**Go Fish**

**Teacher Guide**

**Background information and statistics**

Sustainable management of fisheries is an ongoing challenge. For most species and fisheries in Canada, the fishery has increased from low-level harvest by local native communities to increased pressure from colonization, growing consumer demand and improved technology, followed by overexploitation and collapse. With increasing global demand to feed the growing human population, many fish species and fisheries have been pushed to the brink of collapse. Some examples include:

* North Atlantic cod: when John Cabot first came to Newfoundland, he described the cod as being “abundant enough to walk on”. Five centuries later, cod are at less than 2% of their historical numbers, despite a fishing moratorium (prohibition) since 1992.
* Atlantic salmon in Lake Ontario: Until the mid-19th century, Lake Ontario supported the largest freshwater population of Atlantic salmon in the world. Within 20 years, Atlantic salmon declined through a combination of habitat loss and overharvesting, and are now listed as extirpated (locally extinct). A recent effort is trying to re-establish Atlantic salmon in Lake Ontario.
* Lake trout in the Great Lakes: Lake trout were the most abundant top predator in the Great Lakes, but collapsed in the 1950’s through a combination of overexploitation, pollution, and predation by sea lampreys, an invasive species. Ongoing restoration efforts by Canada and the US have rehabilitated lake trout in Lake Superior; efforts in Lake Ontario, Lake Huron, and Lake Michigan are ongoing.
* Lake sturgeon in the Great Lakes: Lake sturgeon in the Great Lakes were overharvested at the end of the 19th century to make caviar, and are now less than 1% of their historical abundance. Commercial and recreational fishing for sturgeon has been ended, although aboriginal fishing is still allowed.
* Walleye in Lake Erie: the commercial fishery in Lake Erie is the largest commercial fishery of wild freshwater fish in North America. Populations of walleye and other fish declined dramatically in the 1970’s due to pollution and eutrophication, when Lake Erie was declared the “dead lake”. Improved sewage treatment and reduction of phosphates in detergents in the 1980’s improved water quality and enabled fish populations to recover.

**MINDS ON**

Use one of the issues above to solicit student suggestions about the impact on the different people living in the area (e.g. fishers, their families, merchants in the area, teachers, doctors, Aboriginal peoples, truck drivers, etc.), using students’ parents’ occupations as other examples.

**ACTION!**

**Go Fish – Set Up and Rules**

Mark off a large area (50m x 50m is a good size, but it can be adapted to fit your space) using cones or other markers for the field of play, separating 4 equal areas in a 2 x 2 grid. These areas represent North American, South American, European, and international waters. Place a hoola-hoop or a circle of rope in each quadrant to represent the breeding ground. Scatter 15 fish tokens in each of the four breeding grounds and then scatter the remaining fish tokens (240) more or less evenly across all 4 areas. This will be the maximum number of fish in the game. Explain to the students that an ecosystem can only support a certain number of organisms.



Students are divided into 3 groups (North America, South America and Europe), each with their own colour of pinnie. Each group has two kinds of players – 1/3 is government and 2/3 is fishers. The government players wear an armband in addition to their pinnie. Two students should be designated as International Waters Government (armband, no pinnie). The students head to land adjacent to their territorial waters (North American, South American, and European). The international waters are not populated by a team, but the fishers from all the countries can fish there as long as they don’t violate any rules that will be established later by the International Waters Government.

Based on changing rules of who is allowed to fish and how many people that fisher has to feed, students pick up fish tokens – as many as they need from wherever they want (within the rules) in the allotted time. At the end of a round, caught fish are counted and recorded by the government of each region. The number of fish remaining in the breeding ground is also counted and four times that number of fish tokens is added to the fishing grounds of that region up to the maximum number of fish in the initial set-up. Note that half the number of fish in the breeding ground will be added to the breeding ground. The other tokens are scattered evenly around the rest of the regional waters.

The basic rules are:

1. Fishers can take as many fish (tokens) as they need from wherever they want (within the rules) in the allotted time.
2. Play must stop at the teacher’s signal. “Caught” fish tokens are counted, recorded, and then returned to the teacher for redistribution.
3. You must abide by your region’s government and any additions to the rules decided by them. You are obliged to abide by the rules of another region if you are in that region.
4. The winner is the country who gets the ‘**most’** out of their fishery.

At the beginning of each round, the teacher describes the era and general scenario for that round (see “Game Progression”). At the end of each round, the teacher pools the fish tokens collected by the students and uses these to replenish fish into the regions according to how many fish remain in the breeding ground. (e. g. 4 fish tokens still in the breeding ground means that 16 new fish tokens will be added to the regional waters – 2 of the 16 will be placed in the breeding ground.) Stop the game while you are replenishing the fish population, and use the break in play to debrief the current state of affairs with a few of the following questions:

* What changes have occurred in this system?
* What trends do you notice? (human population, fish population)
* Is the resource use ‘fair’? What does ‘fair’ mean?
* Do you foresee any problems in this system for your territory?
* How might you change your choices and behavior to prevent these problems?
* What might happen to you if you do not prevent these problems?
* Do you foresee any problems for other territories?
* What could be done about those problems?
* The game of tic-tac-toe is analogous: there is a point when you realize that you just can’t win. At what stage will it be obvious that your fishery will collapse?
* Do fish recognize different territories’ boundaries? Does this affect how successful your solutions will be?
* What do you think it means to get the ‘most’ out of a resource?

Depending on the size of the playing field and the number of students, each round may take only 1 – 2 minutes. A whistle or other noisemaker to signal the stop and start of play is advised. Replenish fish tokens after each round. Since debriefing will take significantly longer, only debrief after several rounds once a pattern is starting to form. Offer government players time to consult to decide if they want to create any new rules for their region. They may also want to consult with other regions.

Students may want to repeat the game if they realize that their initial strategies were badly planned and the fishery has collapsed. Discuss the value of thinking beyond just a year at a time, especially for a system as complex as fishery management and international relations. Rerun the game to allow students to test their revised strategies.

**Go Fish - Game Progression**

**All rounds start with all fishers on “land”.**

**First Peoples** (Rounds 1-3, about 1500 AD):

Rules: Fish only in your region. Fish to a maximum of 2 fish to feed your family.

Designate two fishers from each region as the starting population in the 1500s, either Aboriginal in the America’s or European. They may fish only **within their own region reflecting the limits of the boats**. Each person is fishing to feed their family, so they represent 4 - 6 people. They only really need to catch 1 or 2 fish to do this. The fishery should be stable and sustainable. There is no government so there are no additional rules.

**Population increase/ Colonization** (Rounds 4-6, 1800s):

Rules: Fish only in your region. Fish to a maximum of 2 fish to feed your family.

The other fishers are added to each territory. These can represent an increase in the aboriginal population or colonization by non-aboriginal people, depending on each territory’s history (e.g. Europe’s population boomed before that of the Americas). Each colonist is only trying to feed 4 – 6 people (other explorers, their own families) so still only need 1 – 2 fish. The fish population may vary in size more than previously, but it should still be stable and sustainable. There is no need for government intervention, so there are no rules. Again, all fishing will be within their own region. Note: Europe does not have Aboriginal People in this round so everyone in that region is non-Aboriginal.

**Economic Development** (Rounds 7-9, 1900- 1950)

Rules: Fish only in your region. Fish to a maximum of 6 fish for European settlers in the Americas and 3 fish for Aboriginals.

European settlers in the Americas are not only supporting themselves, they are harvesting for profit, sending fish back to Europe or to people in inland areas. They increase their harvest of fish to 6. Aboriginal people may have to adapt by fishing more (3 fish tokens) to trade for goods or to store for winter if the Europeans’ harvest is decreasing their success. There are still no fishing regulations. The fish populations will vary much more; there will likely be signs of serious instability in the fishery. Again, all fishing will be within the region.

**Need for Regulation** (Rounds 10-12, 1950 - 1990)

Rules: Fish in any region unless government officials set new rules. No fish limits unless established by government officials.

The basic ratio of roles within each team should be 2 aboriginal fishers: 2-3 government officials: >5 non-aboriginal fishers. By this time, students will notice that their fish populations may be in trouble. In consultation with other players, government officials can decide on fishing regulations (e.g. you are allowed to fish in your home territory or international waters only, other territories’ catch will be confiscated if they are in your territory, no more than 4 fish each round) or other regulations (e.g. no fishing in certain areas — use skipping ropes to mark protected areas). Anyone who exceeds the limit (e.g. more than the allowed number of fish in their hand) will be penalized (e.g. all fish confiscated, 10 sit-ups, no fishing for 3 rounds, etc.).

**A word about penalties:** Be sure that a particular penalty can be performed by all members of the class so that no one is excluded due to mobility or other issues. Penalties might include a fishing ban, sit-ups, jumping jacks, giving up half your catch each round, etc.

**Modern Day** (Rounds 13-15, 1990 - Present)

Rules: Fish in any region unless your government officials set new rules. No fish limits unless established by government officials.

Technological advances in fishing (e.g. boats going farther out to sea for longer periods, radar fish-finder technologies, mechanized seine nets, drift nets) have improved the possible haul: a single fisher can bring in more fish than ever (10 fish tokens). However, this technology is often just compensating for decreasing fish populations.

Government officials may have difficulty catching poachers whose technology exceeds their own. There are also conflicts between recreational anglers and commercial fishers, aboriginal people who may have difficulty catching enough to sustain their traditional lifestyle, and a hungry world. How might we introduce these factors to our game?

**Go Fish - Suggested Solutions and Options - Solutions for Population Collapse**

At any point during the game, students’ fish populations may be in trouble. How might they recuperate? Try some “Suggested Solutions” options.( Allow the teams to consult and take advantage of only one solution each. Teams may consult with each other for a unified international plan. They may have to decide on penalties for poaching in international waters.)

**Fishing moratorium**: Fishers in a particular territory do not fish for 1 (or more) rounds to allow the fish stocks to be replenished. The fish that are born in this territory may or may not end up in this territory since fish do not respect borders. And what will happen to the fishers’ family if they don’t earn money?

**Fish Stocking:**  The addition of fish (usually large numbers of small, young fish) to an ecosystem in the hope that some will survive to breed. In the game, a territory with very few fish can have their territory stocked with fish if all team members pay a fee (e.g. 1 sit-up from everyone in the territory for 1fish).

**Special Needs Options**

Other roles can be created to accommodate varying abilities and to enhance the authenticity of the situations that will be created (e.g. fish canning company, poachers belonging to another nation not represented on the field of play).

**Indoor Option:**

The playing area can be set up in a gymnasium in case of poor weather.

**CONSOLIDATION**

Debrief the trends and events that occurred during the game using the questions suggested at the end of the Action Section of this guide. Other possible debrief/ discussion questions include those on **BLM 3 – Follow-up Assignment** if the assignment itself is not used.

**Extensions**

Go Fish can serve as an introduction to issues and conflicts surrounding fisheries management, and students may come up with their own research topics to extend their understanding of the complexities of resource management or can be referred to the list of possible topics at the end of **BLM 3 – Follow-up Assignment**.