

## Radionuclides

Radionuclides are the third worst pollutants in the world. The US EPA website says that a radio-nuclide is an unstable form of a nuclide. A nuclide is a general term that is applied to all atomic forms of an element. Nuclides are defined by the number of protons and neutrons in the nucleus, as well as by the amount of energy in the atom. They may occur naturally, but can also be produced by manmade processes. <http://water.epa.gov/lawsregs/rulesregs/sdwa/radionuclides/basicinformation.cfm#one>

**Radionuclides** are found naturally in air, water and soil. They are even found in us, because we eat and breathe radionuclides in our air and food and the water. Natural radioactivity is common in rocks and soil, in water and oceans, in building materials and in our homes. There is nowhere on Earth that you can escape natural radioactivity.

Man-made radionuclides are even more sinister. One of the biggest worldwide concerns about nuclear power production is nuclear reactors. Nuclear reactors are found aboard submarines, aircraft carriers, in nuclear power plants that power cities. When they leak, blow up or melt down, they cause tragic events. Storage of nuclear waste takes centuries to decompose, and remains toxic till the end.

### Accessing the Risks and Benefits of Eating Traditional Foods

Now that we have learned about all the contaminants that can affect our food supply, is our food safe to eat? Observations indicate that most regions of the Arctic are far from pristine. Long-range transport and bio-magnification of some substances in Arctic food webs have led to contaminant levels in people that can be 10 to 20 times higher than in most temperate regions.

Indigenous people who rely on traditional diets are likely to be more exposed to several toxic substances than the majority of people elsewhere in the world. There are no illnesses yet reported in the Arctic for which contaminants are known to be a direct cause.

**In Conclusion:** Eating our traditional foods is still the safest food source due to the fact that contamination levels are still very low and the benefits of traditional foods far outweigh the risks of contamination. [http://www.epi.hss.state.ak.us/bulletins/docs/b1998\\_06.html](http://www.epi.hss.state.ak.us/bulletins/docs/b1998_06.html)

### Credits

Telida Village has developed a series of subsistence and environmental brochures to contribute towards keeping the tribal members healthy and the environment clean for future generations, fulfilling the Indian General Assistance Program's objective to reduce the risk to human health and the environment.

### Funding

Funding for this brochure has been provided by Telida Village and the Environmental Protection Agency under the 2009 Indian General Assistance Program grant.

### Information Credits

Arctic Pollution Issues: A State of the Arctic Environment Report  
AK Division of Public Health Dept. Health and Social Services  
AK Department of Epidemiology, Health and Social Services  
U.S. Environmental Protection Agency Website

### Image Credits

Teresa Hanson  
Michigan State University Public Health Department  
Global Geography #7 <http://iashelp.com/wp-content/uploads/2009/12/Jetstream-300x172.jpg>

# Traditional Foods and Contaminants



*Photo courtesy of Teresa Hanson*

Our food comes from the land and waters that surround us. For thousands of years we have subsisted on these foods. Our traditional ways of hunting, fishing and gathering took a lot of time and required lots of energy. We were strong because we ate healthy food. Our traditional diet consisted of wild animals, fish and plant foods that provided us with all the nutrients and energy we needed. Has the world changed so much that our foods are not as healthy for us as they were for our ancestors?

**Information Brochure  
Funded by the  
Environmental  
Protection Agency**

## Pathways of Contamination

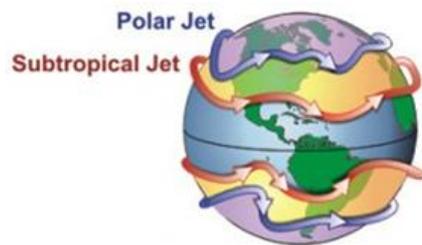
There *is* good reason to be worried, and it is because of where some of the contaminants come from and the pathways they travel to get to us, even when we are not causing any contamination! This is due to the way the waters and winds move about the earth.

### Waters

Waters move about the earth through the water cycle...Where water evaporates, then condenses into clouds, precipitates as rain or snow onto the Earth, where it collects into bodies of water, and then evaporates again. Since water can travel long distances to get to oceans, it can pass through some pretty contaminated land on its way, pick up contaminants and then drop them into the oceans.

### Winds

Wind patterns across the Earth form atmospheric type of 'rivers' that travel all across the Earth in easterly – westerly directions. Occasionally the bands of winds dip below or above their regular lines of latitude, in a north or south direction. When the Polar Jet dips south, it can push the air above much of northern Europe, Russia, China and the northern part of North America northward. Then, when the Polar Jet returns to its normal pattern, it brings the air from above these more



<http://iashelp.com/wp-content/uploads/2009/12/Jetstream-300x172.jpg>

industrialized places of the Earth to the far North...us. A mirror image of this happens to the far South of the Earth.

## How Contaminants Move

Contaminants move in many different ways while being carried in the waters and by the winds. Salmon and other migrating fish carry contaminants within their bodies as they travel upriver. They can get them from the ocean, or from natural erosion processes of the river, or from trash we desoped of improperly. In the winds, contaminants can be picked up, blown about and then drop to the Earth or waters. Some stay there, others “hop.” They can be picked up again and blown even further in sort of a “grasshopper” effect.

### POPS

Persistent Organic Pollutants (POPS) are the first of three groupings of the worst pollutants in the world. The reason is, as their name says, they are persistent. They never go away, they never biodegrade and they can easily travel around the earth's contaminants pathways.

Most POPS come from plastics, agricultural pesticides, insecticides, flame retardants (used in clothing) and other chemicals. Some of these chemicals are released through poorly vented burn boxes or wood stoves, and chemicals leaching into the water from surface paints on boats. Most POPS contain chlorine. As POPS travel, plants absorb them, animals eat the plants or drink the POPS that land in the water, and humans consume them by eating the plants and animals. They are stored in an organism's fat. They get into plants and animals food webs by; **Bioconcentration**, **Bioaccumulation** and **Biomagnification**.

### Heavy Metals (Arctic: 90-98)

Heavy Metals are the second of the three groupings of the worst pollutants in the world. Metals are manmade and naturally occurring, and we need some of them for our natural survival. But elevated levels of certain metals are toxic.

Three heavy metals are of concern; cadmium, mercury, and lead. All three can be toxic at low levels. If an

organism's uptake of a metal is bigger than its ability to get rid of it, the metal will accumulate in its body. Heavy metals usually accumulate in storage organs like the kidneys, liver and bones.

**Cadmium** - Cadmium is toxic to most forms of life. It accumulates in both plants and animals when it is consumed from a water source, as well as from some air and food sources. Serious cadmium poisoning damages the kidneys and sucks the calcium out of the bones of the skeleton. Cadmium leaves the body extremely slowly.

Metals usually do not break down, but they can change form, especially mercury, which then becomes VERY toxic.

**Mercury** - The biggest sources of mercury in the Arctic atmosphere is the burning of fossil fuels, like coal, and trash, released with a “Polar Sunrise.”



Mercury is deposited on the snow during polar sunrise. Image courtesy of Michigan State University Public Health Department

Mercury is toxic to the nervous system and mostly affects the brain in embryos and the young. Mercury also damages reproduction in animals and stunt the growth of plants.

**Lead** - Lead attaches itself to sediments and soil particles, so it does not go directly into plants and animals. It may come through the skin, breathed in through the lungs or eaten in contaminated food. Lead builds up in the liver, kidney, spleen, and skeleton, and can accumulate in eggs and embryos. It takes many years to leave a body once it gets into the skeleton. Lead damages the nervous and digestive systems.