Again, we were involved in the cutting of the salmon; however, because the students were small in size, they were not able to participate much in the smoking procedure because they did not like the smoke, they could not reach the racks in order to turn the salmon and being so young, were not able to put in the long hours it takes to smoke the fish. When the salmon was smoked to the proper point, the students were again asked to participate in vacuum packing it for future use (see figure 20).

Figure 20. Students observing and helping preserve smoked salmon by vacuum packing the salmon, 2008.

The third time we connected with our Elder was to make dried salmon (K`awas). The students put much effort into slicing the salmon thin enough to hang in the smoke house (see figure 21), but did not partake in keeping a watchful eye on the salmon while it was hanging in the smoke house mainly because of location and timing. They did rejoin the Elder to remove the many bones and to bang the salmon until tenderized (see figure 22). The end result was the class reaped many jarred salmon, several vacuum packed half-smoked fish and a bag full of dried salmon ready for our future celebration.

We saved the bones and took a mini-field trip to the beach so that we could show our respects to the salmon by throwing the bones back into the ocean and saying thanks to the salmon for all that it had offered us. Each

student had a chance to take some of the salmon bones and put it into the ocean and give their thanks to the salmon. Having the students physically participate in this activity imprinted in them a small part of traditional knowledge.

Figure 21. Student doing a wonderful job slicing the salmon for drying (k`awas), 2008.

Figure 22. Kindergarten students involved with removing the bones from the dried salmon (k`awas), 2008.

We recognized our Elder's superior efforts to pass on her traditional knowledge to the students with many hugs and thank you's as well as a beautiful gift hand-made by the students. Watching her face, it was obvious she appreciated the effort the students had made to learn a part of our traditional ways.

In section 5 – The Decline of the Pacific Wild Salmon, I focused on changes and affects that have contributed to the decline of the wild salmon stocks. We did a lesson on weather and how it is connected to the decline of the salmon. We brainstormed on how the weather can affect the Pacific wild salmon; things like having too much rain causing river beds to erode and damaging the spawning grounds. We discussed climate change and what factors could possibly be affected by warmer weather and warmer waters. With a bit of guidance, the students were able to understand that salmon eggs do not like warm water, the eggs need cold water to grow.

I also conducted many simple mini-experiments on cause and effect so that the students were able to at least partially comprehend this relationship. For example, I put some ice cubes into a bowl and then asked, "What would happen to the ice when we add heat to it?" Another mini-experiment that I conducted with the Kindergarten class was to melt chocolate then add in some twigs and wait for the chocolate to harden. I got the students to predict as to what might happen to the chocolate if we remove the twigs. The one

experiment that seemed to enforce the cause and effect concept was the egg experiment. I asked, “If I put an egg in boiling water what could happen to the egg?” I proceeded to conduct the experiment so that the students had the opportunity to physically see the end results. I then posed the question, “Do you think this could happen to the salmon fish eggs if the water gets too warm?” The main goal I wanted the students to grasp from this section was how what we do affects something else in this world, based on the principle that every contribution, no matter how small, has an impact and is important. For example, when pollution is dumped into the local river (Gwa`ni River), it floats out to the ocean and is carried by the ocean currents to land on the shores in Australia; or how harvesting fish in South America to make feed for Atlantic salmon raised on fish farms in British Columbia has resulted in the South American peoples losing their own food fishery; or by cutting down whole forest of trees results in the planet heating up, which contributes to climate change in the Arctic, thus melting the ice and causing the polar bears not being able to hunt for seals or fish on ice floes. Little things we do can make a positive or negative change in our world.

We had a conversation about what the Pacific wild salmon needs to survive in the wild and the students of course stated the obvious – “water” and “food”, but could not go further. I had to ask leading questions to get them to think deeper as to what kind of water – clean, dirty, warm, cold, etc…, so I did a water demonstration. I used a clear bowl and poured some water into the bowl

and asked the students, “Do you think the salmon would like to swim in this?” They responded with “yes”. I dropped in some litter and oil, then re-stated the question again, “Do you think the salmon would like to swim in this?” The students all conceded with a “no” answer.

We were able to view the DVD, “T`łina – The Rendering of Wealth” with the purpose of the students being able to comprehend the destruction that is happening to the environment in Kwakwaka`wakw territory. I focused the students while they were watching by asking questions at a specific section such as, “When you go by our docks now, what changes do you notice?” (There are no more fishing boats on the docks). Or making a statement in regards to what a person was trying to point out, such as, “Did you hear what Mr. Chris Cook said? He really made a good point regarding the decline of the salmon. Please listen to him again”. The students watched the DVD with interest and were eager to discuss what they learned from this film.

I then located Alexandra Morton’s email address and emailed her, enticing her to come to the T`łisalagi`lakw School to do a presentation on fish farms and sea lice. She eagerly responded with an affirmative answer, (see figure 23).

On 11/18/09 5:39 PM, "Gloria Alfred" <gloriaa@namgis.bc.ca> wrote:

Hello Alexandra (I hope);

I am an Aboriginal Kindergarten teacher working in our own school in Alert Bay for twenty years now.
I am an avid believer that sea lice and fish farms are detrimental to the wild salmon stocks and I am trying to teach a unit on Salmon to the students.
The students are 5 years old, I say they are never too young to start learning about this situation since it is already affecting them in some way.
Therefore, I need some assistance because I would love to use a video, or an experiment to demonstrate to the students what sea lice is and what they are doing to the salmon.
However, there is sooo much information to choose from and most of it too technical for these young ones.
I was wondering if you could help narrow the search – or better yet, come and give a small presentation.

Sincerely,

Gloria Alfred
T`łisalagi`lakw School
Alert Bay, B.C.
250-974-5591

Gloria

I would love to talk to a group of 5 year olds in Alert Bay!

Alex
973-2306

Figure 23. Email correspondence between myself and Alexandra Morton, 2009.

I never really expected her to make an appearance in our small community seeing as how she is a scientist and an environmental activist, and is very busy fighting the destruction that is happening to the wild salmon because of the fish farms. However, because she has re-located from Echo Bay to Sointula, she was just a hop, skip and a jump away and consented to present a small power point presentation for our class.

A couple of days prior to her arrival, I had an impromptu discussion with the students informing them who Alexandra Morton is and what she does. So when she arrived, I introduced her to the class, and then asked the students if they could please explain what she does. Several of the students stated that "she studies sea lice because its' killing our salmon". They're responses revealed to me that they had already developed some understanding of the effects fish farms and sea lice have on the Pacific wild salmon.

When Alexandra arrived at our classroom she expressed to me that she was excited to do this presentation. She relayed that if it was not for my persistence, she would have let this meeting slip (see figure 24).

On 11/30/09 3:50 PM, "Gloria Alfred" <gloriaa@namgis.bc.ca> wrote:

Good Afternoon Alexandra;

We are excitedly awaiting your arrival this week. You mentioned in the mid-week, so I'm assuming that means Wednesday.
My assistant can meet you at the dock or ferry, depending how you arrive in Alert Bay.
Just give us a time and she will be down the docks (or ferry terminal).
For your information, we have discussed a bit about sea lice, but not indepth. I'll leave that to you.

Gloria

I could by there from 9:30 – 12:20 or 12:20 – 3:30
Which would be better?
I think I will bring my car so I can keep my dog contained
Can I use a powerpoint so I can show them pictures?

Alex
250-974-7086

Figure 24. Email correspondence between myself and Alexandra Morton, 2009.

Alexandra did a forty-five minute colourful power-point presentation, which kept the students in awe (see figure 25). Her calm, gentle demeanor helped keep the students calm and focused. The information she translated to the students was age appropriate with many pictures and language that the students could easily understand. The question period that followed was interesting to observe and listen to because it seemed that no matter what kind of question was asked, Alexandra put much thought into her response.

Figure 25. Alexandra Morton doing a presentation on Salmon and sea lice, 2009.

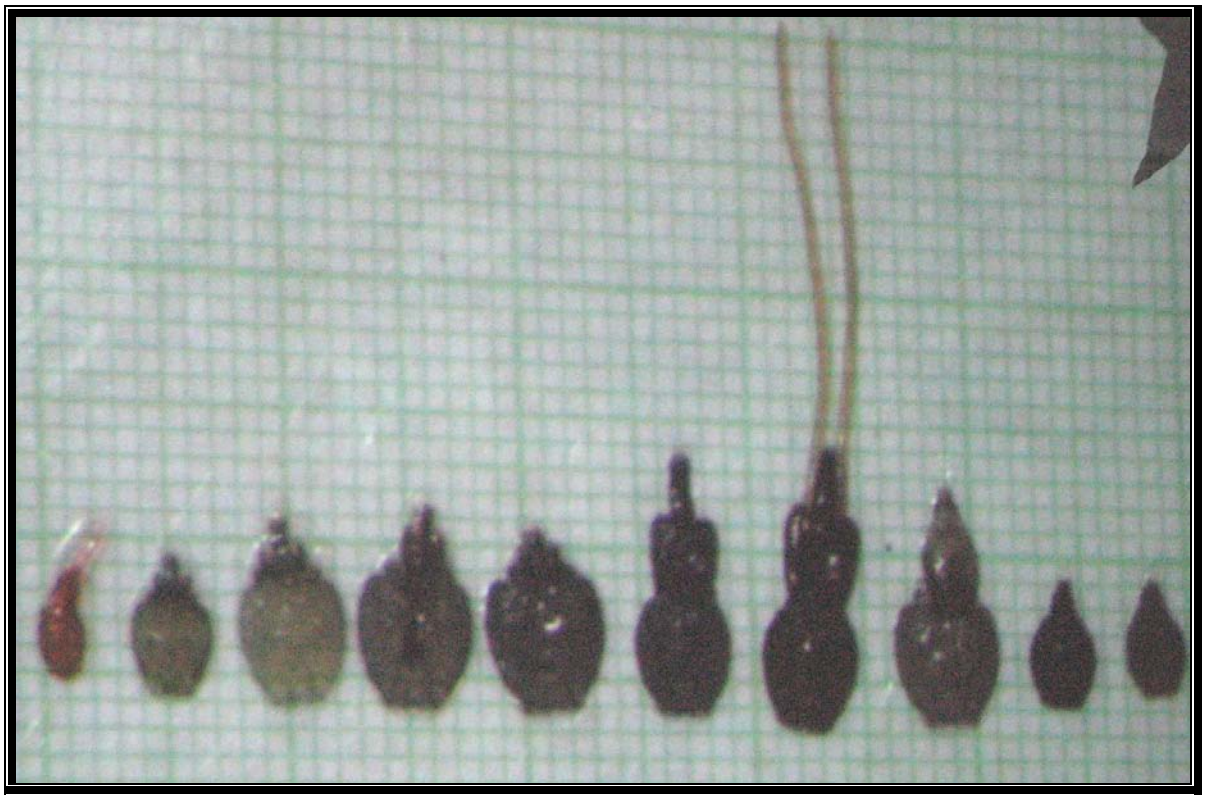

Figure 26. A slide from Alexandra Morton's power point presentation showing various stages of a sea lice, 2009.

When Alexandra's presentation was complete, the class presented her with a set of salmon earrings, which I thought brought a beautiful end to a beautiful day. We had snacks and drinks for her, giving her a chance to sit back and breathe in the moment. To end this specific topic, the students were given one of William Wasden's drawings of a wild salmon infested with sea lice. They colored it, stuffed it, and we hung it around the classroom. Alexandra was thrilled (see figure 27 and 28) to see this art work and requested a copy so that she could use it when she makes a presentation to the government.

Figure 27. Alexandra Morton checking out the salmon with sea lice, 2009.

Figure 28. Alexandra Morton posing with the student's art work, 2009.

Alexandra Morton did not take any payment for her presentation. However, she left a website (Adopt-a-fry.org.) for us to access in which we would be able to make a donation to her cause.

On the same subject of the decline of the Pacific wild salmon, I steered them into a different direction to explore another possible reason that may be causing the salmon to disappear – the logging industry. I opened up the discussion on trees and its' importance to our world. I focused on two points, the latter being the main one - how trees take in bad toxins and release oxygen into the air and how the roots of trees stabilize the earth and reduce erosion. Diane Jacobson, the local `Namgis Treaty Consultant, was able to retrieve several pictures of logging activity being done within our territory, which illustrated this important concept.

Figure 29. Logged out area within the `Namgis territory covered in snow, 2008.

Figure 30. Debris from logging being entangled in front of the Gwa`ni Hatchery, 2008.

Once the students had this background knowledge embedded in them, we went on a field trip to the Gwa`ni Hatchery to observe the deterioration of the rivers due in large part to active logging. During our ride through the logging roads to reach our traditional territories, we passed several logging trucks loaded down with logs, giving the students a good visual of the situation. When we reached our destination, our guide took the students to the river's edge and showed them all the debris that had fallen into the river (see figure 31). It was interesting because the guides were astounded as to how much debris had

Figure 31. A view of the clogged river system from debris caused by logging, 2008.

accumulated, clogging the river system. Mr. Phillip Alfred, a foreman at the Gwa`ni hatchery for twenty years made a comment that there is an area just below the snow covered section called Pink Creek which contains Coho salmon which constantly gets washed out when Spring comes because of the melting snow and the lack of trees to stop the run off.

In section six – Reviving the Pacific Wild Salmon, I chose to go on a field trip to the Gwa`ni hatchery to physically observe the enhancing process of the Pacific wild salmon. I initiated this by emailing Mr. Henry Nelson, the manager of the hatchery requesting to take the Kindergarten students to the hatchery with the purpose of observing and maybe participating in the enhancing process. He set the date for the end of the week because many of the salmon were

ready to spawn. I madly got permission slips copied and sent home to the parents, requested permission from the school board because this is an off-island activity, scheduled the bus, and phoned the ferry to notify them of how many students would be going over and our reason for travelling.

The day turned out great with the weather clearing up so that we could enjoy the activity without worrying about keeping dry or warm. The students were not permitted to physically take part in any of the stages of the enhancement procedure because of the delicate process of attempting to re-create life, but they were able to observe, which they did enjoy immensely. The hatchery crew was professional, courteous, and conscious of the students' age level. The environment however, was not set up for young ones, thus, we did much re-adjusting such as lifting students to look inside the round tubs that contained the live salmon (see figure 32). The students were excited and watched intently every step of the process; they even got close enough to get splashed on when one of the crew had to retrieve a salmon out of the round tubs (see figure 33).

Figure 32. Round tubs containing salmon. 2008.

Figure 33. Students being lifted to look inside the round tubs. 2008.

We were kept busy until it was time for us to return to the ferry. The next day at school I wanted to check their understanding of what they had seen at the hatchery so I printed out my pictures and inserted interlines below for print to be added. Each student received a page and had to think about what was happening in the picture they received. Then my assistant and I transcribed word for word their information onto the paper which the students traced over. The end result was a book that we laminated, bound and sent to the hatchery with a gift of pizzas, donuts and pop for their lunch.

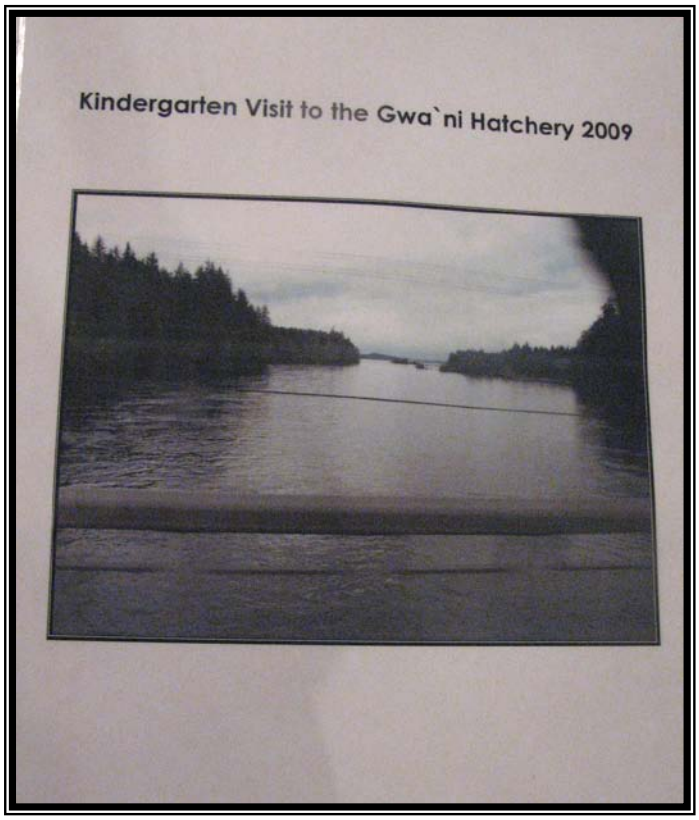

Figure 34. Cover of the book the students created for the Gwa`ni Hatchery. Picture taken by Gloria Alfred, 2008.

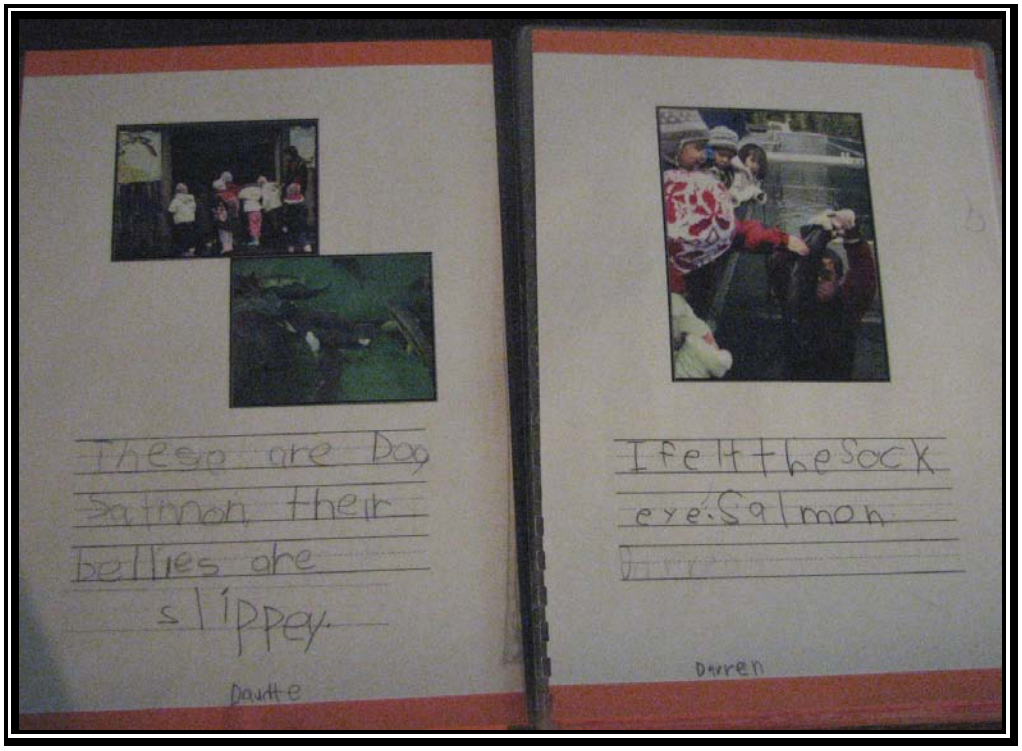

Figure 35. Inserts of the book the students created for the Gwa`ni Hatchery. Picture taken by Gloria Alfred, 2008.

Mr. Nelson phoned me to thank the students and stated that the crew was quite impressed with their knowledge.

For Section Seven – The Salmon Celebration, I decided to have a luncheon as a closure to the unit as a whole, inviting all the resource people that had been involved in this unit as well as the students' parents to come help us celebrate what the students had learned. I followed lesson one in section seven and did not need to adjust the lesson in any way or form. I was going to host this luncheon in the gym, but because our class size was quite small in numbers this year, I selected to have it in our classroom, which worked out well since the students work on this unit was still hanging all around the classroom.

A majority of the parents and guests arrived and enjoyed the student's presentation of the new knowledge they had learned regarding the Pacific wild salmon. The students put so much effort into preparing the classroom for their guests that the energy in the classroom could really be felt when you entered the room. When presenting, the students were a bit shy at first, but with time and encouragement were able to relate all that they had learned.

All in all, teaching this unit to a class gave a feeling of pride and accountability. Deadlines such as stating that this unit will take a month to teach is not realistic because I realized that working with living matter and with elders and resource persons, you sometimes are not in control of what happens, therefore, having to make adjustments on the run.

Evaluation

Evaluation at this level occurred mainly with observations. The students were evaluated by a variety of observation and activity centered approaches, including the following: 1. noting the Kwak'wala words students remembered and used during instruction, 2. observing the life cycle charts, 3. the student dissections and the respect students paid to the salmon while dissecting, 4. outlining the salmon and labeling and recalling the body parts, 5. listening respectfully to elders relating stories about the salmon, 6. making regalia and dancing the salmon dance, 7. the fishing boat drawings, 8. filling in the Modern Fishing Equipment Chart, 9. observing and helping with the drying and preserving of smoked salmon, 10. taking part in science experiments, 11. making gifts for elders, speakers and parents, 12. taking part in field trips, 13. saying the Prayer to the salmon and discussing its importance, and 14. taking an active role in preparing for guests. I was able to watch the students soak in all the information that was thrown at them by listening and interacting through discussions as well as by taking part in all the activities. Their completed assignments also were used as a tool for evaluation. It was evident through their work that the students were able to understand the science related concepts that were presented to them.

There was a different lesson for every day. It was a very busy and full unit. As a teacher, one has to be willing to get into the middle of all the "muck" and

become part of the learning process. There have been many occasions when Kindergarten students have been omitted from activities because of others not believing in the abilities of five year olds. However, after a month with them working on this unit, I was able to see that they were more capable than some to learn because they were eager, curious, and focused.

Chapter 4 Summary and Implications

Purpose

The primary purpose of this project was to develop a traditional science curriculum for grades K – 5 and to pilot-test and evaluate it at the kindergarten level. The curriculum focused on the importance of salmon both as a resource and as a cultural symbol to the Kwakwaka`wakw people. It was to develop awareness and understanding of the environmental impacts that affect the salmon, which, in turn will affect the people of the Northwest Coast. A long-term goal was to bring a consciousness to the Native communities in regards to the rapidly dwindling runs of the wild salmon, what was happening to the salmon, why it was happening, and what needs to be done to save wildlife stocks. It was hoped that this curriculum would give present and future generations of the Kwakwaka`wakw people a starting point to develop plausible solutions to this dilemma. Without the Pacific wild salmon, a major component of who we are as a people will be lost. We used the salmon for bartering with our neighbouring tribes and for demonstrating our wealth as a family. The salmon helped the Aboriginal people of the Northwest Coast develop many traditions and customs which were and continue to be used daily. The Kwakwaka`wakw people learned respect, management of resources, and appreciation through the interaction with the Pacific wild salmon. The salmon and the people of the Northwest Coast are synonymous with each other; one cannot be mentioned without discussing the other.

The curriculum was pilot tested with 16 Kindergarten students who attend the `Namgis First Nation band operated (T`łisalagi`lakw) school in Alert Bay, B.C.; all who are part of the Kwakwaka`wakw nation.

Overview of Curriculum Experience

Completing the curriculum for this science unit was extremely exhausting, but an invaluable experience. Having taught for twenty years, it was difficult for me to put all that I knew down into very specific methodical lesson plans. Pilot testing the lessons was fast paced, with much attention paid to details, especially for arranging guest speakers and field trips. Having the opportunity to insert valuable information taken from the interviews made the lessons more real, more grounded to our location, our history, and our culture.

Finding and selecting specific Elders to interview for this unit was a difficult task to conduct. Elders that have been taught TEKW and live traditionally in today's world have become small in numbers and these Elders had to also have experience with fishing and/or food preparation. Therefore, my attention was focused on a select few. Mr. Stevie Beans, Mr. Roy Cranmer, and Mrs. Peggy Svanvik were the Elders that fit my interview profile and were available. These pillars of the community were willing to participate and were very encouraging with my education plans regarding the Pacific wild salmon. Each had much traditional knowledge and wisdom with regards to fishing and preparing the wild salmon. Several of their comments were added into the many lessons that I

developed which enriched the lesson and sparked the students' interest because the comments were made by someone they knew, someone from within the community, someone they respected. Having that personal connection made the lessons more valuable to the students.

The students were immersed in Traditional Ecological Knowledge teachings and practices throughout the unit. They were also exposed to several words and phrases that were translated into our Native language, Kwak'wala. For this grade level it was important to expose the students to as much hands-on experience as possible so that they could gain a solid understanding of the concepts being taught.

Implications for Science Education in Native Communities

Native communities are surrounded by science and live science on a daily basis without at times, consciously knowing it. What the educational institutes located in Native communities need to do is to harness community members who still practice Traditional Ecological Knowledge and integrate their teaching with the science curriculum (Western Modern Science) being taught in the local schools. There has to be a connection between both worlds so that the Aboriginal students can gain a better understanding of who they are and where they come from and the possibilities of where they can go in their lives.

Bringing the Elders and community resource persons into the schools will create a more cohesive bond between school and home. The students will be

nurtured in the strength from the unity. Having the community actively participate in the science curriculum will also give the students a stronger foundation of their identity. Thus, education, and science becomes real and attainable.

Recommendations for Teachers

1. Make connections early with Elders, local community members and cultural teachers.
2. Develop an on-going list of resource people who have knowledge in this specific area and inform them of your plans prior to teaching the unit.
3. Be flexible and do not panic when the lesson does not go as planned.
4. Always have a "Plan B" in place.
5. No matter what age level this unit may be taught at, give the students many opportunities to have hands-on experiences.
6. Expose the students to as much culture as possible in each lesson.
7. Make use of the Kwak'wala language throughout the unit.
8. Enjoy the experience of learning with the students.
9. Issues over time that change and impact the wild salmon. Be prepared to research new information and add new concepts that enable students to understand how our changing environment can effect the wild salmon.

10. Add to the unit. Be creative.
11. Be positive. Environmental and cultural issues can lead children to feel disempowered and depressed. Search for success stories. Stress the positive.
12. Make an effort to find resource people who have Traditional Ecological Knowledge and Wisdom. This component is very important and needs to be incorporated into the lessons.

Future Research Implications

With the unforeseen future of the diminishing Pacific wild salmon it will be difficult to teach these lessons and have the students retrieve a solid grasp of the key concepts, issues, skills and intended attitudes of this unit without actually being able to come into contact with the endangered species. The potential that can be achieved will be lost without the salmon.

Native communities are involved with the treaty process, which will eventually give each community ultimate control over themselves. This takes into account all the available resources, water ways, and land located in and around the communities. What was obvious at these meetings was the lack of youth involvement in regards to decisions being made which will have a huge impact on their future. How will the next generation survive with their identity as First Nations persons intact if they are not given the tools now, while they are at the formative learning stages of their lives? Our leaders today need to teach

our youth to be able to use our Traditional Ecological Knowledge and Wisdom with what is available today to exist and maintain a strong cultural base as a small but important part of the human race. What is each community going to need to sustain themselves for future generations to come? Resources are a possible avenue for revenue and for community use has to be taken into account. Managing the resources will take knowledge, experience and wisdom in all areas, such as how to sustainably manage logging, fishing, tourism, and shellfish harvesting.

Now more than ever before, we need to develop culturally appropriate curriculum materials and programs that encourage and enable Aboriginal students to participate and be successful in school science and post-secondary. The Kwakwaka`wakw, as with other Aboriginal groups, need to educate our children in the sciences at all grade levels, enabling our future generations to share in the coming responsibilities of self-governing one's own community. As discussed previously, this is of particular importance to First Nations since at this moment because there is a low percentage of First Nations represented in the sciences. Having local educated Aboriginal people working in home communities managing our natural resources will require many years of education, and specifically in the sciences.

Our world seems bleak at the moment with the rapidly declining fish and shellfish species and diminished bio-diverse ecosystems that have been our

home since time immemorial. This stunningly beautiful territory has shaped our culture and way of life, and is the source of our traditional knowledge and spiritual life. However, if teachers, leaders, and Elders take the initiative now to support and develop cross-cultural science programs that emphasize both Traditional Ecological Knowledge and Wisdom and Western sciences, and the two ways of knowing are explored side by side, then our children of today will develop a strong foundation of their identity and will have the tools to live side by side with everyone and with all living creatures and all things in the world. The connection needs to be made between the past and the present in order for a bright future to be possible for our children. We cannot ask the question, "If not our children, then who?" because if our children do not participate now, there will be no next generation of scientifically literate and culturally grounded Kwakwaka̲`wakw.

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Appendix A – Interviews

QUESTIONS FOR ELDERS INTERVIEW

1. Why are the wild salmon important to the Kwakwala speaking people?

2. What do you remember about some of the old techniques used in fishing?

3. Has anything changed as to how you prepare the salmon? Smoked, Half-smoked, Dried, etc…

4. Who brought in the salmon when it was time for winter preparation?

5. How much salmon did you need to last you through the winter months?

6. What can you tell me about the salmon dance? Who is chosen? Why?

7. What was it like during winter preparation?

8. How did/do you show respect for the salmon?

9. What do you think is important to teach our children about the salmon?

10. Why do you think the salmon are disappearing?

11. What do you think can be done to save the stocks?

12. What are some signs you use that will indicate there will be an abundance of salmon?

13. Do you have anything else to add?

INTERVIEW – JULY 9, 2009 – ROY CRANMER
PLACE: ALERT BAY, B.C.
INTERVIEWER: GLORIA ALFRED

Gloria: 1. why are wild salmon important to the Kwakwala speaking people?

Roy: If it wasn't for the salmon we basically wouldn't be here as kwakwala speaking people. Not just the salmon, but anything to do with the sea resources, especially the salmon cause that's what kept everybody with food during the winter. There was smoked salmon, dried salmon and probably some other stuff that you don't know about but that [salmon] was the main one.

Gloria: 2.What do you remember about some of the old techniques used in fishing?

Roy: I may be old but I'm not that old (laughing, but I know over at the river, they had a rock weir, well not really a weir, it's a rock trap. Its about ten feet square and what happened was when the tide came up the fish would come up with it [the tide]and some of them got trapped in there .

Gloria: Who made that Roy?

Roy: I'm not really too sure but when I was a kid I remember the Beans going there and probably some of our older people I guess. Another thing was before the nets they were spearing them. I caught part of that. That's basically what I know other then what my mother was telling me how they used to make the small nets. They weren't very big nets but out of out of dzam, dzam tlam the stinging nettle, that's what it is and the other thing would be the halibut hook. They were made out of wood basically and the line they would use would be kelp.

Gloria: 3. Has anything changed as to how you prepare the salmon now?

Roy: Not really. I remember as a kid helping my mother do fish with the family but that was canning fish. That hasn't changed too much other then they use electric canners now instead of using the arm [crank]. Basically smoking of the fish and barbequing the fish are done the same way still.

Gloria: 4. Who brought in the salmon when it was time for winter preparation?

Roy: Well back in the day when it was a family thing you know, I remember as a kid going over to the river with my father twice, I was six or seven years old. I was with all the older people like Max Whonnock, Charlie Wilson, Johnson Cook (Gago`oll) Peter Fred and them all went and when they got back whatever was caught was disbursed in the village. It's kind of like that now but a lot less, you know, it's more a family thing now.

Gloria: How did you guys get over there?

Roy: Back then there were a couple of old gas boats. I remember our dad had one called Patricia Anne I think it was but prior to that they used to just row over there. I remember rowing over there once but not to fish but just to see if you could make it over there[the river]. I was twelve, thirteen years old then.

Gloria: 5. How much salmon did you need to last you through the winter months?

Roy: Well for us nothing less than five hundred. It would be canned, or frozen. I think that would be about it. Nothing less, sometimes more. Just for the family.

Gloria: 6. What can you tell me about the salmon dance?

Roy: Well other then I mean its like our other dances, its there for a reason. Our people respect the salmon. Its what kept us going. Its saying our people respected the salmon and there's a dance attached to it and a story.

Gloria: Who's chosen to dance this dance?

Roy: Well it varies from group to group. It's basically a community dance, but I guess there are certain family that do have a right to do it.

Gloria: 7. What was it like during winter preparations when you guys were preparing it? Like how did you guys work together and what did you need and how did you plan?

Roy: Well it was never really planned. You just did it and anybody that was willing to help came along and helped, the fishing, the cooking, the wood

Gloria: 8. How did you show respect for the salmon?

Roy: Well very little of us nowadays show a little bit of respect but not the way the old people used to do that. I remember the old lady used to tell me about well the first fish they used to catch, there was kind of a little ceremony but I don't think very many of us do that anymore other than the fact that we know, the 'Namgis decided to shut the river down because we knew that there wasn't enough fish in there. So that was one way of how we were showing some kind of respect there.

Gloria: 9. What do you think is important to teach our children about the salmon?

Roy: Well there's a long list of important things:
The most important thing if it wasn't for the salmon we wouldn't be who we are and what we are.
The other thing is that, even some of our older people, adults, don't know how to work on fish, which I found quite surprising. They don't know how to clean fish, they don't know how to prepare for a barbeque or how to smoke it. I've been trying to tell these people who

have a little bit of authority that's some of the things that we should start introducing even in school. We have to start doing that or some of that [traditions] is going to be lost. Other then what we see in videos.

Gloria: 10. Why do you think the salmon are disappearing?

Roy: Well our worst enemy right now is the fish farms. Lots of people don't want to admit it but DFO and the two levels of government, but prior to that it was the logging practices in the different systems. They're trying to blame it on the Climatel change but they kind of need an excuse so they can do something like that.

Gloria: Yeah.

Roy: you know our fish are all gone just by miss-management by Fisheries especially in our area. We took our treaty group just to show them what we're trying to tell them about how important the fish are to us. We took them out for a ride in the mainland. We went from Embley Lagoon which is big boys country and back in 1990 there was the most pinks that I ever caught in the mainland. We went from there to the mouth of Knights Inlet. Back in 1990 in Embley Lagoon we went in there to do what they call a surplus fishery and they figure there was a quarter of a million fish in there. In three sets in there we took out pretty near 90,000. We went in this Last year and there was supposed to be a pink fishery and we never saw a fish in there. That whole mainland that goes through Kingcome and Wakeman they were hiding in there and going through Tribune to Bond Sound/Thompson Sound that's the only place we saw half a dozen fish jumping. And that place should have been alive with fish in those days.

Gloria: Sad.

Roy: Yeah it's pretty sad to hear. I even had a tear in my eye after we finished that trip.

Gloria. 11. What do you think can be done to save the save the stock?

Roy: Well like I say the biggest problem we have right now is the fish farms. They have to be moved out of here. If they aren't there isn't a hope in hell of any of those fish stocks coming back especially in the mainland.

Gloria: Aren't those government owned?

Roy: they're multi-nationals. You know you only hear what's happening around MTTC but in Chili they're completely ruined the fishery down there.

Gloria: Fish farms?

Roy: Yeah I saw a couple of documentaries where they originated from like Scotland and Sweden and what they've done over there. They've actually wiped out whole runs. You know these guys that are running the fish farms think their farm fish is no problem.

Gloria: How do they get into Canada then?

Roy: Oh Money. Money talks you know. Like I say these multi nations, they're world wide and every place that they've gone and what I've read and seen you know, other then a few jobs , we're just ruined the natural environment that they're in.

Gloria: When they ruin it do they just move to another spot?

Roy: Well they're still doing it in Sweden they pretty much have to if they want fish because that is the only fish they've got. There are a couple of students from Sweden and they came over here to do a thesis on how we felt about Climate change. I told them that's the least of our worries right now and I went into my spiel about fish farms and they have never seen a wild salmon because that's all they have over there is farm fish. So I took them over to the river and that's when we were fishing over there. We caught a couple of spare ones and they couldn't believe what an actual wild salmon looked like so brought them back and barbequed them . They just couldn't believe it.

Gloria: The difference in it.

Roy: I said this is what you guys should be making. So forget about the Climate change.

Gloria: 12. What are some signs that you use that will indicate that there will be lots of salmon?

Roy: Well until they show up you know the old people believe in the salmon berries, if there's lots of berries we'll get a lot of fish that year but that doesn't happen all the time. Back in the day when I used to see all that fish going by the river, it's actually watching them go by and we actually had to deal with fisheries. They have no idea what they're talking about. II took them [Fisheries] one year for a ride in 1990 when we used to check fish out and we never ran out of fish on the mainland. Every place we went looked like rain, we were just brailing. We went up to Anwatti. Just before you even headed up the river those fish are just like balls of herring ---right in the bough.

Roy: We got up to the head of the mouth and there were big pools of fish. So I asked the Fishery guys, "how many fish do you figure is in the system?". I couldn't believe some of the answeres that were coming out of their mouths. One guy said there was about a thousand. One guy said maybe 5,000. I said, "you guys have got to be kidding".

Gloria: I often wonder where they get the DFO guys from. I swear it's not from the coast.

Roy: Well even if they were from the Coast it wouldn't matter. It's about fish. They asked me how many I thought and I said about 350,000 in this whole system.
Strange as it may seem there was 308,000 was the final count. And to verify the count they [fisheries] figured there was 10,000 fish up there.

Gloria: **So that salmon berries is a biggie?**

Roy: **Other than what we usually see as indicators. Yeah, they also say when it hails there's supposed to be lots of eulachons but that doesn't work sometimes either.**

Gloria: **13. Do you have anything else to add?**

Roy: **There are a couple things.**

What you're doing; that should be carried on
What I think of the whole business with whats happening with our environment especially things that kept us going and that should be in school cause if not a lot of that is going to be gone. If you don't have someone to be able to teach that because its kind of hard to watch that a video tape and learn from that

I think what you're doing is important. It should be part of that curriculum in that school

Gloria: **I agree. I totally agree and hopefully I'll be getting that developed by next year and I'll be dragging you into the classrooms. Anything else Roy?**

Roy: **No carry on however.**

Gloria: **Okay thank you so much.**

End of Interview.

INTERVIEW – JULY 7, 2009 00 STEVIE BEANS
PLACE: ALERT BAY, B.C.
INTERVIEWER: GLORIA ALFRED

Gloria: 1. Why are wild salmon important to the Kwakwala Speaking People?

Stevie: That's our main food. Right through the old days its salmon, salmon and if it isn't salmon it's halibut and clams but salmon is the best one of our food. So that's why we can't go without it.

Gloria: 2.What do you remember about some of the old techniques used in fishing?

Stevie: Like fishing in commercial or river fishing?

Gloria: I think river fishing maybe.

Stevie: They used traps like the hatchery people when we were out there, the trap they had, it was a historical trap and they went and poled a depth below the bridge and it was designed for high water. It was blocked off and fish was in there when the tide was up, the fish went down and they were trapped in there.

Gloria: How long ago?

Stevie: It was there when I first went there and it was there in my mom's time.
That little island with the bridge was a major smoking area for chums, dogs. There was smoke houses all on that island before and behind that was the trap.

Gloria: Was everybody allowed to use that trap?

Stevie: Nobody owned anything. Everybody shared it, not like today. Everything was on a share basis. Part of the people went up to the neck of the lake for the chums where they did the smoking also.

Gloria: They caught them up there too?

Stevie: with a long pole with a gaff or a spear head

Gloria: Did you do that?

Stevie: Yeah. It was fun until you get wet and then you start freezing.

Gloria: I know. I remember going over with my Dad on that riverboat during that time.

Stevie: Oh on that drag boat, we fished sockeye.

Stevie: **This is the wintertime that we fished chum. This is in November- December.**

Gloria: **The water's always freezing cold at this time.**

Stevie: **Yeah and right into January. That was a major food source because up in the river they lose their fat and they can smoke them and store them dry without going haywire, going rotten. You would store it in a dry place and sit out in and soaked it and cooked it.**

Gloria: **3. Has anything changed after how you prepare the salmon now?**

Stevie: **Yeah. The tools are the only thing that changed as compared to the old days where what you had you used but now you've got choices.**

Gloria: **You still use a smoke house?**

Stevie: **Yeah**

Gloria: **You don't hydrate at all?**

Stevie: **No**

Gloria: **Okay because I know a lot of people who have tried using the hydrator.**

Stevie: **Yeah, it's artificial.**

Gloria: **4. Who brought in the salmon when it was time for winter preparation?**

Stevie: **They didn't bring it in. They went to the site. It didn't come here.**

Gloria: **So all of the work was done over at the river?**

Stevie: **Yes. They had a big sight up near that lake. That's where the four brothers were and that's where the spawning grounds were.**

Gloria: **All the different families went over and participated in it?**

Stevie: **Yeah**

Gloria: **5. How much salmon did you need to last you through the winter months?**

Stevie: **Today or past?**

Gloria: **Past intake.**

Stevie: **What my mom used to say was when they took their turn up there it was from a thousand to fifteen hundred.**

Gloria: **Was that just for your guy's family or was it for the village?**

Stevie: Half the community was my mom's family. (laughing)

Gloria: **True. (laughing)**

Stevie: **but that's the way it went. And she said you get the heaviest person to kneel on it, compress it, so you can pack all that fish down in canoes.**

Gloria: **Oh cool. So they went up on the canoes?**

Stevie: **Yeah and most of them went up by the lake and those that weren't capable did it on that island below the bridge. That island is called Yahis.**

Gloria: **When you said a thousand to fifteen hundred, that was chum you were mentioning?**

Stevie: **Yeah**

Gloria: **Did you guys prepare any sockeye during the winter?**

Stevie: **No because of the dry content, it wouldn't keep. It only came in after the canning came and the freezers.**

Gloria: **6. What can you tell me about the salmon dance?**

Stevie: The salmon dance is what they use to honor the fish and that's all we can say about it because that's ours.

Gloria: **and it deals with twins**

Stevie: **That's a special thing for spawning**

Gloria: 7. What was it like during winter preparations when you guys were preparing it?

Stevie: **Cold**

Gloria: **You guys must have had everything planned?**

Stevie: **because in the wintertime it's cold so you don't need a fridge or freezer. It was stock piled and they could work on it for days without any deterioration at all.**

Gloria: 8. How did you show respect for the salmon and one was the salmon dance?

Stevie: You just took what you needed but its respect right from the beginning because we never touched that salmon out here. We took it after it was spawned. We never took it like we do today. We kill off the run because the spawners didn't make it. We took it at the spawning grounds after they spawned.

Gloria: 9. What do you think is important to teach our children about the salmon?

Stevie: If we can get them away from the video games we could teach them more about how to preserve fish. Well you have to respect it [the fish] and they say it will take care of you.

Gloria: 10. Why do you think the salmon are disappearing?

Stevie: The first thing is logging the watershed but its not as bad as what is happening with the fish farms and the fish farms here are part of the Federal Government whether you like it or not. Last year the Federal Government dumped in 70 million [dollars] to an industry they say is a viable industry. Why are they doing it?

Gloria: I know they do other things too like that. Off the shore oil too

Stevie: Yeah Well that hasn't happened yet but all the meetings that I've gone to where these people fight these fish farms. We're fighting the government and I don't think that government changed after it changed hands. It was all written in stone in the mid-eighties when they first came promoting fish farms and we had elders, fishermen and everything else. They wanted to know the sensitive areas where they can't put the farms, and when they identified those things [sensitive areas], they put the farms there and when we were meeting with this outfit that was called, Terrace Area Resources, when they first started and we were asking too many questions and they didn't like it and this one guy jumped up and said, "You might as well side with us now, by 1998 there is not going to be any Commercial Fishery". This was already getting out. Where did he get it from? The Federal Government.

Gloria: Yeah Oh God, that's terrible.

Stevie: That's all they said to us, "You might as well side with us now because there's going to be no Commercial Fishery by 1998."

Gloria: They were pretty close to that [date] right?

Stevie: Yeah

Gloria: 11. What do you think can be done to save the salmon drought?

Stevie: Where do we begin? Where do we begin? What we have to do is to get the Federal Government to commit to Salmon Enhancement again what has been abandoned since the fish farms.

Gloria: No they haven't

Stevie: Yeah everything. They haven't put a penny into it. They keep saying they're gong to put money into salmon enhancement but we've never seen it to the scale of what the salmon is already ----------and wanted fish farms in here.

Gloria: 12. What are some signs that you use that will indicate that there will be lots of salmon?

Stevie: One thing I learned from the old people was the salmon berries right from when I was playing on the beach that was the indicator.

Gloria: That there was lots of salmon berries?

Stevie: Yes

Gloria: If there are lots of salmon berries, there will be lots of salmon and there have been a lot of salmon berries this year so hopefully [we will get lots of salmon].

Stevie: They're doing well up North.

Gloria: Gee they have big runs compared to our area.

Stevie: Well they can't select what they catch and they even do a big number on the chums up the Nass and when we go we're paying the price. We can't keep the chums because it drops it down.

Gloria: 13. Have you got anything else to add?

Stevie: Not really.

Gloria: Okay Well thank you so much Stevie, We're done.

End of Interview

INTERVIEW – AUGUST 11, 2009 – PEGGY SVANVIK
PLACE: ALERT BAY, B.C.
INTERVIEWER: GLORIA ALFRED

Gloria: 1. Why are wild salmon important to the Kwakwala speaking people?

Peggy: It's their food. It's the thing that they depend on.

Gloria: 2. What do you remember about some of the old techniques used in fishing?

Peggy: Well I never went fishing myself but my father used to. They didn't have seine boats. They had drag nets that they would put in and drag the river.

Gloria: Up here or at the river?

Peggy: At the river and out where ever there was salmon.

Gloria: Did you ever take part in the river drag seining?

Peggy: No but I was there sometimes[watching] but I never did [take part].

Gloria: I did a couple of times with my Dad

Peggy: I think Irene did that too.

Gloria: 3. Has anything changed after how you prepared the salmon now?

Peggy: Oh yes because now they can it or jar it or they freeze it. Before they didn't have jars and things or freezers to put them in.

Gloria: So how did they keep it for the winter?

Peggy: well especially the dog salmon they would wait until the dog salmon went up the river and waited until they went up and spawned and when it came back they took it because it lost the fat. So they were then able to dry it and they were really dry so it could keep all winter without going moldy.

Gloria; 4. Who brought in the salmon when it was time for winter preparation?

Peggy: The men.

Gloria: 5. How much salmon did you need to last you through the winter months?

Peggy: Well we used to have lots. What I really remember is when we used to do the dog salmon my mother used to get 400 and 200 she would cut and fillet and make kawais and hang it to dry and the other 200 we used to barbeque and I liked

that because my father used to burn the fire right around a log and put the barbeque around the log and cook a log of fish at one time.

Gloria: So with the barbeque did you guys jar it or can it?

Peggy: Later on we did but before they didn't. Before they used to dry it too.

Gloria: Oh really?

Peggy: Yeah they would dry it. And then when it was time for us to eat it they would soak it overnight and then we could eat it the next day.

Gloria: 6. What can you tell me about the salmon dance? Who's chosen and why?

Peggy: Well the salmon dance , usually they have twins to lead that because they represent the family and because when twins are born at the beginning of the year they say its going to be a good salmon year.

Gloria: Okay that sounds good.

Peggy: I never did find out what happened at the end of the year. (laughing)

Gloria: 7. what was it like during winter preparation?

Peggy: It was cold

Gloria: Did you guys work in a family group?

Peggy: oh yeah our family.

Gloria: Did you guys take turns watching the fire.

Peggy: Well usually my Dad looked after the fire. Oh we used to help too but it was mainly he that did.

Gloria: What was your job?

Peggy: My job was to help cut the fish and my mother would fill up the can and then when the cans came then my job was to seal it. We had those sealers you had to wind.

Gloria: Yeah I remember my mom used to have that.

Peggy: And it always seems to be me that got that job. We all had to do something so those that weren't working on fish, their job was to prepare our meals for us. Everybody had to do something.

Gloria: Okay. Nowadays when we are preparing the salmon, like when I'm doing it, there's nobody there to cook for us.

Peggy: Oh yeah my mother would say, "You have to". It was a must; we had to learn how to do fish when we were little. She said, "You will be a useless woman if you don't know how to do your fish"

Gloria: that's true.

Peggy: And she said, "When you have children you've got to feed your children.

Gloria: 8. How did you show respect for the salmon?

Peggy: Well my mother, with the very first salmon that she got, she could not eat that by herself so she cut it up and made Yusa [fish soup] and then invite all the ladies in the neighborhood. She said, you had to share it so you could get more.

Gloria: 9. What do you think is important to teach our children about the salmon?

Peggy: That the salmon is important to our livelihood, to our well being and if you think about all the illnesses people have today. I never heard of cancer when I was young.

Gloria: It's so funny now. They're throwing that Omega 3 at everybody. Saying that's the cure for everybody and that's what has always been in salmon.

Peggy: Yeah

Gloria: 10. Why do you think the salmon are disappearing?

Peggy: Over fishing and then the logging camps, dropping their logs in the river and destroying the river and we don't get enough snow, its not good for the river.

Gloria: My brother was saying the Fraser River is really low [water levels] right now. Too hot I guess ?

Gloria: 11, what do you think can be done to save the salmon?

Peggy: Clean the rivers so that the salmon can go up.

Gloria: 12. What are some signs that you use to indicate that there will be lots of salmon?

Peggy: One of the things the old people used to say is when there is lots of salmon berries there's going to be lots of salmon.

Gloria: Good

Peggy: plus the twins. I remember one time when we had an over abundance of salmon and that was in 1948 and the bushes were just full of salmon berries.

Gloria: I noticed there was lots of salmon berries this year.

Peggy: Sunny Isaac's great granddaughters were born at the beginning of this year.

Gloria: 13. Do you have anything else to add that about the salmon that I haven't asked?

Peggy: Well I remember a while back a medicine man was talking to us and he told us that we were going to have trouble. When there will be a time that we will be having no salmon and he told us to prepare it [all the salmon you could get] because there's going to be a time when you're not going to have any and two years now I never jarred or canned fish.

Gloria: Oh okay. That's nice. Phil was out the last day. He went out and he said, it was picking up 600 big ones. He said they're way bigger then the Steward runs. I don't know how they can tell the difference what run they are.

Peggy: You know what they say about salmon, "I don't want it if it's not the sockeye. People don't want to use the humps. They want to throw it away because their too small and its good fish. I said, "Let's take the humpbacks. We'll smoke it" I said. Its good smoked. You can can it and jar it.
Last year that's all we got to jar. We got a few springs and humpbacks. I kept telling people all humpbacks come to me. They always look at me like I don't know what I'm talking about.

Gloria: Not me I know you're very wise. . Okay that's it. You're all done.

End of Interview

Appendix B – List of Lessons

LESSON ONE:	**The connection the Salmon has to the Kwakwaka`wakw Culture**
LESSON TWO:	**Legends and Stories**
LESSON THREE:	**Prayer to the Salmon**
LESSON FOUR:	**The Wild Salmon – Species and Body Parts**
LESSON FIVE:	**The Salmon Life Cycle**
LESSON SIX:	**Preparing and Harvesting the Pacific Wild Salmon**
LESSON SEVEN:	**Salmon Food Relationships**
LESSON EIGHT:	**Traditional Fishing Methods**
LESSON NINE:	**Present Day Fishing Equipment**
LESSON TEN:	**The Decline of the Pacific Wild Salmon**
LESSON ELEVEN:	**Fish Farms**
LESSON TWELVE:	**Loss of Good Salmon Habitat**
LESSON THIRTEEN:	**Reviving the Pacific Wild Salmon**
LESSON FOURTEEN:	**Salmon Celebration**

Appendix C – Selected Lessons

LESSON FOUR: **The Wild Salmon – Species and Body Parts**

Concepts

1. Pacific wild salmon have distinct features and a specific growth pattern.

2. The five species of Pacific wild salmon are: Sockeye, Chinook, Coho, Pink and Chum.

3. Salmon body parts include the tail, fins, mouth, eyes, gills and scales.

Learning Outcomes

- The students will be able to identify the five species of Pacific wild salmon.
- The students will be able to describe characteristics of the Pacific wild salmon's body; including color, shape, texture, size, and weight through touch and observational exploration.
- The students will be able to label and describe what each part of the Pacific wild salmon's body function can do.

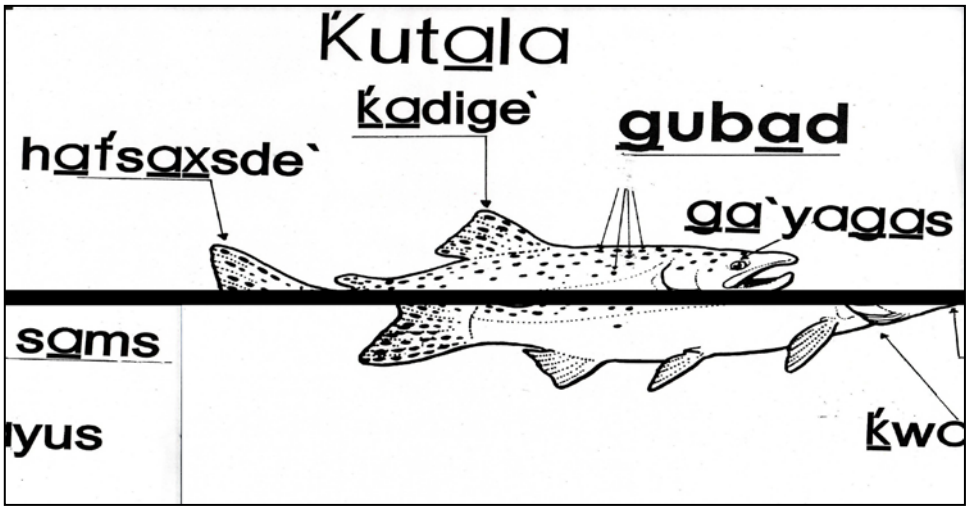
Materials

- 5 posters of the Pacific wild salmon (from the Department of Fisheries)
- 5 small recipe cards with the posters of the Pacific wild salmon put on them (shrunk)
- A large outline of a salmon with names of the body parts (Kwak`wala)
- A class set of the worksheet (same as above)
- A booklet of the Life cycle of the Salmon for each student
- Three wild salmon
- A fish bowl with 2 or 3 goldfish
- Magnifying glasses

- ❖ Tweezers
- ❖ Butcher paper

Kwak`wala Vocabulary

K`utala	- fish
Sams	- mouth
K`wayus/patła	- gills
Ga`yagas	- eye
Gubad	- scales
K`adige`	- top fin
Hat`saxsde`	- tail
Gwax`nis	- Chum Salmon
Małik	- Sockeye Salmon
Dza`wan	- Coho Salmon
Hanu`n	- Pink Salmon
Sat`sam	- Chinook Salmon



Body Parts of a Salmon – drawing by Gloria Alfred 2002

Preparation

- ✓ Preserve several wild salmon for this lesson or have someone that you are able to connect with who would supply you with the salmon. The `Namgis First Nations band has a supply of salmon which is readily available for educational uses. If you are not able to get the salmon freshly out of the water, then make sure that you take the salmon out of the freezer a day before this lesson.
- ✓ Hang the five posters in a place that is easily seen by the students. I have labeled each salmon with their Kwak`wala name.
- ✓ Also hang the five recipe cards on the chalkboard.
- ✓ Prior to this lesson make sure that you have cut enough pieces of butcher paper for the salmon drawing activity. With this activity I put the students into groups of two or three, depending on the class size.

- ✓ You can buy a small fish bowl with fish for a small sum at the closest pet store, or you can ask one of your students to bring in their fishbowl, or use any clear plastic container available.

Procedure

1. Using the posters of the salmon, introduce each specie of salmon.
2. Go through the posters again, introducing the Kwak`wala names for each salmon. Have the students practice each name several times.
3. For each salmon, brainstorm the similarities and differences that they can see. Using the recipe cards taped to the chalkboard, list these similarities and differences under each species.
4. Ask the students to come around the fish bowl and have them observe the way the fish is moving through the water as well as look at the body parts and what purpose each body part serves.
5. Using the large outline of the salmon, introduce each body part of the salmon in English and in Kwak`wala. Ask the students to identify each body part as you point to them and to also explain their uses.
6. Hand out the "Body Part Identification" activity sheet for the students to fill in the names of each body part using Kwak`wala.

Enrichment Activities

In the classroom, bring in three dead wild salmon for the students to examine.

Activity 1

The students will inspect the external body parts of the salmon. Using magnifying glasses, and tweezers, the students will poke, prod, turn and open the salmon.

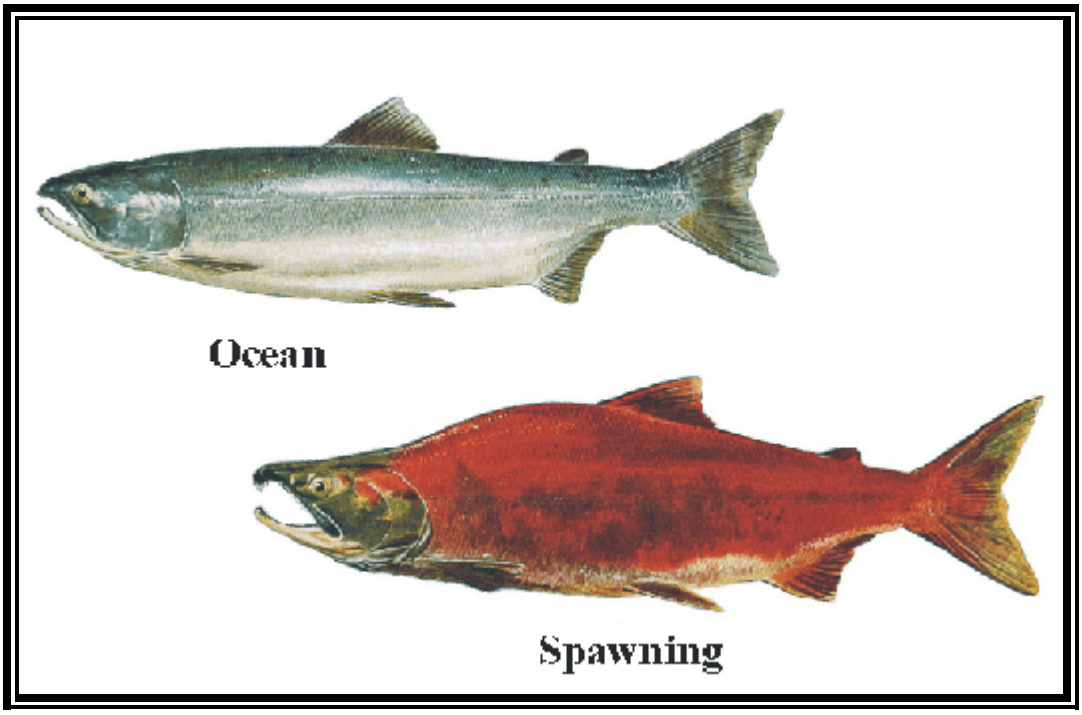
Activity 2

The students will get into their selected groups and put the salmon onto butcher paper and trace an outline of the salmon. Then label all the body parts (in Kwak`wala) that they are able to identify. Color the traced salmon.

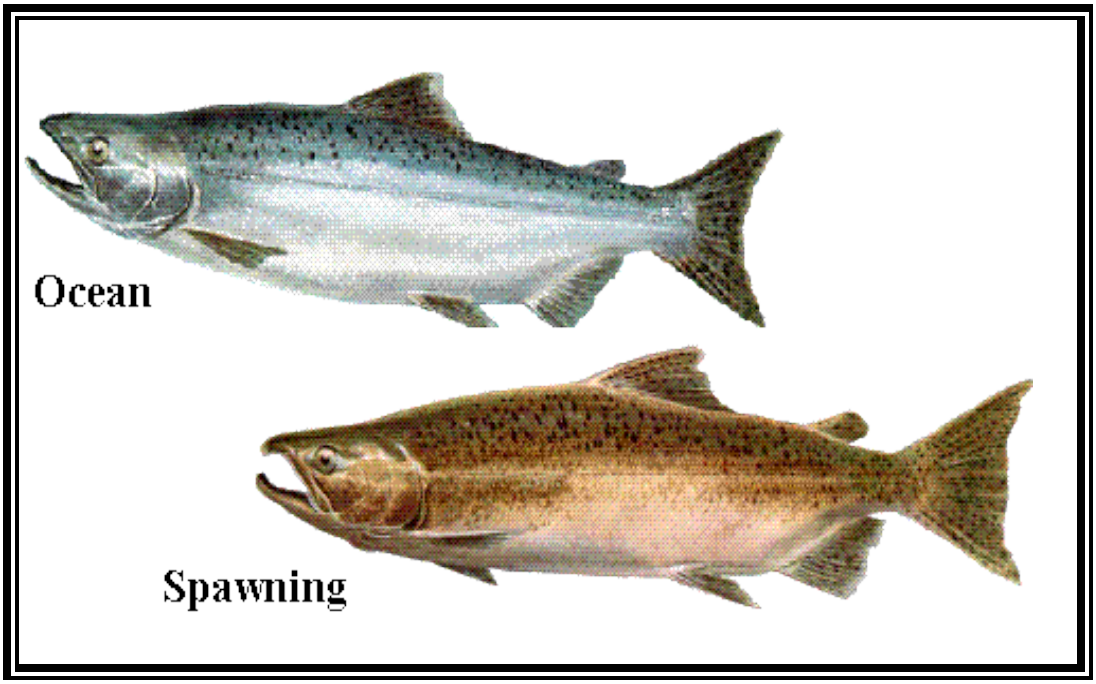
Activity 3

The students will sing the "5 Little Salmon" song to the tune of "5 Little Ducks". Prior to singing the students will need to make salmon finger puppets. (Attached activity sheet)

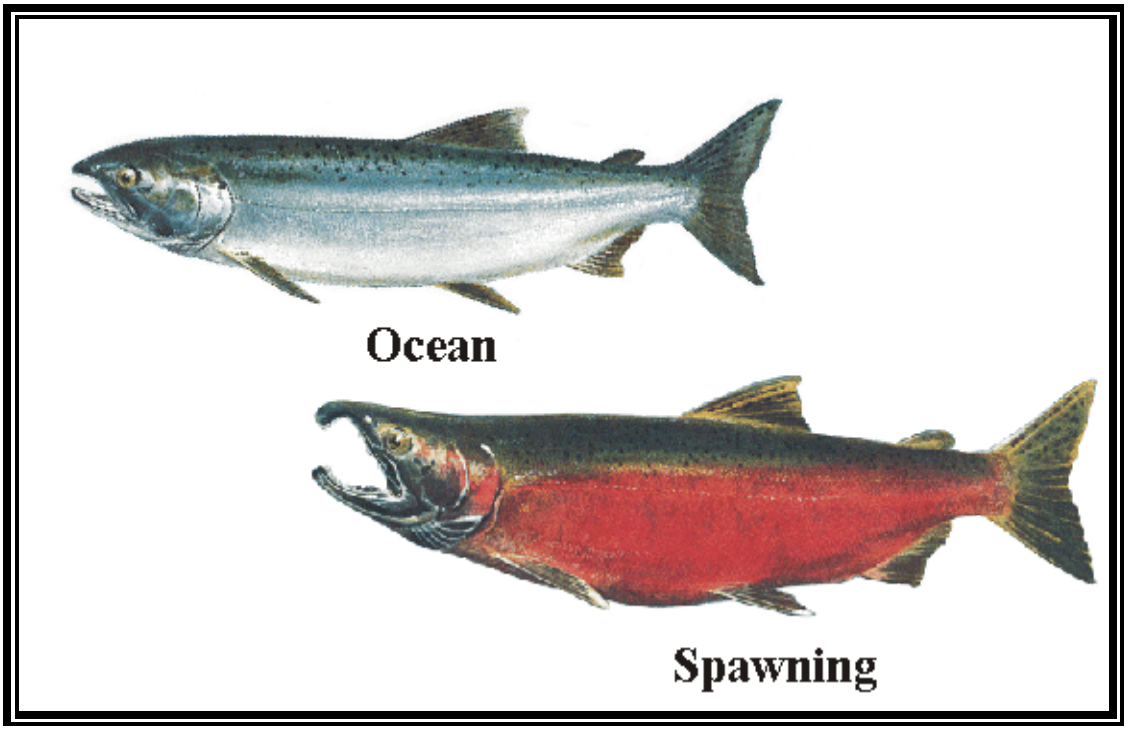
RECIPE CARDS



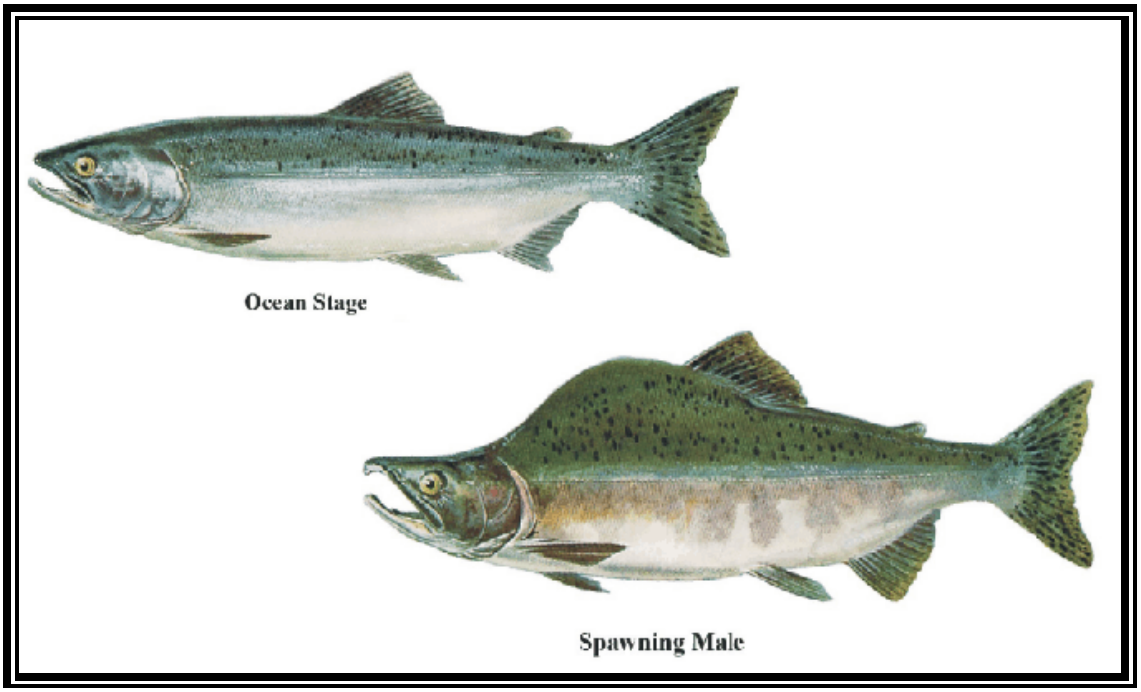
Sockeye (Małik) Recipe Card (1) http://cybersalmon.fws.gov/sockeye.gif



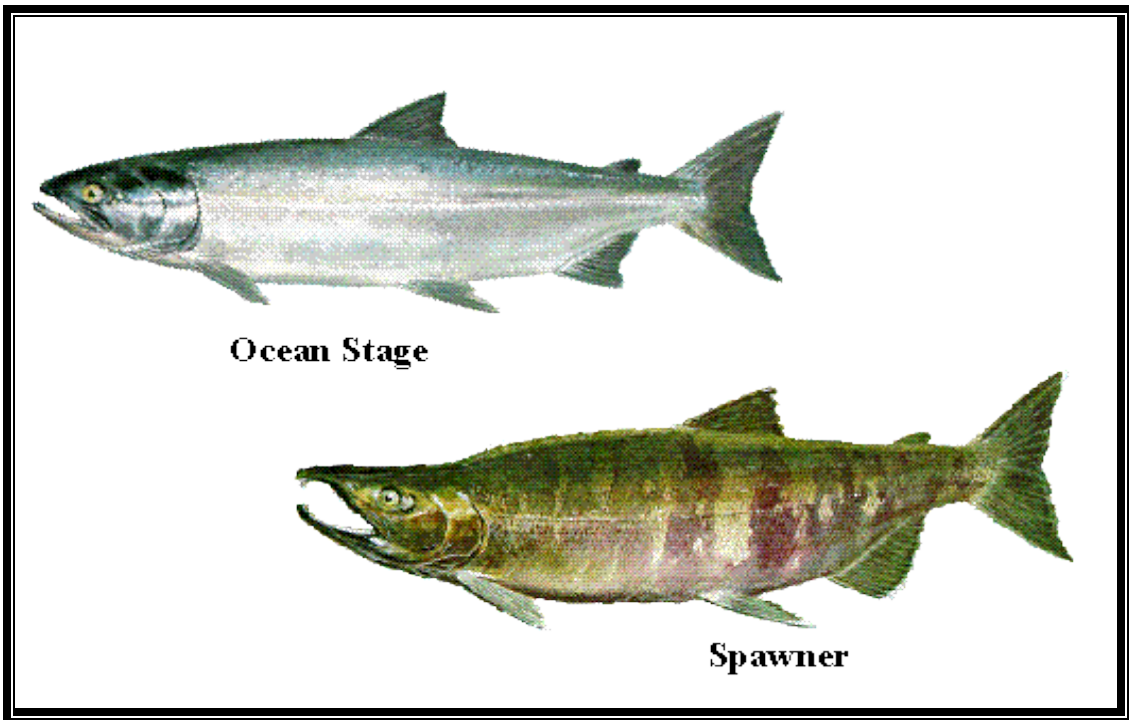
Chinook (Sat`sam) Salmon Recipe Card (2) http://cybersalmon.fws.gov/chinook.gif



Coho (Dza`wan) salmon Recipe Card (3) http://cybersalmon.fws.gov/coho.gif

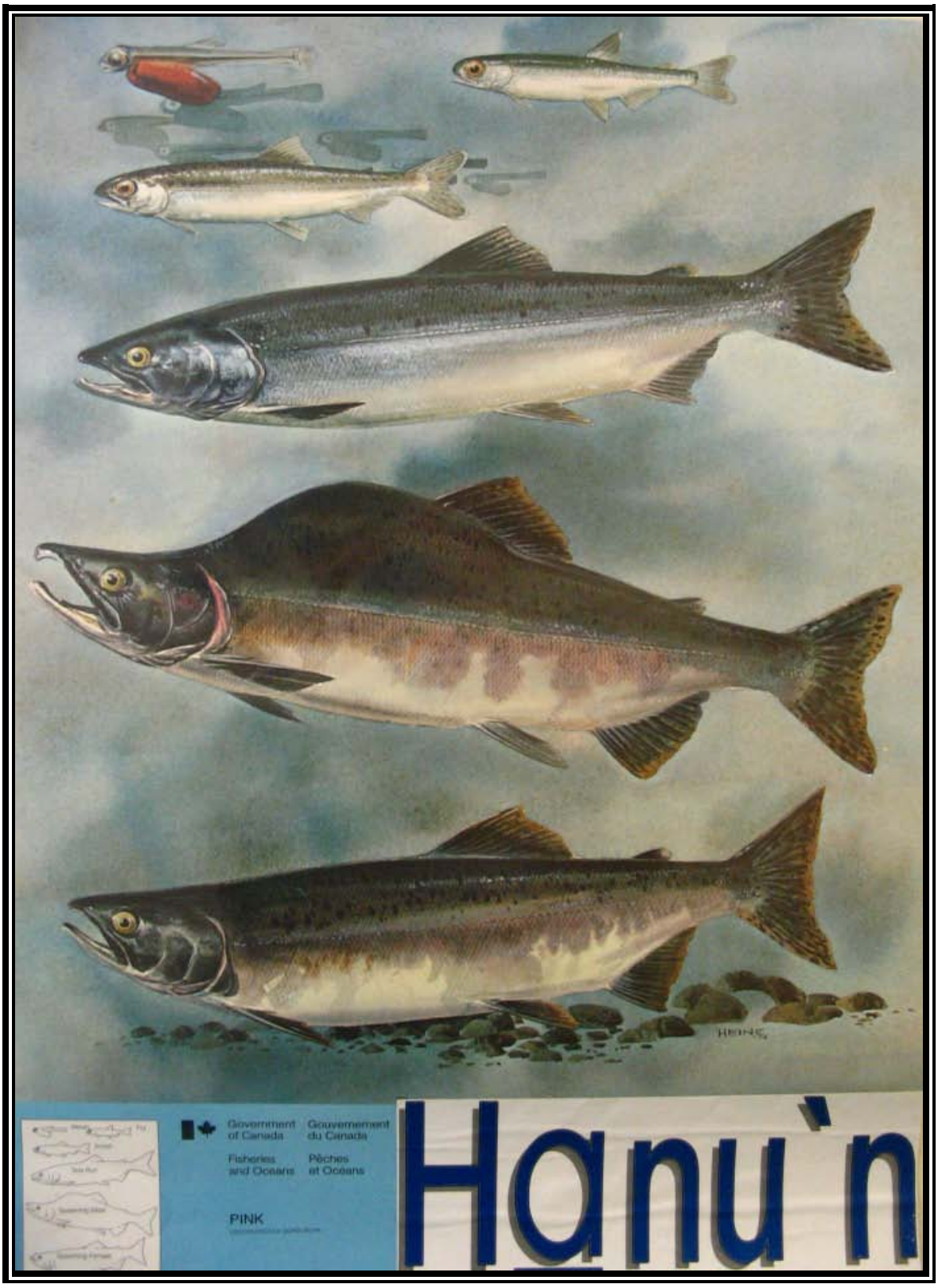


Pink (Hanu`n) Salmon Recipe Card (4) http://cybersalmon.fws.gov/pink.gif

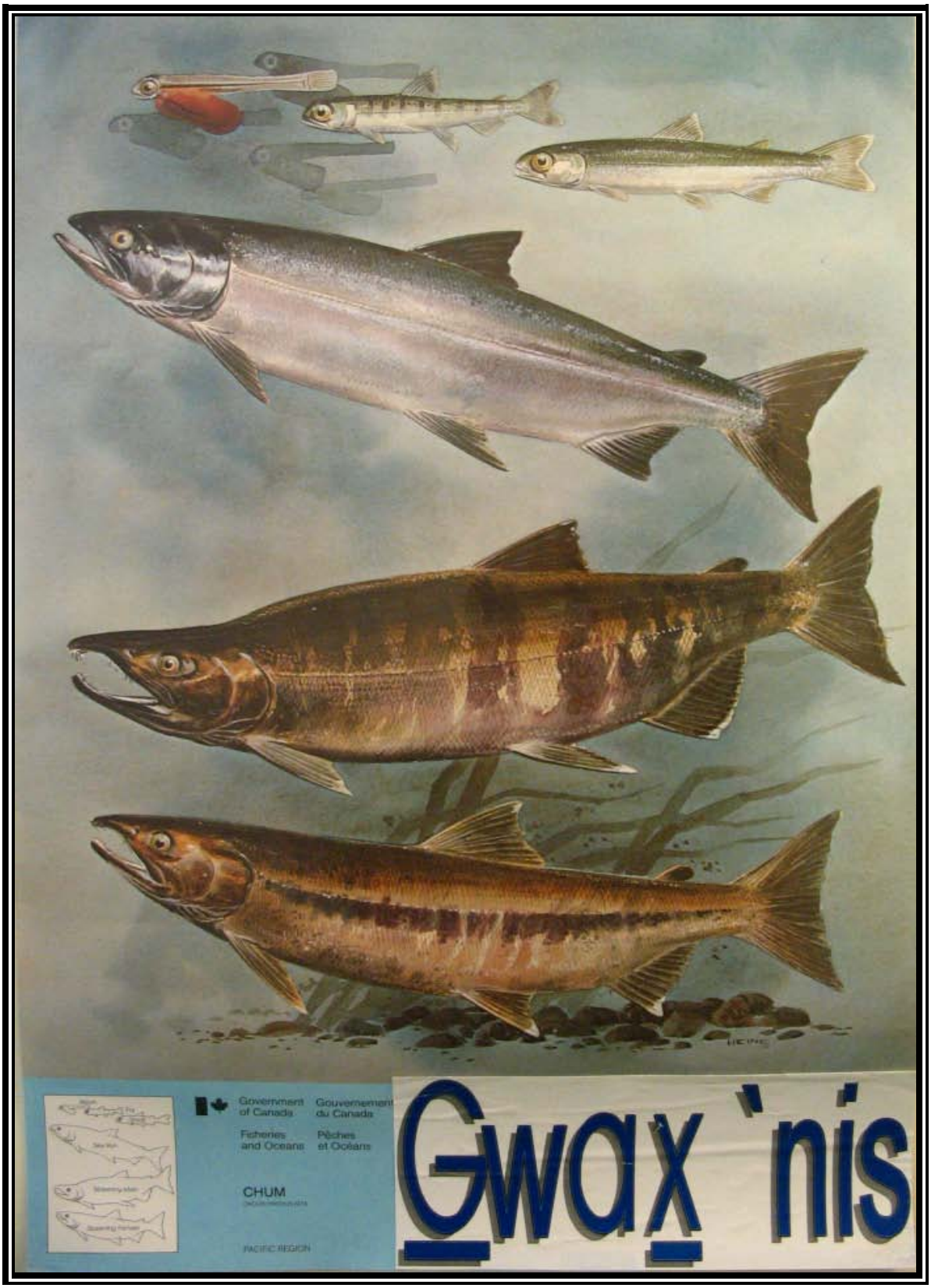


Chum (Gwax`nis) Salmon Recipe Card (5) http://cybersalmon.fws.gov/chum.gif

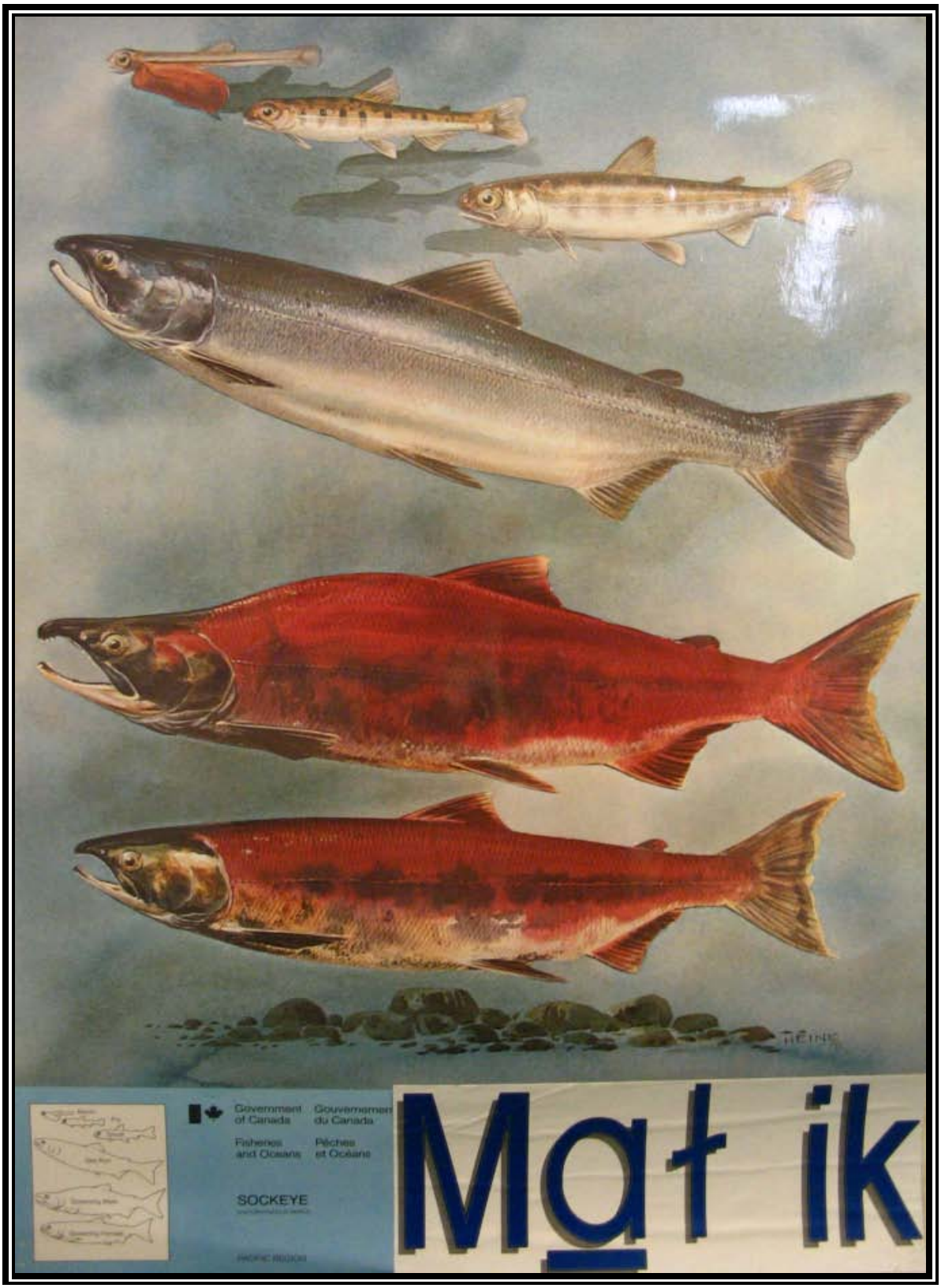
Salmon posters (1 of 5) Dzą`wąn (Coho). Government of Canada/Fisheries and Oceans. 1995.



Salmon posters (2 of 5) H<u>a</u>nu`n (Pink). Government of Canada/Fisheries and Oceans. 1995.

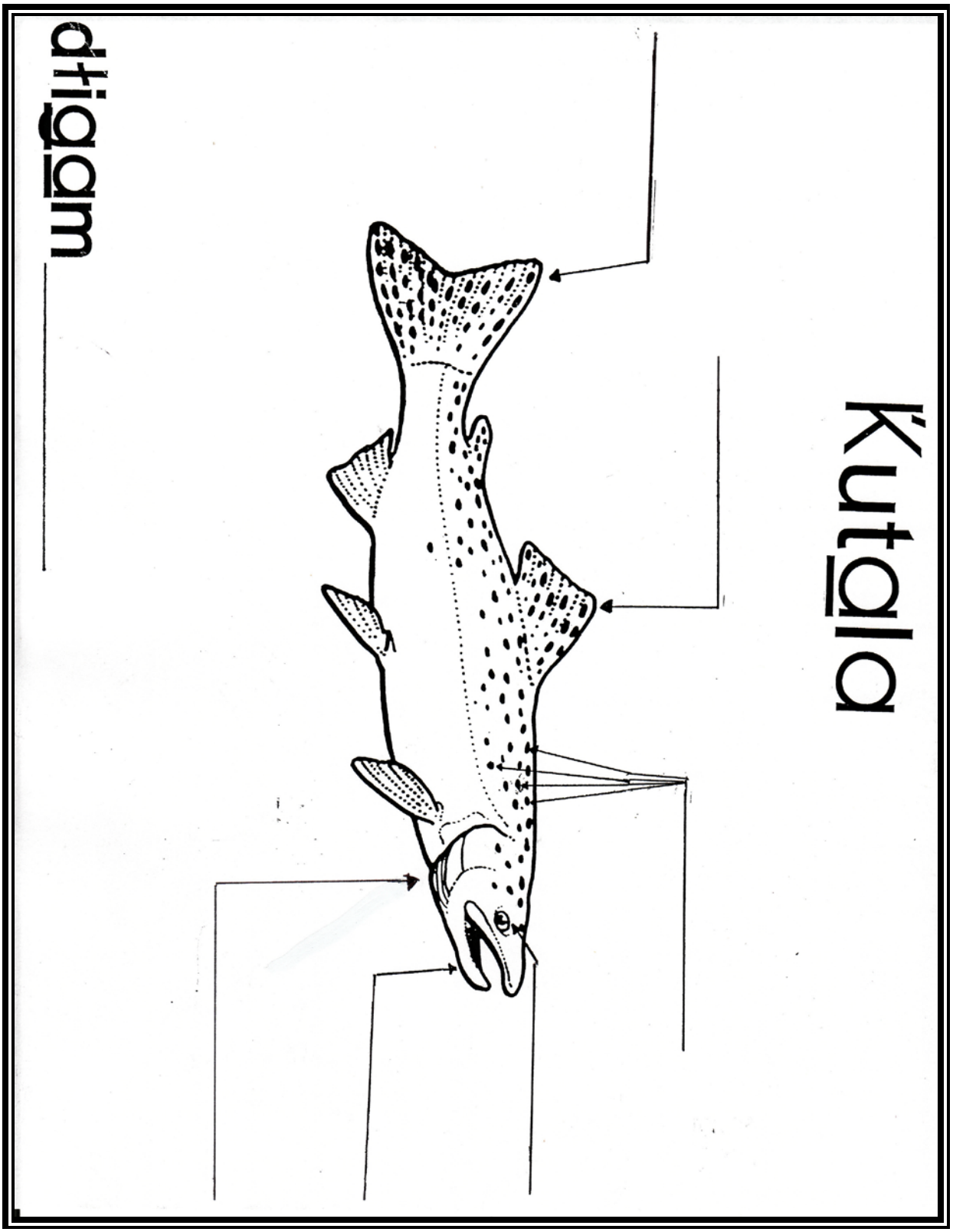


Salmon posters (3 of 5) Gwax`nis (Chum). Government of Canada/Fisheries and Oceans. 1995.

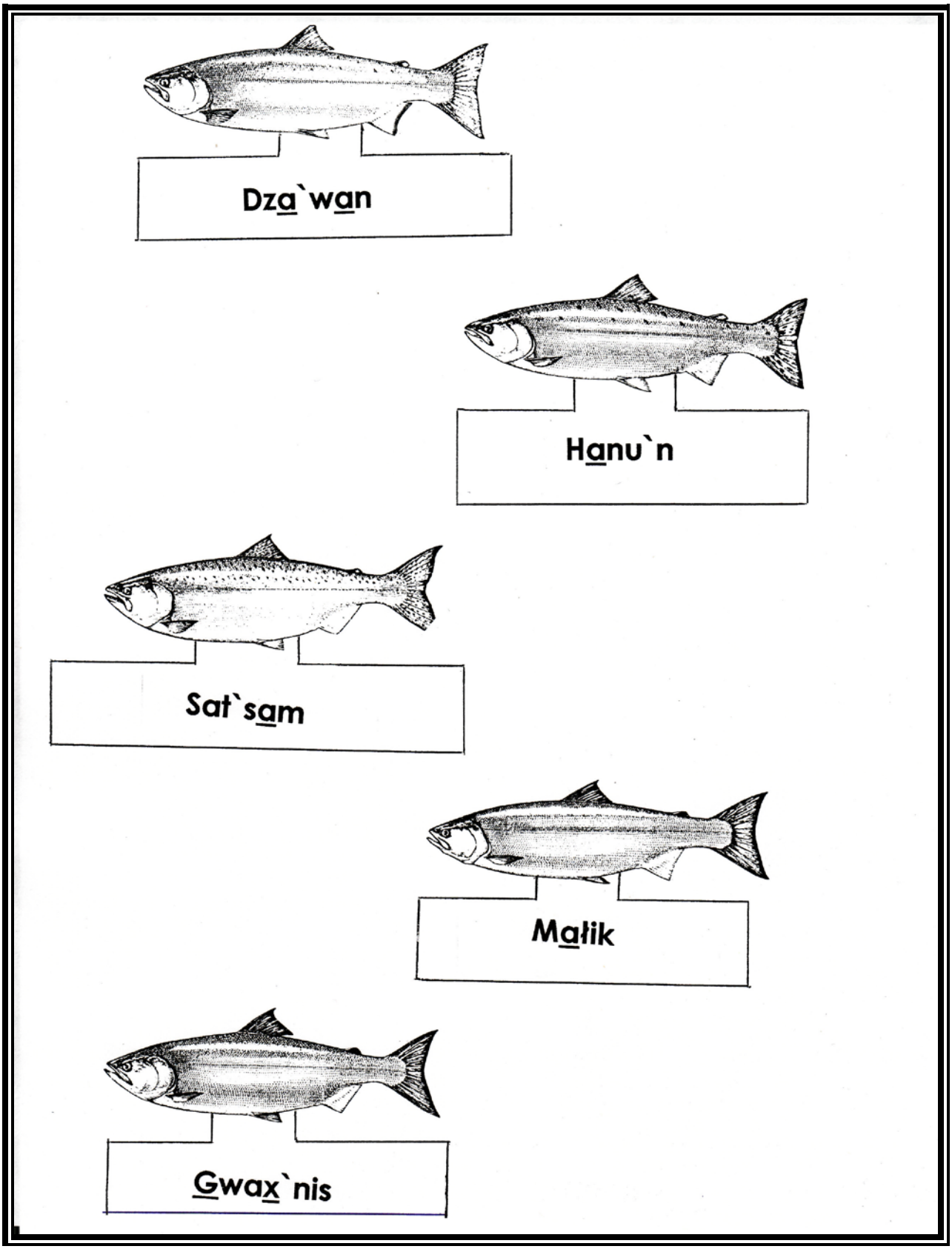


Salmon posters (4 of 5) Mał ik (Sockeye). Government of Canada/Fisheries and Oceans. 1995.

Salmon posters (5 of 5) Sat`sam (Chinook). Government of Canada/Fisheries and Oceans. 1995.



Body Part Identification activity sheet – Drawing by Gloria Alfred 1998



Salmon Finger Puppets – Developed by Gloria Alfred 1998

LESSON TEN: **The Decline of the Pacific Wild Salmon**

Concepts

1. Aboriginal peoples of the Northwest Coast have a way of living with the environment peacefully and respectfully.

2. There is such a significant decline of the Pacific wild salmon, that some stalks are at risk of extinction.

3. There are many factors that are causing the decline of the Pacific wild salmon: over fishing, fish farms, loss of habitat, pollution.

4. There are possible solutions to the decline of the Pacific wild Salmon.

Learning Outcomes

- The students will describe how the basic needs of the Pacific wild salmon are met in their environment.

- The students will describe some changes that affect the Pacific wild salmon.

- The students will demonstrate awareness of the Aboriginal concept of respect for the environment.

- The students will observe and list through guest speakers, films, and data; the several reasons why there is a decline to the Pacific wild salmon.

- The students will become more familiar with the Aboriginal peoples of the Northwest Coasts' way of living with the environment.

Materials

- Guest speakers –Mrs. Vera Newman, Mrs. Gloria Cranmer/Webster, Mr. Arthur Dick Sr, Mr. Stevie Beans.

- The DVD "T`łina – The Rendering of Wealth".

- Reserve the video, "Protect our Wild Salmon – Say No to Fish Farms".

- Chart paper

Kwak`wala Vocabulary

K`utala - fish

Gilakas`la - welcome

Preparation

- ✓ Review the DVD, "T`łina – The Rendering of Wealth" and mark the sections that specifically talk about how the Aboriginal peoples of the Northwest Coast took care of the environment as well as the sections that show some of the effects that is causing the wild salmon to decline.
- ✓ Phone guest speakers well in advance to this activity explaining that you are studying the salmon and that it would be great if s/he could relate his/her knowledge and expertise on his/her specific subject (respect for the environment, causes to the salmons' decline, etc…) to the students in your class. A week before the guest speaker is expected to speak send a notice to him/her to confirm the date and time.

Teacher Information

There are several factors that are the culprits to the decline of the Pacific wild salmon. The hardship that a salmon has to endure on its' natural journey to and from the ocean is one already filled with danger. Then add in the human factors which affect the wild salmon. No wonder the Pacific wild salmon is on the verge of extinction.

The Pacific wild salmon do not feed once they leave the ocean, several will die on their journey because they haven't stored enough body fat to make the trip. Many will be caught in **fishermen's nets**. Those that evade the nets may have to swim through **polluted waters** near cities. Many must make their way over **power dams**, leaping up from one tiny pool to the next along cement stair step cascades called **fish ladders**. In the tributary streams, waterfalls and rapids are steep and swift enough to eliminate all but the strongest. **Otters**, **eagles**, and **bears** stalk the salmon in shallow riffles. Once on the spawning grounds, the fish battle each other: females against females for places to nest, males against males for available females.

Pacific salmon encounter increasing human-caused hazards in their migrations to and from spawning grounds. All salmonids require pure, well-oxygenated cold water and are one of the first species to suffer when water quality is degraded. Many salmon stocks are seriously threatened by what are called the "four H's": **Habitat destruction**, (clear-cut logging), **Hydroelectric dams**

on migratory rivers, **over-Harvest** of rare stocks, and competition with **Hatchery fish** (specifically farmed-fish).

Some stocks are so severely reduced that they have been listed as endangered or threatened species under the Endangered Species Act. Endangered means they are likely to become extinct. Threatened means they are likely to become endangered in the near future.

A 1991 report by the American Fisheries Society indicated that 214 of about 400 stocks of **salmon**, steelhead, and sea-run cutthroat trout in the Northwest and California are at risk of extinction. The report also indicated that 106 are already extinct. www.fws.gov/species/species_accounts/bio_salm.html.

In 1878 the federal **Fisheries Act** was created, limiting the Indian fishery to harvesting for food, ceremonial or social purposes. Despite their subsistence harvest rights, the 'Namgis were prohibited from using their traditional Gwa'ni fisheries, also on the sections of the river that flowed through their reserves. A system of licenses for fishing was imposed by the federal government in 1910 whereby only canneries and white fishers were eligible. An estimated 46,000 - 82,000 "Nimpkish River" sockeye salmon along with large numbers of Chinook salmon from Gwa'ni were processed annually by the Alert Bay Canning Company (left) from the early 1900s until its closure in 1931. In 1914, 'Namgis Chief Legeuse protested over the exclusive fishing rights given to the Alert Bay Canning Company. See: McKenna McBride Report (Union of BC Indian Chiefs). Later the company was taken over by BC Packers Association, the biggest

salmon cannery in British Columbia. The industrial logging of 'Namgis Territory did not benefit the 'Namgis. The enormous company profits were not shared nor were the 'Namgis compensated for bad logging practices which resulted in debris torrents and massive silt slides caused by **clearcutting** steep slopes, logging too close to streams and inadequate road maintenance. Tree Farm License 37 is currently held by Western Forest Products which harvests about 950,000 cubic meters of second growth timber each year from Gwa'ni. The history of the deforestation of the Gwa'ni watershed began in 1917 when an American built a lumber and pulp company at Beaver Cove, an estuary just south of Gwa'ni in 'Namgis Territory. In 1925 another lumber company was built at the nearby Englewood, which was bought in 1938 by Canadian Forest Products (Canfor). In the 1930s, the BC Forest Service documented the so called "Natural Reproduction" of the Gwa'ni (Nimpkish) watershed. 'Namgis elders warned that the logging of the forests too close to the edge of Gwa'ni would result in the destruction of the salmon but were powerless to prevent it. During this period, repressive government policies even prohibited 'Namgis fishers from operating drag seine nets on Gwa'ni (Nimpkish River).

Fisheries management policies imposed by Canada from the 1960s onward have been designed to drastically reduce 'Namgis participation in the commercial fishing industry. These policies have favoured large fishing corporations, the commercial sport fishing industry, and multi national owners of environmentally destructive salmon farms [which are] polluting the sea with

chemicals, feces, and masses of sea lice. Local salmon stocks that are already under pressure from impacts of industrial logging are now no longer able to also survive harvests.http://www.firstnations.eu/fisheries/kwakwakawakw-namgis.htm

Procedures

1. Have a discussion with the students regarding what is happening to the wild salmon. List their responses onto chart paper.
2. Ask them focus questions such as, "Why is this decline happening now – why didn't it happen before?", "What was different before for the wild salmon to co-exist with humans?" etc…
3. Prior to viewing the DVD, "T`łina – The Rendering of Wealth", focus the students by asking them one or two questions related to the specific topic of the decline of the Pacific wild salmon, such as, "What were some reasons that were stated on the DVD that possibly caused damage to the fish?" "I wonder why Mr. Roy Cranmer said that maybe it was better off that the Fisheries did not know of this area?" Or you could have them look for certain speakers who mention factors that have caused in part the decline of the Pacific wild salmon.
4. Show the students the DVD, "T`łina – The Rendering of Wealth".
5. Inform the students that there will be a guest speaker (Mrs. Vera Newman, Mrs. Gloria Cranmer-Webster, Mr. Stevie Beans, or Mr. Arthur Dick Sr.) today speaking on how the Aboriginal peoples of the Northwest Coast co-existed with the environment and all that is in it.

6. Have the students think of questions that they will want to ask the guest speaker in regards to this specific topic. Write these on the blackboard.
7. Have the guest speaker present his/her speech.
8. Have the students ask the guest speaker the questions they brainstormed prior to the guest speaker's arrival.
9. Make a list on chart paper detailing what they learned from the guest speaker.

GUEST SPEAKERS NOTICES (2)

_____, 2010

Dear _____,

Our class is studying "Salmon" for this month and would be honored if you would accept our invitation to participate in our learning experience**.** We would appreciate it if you were able to come into our classroom to share your knowledge and expertise on **Native ways of showing respect for the environment**. Your knowledge and wisdom will benefit the students understanding on how they should conduct themselves in relationship to the environment. We would like to humbly thank you in advance and express our appreciation because without people like yourself, our children might never experience what you have to offer.

We are hoping you can visit us on _____, 2010 at _____A.M. We will pick you up prior to schedule time and safely return you back home after your presentation.

Sincerely

(Teacher's name)
(Classroom)

_____, 2010

Dear _____

Our class is studying "Salmon" for this month and would be honored if you would accept our invitation to participate in our learning experience**.** We would appreciate it if you were able to come into our classroom to share your knowledge and expertise on **the causes of the Pacific wild salmons' decline**. Your knowledge and wisdom will benefit the students understanding which will led them in the direction of positive action. We would like to humbly thank you in advance and express our appreciation because without people like yourself, our children might never experience what you have to offer.

We are hoping you can visit us on _____, 2010 at _____A.M. We will pick you up prior to schedule time and safely return you back home after your presentation.

Sincerely

(Teacher's name)
(Classroom)

Environmental Impact Chart

ENVIRONMENTAL IMPACTS ON SALMON	
IMPACTS	**EFFECTS**
Fish Farming	*Sealice infestation/salmon migratory routes affected*
Global Warming	*Water too warm to reproduce*
Logging	*Damaged spawning beds/river banks being washed away*

Environmental Impacts chart developed by Gloria Alfred, 2009.

LESSON THIRTEEN: **Reviving the Pacific Wild Salmon**

Concepts

1. There are strategies that we as individuals can implement which can reverse the decline of the Pacific wild salmon.

2. The Aboriginal peoples of the Northwest Coast have re-incorporated fishing practices and techniques that will enhance the wild salmon.

3. The Gwa`ni Hatchery have developed a process to enhance the Pacific wild salmon as close as possible to the natural process.

4. Fertilization of the Pacific wild salmon eggs are being aided by the Gwa`ni Hatchery because of the decline in natural fertilization.

Learning Outcomes

- The students will identify and describe fishing practices and techniques that are being practiced by Aboriginal peoples that will enhance the Pacific wild salmon.
- The students will identify and describe the stages of development of the wild salmon
- Given a set of photographs, the students will organize the photos in order according to the stages of development of fish hatchery salmon.
- The students will observe and participate in reviving the wild salmon.

Materials

- ❖ Field trip notices for the class to participate in and observe the `Namgis First Nations Gwa`ni hatchery crew fish and conduct the first procedures of enhancing the Pacific Sockeye salmon at Woss Lake.
- ❖ Guest speakers, Mr. Henry Nelson and/or Mr. Phillip Alfred, Mr. Roland Emery.
- ❖ Chart paper
- ❖ Drawing paper
- ❖ Pencils & coloring pens

K`wak`wala Vocabulary

K`utala	- fish
Gwan`i	- name of our river
K`ama	- fry
Gi`ni	- salmon eggs
Xwilawa	- fertilization

Dzalak- spawning salmon

Preparation

- ✓ Send out the field trip notices at least two weeks in advance. The students will need to dress warm, and they will need a touque and gumboots.

- ✓ Phone or email Mr. Henry Nelson and/or Mr. Phillip Alfred asking them to come to the class to do a presentation on the strategies that are being used to enhance the Pacific wild salmon. Invite them to use film, slides, and/or pictures to assist with their presentation.
- ✓ Phone or email Mr. Henry Nelson and /or Mr. Phillip Alfred requesting permission to participate in a field trip to Woss Lake during their Sockeye retrieval and enhancing process time.
- ✓ Reserve a TV, and/or a slide projector for the use of the guest speakers presentation.

Teacher Information

Standing at the bow of a traditional 'Namgis dugout canoe carved from an ancient cedar tree, Chief Cranmer delivers an eviction notice to fish farm owners Stolt Sea Farm Group and Heritage Salmon Company (now Pan Fish of Norway) as part of a First Nations demonstration against aquaculture in the Broughton Archipelago on 11 February, 2003.
http://www.firstnations.eu/fisheries/kwakwakawakw-namgis.htm

This was one small stance taken by the Aboriginal peoples of the Northwest Coast to stop the destruction of the Pacific wild salmon and to begin travelling the road to recovery and sustainability. There are many people on the coast, Native and non-Native fighting to keep the wild salmon alive. There are several individuals who see the results of what many years of deforestation, fish farming, and climate change has done to the wild salmon and they personally find the need to assist in reversing the damage. People like Alexandra Morton, who has made it her purpose to fight for the Broughton Archipelago; Ray

Bentley and his son Ray Lutz who are re-stocking the rivers with enhanced salmon using their own funds; as well as many more volunteers who are willing to take the time and effort to make a change. Although their voices are not making much of an impact against the much louder and forceful multi-nationals whom the local government has joined hands with, they are starting to see some small but significant progress.

The `Namgis First Nations is actively involved in participating in **environmental impact assessments** for projects located in their territory. Traditionally, outside interests control environmental impact assessments (EIA). The EIAs typically cover a narrow 'footprint' directly occupied by proposed project activity. By gaining an equity share of economic development projects, the 'Namgis can take a better approach to the EIA process. http://nativemaps.org/node/2769

Several local Native **hatcheries** up and down the coast are working diligently on reviving the salmon stocks. However, because the majority of these hatcheries are tied in with the Department of Fisheries for funding, which of course is controlled by government, the hatcheries are constantly being downsized and their objectives minimized. The DFO has input into what a hatchery is permitted to enhance, and how much they can enhance. The hatcheries are caught in a catch 22 – they need money to operate successfully,

but cannot operate successfully because the one (Department of Fisheries) controlling the money bags is holding them back.

The **Gwa`ni Hatchery** crew begin concentrating of the Pacific wild salmon in the summer, doing river and stream assessments, locating the spawning salmon as they return to their habitats. Once located, the crew then begin the process of catching the salmon without harming them. This takes much time and careful attention to how they handle and hold the live salmon until they are ready to spawn. After closely monitoring the female salmon by checking the belly to see if they are ready to release their eggs on a daily basis, the crew quickly sets up a station for retrieving the eggs from the female salmon.

With careful precision, sterilized equipment, and stealth, the crew sets into motion the process of cutting the belly anus up releasing the eggs into a bucket. While one crew is busy with the eggs, there is another crew fighting with the male salmon to obtain the milt which will be used to fertilize the eggs. Once the crew member have a good hold on a male salmon, they use their hands and squeeze from the front of the belly to the anus, squeezing out the white liquid. The male salmon get thrown back into the raceways to live another day because they can produce more milt.

When there is adequate amount of eggs and milt, the crew speedily carries the buckets inside the hatchery building and fertilizes the eggs by adding the milt, mixing them together and then rinsing the bowl of fertilized eggs with

water. When the eggs have been safely transplanted into heath trays (eight trays to a stack), then it's a waiting game, making sure the water is flowing through the trays on a continuous basis, the temperature is balanced, and constantly being checked for fungus or other diseases that will destroy the tray possibly the whole stack. The whole fertilization process takes approximately six months depending on the species and monies. When the eggs have safely grown into smolts, the length of time they are held at the hatchery will be determined by the amount of monies is allocated to spend of feed.

The **Treaty process** is another tool being used by Aboriginal people to gain control over their lands and resources. It is bringing hope to the people of the `Namgis because the process is an opportunity for the 'Namgis people to assert power over their lives and the life of their community**.** It is an opportunity for us to exercise our economic power by setting the rules for resource development in our traditional territory – enabling us to protect those resources that are sacred, and to harvest those that we need for our own prosperity. The treaty process is an opportunity for us to finally and fully take our rightful place as one of Canada's First Nations – to share in all the benefits of living in this prosperous country, but do so in a way that honours the traditions, the spirit and the values of 'Namgis. http://www.namgis.bc.ca/TREATY/Pages/ChiefsMessage.aspx

Procedures

1. Read the description Chief Bill Cranmer delivering an eviction

notice to fish farm owners. Ask students questions that will get them focused on the information box, such as, “Why do you think the Chief delivered his message in a canoe?”, or “What possible solutions do you think came of this message?”

2. Have a discussion with the students as to how we as a group or school can help revive the Pacific Northwest Coast wild salmon.

   Explain in such a way that the students feel hopeful and optimistic.

   On chart paper list their responses.

3. Inform the students that there are several Aboriginal peoples all along the Northwest Coast who have started procedures to enhance the Pacific wild salmon stocks. You can talk about our local hatchery, the Quatsino hatchery and the Quinsam hatchery. You could also include individuals such as Alexandra Morton, Ray Bentley, Ray Lutz, etc… who have taken the role of reviving the salmon upon themselves with no assistance from the government.
4. Inform the students that there will be a guest speaker (Mr. Henry Nelson and/or Mr. Phillip Alfred) today speaking on how the Aboriginal peoples of the Northwest Coast, specifically our local territory, are taking the initiative to revive the stocks of the Pacific wild salmon.
5. Get the students to think of questions that they will want to ask the guest speaker in regards to this specific topic, such as, “What salmon do you select to enhance, why?”, or “Why do you think enhancing the wild salmon is better that letting the wild salmon go through its’ natural process of the lifecycle?”, or “When you enhance a salmon species does the salmon then think the hatchery

to be its' birth place and will want to come back to it at the end of its' cycle?", etc…

6. Have the guest speaker conduct his presentation, with the students asking the guest speaker the questions they thought of relating to the topic that was introduced.
7. Make a list on chart paper of what the students learned or found interesting from the guest speaker.

Enrichment Activity

The students will take a day field trip to the Woss Lake to observe the process of enhancing the wild salmon.

Activity 1

The day prior to the field trip to Woss Lake, get the students in groups of two or three and bring each group into the kitchen to participate in making soup and desert for the Gwa'ni hatchery crew who will be taking the time to demonstrate the process of catching the salmon and enhancing the salmon. You, the teacher can either be the one in the kitchen supervising and have your assistant stay with the rest of the class working on an activity, or visa versa. One group can peel the carrots and potatoes. The next group can cut the carrots and potatoes. Another group can cut the meat. You can get the next group to assist in making buns or tea biscuits. Then you can have the last group making dessert such as rice krispee squares, or cookies.

On the day of the field trip make sure you pack all the essential tools you will need to serve the food to the crew and students, such as bowls, spoons, knives, butter, salt, pepper, napkins and a serving ladle. It is also a good idea to bring a thermos or two of hot chocolate for the students to sip on.

Activity 2

Have the students sit down and draw a picture of what they are observing using drawing paper and a pencil. It is important for each student to show you his/her picture and explain in some detail what they have drawn. For the younger grades, if you have the time you and your assistant can label some of the students' drawings. For example, if the student says that one part of his/her sketch is a fish, print fish close to the sketch that the student indicated. Or you can split them into groups of two and get each group to draw a specific step.

FIELDTRIP NOTICE

_____, 2010

Dear Mr. Nelson/Mr. Alfred,

Our class is studying "Salmon" for this month and would like to **visit the Gwan`i Hatchery** to observe and participate in enhancing the wild salmon**.** Your knowledge and expertise in this specific area will benefit the students understanding on the process of reviving the wild salmon stocks.

We would like to humbly thank you in advance and express our appreciation to you and your crew because without people like yourself, our children might never experience what you have to offer.

Our tentative date will be _____, 2010 at _____A.M.

We have (number of students) in our class, each eager and anxious to participate in this hands-on experience. We will leave on the 9:35A.M. ferry and will catch the 2:20P.M. ferry back to Alert Bay. Thus you will have three fun-filled hours of our undivided time.

Sincerely,

(Teacher's name)

(Classroom)

GUEST SPEAKERS NOTICES

_____, 2010

Dear Mr. Henry Nelson or Mr. Phillip Alfred,

Our class is studying "Salmon" for this month and would be honored if you would accept our invitation to participate in our learning experience**.** We would appreciate it if you were able to come into our classroom to share your knowledge and expertise on **what strategies are being implemented to enhance the Pacific wild salmon.**

Your knowledge and wisdom on this specific subject will benefit the students understanding on the steps that are being used to increase the wild salmon stocks.

We would like to humbly thank you in advance and express our appreciation because without people like yourself, our children might never experience what you have to offer.

We are hoping you can visit us on _____, 2010 at _____A.M. We will pick you up prior to the scheduled time and safely return you back home after your presentation.

Sincerely,

(Teacher's name)

(Classroom)

Alert Bay Indians fishing on the Nimpkish River. BC Archives. (no date)

Reviving the Pacific Wild Salmon Chart

Charts developed by Gloria Alfred, 2009

REVIVING THE PACIFIC WILD SALMON	
What are some things that are killing the salmon?	**What are some thing that we can do to stop the killing process?**

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The Enhancing Process Chart

THE ENHANCING PROCESS		
	WHERE DOES THIS OCCUR? HOW? WHEN?	HOW LONG DOES THIS PART OF THE PROCESS TAKE?
SCOUTING FOR FISH		
MAKING A SET TO CATCH THE SALMON		
SEPARATING THE FEMALES/MALES		
TAKING THE EGGS FROM THE FEMALES		
MILTING THE MALES		
ACTIVATING THE EGGS		
INCUBATION		
EYED EGGS		
ALEVIN		
FRY		
SMOLT		

RELEASE		

The Enhancing Process Chart developed by Gloria Alfred, 2009.

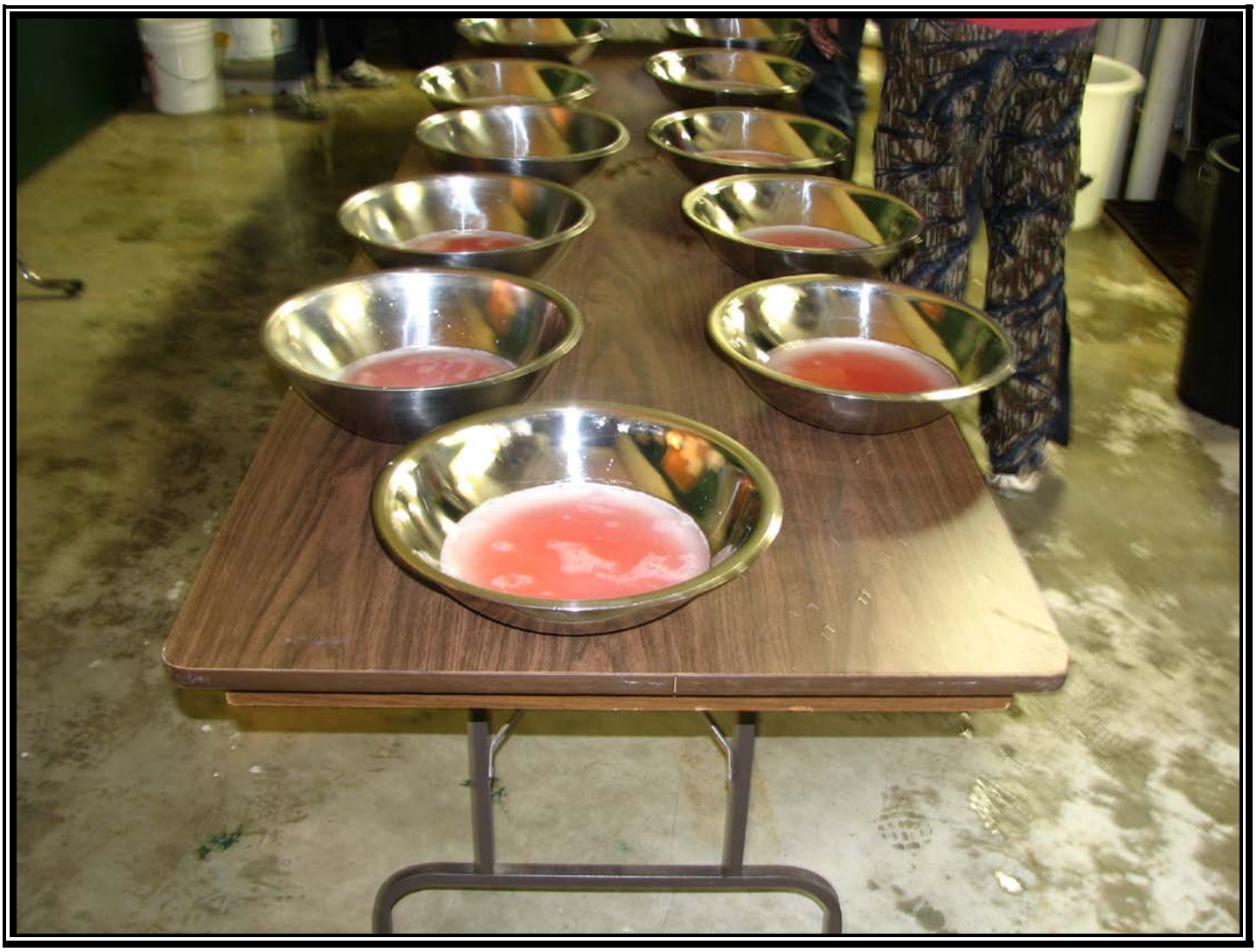
The Gwa'ni hatchery crew making a set to catch the salmon at Woss Lake. Photo taken by Gloria Alfred

2008.

One of the Gwa`ni hatchery crew hanging the female salmon to bleed out. Photo taken by Gloria Alfred, 2008.

The Gwa`ni hatchery crew stripping the eggs from a female salmon. Photo taken by Gloria Alfred, 2008.

The Gwa`ni hatchery crew milting the male salmon. Photo taken by Gloria Alfred, 2008.



The Gwa`ni hatchery crew mixing the milt and eggs together to activate the eggs. Photo taken by Gloria Alfred, 2008.

Appendix D – Student Permission Slip

Student and Parental Consent

Gloria Alfred
P.O. Box 463
Alert Bay, B.C.
V0N 1A0

Parent Advisory Council (PAC)
T`lisalagi`lakw School
Box 50
Alert Bay, BC
V0N 1A0

RE: The development and evaluation of "The Salmon - the Lifeline to Our Kwakwaka`wakw Culture" Curriculum Project

Dear Parent:

Your child has been invited to participate in a study entitled "Salmon - the Lifeline to Our Kwakwaka`wakw Culture" that is being conducted by Gloria Alfred.

This project stems from research conducted by the Ministry of Education. The evidence points to the fact that in British Columbia high schools the majority of students of First Nations ancestry do not participate in the sciences. Although the Ministry of Education has recently mandated that examples of Aboriginal science be included in the K - 7 classroom, very little curriculum exists and little research has been conducted. This study can potentially facilitate the inclusion of Aboriginal science knowledge into mainstream thinking and therefore, inform teachers, students, community, and education systems.

Gloria Alfred is a Graduate Student in the Department of Education at the University of Victoria and you may contact her by phone at the T`lisalagi`lakw School (250-974-5591) or by email (galfred@namgis.bc.c.a) if you have further questions.

As a Graduate Student she is required to conduct research as part of the requirements for a Masters degree in Education. It is being conducted under the supervision of Dr. Gloria Snively at the University of Victoria (250-721-7764) or (gsnively@uvic.ca) and Dr. Lorna Williams at the University of Victoria (lwilliams@uvic.ca). You may contact either of her supervisors if you have any questions or concerns.

In general, the purpose of this study is to develop, pilot test and evaluate a traditional science curriculum for grades K – 5 that focuses on the importance of salmon both as a resource and as a cultural symbol to the K`wakwaka`wakw people. It is to develop awareness and understanding of the environmental impacts that affect the salmon, which, in turn will affect the people of the

Northwest Coast. The purpose is to also develop and evaluate cross-cultural science units of study that guide students to explore both traditional Native knowledge and western science knowledge related to salmon.

Research of this type, is important because educators have a responsibility to learn how to best teach their students about their community and environment. Mrs. Alfred would like the students to experience science from both a traditional Native perspective and a western science perspective.

If your child agrees to voluntarily participate in this research, their participation will include: (1) partaking in the pilot testing of this newly developed Kwakwaka`wakw science curriculum over one month, (2) video taping during their involvement of the pilot testing, (3) informal classroom discussion of Aboriginal science knowledge prior to and after instructional input and (4) examination of students completed work. These copies will be strictly confidential and his/her name will not be used. I WILL REITERATE TO THE TEACHERS AND STUDENTS AT EACH SESSION THAT ON-GOING CONSENT IS VOLUNTARY AND THEY ARE FREE TO WITHDRAW. I WILL ALSO REGULARLY REVIEW MAIN ASPECTS OF THE RESEARCH WITH EACH PARTICIPANT GROUP.

Mrs. Alfred is a teacher in the T`lisalagi`lakw school and this research is taking place only in the T`lisalagi`lakw Elementary school. Mrs. Alfred will take part in grading these students with input from the Elders and the teachers that are involved.

There are no known or anticipated risks to teachers or student from participating in this research. Their participation in this research must be completely voluntary. If they decide to participate, they may withdraw at any time without any explanation. If they do withdraw from the study their data will not be used. ALL STUDENTS WILL RECEIVE THE MANDATED CURRICULUM EVEN IF THE PARENT DOES NOT PROVIDE CONSENT FOR THE RESEARCHER TO USE THE INFORMATION GATHERED IN THE CLASSROOM. To make sure that you continue to consent to participate in this research for the review of transcripts, I ask you to check the box below for ongoing consent.

In terms of protecting your child's anonymity, pseudonyms will be used to refer to their name. As there will be limits to participant's confidentiality due to the nature and small size of the sample, the researcher will change your child's name in an effort to protect their identity.

To secure your child's confidentiality, all audio taped and video taped interview data will be stored and secured in password protected computer files. The audio taped interview data will be erased after being transcribed by the researcher and verified for accuracy by the Principal/guardian. I will provide the `Namgis First Nation with data that they will archive and any data in my possession will be destroyed. THE T'ɬISALAGI'LAKW SCHOOL WILL ALSO BE MENTIONED IN THE FINAL REPORT.

It is anticipated that the results of this study, including video tapes, will be shared with others in the following ways: (1) a report to the `Namgis First Nation, (2) a report to the

principal of the T`lisalagi`lakw School,(3) and a M. Ed document that will be stored in the McPherson Library at the University of Victoria.

In addition to being able to contact the researcher and her supervisor at the above phone numbers, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the HUMAN RESEARCH ETHICS OFFICE at the University of Victoria by phone (250-472-4545) or email (ethics@uvic.ca).

Your signature below indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

Thank you for your help with this study.

[Consent by parent/guardian and student]