Contaminant and Nutrient Ecology in Coastal Marine Mammals and Fish

How do contaminants get to the North Slope?

Contaminants are produced and released all over the world. On the North Slope, there are many local sources. Military sites, industrial development, and unethical hunting of local mammal populations can cause contaminants to be carried around the world in air and water. Contaminants found on the North Slope may have been released in the lower 48, in Asia, or in Europe.

Once they are in the air and water, they can travel thousands of miles, so contaminants tend to concentrate in the Arctic. They are captured here in the air, and settle where it is cold. They may be taken up in plants and animals. Once they are in the food web, they are hard to get rid of.

The North Slope is fortunate that major contaminant transport pathways tend to lead elsewhere, which is not the case in other Arctic regions.

The eastern Canadian Arctic and Bering Greenland, for example, have higher levels of many contaminants. This is because of the eastern United States and Europe, carried by air and water to that part of the Arctic. The North Slope receives some pollution from Asia, but levels are still relatively low.

What do contaminants do to animals and people?

Contaminants upset our balance because they can be harmful. The many different types of contaminants can cause many different effects in humans and animals. The effects depend on how much is present and how the person or animal is exposed to it.

Organochlorines can disrupt whole systems. When present, some can cause cancer. Others may affect the ability to reproduce or cause damage to the brain. At high levels, they can cause immune system effects, including death. This kind of acute exposure is rare, usually from an industrial accident. On the North Slope, exposures would be more likely to be chronic; meaning that they would occur in small amounts over a long time.

Contaminants of subsistence harvested foods from the North Slope are fortunate that the scientific analyses have shown very low levels of organochlorines to be present in many of the subsistence foods that they eat, at levels that are below levels of public health concern.

Heavy metals also disrupt bodily functions. Mercury can hurt the brain and kidney. Cadmium can harm the kidneys and lungs. Lead has the potential to cause nerve and brain damage, also. As with organochlorines, exposure can be acute or chronic. On the North Slope, the main concern is chronic exposure.

How do organochlorines get on our food?

Organochlorines are of lipophilic, which means that they like to concentrate in fat. They have a low water solubility, so this is why they tend to concentrate in fat. They are found in the highest levels in fat, and much lower levels in lean muscle tissue. They are also present in the skin and bone.

How much organochlorines are eaten?

It is very hard to estimate exactly how much organochlorines are eaten. We can’t measure exactly how much is ingested, and how much is retained in the body. However, we can measure how much is in the tissues of the animals that eat the food, and then extrapolate to estimate how much is in the food we eat.

What do organochlorines do?

Orgainochlorines are very toxic. They can cause damage to the nervous system and the brain. At high levels, organochlorines can produce major effects depending on how much is present and how the person or animal is exposed to it.

Effects of organochlorines on the body include:
- Nervous and brain damage
- Cancer
- Reproductive issues
- Immune system effects
- Other effects depending on the specific organochlorine present

The North Slope is fortunate that the North Slope Borough Department of Wildlife Management, with the University of Alaska, has been monitoring contaminants in subsistence foods for many years. We know that the levels of these contaminants are low, and that they are not expected to cause health problems.

Organochlorines are found in many of the subsistence foods that are eaten in northern Alaska. They are present in bowhead whale, beluga whale, and ringed seal tissues. They are also present in the tissues of other marine mammals and fish. The levels of organochlorines in these tissues are low, and they are not expected to cause health problems.

For a number of years, scientists of the North Slope Borough Department of Wildlife Management, along with local subsistence hunters and graduate students, have collected tissue samples from various subsistence species from Alaska’s North Slope through the cooperation of Alaskan Native hunters.

Many locally caught marine mammals, terrestrial mammals and marine and freshwater fish were tested for organochlorines (like PCBs, DDT, heavy metals mercury, lead), and radionuclides (radioactive particles).

Results of these studies show that most contaminant levels in northern Alaska animals are low, in comparison to the rest of the Arctic. The levels of these contaminants are considered to be below levels of health concern for people. This is all good news, documenting that traditional foods are healthy.

Subsistence foods are good for you.

Northern Alaska Subsistence Food Research

Blubber and maktak (skin) represent a good source for organochlorines to be present in many of the subsistence foods that are eaten in northern Alaska. They are present in bowhead whale, beluga whale, and ringed seal tissues. The levels of organochlorines in these tissues are low, and they are not expected to cause health problems.

Organochlorine contaminants in the blubber of beluga whales have been monitored for many years. The levels of organochlorines in these tissues are low, and they are not expected to cause health problems.

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