Squamish Streams Around the Corner

Grades: 4-7

Subject, Science, Language Arts

Time required:30 –60 minutes

Key Concepts:

Everyday actions make a difference in watershed and estuary health..

Objectives:

To identify local streams and protected areas

To use research, mapping and interviewing skills;

use a variety of ways to collect and record data;

Key Words:

water

Streams, protected areas

Skills:

Analysis, discussion, listing, writing/ drawing

Background:

In British Columbia, there are many different types of protected areas. They include public lands in networks of national, provincial and regional parks, wildlife management areas, recreation areas, wilderness areas, ecological reserves, nature sanctuaries, greenways and municipal parks, cultural heritage sites, heritage buildings and more. They also include areas that are protected but not owned by the public but are protected by a range of federal, provincial or local regulations. These types of protected areas include local areas such as water-courses (rivers, streams, lakes, ponds, wetlands) and their riparian (streamside) areas, environmentally sensitive areas, and other areas of noted local importance.

Materials

- Maps

(community & school)

- Student Journals
- Pencil or pen

Squamish Streams Around the Corner

Protected areas range in size from vast expanses of wilderness areas to tiny pockets of nature covering a few hectares or less. Together, protected areas on public and private lands provide ways to protect natural ecosystems such as streams as well as to enhance and restore local natural areas.

As students study their community map, they will find streams nearby. Visiting these areas will increase their knowledge and may lead to active involvement in caring for these streams and the organisms that live there.

Procedure:

1. As a class, brainstorm as many different kinds of protected areas that might be found nearby the school. Use the students' list to locate all of these places on a community map. Some of these areas may include: rivers and streams, parks and green spaces, and trails.
2. Go to the map folder of the teacher CD and find the map of your school. Hand out the map to students. In groups of two or three, ask them to find local landmarks and then to find examples of parks, streams/rivers, green spaces and trails on their map.
3. Discuss different ways that they could find out more about their local stream or protected area. This might include making observations, interviewing people, reading newspaper clippings, pamphlets or historical records, and studying photographs and memorabilia.
4. Ask each group to brainstorm a list of places and people in their community that might be able to help them answer the following questions about their stream:
    - What is protected here?
    - Why is it protected?
    - Who or what is it protected from?
    - How is this place protected?
    - What are the costs (monetary and other) of protecting this place?
    - What are the costs (monetary and other) of *not* protecting this place?
5. Organize a walking field trip to the local stream or river. On the field trip day, visit the site and ask them to take their journals and write about:
    - what they see, hear, feel and/or smell at the site
    - how they feel visiting the site.
5. Back in class, ask students to present their findings. The conversation might center around what surprised them most at the site they visited. Challenge them to discuss the questions listed above.

Extensions:

1. Ask students to write a short sentence or poem (such as a haiku) which sums up what they learned about the stream they visited.

Evaluation:
Have students describe the stream or river nearby the school and why it is important to protect it.

Resource:
This activity has been adapted from "Protected Areas around the Corner" from Protected Areas (1995). Available from Wild BC. www.wildbc.org

Taking it home:
Go visit the stream or river closest to your house – can you find out its name?

References:

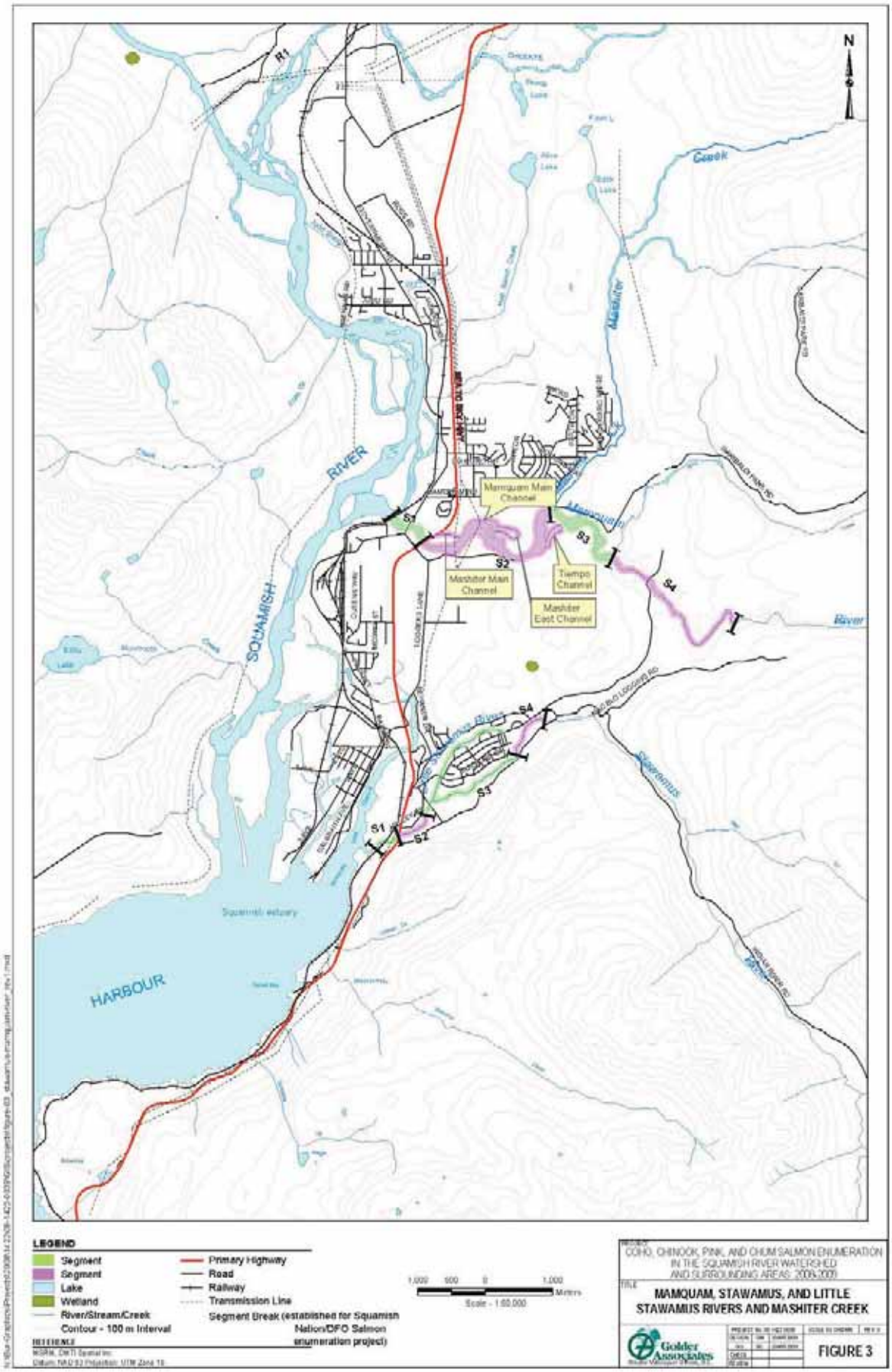
Blair Whitehead, DG (Ed.). 2002. Protected Areas: preserving our future. 2nd edition. Available from Wild BC http://www.wildbc.org

Bouchard, Randy and Dorothy Kennedy. 2007.Aboriginal History of the Squamish Nation. For the Squamish Nation, Squamish. BC

District of Squamish. Community Mapping data http://www.squamish.ca

Golder Associates. 2007. Report on the Conceptual Management Plan for Site "A" of the Squamish Estuary. For the Squamish Nation, Squamish, BC

Staniforth, Sue. 2009. Get Outdoors!: an educators guide to outdoor classrooms in parks, schoolgrounds, and other special places. Available from Wild BC www.wildbc.org



Source: Golder Associates

Taking it Home…

Name: _____

Go visit the stream or river closest to your house.
What is the name of the river or stream?

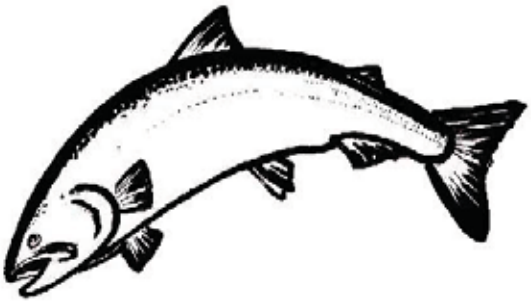
What type of fish do you think live there?

Did You Know??

Local streams and rivers are important habitat for the four most common species of salmon that live in our watershed.

These fish have been a traditional source of food for thousands of years to local First Nations.

Squamish Nation elders recalled that around 1900, the chum salmon were so thick in the Squamish River around Brackendale that it was apparently possible to "cross the water on their backs."!!! Wow, that is a lot of fish!



Watershed Food Fest

Grades: K-7

Subject, Science, Language Arts; Social Studies

Time required:30 minutes research; 60 minutes cooking & eating

Key Concepts:

Everyday actions make a difference in watershed and estuary health.

Objectives:

It is expected that the student will:

- Learn about a variety of foods that grow in their watershed (native and non-native);
- Appreciate the importance of water and watersheds in lifestyle choices;

Key Words:
Decision-making; sustainability; native plants; First Nations

Skills:
discussion; research; communication;

Background:

Today most of our food comes off the farm, often from far outside our own watershed. However, there are many plants and animals that grow, often wild, in our watersheds.

First Nation peoples make use of these foods to sustain their culture. Plants that grow wild naturally are called "native plants." These plants are adapted to live in a particular biogeoclimatic zone. Plants that have been introduced to an area but then self-seed are "naturalized" plants. These plants can also be "wild" foods of a watershed.

In British Columbia, we can look at foods that First Nations peoples traditionally used to gain an understanding of what foods are native to watersheds in British Columbia. While the traditional aboriginal diet of the Coastal peoples relied heavily on protein: fish, shellfish, and sea mammals, coastal peoples also have extensive knowledge of native plants, using over 200 species for food, medicine and other purposes.

In the Squamish watershed, the Squamish First Nation have been harvesting and eating native foods for well over 4,000 years. They have an expression: "when the tide is out… the table is set." This refers to how

Materials

- Research materials
- Native Plant foods
- Local food samples

Watershed Food Fest

Background continued:
important the food fishery is to their traditional diet. This continues to be true today.

Traditionally, the Squamish First Nation ate animal foods such as chum and Coho salmon (dried and fresh), herring spawn, clams, deer, goat, or other game animals as the mainstay of their diet. However, greens (shoots, stalks, young plants) and other vegetable dishes were eaten daily and provided necessary vitamins and minerals. Greens such as roots and bulbs were often prepared in steaming pits. Pit ovens can retain heat for several hours before cooling and are very efficient for preparing large quantities of foods. People also prepared foods such as soups and stews with meat or fish and vegetable combination using baskets and more recently kettles or pots. Drying berries and other fruits was an important way to preserve them for later use. Sometimes berries would be cooked first and then dried into berry "cakes." People ate dried berries and berry cakes such as the way modern people eat raisins or other dried fruit.

The basic types of food plants gathered and prepared fall into several categories: fruits (especially berries), green vegetables (sprouts, leaves, seaweeds), mushrooms, underground parts of plants (roots, bulbs, rhizomes) and cambium from certain trees. One component of the traditional aboriginal diet that was in short supply: carbohydrates. In many areas, due to the lack of food sources for carbohydrates, this part of the diet was replaced by animal fats and oils. Plants that provided edible roots, rhizomes, and bulbs were scarce and often seasonal. Sometimes however, these products would be soaked overnight in water to plump them up prior to eating.

Today, we have growing and living in our watersheds a rich diversity of foods. Some foods are native plants and animals, while some have been introduced to our watersheds from elsewhere. We can learn about our local ecosystems and traditional customs using foods as a teaching tool. This is a powerful way to learn about your watershed.

Teaching Note:
Please use caution if exploring your watershed for native plants and be sure plants are identified as edible and safe to handle. Some native plants are extremely sensitive to disturbance: do not disturb sensitive sites.

Procedure:

1. Explain that today we can eat foods from around the world. However, in our own watersheds there is an amazing diversity of plant and animal life.
2. Brainstorm with students the names of plants, animals and foods that grow or could be harvested from their community. You could ask them if they have gone to a local Farmers Market: what did they see or what did their family buy there?
3. Make a list of these foods. Be sure to remember seasonal foods and native plants that may be an important local food.

Watershed Food Fest

4. Review the class food list and choose a menu for your festival. See sample native food plants for menu ideas.
5. Review the Watershed Food Fest by Season diagram. Have student research the plants and animals. Are they native? Introduced? Where do they grow or live? What are some interesting facts about the plants or animals used as food?
6. Prepare food and sample!
7. Wrap up by discussing the choices we make to eat or not eat certain foods. Are they healthy choices for people? What is the impact of our choices for sustainability of our ecosystems? Or our local economy?

Extensions:
Ask students to research the 100 Mile Diet and prepare a menu within the 100 mile radius. Go to http://foodshed.100milediet.org/ for further information and teacher resources.

Evaluation:
1. Ask students to name three native and non-native plants that grow in their watershed.
2. Have students create a mind-map/web with food plants and animals of the Squamish watershed.

Community Connections:
1. Ask the Squamish Nation Education Department to provide a workshop or session on their potlatch or other traditions.

Resources:

Turner, Nancy J. 1987. Food Plants of British Columbia – Coastal Peoples. British Columbia Provincial Museum Handbook: Victoria, BC

References:

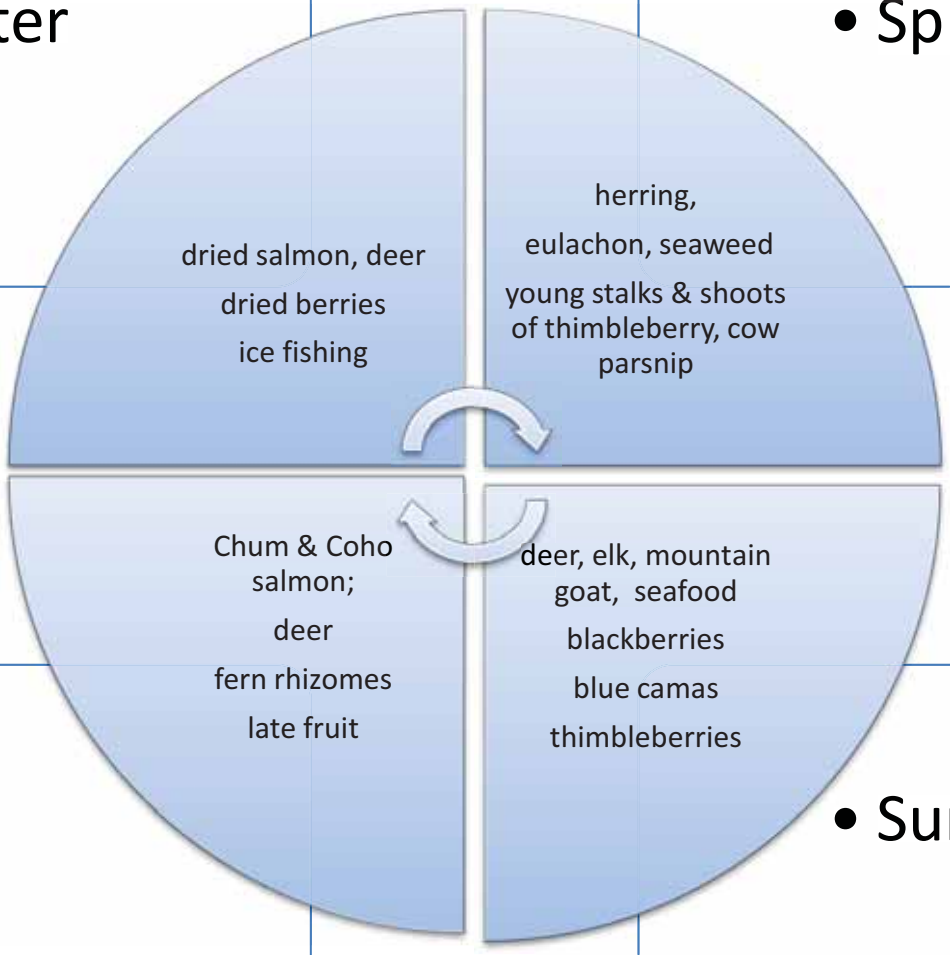
Bouchard, Randy and Dorothy Kennedy. 2007.Aboriginal History of the Squamish Nation. For the Squamish Nation, Squamish. BC

Lewis, Randall. 2009. Personal Communication. Squamish Nation Environment Department

Szczawinski, A.F. and G.A. Hardy. 1975. Guide to Common Edible Plants of British Columbia. BC Provincial Museum, Victoria, BC

Traditional Squamish Food Fest by the season

- Winter
- Spring



- Fall
- Summer

Some common foods of the Squamish First Nation (with traditional names)

Bracken Fern	sx̲wútl'ekw
Salal	t'ák̲a7
Blue Camas	spánanexw
Elderberry	sts'iwk̲'
Blackberry	sk̲w'élem̓xw
Cow Parsnip	yúla7
Red Cedar	x̲pay̓
Deer	sx̲wí7shen
Salmon	sts'úk̲wi7
Herring	slhaawt'
Elk	k̲'iyí7ch

Some Common Food Plants of Coastal First Peoples

Bracken Fern – sx̱wútl'ekw
(*Pteridium aqulinum*)
This is the largest and most common fern in the Province – it often grows to 2 m tall. The rhizomes, found about 20 cm below ground, were used as a food by most Coastal peoples. They were generally dug during the late fall or early winter and then dried. They could then be roasted in an open fire and then the inner part would be mashed and eaten with fish eggs or oil.

Salal - t'á*k̲*a7
(*Gaultheria shallon*)
Salal berries are probably the most plentiful and widely used fruit on the B.C. coast. All of the Coastal Indian groups used them in large quantities. This thick stemmed shrub usually grows up to 2 m tall and it has hairy, dark blue to black berries. The berries were picked in late summer and eaten both fresh and dried in cakes for winter use. Salal berries are still eaten today, usually in jams or preserves.

Blue Camas - spánanexw
(*Camassia quamash*)
Camas bulbs were an important staple food for many native peoples along the coast. It is usually found in meadows and grassy bluffs and the bulbs were usually dug sometime between May and August, just after the plant flowered. The bulbs were cooked in steaming pits: the pit was dug and lined with rocks and a fire was allowed to burn until the rocks were red hot. The ashes were then removed and then seaweed, blackberry, salal branches, fern fronds or fir boughs were placed in the pit. The bulbs (as much as 45kg at a time!) were then placed on top of the branches, then covered with more branches and finally soil, sand, and old mats. Finally, water was poured in through a hole and the bulbs were allowed to steam for at least one day. The bulbs are soft and sweet when cooked and were eaten dried and also added to a variety of other foods.

Cow Parsnip – yúla7
(*Heracleum lanatum*)
This plant is sometimes called "Indian celery" or "Indian rhubarb" and was used by almost every Indian group in British Columbia as a green vegetable. This plant grows to 1.8 m tall with distinctive very large leaves, and is usually found in wet, open areas such as meadows, ditches, and roadsides. The young stalks and leaf stems were peeled and eaten raw or sometimes boiled.

Stewardship BINGO!

Grades: K-4

Subject, Science, Language Arts

Time required:30 minutes

Or more if outside

Key Concepts:
Everyday actions make a difference in watershed and estuary health.

Objectives:
Students will be able to:
identify stewardship activities that help care for a stream or other sensitive habitat

SQUAMISH RIVERS

Key Words:
Stewardship; Responsibility Steward;

Skills:
Analysis, discussion, listing, writing/ drawing

Background:

Stewardship involves participating in a variety of activities that can take place either in a backyard or in a protected area such as beside a stream or a park. For example, stewardship of our backyard habitat may involve composting our garden waste, while stewardship of a sensitive area like a stream may involve respecting wildlife by using binoculars to not disturb nesting Great Blue Herons.

District of Squamish staff use a variety of tools such as land-use management plans and public outreach to encourage stewardship of the areas they manage. This activity focuses on ways students can participate in stewardship of some protected areas like streams near their home, school, or in their community.

Materials

- BINGO template
- Extra paper
- Scissors
- Glue sticks
- Poker or Bingo chips
- Clipboards for outside
- Pencils/pens
- Crayons (optional)

Stewardship BINGO!

Procedure:

1. Photocopy Student Worksheet and hand out to students. Make at least two extra copies of the template, cut out squares, and place in a hat or box.
2. Students should colour, cut, and paste stewardship cards onto the blank bingo template prior to playing the game. Teachers should instruct students to "mix-up" their cards so that students have different bingo sheets.
3. To play the game, call out activity squares pulled from a hat "Bingo style". For example, if the "Respect wildlife" square is pulled out of the hat, then students can then place a bingo or poker chip over that space.
4. The aim is for students to complete a row, either vertically, horizontally, or diagonally, to win.
5. Continue calling out activities until someone calls out "Steward!" when they have completed a row.
6. When most (or all) students are "stewards" ask students where they think these activities should take place. Is it appropriate to respect wildlife, for example, at home or in the schoolyard or in a park? How could they do this?
7. Draw three columns on the board – listing home, school, and community. The discuss with students which column to place each stewardship activity: home, school, community, or park? Discuss the pros and cons of each. Some activities might fit into all places – others may only be appropriate for one type of area.

Extensions:

1. Go on a Stewardship walk around the school and school yard. When a student finds a place where a stewardship activity could take place (like the school recycling bins) they can mark it off or colour it in on their BINGO! sheet. When all spaces are filled in, call the class together and discuss what they found.
2. Play different types of Bingo. Some variations include:
    - Four corners: cover all four corners plus the middle
    - One corner patch: cover one corner with four cards
    - Opposite corner patch: cover two corners with four cards each.

Winners of the bingo game can then become the Captain of the "STEWARD – SHIP."

Evaluation:

1. Have students name three types of activities that care or protect sensitive areas like streams and rivers.

Community Connections:

1. Take a walk nearby your school to find local areas that can be protected by stewardship activities such as a park, local streams or other special places.

Stewardship BINGO!

Resource:
This activity has been adapted from "Stewardship Bingo!" from Protected Areas: Preserving our Future (2002).

Taking it Home:
Ask students to make their own family Stewardship BINGO! Card using the template provided. Share in class.

References:

Blair -Whitehead, DG (Ed.). 2002. Protected Areas: preserving our future. 2nd edition. Available from Wild BC http://www.wildbc.org

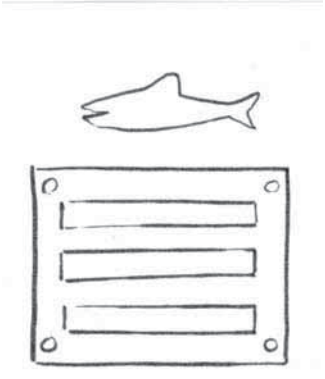
Staniforth, Sue. 2009. Get Outdoors! An Educator's Guide to Outdoor Classrooms in Parks, Schoolgrounds, and Other Special Places. Wild BC, Victoria, BC

Taking it Home… Name: _____

Make your own Stewardship BINGO! by drawing actions in the boxes that can help protect streams and fish.

Stewardship BINGO! Name: _____

Stewardship BINGO! Name: _____

 Respect wildlife	 Stay on trails	 3 R's
 Put litter in its place	 Care for streams	 Keep dogs on leash
 Care for trees	 Protect fish	 Look at plants and animals

The Changing Estuary

Grades: 4-7

Subject, Science, Social Studies, Language Arts

Time required:1, 50 minute period & research time

Key Concepts:
Water resource management means balancing the needs of wildlife, habitat, and people

Objectives:
Students will recognize the changing nature of the estuary and how people impact the estuary .

SQUAMISH RIVERS &

Key Words:
Estuary, pollution, human impacts

Skills:
Gathering information, analysis

Background:

The Squamish Estuary, located at the head of Howe Sound, is a fjord-head estuary draining some 3650 km^2 of coastal rainforest. It was one of the most culturally-significant sites in the *sḵxw'umish7ulh*^{2} *(*Squamish territory) —being the location of both winter villages and seasonal camps; a place for harvesting several species of fish and obtaining many other resources used in daily living. The fertile delta of the Squamish River has had human use and settlement throughout the ages. Over centuries, wetlands, floodplain forests, river channels, and sloughs have been used by people in many different ways.

A diversity of habitats can be found within estuary lands, including deep water, shallows, extensive marshland, sand and mud-

Materials

- Pencils, pens
- Squamish Odyssey
- Student Worksheets
- Oil Spill article (optional)

The Changing Estuary

Background Continued
flats, mixed deciduous and coniferous woods and meadows. This diversity of habitats within a relatively small area supports an abundance of wildlife. Over 200 species of birds rely on this estuary for habitat and feeding grounds, including one of the largest wintering populations of Bald Eagles in North America.

The Squamish River system is vital from a fisheries perspective too, since chum, chinook, Coho and pink salmon, steelhead trout, sea run cutthroat trout, and Dolly Varden char can all be found within its waters. Millions of ocean-bound salmon and trout rely on the protective waters of the estuary as they transition from fresh to salt water.

The Squamish Estuary was originally settled by the Coast Salish people then was eventually dyked and farmed by European settlers. Development for various uses – waste disposal, log sorting, port development, further dyking – continued until the early 1980s. In 1981, the Squamish Estuary Management Plan was initiated to restore and sustain the estuary while balancing the need for economic development. In 1999, a management plan was completed that revised the balance of industrial development to conservation areas of environmentally sensitive areas. In 2007, the *Skwelwil'em Wildlife Management Area* was designated. This highly productive 673 hectare area located within the estuary provides significant winter migratory bird habitat. The designation of this wildlife management area is a result of 25 years of planning under the Squamish Estuary Management Committee. This, among other initiatives, tries to balance the changing needs of the community with the needs of the

Procedure:

1. Have students read "The Squamish Odyssey" and then ask students to list activities that they think have happened in and around the estuary over time.
2. Handout the student worksheet, asking students to match the human activities to the correct historical periods.
3. Ask students to find articles from the *Squamish Chief* or other community media about the estuary.
4. Discuss with students their findings. Ask:
    - **a.** How have these human activities affected the estuary?
    - **b.** What type of habitats do you think were the most affected?
    - **c.** What has been the benefit of these activities to humans?
    - **d.** Which present day activities should be encouraged or discouraged in the estuary? Why?

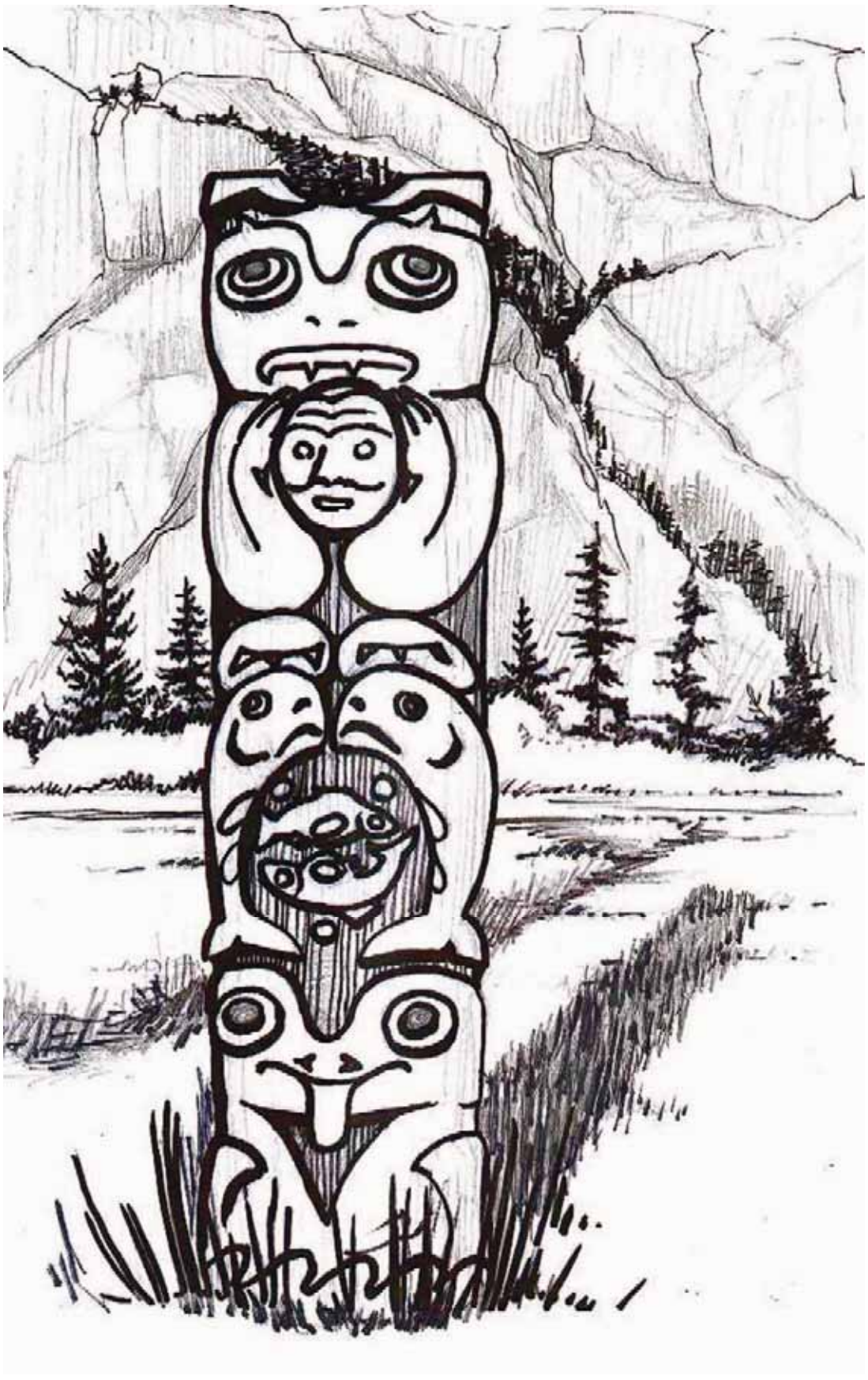
Evaluation:

1. Have students:
    - a. Complete the Changing Estuary worksheet;
    - b. Write a journal entry about their perspective on balancing human activities and wildlife in the estuary.

Community Connections:

1. Ask someone from the District of Squamish municipal government to talk about the new *Skwelwil'em Squamish Estuary Wildlife Management Area.*

Skwelwil'em Squamish Estuary Wildlife Management Area.



Extensions

1. Make a timeline that shows the changes to the estuary over the centuries using a meter stick, a 1 meter strip of paper and coloured markers. Draw a vertical line across one end of the paper and label this 1600 and earlier. Draw a horizontal line to the other end of the paper and using the meter stick, mark each decade where 2 cm represents a decade (10 years), marking up to the present. Using the information provided in this activity and student research, draw or write about issues and solutions that affect the estuary.
2. Ask students to find out more about the pollution in the estuary and its impact on the estuary. How can pollution spills be prevented in the future? What kind of clean-up or habitat rehabilitation should happen?

Resource:

This activity has been adapted from "The Changing Estuary" from Discover your Estuary (1992)

References:

Armitage, Doreen. 1997. *Around the Sound – A history of Howe Sound –Whistler*. Harbour Publishing, Madeira Park, B.C.

BC Ministry of Environment, Environmental Stewardship Division. 2007. *Skwelwil'em Squamish Estuary Wildlife Management Area Management Plan*

Taking it Home:

Have students do the crossword puzzle at home.

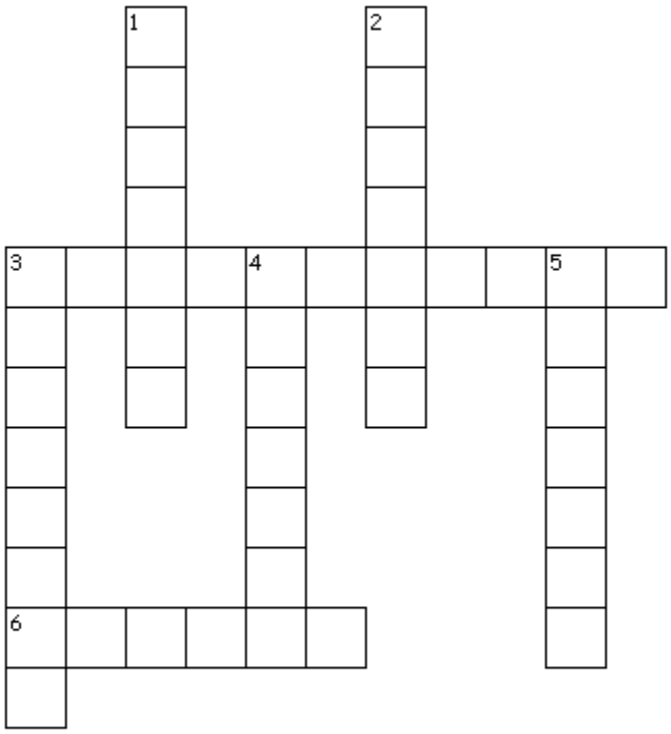
Taking it Home…

Name: _____

Complete the crossword puzzle:

Across
3. The traditional name for an area on the east side of the Squamish River near the river's mouth.
6. Part of the estuary

Down
1. A road that goes Sea to Sky
2. One of the first land uses by European settlers
3. Another name for the Squamish First Nation people
4. Forestry
5. A type of wetland where freshwater and saltwater mix



Did you know??

A Special Place: Skwelwil'em

This name is the traditional name applied to an area on the east side of the main channel of the Squamish River near the river's mouth.

According to Squamish Nation research, this place is of international significance for migrating and over-wintering water birds, and it is a feeding, spawning and rearing ground for many fish species – including steelhead and salmon species. In the past, Squamish Nation (*Sko-mish)* people used this area to camp for the chum salmon run and according to others, *Skwelwil'em* was a place where they used to go to pick salmonberries.

Today, the *Skwelwil'em* Wildlife Management Area and a new part of the conservation area called Site "A." is aimed to conserve the estuary. The primary goal of the wildlife management area is to maintain and enhance the quality of fish and wildlife habitat, to encourage research and monitoring activities and to protect and promote traditional uses and values.

- KEY -

Taking it Home...

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The Squamish Odyssey

Abstracted from: www.district.squamish.bc.ca/Discover_Squamish/

To fully understand the Squamish story, one needs to look back beyond the era of logging and adventure tourism, past the human definition of time to capture events that happened thousands or millions of years ago, and sometimes kilometers above and below us.

About 10,000 years ago, Howe Sound was being scourged by the recession of the last ice age and received its unique geologic character. Mount Garibaldi (one of many volcanic centers in the Cascadia Mountain Range which includes Mount Cayley, 33 kilometers north of Squamish and Mount Meager northwest of Pemberton) erupted forming a volcanic cone over the glaciation ice. When the ice receded the cone collapsed creating the craggy and constantly eroding Garibaldi one sees today. The Stawamus Chief, an old magma chamber of an ancient volcano and the world's second largest Granite monolith, was revealed as ice eroded weaker rock. If you look closely, one can still see volcanic and glacial evidence in Squamish's dynamic surroundings. There are lava flows, basalt deposits, glacial-polished rock forms, like the one at the south end of the Stawamus Chief parking lot, and the notorious Cheekye debris fan.

It wasn't long after the recession of ice that the human touch left its print on the Squamish story. Descendants of the aboriginal people who made the epic journey from Asia across a frozen Bering Strait and down the Alaskan Panhandle to Howe Sound, possibly as long as 5,000 years ago, still live in the area today. For millennia, the Sko-mish or Squamish people hunted, trapped, fished and raised their families in this lush Valley.

Their adventure joins a European one on a rainy day in June, 1792 when British Explorer Captain George Vancouver and his crew sailed their ship Discovery into Howe Sound's Darrell Bay, just south of Squamish. The Sko-mish people called the historic meeting place Whul-Whul-LAY-Ton or White Man Place. Capt. Vancouver said this was "a most uninhabitable place."

Traders, gold seekers, and adventurers followed during the next century, but it wasn't until Mr. and Mrs. Alec Robertson of Manitoba pre-emptied land in 1889, then farmed and settled at the head of Howe Sound, that non-natives found a permanent home in Squamish. The Robertsons so loved their new home that their daughter Catherine and her husband Allan Rae settled in Squamish later that same year. A month after the Rae's arrival in the area they had the first non-native baby born in the valley: a son Edgar.

Forestry quickly surpassed farming as the foundation for the economy in Squamish soon after the railway from Prince George to the north was completed just prior to World War I. The Valley was a busy and prosperous place, connected with the growing city of Vancouver only by the sea.

The next harbinger of change for Squamish was the completion of the railway from Squamish to Vancouver in 1956 and the Sea-to-Sky Highway two years later. Strangers drove up the highway penetrating Squamish's familiar and insular world. Adventurers like Jim Baldwin and Ed Cooper, who spent six weeks in 1961 scaling the Grand Wall of the Chief, brought worldwide media attention to the Valley. The influx of outdoor revelers grew when the resort of Whistler, formerly Alta Lake, first took baby steps in the late 60s.

Today, the Squamish story continues to unfold. Changes in the viability and longevity of the province's forest industry and the increase in outdoor recreation and tourism related economies are ringing in even more dramatic change. An all-season mountain resort development is proposed for the Brohm Ridge area of Mount Garibaldi. Small high-tech companies are coming to the area, as are commuting urbanites seeking Squamish's relaxing lifestyle. And this beautiful Valley is slowly being discovered as North America's premiere outdoor Mecca with unparalleled quality and quantity of outdoor activities to be explored.

The Changing Estuary
Student Worksheet

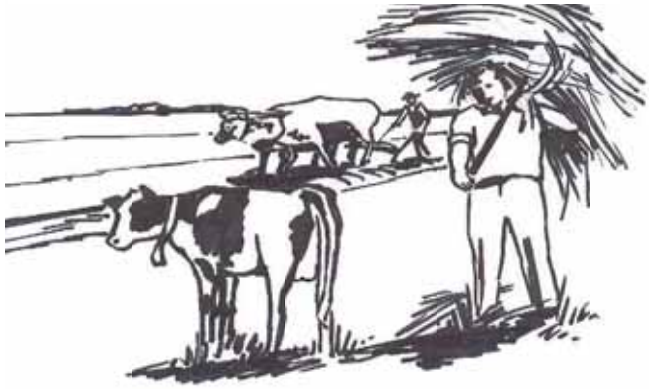
The fertile deltas of estuaries have attracted human use and settlement throughout the ages. Over centuries, wetlands, floodplain forests, river channels, and sloughs have been used by people in many different ways. The Sko-mish (Squamish) people have used the Squamish Estuary for at least 5,000 years.

The objective of this activity is to match the different historical time periods with the type of human activities that occurred with them.

Place the numbers of the activities listed below in the correct time periods in the boxes with the illustrations on the next page. You can list an activity more than once.

1. Industry
2. Land clearing
3. Exploring
4. Steamboats and Large Ships
5. Fishing
6. Logging
7. Food gathering
8. Hunting
9. Road building
10. Gold Rush
11. Dredging
12. Railroad
13. Farming
15. Mining
16. Sawmill
17. Tourism
18. Urban Development

The Changing Estuary Name:_____



Answer Key to Worksheet:

Pre-White Settlement:
Food gathering, fishing, hunting, exploring

1790s's- 1830's:
Food gathering, hunting, fishing, exploring

1840's- 1860's:
Hunting, farming, exploring

1870's- 1890's:
Mining, land clearing, fishing, logging,

1900's- 1940's:
Railroad, steamboats and large ships, industry,
Fishing, logging, road building, sawmill

1950's – present:
Tourism, railroad, steamboats and large ships, industry, dredging, sawmill, urban development

River & Estuary Jugglers

Grades: 3-6

Subject, Science, Language Arts

Time required: 20 minutes

Key Concepts:
River and estuary habitat is important for fish, wildlife, and people.

Objectives:
Students will name important habitat, plants, and animals of the estuary.

SQUAMISH RIVERS & ESTUARY

Key Words:
Water bodies

Skills:
Description, gathering information, discussion

Background:

This game can help students remember the names of key characteristics of the Squamish Watershed and the complex interactions of the Squamish Estuary and local rivers and streams.

The game also stresses the importance of working together as a group —a critical aspect for the management of water resource and watershed management.

Materials:

- Tennis balls or other small balls
- String (optional)

River & Estuary Jugglers

Procedure:

1. Review what students have learned so far about local rivers, streams or the estuary. See background information from other activities.
2. Brainstorm with students the names of river or estuary water bodies (including the rivers and streams that flow into the estuary). Now come up with a list of plants and animals that live in the estuary or in local streams.
3. Have students stand in a circle and think of a water body, plant or animal from the lists. Or, you can put the names on a piece of paper in a hat or bowl and have students pick one to select their juggler "identity."
4. Ask students to name their water body, plant or animal and what they know about it – going around the circle one by one. Students can share knowledge about each other's river or estuary "personae" if a student needs more information.
5. Begin the game by picking a student, saying the name of their water body, plant or animal and then tossing the ball to him or her. That student then tosses the ball to another student saying their personae. Continue tossing the ball until everyone has had the ball at least once.
6. Now speed up the game, when this gets easy – add one or two more balls.
7. Wrap up by asking students to recap what they know about river or estuary water bodies, plants and animals. Can they remember the names of each others' river or estuary personae?

Extensions:

1. After tossing the ball several times, introduce a ball of string to the game. In this case, begin in a similar manner as above but students will toss the ball of string to another student that is directly affected by him or her. For example, a student who is a heron can pass the string to a young salmon, who passes it to an eagle, etc. Continue on until all students are connected to the "web of life."

Evaluation:

1. Have students:
    a. Research a plant or animal of the estuary and write a paragraph describing their plant or animal.
    b. Name at least 3 water bodies important to the Squamish watershed.

Community Connections:

1. Take a field trip to the location or habitat of several of the student's "personae."

Resource:

This activity has been adapted from "River Jugglers" from *Give Water a Hand* (1996). *Give Water A Hand* is a program of the University of Wisconsin - Environmental Resources Center. Support for Give Water a Hand is provided by National Fish and Wildlife Foundation; the US Department of Agriculture, CSREES and NRCS; Church & Dwight, Co., Inc., and the University of Wisconsin.
http://www.uwex.edu/erc/gwah/

Taking it Home:

1. Ask students to look at a map of the Squamish area with their families and find their own house location and the water bodies and habitats of the plants and animals nearby. Bring the map back to class and discuss what they found out. Hint: you can use the maps from the Squamish Streams Around the Corner activity.