Fact sheet #1:
The Arctic Climate Impact Assessment – Changes in Climate

- The Arctic Climate Impact Assessment (ACIA), a project of the Arctic Council and the International Arctic Science Committee (IASC) was started in 2000. It has 17 chapters, which describe the effects of climate change and increased radiation from the sun. Indigenous peoples helped write several of those chapters, and traditional knowledge from indigenous peoples helped inform the entire assessment.

- The Arctic is expected to feel the effects of climate change more than other regions of the earth. There are several reasons for this, including a thinner Arctic atmosphere, and an increase in the heat the land and sea can absorb when they are not covered by snow and ice for so long.

- The ACIA summarises the changes seen so far as:
  - The region as a whole is warming: Central Russia, Alaska and Western Canada are warming more than other regions.

- The possible changes in the strength of some ocean currents lead some people to believe that Northwestern Europe, which is home to the Saami, may become cooler.

- What the authors of the ACIA expect to happen generally in the Arctic is an increase in temperatures of:
  - 1ºC by about 2020
  - 2ºC by about 2050
  - 3ºC by about 2080.

- Scientists predict that winters particularly will become warmer.

- Wet periods in the Arctic are generally expected to become either longer, or more frequent, or both.

- A change in the Arctic climate will also affect the climate in the rest of the world, because a lot of the world's climate processes are dependent on the Arctic.

- Most of the Arctic is expected to see a reduction in sea ice. That means the ice cover is becoming gradually smaller, and the ice that remains is generally thinner. The area covered by ice in the Arctic during the summer has been reported to be decreasing by about 3% every ten years for the last thirty years.

- Some scientific models say the Arctic will have no sea ice in the summer as soon as 2030. Other models say that change will take 100 years.

Fact Sheet #2:
The Arctic Climate Impact Assessment – Changes to Animals and Plants

- Particular plants could disappear, or become more rare, in parts of the Arctic. Some lichens, for instance are predicted to do less well in a warmer, wetter Arctic. That could affect the caribou and reindeer that eat the lichens.

- The patterns of vegetation are already changing. Indigenous peoples have observed trees growing in areas which once were covered by grasses and shrubs. This also could affect grazing animals.

- Warmer temperatures are expected to bring more insects that eat plants.

- Forest fires are predicted to increase in both North America and Russia.

- The area burned in western North America is thought to have doubled over the past thirty years and it is forecast to increase by as much as 80% over the next century.

Effects on animals

- It is expected that more unstable weather will mean more times in the autumn and winter when the temperature rises to near freezing point. This can create layers of ice on the ground. The ice makes it harder for animals such as caribou, reindeer, and muskox to reach the plants they need.

- As the sea ice disappears, it takes away an important part of the Arctic. Some animals rely on being able to use its surface to rest and breed, while other very small animals and plants at the bottom of the food chain are adapted to living near ice.

- The lack of sea ice is expected to have a direct negative impact on some species of seal, walrus, and polar bears which all use the ice either for giving birth, resting, or hunting.

- Changes in sea ice are also expected to have other large effects, because the small plants and creatures that larger creatures feed on are likely to change where they are found, and when they are most plentiful. These little plants and creatures respond to changes in light and temperature, both of which are predicted to change in the Arctic Ocean. This means that fish will move, and other animals that rely on the fish will move too, or they will not survive.

- Birds that breed in the Arctic are expected to face challenges because of changing vegetation which will change the food available to them, and will also change their breeding areas.

- Birds that rely on fish can also be threatened if changes in water temperature push the fish away from the birds' regular breeding sites.

- Some fish species, such as cod, have been shown to be very dependent on certain water temperatures. As waters warm or cool, it is likely that fish stocks will move.

- A direct effect predicted by indigenous knowledge is that caribou in some areas will likely be more bothered by insects, as the pockets of summer snow disappear.

- An indirect impact on animals is the likelihood of increased industrial activity in a warmer north. Longer ice-free seasons will open up coastal areas to oil and gas exploration and development. If the Arctic becomes a regular shipping route, it will also be open to spills of toxic materials.

John Crump
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Berlin Brown Bag, May 18, 2005

Fact Sheet #3:
Arctic Climate Impact Assessment – Effects on Indigenous Peoples

- The most obvious effect on Arctic peoples will be changes in the food resources on which they rely.

- Reindeer herders may find it difficult to find the right sort of pasture for their herds, as ice forms over the land in winter, and new kinds of plants appear in place of the older kinds of plants. Migration routes may change, as rivers may run faster in the spring, and lack of snow and ice in the autumn may make traveling difficult.

- Climate change may also change the migration times and routes taken by wild reindeer or caribou. In Siberia, this may mean that the caribou avoid traditional hunting spots at river crossings. In Canada and Alaska, changing migration routes may move the animals too far from indigenous communities for hunters to travel.

- Traditional foods such as berries may no longer thrive in the changing climate.

- Some of the most severe effects are expected for species that have adapted to the presence of ice. This means that whole seal populations are considered to be at risk, as are walrus. Coastal peoples who rely on these species may have their food options drastically reduced. Even shellfish gathered by coastal peoples could be negatively affected by climate change, as the quality of the water changes due to more sediment, and the bottom plants and animals in the food chain are affected by differences in temperature.

- It has been well documented that the physical and mental health of indigenous peoples can suffer when they are deprived of traditional foods. Increased heart disease and diabetes are physical symptoms, while food is so closely associated with culture for Arctic indigenous peoples that losing a particular food source can cause intense grief.

- Other health problems that climate change may bring include those related to storms, floods and droughts, all predicted to increase with climate change.

- Other diseases may also spread north. West Nile virus, a sometimes deadly disease spread by mosquitoes that recently arrived in North America is one possibility. The state of Alaska is already checking for evidence of the disease.

- Less land-fast ice means less safe and fast routes for the travel of coastal people to hunting areas and between communities. Changing ice strengths, qualities, and thickness can mean travel on freshwater and saltwater ice can become more unpredictable and dangerous.

- It is expected that rivers will have lower flows in the summer which would have a negative effect on transportation in some rivers. In springtime, there is expected to

be increased flooding that may affect transportation, as well as affecting dwellings built beside rivers.

- Erosion, particularly on coasts and along rivers, is expected to increase. Part of the increase is due to the warming permafrost. When the frozen ground warms up, it becomes less stable, and parts of the land slip into the water. Longer ice-free seasons, and an increase in stormy weather are also expected to add to the amount of land which is washed away.

- Indigenous communities are typically located next to water, and so are most likely to be affected by increased erosion. The indigenous community of Shishmareff in Alaska some building have already had to be moved because of rapid shoreline erosion, and the entire town is facing evacuation. The Inuit community of Tuktoyaktuk in Canada has had to invest in shoreline defences because of a similar problem.

Fact Sheet #4:
Arctic Climate Impact Assessment -Traditional Knowledge of Indigenous Peoples

- The ACIA looks at some sources of traditional knowledge, particularly a community in Alaska (Kotzebue) and some Saami communities in Finland and Russia.

Some common themes are:

- Unpredictability of weather. Annual events (such as freeze-up) are happening at different times of year. It is more difficult for elders, who are skilled at predicting short-term weather, to do so accurately.

- Difficulty of travel. Ice that develops later is often thinner, and more likely to be pushed up, making ice surfaces bumpy.

- In some regions, the quality of snow has changed, making it less suitable for building temporary shelters for those traveling on the land.

- Dropping water levels have stopped people from using some rivers and streams to get to hunting grounds.

- Lack of snow has made travel by snowmobile difficult, blocking access to harvesting sites, and creating difficulties for reindeer herders.

- Difficulty for grazing animals. Freezing rain in autumn locks feed for animals such as reindeer and caribou in ice, causing stress or death to the animals.

- Spread of new (southern) species of animals and plants. This was sometimes identified as a problem, such as the spread of mink that take ptarmigan, sometimes just as a change.

- Climate change should be considered in the context of other local and regional changes taking place, socially, culturally, and physically.