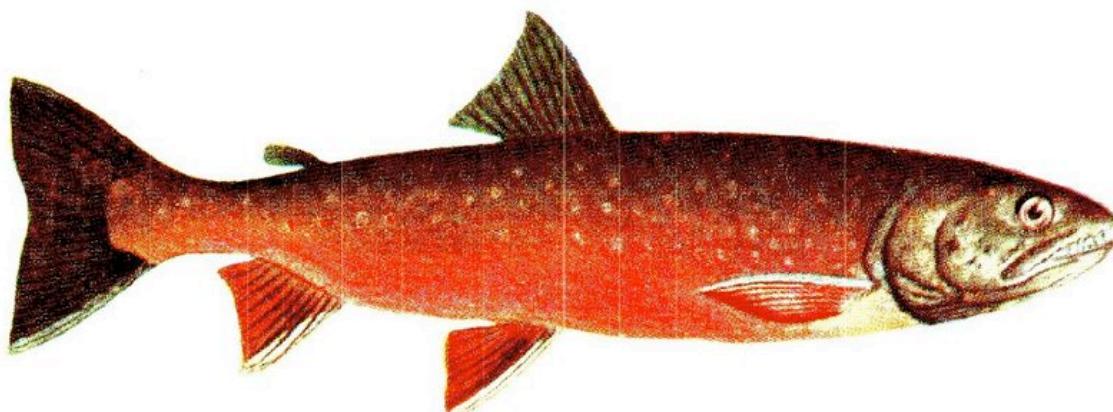


Place of Fish

Module 11 - Akshayuk Pass Expedition



PLACE OF FISH

The story of the Arctic Char delivers us to the present day in our expedition narrative. The Akshayuk Expedition has led us on a journey through time that has illustrated the many factors that have contributed to the making of the Arctic and the people who live there. We have learned of the impact of glaciers, technology, economic forces, food security, governments and climate change on the fragile ecology and culture of the Arctic. So the question arises, in an increasingly volatile world how is the north to sustain itself?

The Capital of Nunavut is Iqaluit, located on Baffin Island roughly 300 kilometers south of the Akshayuk Pass. In Inuktitut, Iqaluit means “The Place of Fish”. As we have learned, the relationship between the Inuit people and animals is very intimate – and a number of animals including the seal, the caribou and the arctic char have been, and continue to be particularly important to the Inuit people.

ARCTIC CHAR

The Arctic Char is a beautiful fish that is in the same family as its more famous ‘cousins’ to the south, the salmon and the trout, and is found throughout the circumpolar north. There are a wide variety of subspecies of char and they can vary in appearance from region to region. The char, like its close relative the salmon has the capacity to live in both fresh and salt water. Fish that can live in both fresh and salt water are called anadromous. Curiously there are some char that remain in fresh water all their lives while

others migrate annually between fresh and salt-water environments. Those that remain in fresh water tend to be smaller and less noted for the rich red color of the classic Arctic Char. There are however some species of char that live year round in fresh water that are always red, that the local people in Pangnirtung call the “red fish”.

Anadromous char breed in freshwater rivers and lakes, migrate to the ocean in the early summer, and return to their river of origin in the fall. It was during the fall migration that the Inuit would fish for char by building weirs or ‘fish dams’ across the river and spearing them with special harpoons called kavivak, which have three prongs. In the winter they would fish through the ice with gill nets or spears.

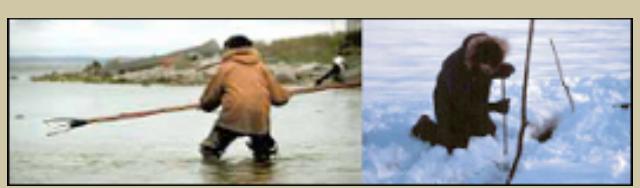


Figure 1: Inuit spear fishing in the fall and gill netting in the winter (courtesy of the Canadian Department of Fisheries & Oceans).

SUBSISTENCE IN ARCTIC CANADA

The Arctic Char is by far the single most harvested animal species in Northern Canada, accounting for a significant proportion of the subsistence economy of the Inuit people. Commercial fishing began in Arctic Canada in 1940, and there are now three fish processing plants in Nunavut, including one in Pangnirtung at the south end of the Akshayuk

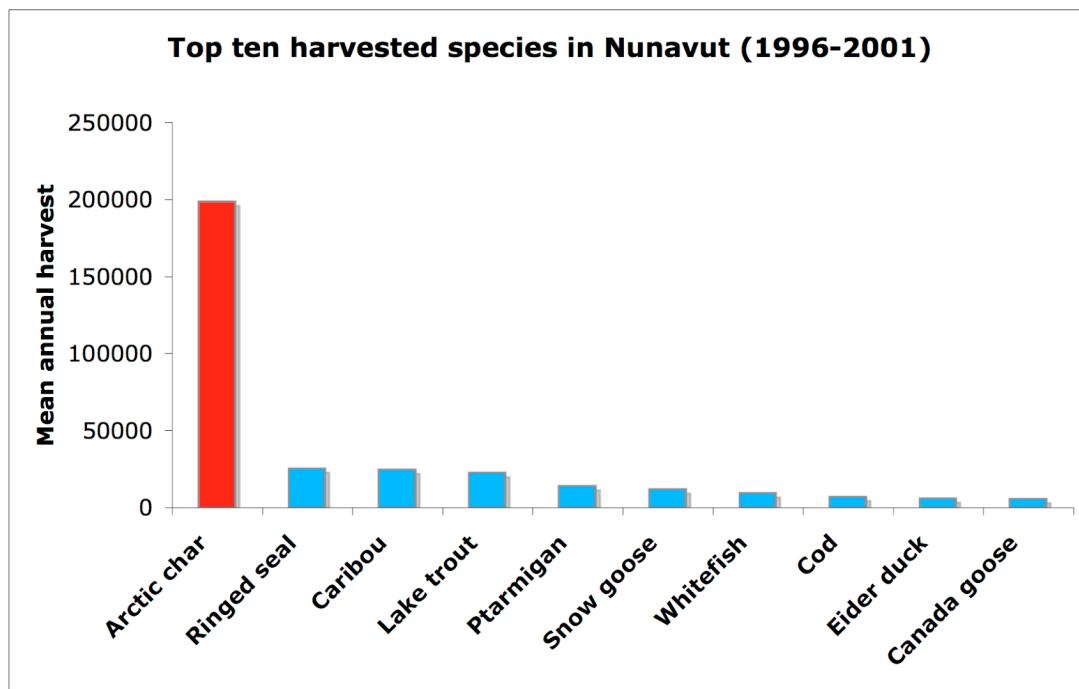


Figure 2: Top ten harvested species of animals in Nunavut by number of animals (courtesy of J.S. Moore)

Pass. The plant in Pangnirtung, a hamlet of 1275 people, employs 6 full-time permanent, and 40 full-time seasonal residents.

Figure 2 clearly illustrates how profoundly important Arctic Char is to the subsistence of the people of Nunavut, and similar patterns are found across the north. Imagine if the Arctic Char population declined, and the fish were gone. What would happen to the people of the North?

WORLD FISHERIES



One does not need to look too far to find fish populations that are in dramatic decline. An article in the Washington Post in November of 2007 announced:

"An international group of ecologists and economists warned yesterday that the world will run out of seafood by 2048 if steep declines in marine species continue at current rates, based on a four-year study of catch data and the effects of fisheries collapses."

Video Link:

Fishing for Arctic Char

[Catching Char](#)

There have been dire warnings for years about the overconsumption of fish worldwide and dramatic examples of the loss of fisheries. One of the most infamous examples is the wholesale destruction of the Atlantic cod stock. In 1992 when the Canadian government shut down the cod fishery they hoped this would allow the fish stock to regenerate. But it was too late. The northern cod stock – one of the most plentiful fisheries in the world - appears had been permanently destroyed by overfishing by humans.

SUSTAINABLE POPULATION

There is certainly concern about the long-term welfare of the Arctic Char. Char are slow growing fish and are also slow to reproduce and as such cannot sustain heavy exploitation. They are a very tasty fish and have become very popular as a delicacy, and they represent one of the most ready economic resources available to the people of Nunavut. On top of that, climate change may have a negative effect on char populations, although this has yet to be fully established.

The Inuit have been had a long and stable relationship with the Arctic Char for a thousand years. Central to their livelihood has been a profound understanding that it is essential not to harvest more from the land than is essential for survival. Kathleen Merritt's grandfather reflects this approach when he states:

"Growing up we were always told by elders not to over hunt any animal. Only to take what was

Did You Know?

Traditional Knowledge is the sum of long-standing wisdom, traditions, and practices – often passed down orally – that an indigenous people has acquired to support their traditions and collective welfare.

needed to feed the family and dog team."

The notion of hunting or fishing as *sport* is foreign to the Inuit tradition. Thus the traditional Inuit relationship to the animals ensured a sustainable ecosystem. However, this ecosystem is now at risk, as the Inuit are not the sole consumer of the Arctic Char, and the commercial exploitation of arctic fish populations has the potential to destabilize them.

Thus for the welfare of the Arctic Char and the people of the north, a means must be established to properly manage the fish stock to ensure its health and longevity. This involves incorporating traditional knowledge and practices, as well as a better understanding of char biology and ecology, into a char management plan. This is where the work of Jean-Sébastien Moore comes into play.

Jean-Sébastien is a PHD student at the University of British Columbia who is studying the Arctic Char population of the Cumberland sound, just South of the Akshayuk Pass. He is trying to establish the levels of char stock in the sound and get a better understanding of char behavior in order to provide the local Inuit of Pangnirtung with information that they can use to complement their traditional approach to the management of char populations.



Figure 3: An Arctic Char in Captivity (photo: Zouavaman le Zouave).

MICROSATELLITES

He is accomplishing this work by analyzing microsatellites in Arctic Char populations. Microsatellites are remarkable genetic markers that are unique because they undergo rapid variation from generation to generation compared to other segments of the genetic code. Microsatellites are not unique to fish, but are found in other species including humans.

Did You Know?

Microsatellites are used in human beings when there is a conflict about the identity of child's father (paternity testing). Microsatellites in the two men claiming to be the child's father are compared to the child's microsatellites. The real father is the man whose microsatellites are almost identical to the child's.

The rapid variation in microsatellite segments of the fish genetic code (genome) means that the more closely related two different fish are the fewer differences their will be in their microsatellites. Tracing microsatellite differences in the fish population in a region will allow one to establish the breeding and migration patterns of the fish. For his study Jean-Sébastien is tracing microsatellites in Arctic Char from Cumberland sound. He then will sample about 50 – 75 fish from up to 8 different rivers that flow into the sound, and using genetic typing establish where the fish with specific microsatellites have gone. By sampling the fish over a few years he can develop a picture of the behavior of the local Arctic

Char population. This information, when combined with traditional Inuit knowledge can provide a sound base upon which the people of Pangnirtung can develop a comprehensive plan to manage the local fish stock. In this manner hopefully the Arctic Char and the people of the north can continue to live in harmony for another thousand years.

When Ray and the i2P team arrive in Pangnirtung after the trek through the Pass, Jean-Sébastien will be in the community conducting the fieldwork for his project. He has kindly offered to take the team out and provide not only a demonstration of how he conducts his fieldwork, but also for a good feed of char.

Class Exercise:

The Inuit were careful to manage their natural resources properly by not consuming more animals than they needed. Is the manner in which we in North America sustainable?

Have the students look at how much food is thrown out (wasted) at their homes. How much energy is used for non-essential (leisure) activities?



Profile: Jean-Sébastien Moore – Arctic Char Research

Jean-Sébastien Moore grew up in rural Québec where he used to follow his veterinarian father from farm to farm. Fascinated by animals, he decided to study biology in university in Montréal, where his research on the genetics and evolution of fish species took him to such exotic locations as British Columbia, the Galapagos Islands, and Trinidad and Tobago. Wanting to put his skills to use solving more applied problems, he chose to pursue a PhD on Arctic char, an important food source for the Inuit of Nunavut. His current work uses modern ‘CSI-style’ genetic tools to study the movement of Arctic char. He is also interested in fishery management and on the effects of climate change on Arctic fish resources.