



## Lesson 2.2: MY HOME, MY WATERSHED: EXPLORING THE SKEENA WATERSHED

\* For more detailed information on watersheds, their functions and features, please review Lesson 2.1: What is a Watershed? There is also a powerpoint presentation available for Lesson 2.1 and 2.2.

**GRADE LEVEL:** Grades 4-9

### OBJECTIVES

- Students will learn about, identify and describe the Skeena Watershed
- Students will discover their personal and cultural connections to the Skeena Watershed

### OVERVIEW

The majority of people living in Northwest BC are connected to the Skeena Watershed. The watershed is a vital transportation corridor, a food source, a place for people to live, one of the largest salmon spawning rivers in the world and habitat for other species. It also holds cultural significance for many First Nations, is a source of many jobs and a tourism and recreation destination.

In this lesson, students learn more about the Skeena Watershed, its tributaries, its features and will also consider their own personal connections to the Skeena River Watershed.

### BACKGROUND INFORMATION

#### What is a Watershed?

A watershed is an area of land where all the surface water drains into the same place, whether it's a creek, a stream, a river or an ocean. For more detailed information, please refer to **Lesson 2.1: What is a Watershed?**

#### QUICK FACTS ABOUT THE SKEENA

~Second longest river in BC (610 km)  
Longest river in North America with no dams

Watershed is 54,400 km<sup>2</sup>

~Includes communities of Terrace, Kitimat, Kitwanga, Hazelton, Kispiox, Smithers, Houston, Dease Lake  
Second largest commercial salmon fishery and sport fishery in the world  
Major economy driver in the region, generating more than \$100 million annually into the local economy

~Home to five species of Pacific salmon (Chinook, Sockeye, Chum, Coho, and Pink) and Steelhead Trout  
Starts at the Spatsizi Plateau (at the "Sacred Headwaters")  
Empties into the Pacific Ocean at the Skeena Estuary

~Includes 11 primary sub-basins (Ecstall, Kitsumkalum, Lakelse, Zymoetz, Kitwanga, Kispiox, Babine, Bulkley, Morice, Sustut/Bear)  
60,000+ people live in the watershed

~Home to three major First Nations (Tsimshian, Gitksan, Wet'suwet'en)

~In 2009, a Smithers woman, Ali Howard, swam the entire 610 km length of the Skeena River to raise awareness of unique wilderness of the the watershed, to strengthen connections between communities and to raise awareness about the important of preserving the natural habit.



## The Skeena Watershed

At 54,400 km<sup>2</sup>, the Skeena Watershed is BC's second largest watershed and is one of the world's last large, intact wild salmon ecosystems which is also inhabited by a significant human population. It is also home five species of wild Pacific salmon (chum, sockeye, chinook, coho, pink), as well as an important salmonid, steelhead trout. Together, they support a vibrant First Nations culture, Canada's second-largest commercial salmon fishery and a world-renowned sports fishing sector. The Skeena Watershed is home to more than 60,000 people.

From its northern headwaters high in the Skeena Mountain range (Spatsizi Plateau), the river flows about 610 km and drains into the Pacific Ocean. Seven different biogeoclimatic zones support a large diversity of habitats from coastal temperate rainforest to dry interior boreal forest. The Skeena Watershed includes portions of four mountain ranges: the Kitimat, Hazelton, Skeena and Babine mountains. Eleven major sub-systems make up the Skeena: Ecstall, Lakelse, Kalum, Zymoetz, Kitwanga, Kispiox, Babine, Sustut/Bear, Morice, Upper Skeena and Skeena River West.

The Skeena's six species of wild salmon include approximately 300 individual populations (besides salmon, 28 other species of freshwater fish are found in the Skeena). The Skeena has produced the largest salmon and steelhead ever record: salmon weighing over 120 pounds and steelhead weighing over 40 pounds.

For millennia, Skeena wild salmon sustained First Nations Cultures and communities throughout the watershed. The Tsimshian, Gitanyow, Gitxan, Wet'suwet'en, Ned'u'ten, Tahltan and Takla have traditional territories occupying different regions of the Skeena Watershed. Their food, social and ceremonial fisheries (FSC) are a constitutionally protected right, providing First Nations with thousands of salmon each year for food and trade.

## Components of the Skeena Watershed

(Source: "Skeena River: Fish and Their Habitat", Allen S. Gottesfeld and Ken A. Rabnett; 2008)

### Upper Skeena- Northern Skeena Headwaters

**Physical Characteristics:** This area encompasses the Skeena River and its tributaries from the Sustut River to the upper headwaters. Located in north-central BC, 200 km north of Smithers, the Skeena River flows southeast from the headwaters in the Spatsizi Plateau. The mainstem of this section of the Skeena River is 133 km long, flowing through a mainly mountainous and relatively high elevation. Glaciers feeding into the Upper Skeena help to maintain moderate summer stream flows, and contribute natural sediments to the river.

**Skeena Salmon:** Chinook arrive in the headwaters in early August to spawn. There are two populations of sockeye that spawn in this section, some rearing in lakes. Most coho arrive into the upper Skeena tributaries in September; juveniles and adults are widely distributed in tributaries with no spawning in the mainstem but in low-gradient tributaries in the Skeena River valley floor. Steelhead are found in lakes and tributaries; the upper Skeena drainage



supports a summer-run steelhead population. Little is known about freshwater fish populations, however, some documented species include rainbow trout, bull trout, Dolly Varden and mountain whitefish.

## **Mid-Skeena River (Terrace to Kitwanga)**

**Physical Characteristics:** Encompassing the Skeena mainstem and its tributaries from the Kitsumkalum River upstream to the Kitwanga River, this section includes all tributary drainages other than the Kitsumkalum, Zemoetz, and Kitwanga Watersheds. The peak flow is in May and June (freshet), then they decrease until September when the autumn rains and early snowmelt increases stream flow through October.

Summer low flows are typically four to eight times greater than winter streamflows and are principally sustained by high-elevation snowmelt, while winter low flows are derived from groundwater, lakes and unfrozen wetlands. The surrounding glaciers on mountains help to maintain the moderate summer streamflows. The glacier deposits also produce moderate amounts of natural sediment that contribute to the wash load, eventually deposited into the Skeena Estuary. During major rain events, the Hazleton Mountains, which are composed of the Nass and Bulkley Ranges exert the major hydrological influences and tributary streamflows have a moderately high and rapid response from rainfall due to the high gradients of the major tributaries.

**Skeena Salmon:** Chinook do not spawn on the mainstem but in tributaries. The mainstem provides rearing and migration habitat for some of the Skeena system Chinook. Pink spawn in the lower reaches of streams and tributaries of the mainstem. Chum arrive in the Skeena from late July to early September. Chum are probably the Skeena Watershed salmon species in the greatest danger of significant spawning stock and genetic diversity loss. They are highly specialized in their selection of spawning sites. Several of the Skeena spawning sites that they use every year are a couple hundred metres long. Rarely do they spawn on the mainstem. Coho are the most widely dispersed salmon species throughout the mid-Skeena, and they usually spend one or two winters in fresh water before they migrate to the ocean. Jacks are often found in this area of the Skeena as far upstream as Kitwanga River.

The mid-Skeena is a migratory route through August, typically moving into tributaries to hold. Dependent on high water flows, coho will wait for fall rainstorms and floods before moving into the tributaries to spawn from late September to November. Spawning populations within the watershed are relatively small and dispersed, though important. The mid-Skeena supports summer run steelhead populations from the start of August through the autumn months. Spawning occurs from March through May (coinciding with warmer waters and higher stream flow). The Skeena mainstem is used as a migrate route for upstream Skeena River and Bulkley River steelhead stocks. Steelhead spend the winter in the Skeena River at the mouth of the Kitwanga River. Information on freshwater species is rare in this part of the Skeena. Known species include rainbow trout, cutthroat trout, bull trout, Dolly Varden, char, mountain whitefish, peamouth chub, largescale sucker, threespine stickleback, river lamprey, kokanee, coastrange sculpin and prickly sculpin. Green sturgeon may reside here as well.

## **Lower Skeena River (Terrace to Estuary)**



**Physical Characteristics:** The Lower Skeena River is defined as encompassing the portion of the river and tributaries between the mouth and Kitsumkalum River. Extending from the mouth at 54°N, just south of the City of Prince Rupert, upstream 116 km into Terrace. This portion of the river is bounded to the north and the south by the Kitimat Ranges, to the east by the Hazelton Mountains, and to the West by Chatham Sound.

The Lower Skeena River is very important fish habitat. All six species of salmon, as well as steelhead, cutthroat trout and Dolly Varden, are found in this section of the Skeena River for some portion of their lifecycle. Salmon species such as Sockeye mostly migrate straight through to the Skeena Estuary, while Chinook, Pink and Chum spawn in large numbers in this section.

This area, where salt water meets freshwater, supports a large number of anadromous and freshwater species. Anadromous fish will spend weeks to months in this part of the Skeena while their bodies undergo physiological adaptations necessary (smoltification) to move from fresh water to sea life. The varied salinity regime of the estuary facilitates this adaptation. Juvenile fish migrating downstream to saltwater can be found feeding and rearing in the lowest Skeena's side channels, log jams, wetlands, and the very fertile estuary. Conditions in this area of the Skeena can be challenging for juveniles as they try to adjust to different temperatures, tides, currents, changes in food sources, and different predator populations.

**Skeena Salmon:** Chinook spawn throughout the lower Skeena. Pink spawn in the mainstem, gravel bars and back channels. Chum are commonly found in the lower Skeena and tributaries. Sockeye spawn in Esker Slough. Coho are distributed throughout the lower Skeena, spawning in the mainstem is rare. The summer/winter Steelhead run move through, with no evidence of spawning here. Eulachon spawn in the mainstem and the lower tributaries.

## **The Skeena River Estuary**

**Physical Characteristics:** The Skeena River estuary has a rich and complex ecosystem. Terrestrial nutrients carried from inland areas by the turbid Skeena River water mix with clear ocean water at the edge of the Skeena plume. This region of mixing, where the water is both rich in nutrients and clear enough to allow sunlight to penetrate, supports prolific populations of phytoplankton (microscopic plant-like organisms). These phytoplankton are, in turn, fed on by zooplankton (small animal-like organisms). The zooplankton become food for fish. Large eelgrass beds, such as Flora Bank, are supported by both the sediments and the nutrients from the Skeena River. Both eelgrass beds and the abundant kelp forests found along the rocky shorelines of the coast provide important nursery, foraging, and spawning areas for fish. Epiphytic zooplankton, which spend their lives associated with the blades of eelgrass or fronds of kelps, also provide an important food source for fish. Many species of fish are supported by this ecosystem, including salmon, eulachon, herring, capelin, smelt, sandlance, flounder, halibut, rockfish, and lingcod.



## ACTIVITY 1: Mapping the Skeena Watershed

**Objective:** To identify and label the Skeena River, its source, mouth, major tributaries and watershed.

**Materials:**

- Felt pen markers in blue, red, green, and black
- Pencil crayons in various colours
- Paper maps of the Skeena Watershed and the sub-basins

**Procedure:**

1. Have students identify major bodies of water on the map and colour them blue (e.g., Lakelse Lake, Kitsumkalum Lake)
2. Have students trace the Skeena River in red. Ask: Where do you think the river begins (headwaters)? Where does it end (Skeena Estuary/Pacific Ocean)? Use black arrows to show the direction of the flow. Explain facts about the Skeena River (refer to background information)
3. Have students trace the major tributaries that flow into the Skeena River using green.
4. Have students mark the boundaries of the Skeena Watershed and shade the entire area.
5. Have students analyze the relationship of the watershed to the shape of the land. Brainstorm how the shape of the land and the flow of water are related. Talk about how water flows from areas of higher elevation to lower elevation. Refer to rivers or streams in your own community or nearby. Ask: *Where do you think areas of higher elevation are?* Ask: *What effect does the shape of the land have on how water flows into the Pacific Ocean?*

Source: National Geographic ([www.nationalgeographic.org/activity/mapping-us-watersheds](http://www.nationalgeographic.org/activity/mapping-us-watersheds))

## ACTIVITY 2: What are My Personal Connections to the Skeena Watershed?

There are more than 60,000 people who call the Skeena Watershed home, and are deeply connected to their communities and to the Skeena River. It is a vital corridor, a food source, a place for people to live, one of the largest salmon spawning rivers in North America and habitat for other species, a source of jobs, and a tourism or recreation destination. Indigenous people have lived here since time immemorial, and the Skeena River holds cultural and sustenance meanings, as well as economic. In this activity, students consider their personal connections to the Skeena River.

### What you need:

- Time: 30-60 min
- Large white paper, white board or smart board
- Handout
- Large poster of the Skeena Watershed

### What you do:

- As a class, brainstorm some ways that students are connected to the Skeena River and watershed
- Break a class into small groups and assign each group a category (i.e., jobs). There will be overlap between the categories.
- Basic needs (human survival); air, water, food, habitat, etc.
- Jobs (think industries, tourism, port operations, scientists, etc.)
- Imports (food, cars, clothing, computers, etc.)
- Natural resources (timber, mining products, salmon, water, gravel, hydroelectric power, etc.)
- Recreation (fishing, boating, hiking, camping)
- Cultural/spiritual (Aboriginal culture, museums, tourist attractions)
- Have groups create and present a mini-poster or a collage about their category
- Ask students to consider which ways they feel most connected to the Skeena River
- Provide an opportunity for students to share their personal connections

### Discussion:

- How might these different uses/needs compete? How do you think that might impact the health of the Skeena River?
- How have the students' feelings about the Skeena River changed after completing this activity?

### Extensions:

- Ask students to find out why their families live in the Skeena River Watershed?
- Have they always been here? Were they drawn by opportunities related to the Skeena River?
- Look historically; share Indigenous origin stories, also consider what opportunities drove settlement in the past?

*Source: "My River, My Home"; Fraser Basin Council*



# BRITISH COLUMBIA'S skeena salmon

CONNECTING PEOPLE AND PLACE

AT 54,000 SQUARE KILOMETERS, the Skeena is one of the most important and diverse salmon watersheds in the world, and is home to five species of wild Pacific salmon as well as steelhead. Together they support a vibrant First Nations culture, Canada's second-largest commercial salmon fishery and a world renowned sports fishing sector. At present, wild salmon are one of the region's most important economic drivers, contributing over \$100 million to the local economy each year.



## 1 KITWANGA RIVER FENCE

The Gitksan Nation maintain a strong cultural identity around salmon and fishing. When wild traps supported the Gitksan's most intensive fisheries on the Kitwanga River, logging brought all of the salmon needs for their people. These productive waters were commonly found throughout the Skeena watershed prior to European contact. In the present day, the Gitksan manage various fisheries research programs, including a wild steelhead salmon recovery plan to rebuild the stock so that they can once again harvest this precious food source.

## 2 KERMODE BEAR

The region in and near the Skeena Valley from Prince Rupert to Hazelton plays host to the rare and provincially protected Kermode bear (aka "Spirit Bear"), a beautiful white form of the black bear. The Spirit Bears had a permanent place in the mythology of the area's Indigenous people, Tsimshian, who call them Mlgokegwil. Kermode bears feed primarily on the area's plentiful salmon, which they then rapidly pass weight for to their cubs.

## 3 SPORT FISHING

The Skeena steelhead has been revered as one of the world's largest wild steelhead trout since 1954, when Fred and Stearns Magazine reported that their world record catch—over 33 pounds and the other 34 pounds—were caught on the river. Today the Skeena sport fishery is internationally renowned, attracting tourism dollars as anglers return year after year to try their hand at hooking a salmon or giant steelhead.

## 4 SKEENA CHINOOK SPORT FISHERY

The lower Skeena River area is "where to be" when angling for world record wild chinook salmon, some weighing over 100 pounds. Local families enjoy first-class fishing only minutes from their doors, while anglers from around the world arrive every year with dreams of hooking one of these famous giants. This recreational fishery supports numerous tourism businesses, such as fishing guides, fish camps and lodges, transportation services, and sport fishing retail services, capturing over \$13 million in direct economic benefits for the region.

## 5 COMMERCIAL FISHERY

Prince Rupert is home to British Columbia's second largest commercial salmon fishery and a renowned sports fishery. During the summer a large all net and seine fleet harvest sockeye and pink salmon for the local fish processing industry, which in turn exports seafood products around the world. Today Skeena wild salmon contribute over \$100 million annually to the regional economy.

## 6 LOWER SKEENA BACKCHANNELS

The extensive network of backchannels in the Skeena River floodplain downstream of Terrace provides important habitat for juvenile and adult salmon. Swampland fish and near along the network of bays, side channels and wetlands, as well as the fertile estuary. A special feature of these back channels is the very large amounts of detrital (litter) that provide high-quality salmon food and indicate healthy streams.

## 7 PORT ESSINGTON

Port Essington was a salmon cannery town and business centre of the North Coast prior to the 1914 opening of the Grand Forks Railway in Prince Rupert. During the late 19th century, the Skeena River was second only to the Fraser River in the rate of its annual "canoeed back" and flotilla of canoes in operation. More than 35 canoes were operating on the river by the 1820s, bringing economic growth to the region and seasonal employment for many First Nations men and women and Chinese, Japanese and European immigrants. Today, only one cannery remains, and Port Essington is now a ghost town.

## 8 KEMANO COMPLETION PROJECT

The Nechako River in the Fraser watershed, originally drained a network of spectacular wilderness streams and lakes. However, in the 1950s, Alcan Smelters and Chemicals Ltd. dammed the river and created a hydroelectric generating station at Kemano to power an aluminum smelter in Kitimat. The project flooded the traditional territory of the Chehalis and Wot'sawet in First Nations, and severely damaged salmon spawning habitat. By 1984, Alcan revealed plans for a second hydro project, which would have been twice as costly and cut up to 40 percent of the Skeena River's major tributary of the Skeena. However, First Nations, fishermen, environmentalists and outraged citizens from the region joined together to fight the project, finally convincing the BC government to cancel it in 1995.

## 9 CBM BLOCKADE

In 2004 the British Columbia government granted Shell Canada a 400,000-hectare tenure of land for coalbed methane gas development near the mouth of three major salmon rivers: the Skeena, Neke and Skeena. The project flooded the traditional territory of the Chehalis and Wot'sawet in First Nations, and severely damaged salmon spawning habitat. By 1984, Alcan revealed plans for a second hydro project, which would have been twice as costly and cut up to 40 percent of the Skeena River's major tributary of the Skeena. However, First Nations, fishermen, environmentalists and outraged citizens from the region joined together to fight the project, finally convincing the BC government to cancel it in 1995.

## 10 FISH FARM MORATORIUM

In 2006, a Norwegian company revealed plans to build open-net salmon farms near the Skeena's mouth. Scientists had already begun to document the serious impacts salmon farms have on wild salmon stocks around the world. Public opposition to the plan grew quickly among First Nations, community leaders, commercial fishermen, conservationists and anglers who launched a grassroots campaign to stop the farms. Their efforts culminated in 2008 when the Province declared a moratorium on fish farms on the north coast.

## 11 FULTON / PINK SPawning CHANNELS

The 150-million Pitkin and Fulton spawning channels were built on the west side of Babine Lake in the late 1950s to boost production of valuable sockeye salmon. They're still a vibrant commercial fishery, producing over 100 million sockeye salmon annually. A vibrant commercial fishery existed until the mid-1920s, when construction concerns for safety and other smaller Skeena salmon populations led to reduced fishing opportunities for the commercial sector. Today, salmon can still witness one of the largest salmon runs in the world at the Fulton River Spawning Channel.

## 12 MORICETOWN & KITSEGAS

For centuries, Skeena First Nations conducted large-scale fisheries along the length of the river. At canyon locations where strong currents concentrated salmon, a variety of traps were ingeniously used to capture fish in the headwaters. The West coast's first trap nets to selectively harvest live fish at Hazelton Canyon and Moricetown Canyon. The Gitksan used a similar dip-net fishery at Kitsegas (Kitsegas Canyon). Here, the ancient village of Gitksan (Tsimshian people who fish) was historically one of the largest aboriginal settlements in the Skeena watershed.

## 13 KSNAN VILLAGE

Ksan (Ksan Village) is the present village of Gitksan, at the confluence of the Skeena and Skeena Rivers near Hazelton. For millions, Gitksan's have maintained communities at canyons and junctions on the Skeena River. Ksan Village was an important salmon harvesting and transportation hub. Gitksan families trace their roots to the legendary "Amlikan" or "Prime Town" on the Skeena River, which some researchers say existed at least 5000 years ago.

## 14 GRIZZLIES ON THE BABINE

The Babine River — one of the major tributaries of the Skeena — is also known as "River of Grizzlies". The river corridor is home to one of the highest concentrations of Grizzly Bears in North America and is rich with cultural history along the banks of the Skeena and by many streams and tributaries, about 150 massive grizzly bears are roamed by the watershed's rich salmon runs.

## 15 BEACH SEINE

The mid-Skeena river has supported a large First Nations food fishery from ancient times to the present. In the past decade, the Canadian government has also permitted a few in-river commercial fisheries, an important source of income for First Nations. These fisheries selectively harvest only targeted salmon species while allowing other competing fish to continue on their journey. On the mid-Skeena, the Gitksan people use beach seines to live capture sockeye salmon for commercial markets.

## 16 SKEENA SWIM

As Howard learned to help protect the Skeena watershed, so in 2009, she decided she would swim the river's wild 610-kilometre length. Accompanied by a support crew in rafts and kayaks, Howard swam through boulder gardens, class IV rapids, and giant whirlpools. As she swam through communities, residents lined the banks to play tribute to her momentous effort. In each community Howard encouraged people to come together to protect the Skeena for future generations. 28 days later, Howard reached the Pacific Ocean — the first person to swim the mighty Skeena.



### THE SALMON SPECIES



# EDUCATION RESOURCES

## WEBSITES

SkeenaWild Conservation Trust – [www.skeenwild.org](http://www.skeenwild.org)

Skeena Watershed Conservation Coalition – [www.swcc.org](http://www.swcc.org)

Skeena Watershed Initiative – [www.skeenawatershedinitiative.org](http://www.skeenawatershedinitiative.org)

## BOOKS

“Skeena River: Fish and Their Habitat” (by Allen S. Gottesfeld and Ken A. Rabnett)

## MATERIALS

The following materials can be accessed by contacting the office at 250-638-0998 or email [education@skeenawild.org](mailto:education@skeenawild.org):

- Skeena Watershed Map Poster (also available at <https://skeenawild.org/maps/#!overlay/8/>)
- 8.5”x11.5” paper maps of the entire Skeena Watershed or selected sub-basins

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