Canadian Geography 1202
Chapter 8
Fisheries

There are three types of fisheries in Canada:

1. Atlantic
2. Pacific
3. Inland or Freshwater

With valuable fisheries on both the Atlantic and Pacific coasts, Canada is one of the largest maritime nations in the world. Canada is surrounded by the Arctic, Atlantic and Pacific Oceans and is also home to the Great Lakes. It also has the world's longest coastline in addition to containing 16% of the world's freshwater areas and four of the fourteen largest lakes in the world.

Canadian fish and seafood are sold in over 100 different countries! The primary markets for the exportation of fish from Canada are the United States (50% of total exported product) and Japan (29% of total exported product).

Jobs that are dependent on or related to commercial fishing:

1. Manufacturing of fish equipment
2. Cleaning and packaging of fish
3. Transportation of fish
4. Construction of fishing vessels
5. Research on and administration of the fishing industry (private and government)

Commercial Fishing: fishing with the purpose of selling the catch.

Total percentage of exported fish in each region:

1. Atlantic 81 %
2. Pacific 89%
3. Inland 78%

As a whole, **Canada exports 83%** of its fish intake to other countries, making it the fifth leading exporter of fish in the world!

Large quantities of Canada's seafood are exported to meet high international demand. This also reflects a relatively low demand from the domestic (home) market. This is an advantage for

Canada as increased exports contribute to the growth of our national economy.

Fisheries Statistics (as of the year 2000)

Number of fishers:	Atlantic	43, 800
	Pacific	9, 200
	Inland	3, 500
	Total	**56, 500**
Number of fish plant workers:	Atlantic	17, 500
	Pacific	2, 660
	Inland	840
	Total	**21, 000**
Percentage of fish caught:	Atlantic	82%
	Pacific	14%
	Inland	4%
Total Production:	Atlantic	$ 1,700,000,000
	Pacific	$ 367,000,000
	Inland	$ 83,000,000
	Total	**$ 2,150,000,000**

Canada is the second largest country in the world (only Russia has a larger area). The coastal

provinces of Canada have always had easy access to fresh fish, but the same cannot be said for the mainland provinces. Fish had to be dried or salted before it was shipped and therefore it did not compete well against fresh pork, beef, and chicken.

Today, new technology has made fresh fish available to all Canadians. Our eating habits are changing, especially as we became more concerned about fat content in our diet (for example, a person may choose to eat fish as it has less fat than pork or beef).

Export: a product or service that leaves a country as a result of trade.

Import: a product or service brought into a country as a result of trade.

Atlantic Fishery

The Atlantic fishery has been practiced for over 500 years by such nations as Britain, Portugal, France, Spain and Holland.

East coast waters (Atlantic Ocean) have conditions that make it one of the richest fishing areas in the world. These are:

1. **Phytoplankton in large quantities:** Microscopic single-celled plant organisms that live in the top layer of the ocean waters where sunlight can penetrate easily.
2. **Zooplankton:** Microscopic, single-celled animal organisms that live in the top layer of ocean waters.
3. **Continental Shelf:** The gently sloping sub-marine fringe of a continent, usually less than 200 metres deep.
4. **Fishing Banks:** A shallow area on the continental shelf that provides a feeding and spawning ground for fish. Phytoplankton thrive in the fishing banks because the cold, nutrient-rich water is located at the surface where sunlight can easily penetrate the water.

Figure 8.4 on page 134 reveals the major fishing banks in the Atlantic Ocean. The Grand Banks off the coast of Newfoundland is by far the largest and richest in resources (both marine and minerals).

The Atlantic Fishery has two distinct categories:

1. **Inshore Fishery -** Use small boats to fish close to shore.
2. **Offshore Fishery -** Use large vessels to fish far from shore.

The Inshore Fishery

- Boats remain within 20 km of the shore and return home each day.
- Approximately 80% of all Atlantic fishing is engaged in the inshore fishing industry.
- Most boats are small (5 to 20 metres in length) and independently owned and operated.
- Boat crews generally consist of one to three people.

- Species include cod, haddock, halibut, herring, lobsters, oysters, and shrimp.
- Income (money) is generally low and irregular. Most inshore fishers must work second jobs or collect unemployment insurance in the offseason.
- The number of workdays can be limited by weather conditions. Boats are small and often not able to withstand hazardous weather at sea.
- Inshore fishers are self-employed and market and sell their own catch at market.

Certain conditions make Atlantic Canada ideally suited for inshore fishing:

1. Rich fishing banks are located within 20 km of the local harbours.
2. The coastline of Atlantic Canada includes sheltered bays. These bays make ideal harbours for an inshore fishing fleet.

Skills needed to be a successful inshore fisher:

1. An understanding of the variety of species of fish in the region and the different methods of catching them.
2. Knowledge of how to run a small business. This includes knowing how to market and sell your catch.

Reasons why the inshore fishing industry is failing in many parts of Atlantic Canada:

1. Does not generate the income to sustain a "North American" lifestyle. People prefer to earn a fixed income and know what they will be making. For inshore fishers, the work is very hard and the profits are uncertain.
2. People must supplement their incomes by finding second jobs or by collecting unemployment insurance.
3. Large freezer trawlers in the offshore fleet can catch huge volumes of fish and sell their catch more closely to markets.
4. Fierce competition among fishermen.
5. Fish stocks are depleting (with overfishing being a primary reason).
6. The cod moratorium has caused fishers to overfish other species.

Life of a typical inshore fisherman:

1. Responsible for a variety of tasks (repairing and cleaning equipment, fishing, cleaning the catch, delivering catch to buyers, negotiating prices).
2. Dealing with various weather conditions, which can sometimes be very dangerous.
3. Long hours required to bring in the catch.
4. Nights away from home to pursue fish in other coastal areas.

Advantages of working in the inshore fishery:

1. Fishers see their families on a regular basis. They are home most nights, except when they fish in coastal waters away from their home.
2. They have independence because they are self-employed.
3. The variety of tasks makes the work more interesting.

Disadvantages of working in the inshore fishery:

1. Fishers generally earn low incomes.
2. The number of working days is limited by weather conditions.
3. Income is uncertain and inshore fishers usually have to find a secondary source of money.

Read the case study on the Inshore fishery on pages 135-137.
Make note of:

- Daily fishing conditions
- Quality control
- Regulations
- Species caught
- Type of gear used

Offshore Fishery

- Operates out at sea within Canada's 370 km fishing zone limit (on the rich fishing banks of the continental shelf).

- While only 15% of all fishers work is in this sector, it accounts for 90% of the total fish caught.
- Boats are larger than in the inshore fishery. They range from 20 to 50 metres in length.
- Most boats have the latest technology on board
- These boats are often nicknamed “draggers". This is due to their huge nets which are used to drag and scoop fish.
- Have large crews on board.
- Due to their size and sturdiness, offshore boats can withstand many hazards at sea (example: storms).
- Offshore fishers enjoy a steady income.
- Fishers work at sea for two to three weeks (or even longer in some instances) before returning home.
- Boats have processing equipment. This enables workers to prepare some of the fish for market while still on board.
- Boats are usually owned and operated by large companies that catch, process, and market the fish.

Advantages of working in the offshore fishery:

1. Fishers earn a good income.
2. The work is steady.
3. The trawlers are spacious and often have amenities such as TV's, DVD players, and social-gathering areas for card playing, etc. in the mess hall.
4. The variety of specialty tasks on board allows fishers to concentrate on the tasks they prefer.

Disadvantages of working in the offshore fishery:

1. Fishers have less independence because they are employees of a larger company and not self-employed.
2. They are away from their families for extended periods of time.

3. They may not enjoy working with certain crewmembers.

Processing Atlantic Fish

- Years ago Canadian fish was dried, salted, and canned before being exported. Today, high quality fish products are produced in large part with the creation of large, modern processing plants. To meet changing demand, a large part of the catch is cooked and sold as single or multiple-serving frozen food.

- Most major fish processing companies such as the ***Fisheries Products International*** in Newfoundland and the ***National Sea Products High Liner*** in Nova Scotia control the fish processing markets. They are regarded as “vertically-integrated companies”. This means that the company controls all aspects of the fish processing from catching to processing to marketing. (See Figure 8.10)

- When fish are caught they are unloaded at the docks where inspection and sorting occur

according to species, size and quality. Fish are washed and refrigerated. Once in the processing line, they are filleted and processed.

Processing occurs in three ways:

1. Iced and sent fresh to buyers.
2. Frozen for eventual distribution to supermarkets, fish and chip stores, and restaurants.
3. Made into a variety of precooked, convenient foods, such as fish sticks, fish burgers, and fish nuggets.

Newfoundland Cod Fishery

Moratorium: a period of time during which a certain activity is not allowed or required.

- Fishing has been a way of life in Newfoundland and Labrador for almost 500 years. When John Cabot first arrived in Newfoundland in 1497, he claimed the fish were so plentiful along the Grand Banks that

it sometimes stopped the progress of their ships!!!

- In 1992, the once rich cod stocks off the coast of Newfoundland collapsed, and a moratorium was placed upon fishing them.

- At the time the moratorium was passed, 19,000 fishers and plant workers in Newfoundland and Labrador found themselves unemployed. At the same time, 20,000 additional workers who worked in fields related to the fishery also found themselves without a job. All together, close to 40,000 people were directly affected by the collapse of the fishery.

- Rural communities suffered the greatest economic setback. Many families and communities were totally dependent on the fishery as a means of income. As a result of the collapse, many people were forced to move into urban areas (the city) to find employment and a steady income.

- **Example:** Burnt Islands. The population for Burnt Islands in 1996 was 919, down over 100 from the 1991 census, just five years earlier. This loss of population represents the collapse of the inshore fishery and the subsequent cod moratorium that came into effect in 1992. This forced many to leave the area in search of new economic opportunities.

The Atlantic (Newfoundland) Cod Fishery collapsed for a number of reasons:

1. Overfishing by both Canadian and foreign offshore ships.
2. Biologists overestimated the size of the fish stocks. The quotas were too high and the waters were overfished.
3. The fish industry may have failed to report the full catch.
4. Fishing methods were to blame. Dragnets that scraped over the ocean floor damaged

plant and animal life on the fishing banks, thereby disrupting the feeding grounds and reproduction of fish.

5. Changes in the flow patterns of the Labrador current and the Gulf Stream may also have caused the fish to migrate elsewhere.
6. Fur seals, protected from hunting in the 1980's played a small part in the depletion of the cod as well. The fur seal feeds on cod. Therefore, when the population increased it placed greater pressure on the cod stocks.

Quota: the maximum number of fish that can be legally caught within a defined time period.

Pacific Fishery

Salmon is the most important species in this fishery.

Five varieties of salmon:

1. Coho
2. Chum

3. Pink
4. Sockeye
5. Spring

- These five species of salmon account for 20% to 35 % of the total quantity and 40% to 60 % of the total value of fish caught in the Pacific Coast.

- **Other species include:** clams, cod, flounder, halibut, herring, and oysters.

Life cycle of the salmon:

The life cycle of the salmon starts and ends in the cold, freshwater rivers of the west coast. Its mid-life, however, is spent in the salty waters off the north Pacific. The fast-flowing mountain streams, created by snow melt and heavy rains, help the salmon migrate to the ocean. Once there, they find a plentiful supply of food as they grow and mature. In 2 or 3 years they return to the rivers where they were born. This is where the commercial harvest begins.

There are three methods of harvesting salmon:

1. **Gill Nets:** A curtain-line net suspended from floats and held down by lead weights that catch fish by the gills. Accounts for about 27 % of the catch.
2. **Purse Seines:** A net designed to encircle and trap a school of fish. Accounts for about 50 % of the catch. (see Figure 8.15)
3. **Troll Lines:** A long stainless-steel line, let out into a school of fish in deep water and retrieved by power-driven reels. Accounts for about 23 % of the catch.

Habitat: The natural environment where organisms live successfully.

Salmon habitats are being destroyed in many ways:

1. **Dams:** cause the obstruction of salmon migration routes.

2. **Pollution:** Organic wastes decompose and reduce the amount of oxygen in the water.
3. **Logging:** Clear cutting promotes soil erosion, causing mud and silt to cover the salmon eggs in the gravel stream beds. Log drivers also destroy spawning beds, and log jams and debris block fish migration routes.
4. **Illegal sport fishing**: often occurs in salmon-spawning grounds.
5. **River Diversions:** diverting water for industry and irrigation harms the salmon habitat. In the summer, the demand for irrigation water peaks. This is the same time the juvenile salmon migrate downstream. The irrigation process results in low water levels and warmer water temperatures that are hazardous to the young salmon and results in death.

Irrigation: the artificial watering of the land, using water diverted from rivers and lakes or pumped from underground.

Ways to Protect the Salmon Industry:

1. Both the American and Canadian Governments have to set lower quotas for salmon catches and monitor these quotas carefully.
2. Forest companies harvesting in mountain ranges above salmon spawning grounds have to use only selective cutting to gain access to resources. Selective cutting instead of clear cutting reduces the amount of soil erosion.
3. Governments need to set limits on log drives on salmon spawning rivers. This would ensure that log jams did not block migratory routes.
4. Manufacturing plants and pulp and paper plants need to be monitored closely to prevent the discharge of pollutants into the waterways.
5. Marshes and estuary lands need to be designated as protected areas to prevent further destruction of the marshlands.

Factors that have led to the decrease in salmon stocks:

1. Drift nets used by many Asian ships are designed to catch larger fish but scoop up everything in their path, including salmon.
2. Disagreements between the Canadian and American Governments have led to a breakdown in talks about salmon resource management.
3. In the absence of regulations both Canadian and American fishers have maximized their catches, further depleting the resource.
4. Increases in ocean temperatures have led to an increase in mackerel fish. Mackerel fish feed on young salmon.
5. The number of sport fishers and Native fishers has grown.

Freshwater Fishery

- Canada has an abundance of freshwater lakes. Therefore, it is not surprising the country has a large and vibrant freshwater fishery.

- The largest freshwater fishery is concentrated in Lake Erie.

- Lake Winnipeg, Great Slave Lake, and hundreds of smaller lakes in Canada produce over 180 species of freshwater fish.

- Species such as bass, perch, pickerel, trout, and whitefish are the major species.

- The freshwater fishery provides jobs for over 9,000 fishers and fish-processing workers.

- The catch is sold fresh or frozen to the United States, Japan, and Europe.

- Sport fishing is part of this fishery. It promotes tourism in provinces such as Ontario and Manitoba. It is also a major economic activity for many communities. (For example, it is the main source of income for native communities in the North.)

Lake Erie is the shallowest of the Great Lakes and the most productive fishery. This shallowness helps the fish population for the following reasons:

1. Due to its shallowness, warm temperatures are maintained. The deeper lakes are cooler.
2. Nutrient cycling from the soils of the Great Lakes Lowlands is greater than that of the Canadian Shield.
3. Light can penetrate to the bottom of Lake Erie, stimulating phytoplankton growth.
4. Shallowness produces a more thorough changing of waters. Wave action stirs water up more quickly, allowing more nutrients to reach the phytoplankton. Phytoplankton is the basis of the fish food chain.
5. There are more shallow areas and wetlands along Lake Erie's shore.

The marketing of freshwater fish in Canada:

- The location of the Great Lakes is a major advantage for marketing fish.

- A large population surrounds the Great Lakes and this provides a steady demand for fresh fish. Fresh fish can reach these consumers quickly. It is inexpensive because of the proximity. The bulk of the catch is exported to the United States and reaches stores one to two days after being caught.

Aquaculture

- The raising of marine life in a controlled environment. Often called fish farming, aquaculture breeds and raises fish in tanks, ponds and reservoirs. Since the fish are fed regularly and are safe from natural predators, they mature rapidly and successfully.

- The growth of aquaculture is largely the result of overfishing. As fish stocks are threatened, aquaculture may help to ensure that the supply available meets the demand.

- Fish farming in Canada today involves the following leading seafood: mussels, oysters, salmon, and trout. Other species are now being experimented with, mainly cod and halibut.

- The Canadian government recognizes the importance and significant benefits to society and the economy that aquaculture provides. As a result, it has made sustainable aquaculture a priority.

Sustainable Aquaculture: aquaculture development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Why might Aquaculture be called the future of the world's fishing industry?

- Aquaculture can produce large volumes of healthy mature fish in a relatively short period of time. With overfishing depleting natural fish stocks, aquaculture may be the best way to meet a growing world demand for fish.

The future of Aquaculture in Canada

- For over ten years Canada has experienced significant success with aquaculture. We have the resources to sustain this industry successfully.
- Canada is well suited to aquaculture because it has large areas with abundant amounts of freshwater for the construction of reservoirs, ponds, etc.
- Many sheltered harbours in saltwater bays provide suitable locations for aquaculture projects.