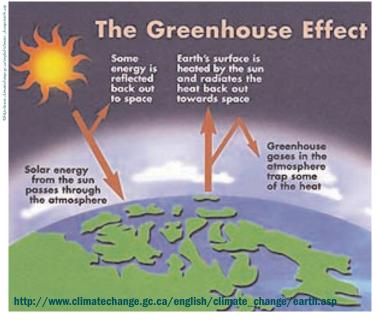


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the Arctic **Assessment** released in **November** 2004, "The **Arctic is now** experiencing some of the most rapid and severe climate

change on

Earth. "

According to

GLOBAL WARMING HITS HOME

We have been hearing about global warming for several years now. Research has shown that the Earth's average surface temperature has risen 1° F in the past century, with the most significant temperature increases occurring in the past 2 decades. Why is this happening? The gist of it is that by burning more and more fossil fuels we are releasing more greenhouse gases such as carbon dioxide, methane, and nitrous oxides into the atmosphere, which in turn trap more heat. As the name implies, these gases act just as the glass in a greenhouse does. The glass in a greenhouse allows light energy into the structure and that light is converted to heat energy, which cannot pass back through the glass. Therefore the heat is trapped and as more light energy enters and is converted to heat energy, temperatures will continue to rise.

So what does this mean? For animals that call the Arctic home it means drastic changes. Due to rising temperatures,

at twice the rate of the global average, 9% of perennial sea ice is being permanently lost per decade. This means that the ice could be gone at the century's end. For polar bears, a species that matures very slowly and sires few cubs in their lifetime, these changes could be catastrophic. As the ice disappears, polar bears are simultaneously losing access to their main food source, ring seals. They hunt the seals by locating Climate Impact air holes in the ice and capturing them when they come up for a breath. During the summer months when ice cover is typically reduced and food is inaccessible, polar bears will fast for four months, eight months when pregnant, and survive off of stored energy. The increase in temperatures has caused the ice to melt earlier and freeze later; extending the amount of time the bears must fast. Studies have shown that for each week earlier that the ice melts, bears are an average of 40 pounds lighter and produce 10% fewer cubs. (This information was collected from polar bears in the Western Hudson Bay region.) This reduction in adipose tissue means they have less energy to travel, hunt and reproduce successfully. There have been reports of polar bears approaching human development as hungry bears search for much needed energy. This could have serious repercussions on their populations.

The premature thinning ice can be an obstacle in travel as well. Distances between solid ice patches can grow too large for bears, and especially their cubs, to swim when trying to return to their natural home range. Drowning or starvation can result and sights deemed optimal for building dens may not be reached. There have even been reports of digging dens on land in the winter months. Another concern arises as polar bears progress across the ice. As polar bears travel they are walking against the drifting ice, which with changing climate, is being pushed by stronger winds. (Think about walking the wrong way up an escalator.) It requires more energy from the bears, which in turn results in lower growth and reproductive rates.

Aside from decreasing the extent of ice coverage, rising temperatures have other impacts as well. More rain in the spring and summer months, as opposed to snow, can cause dens built in snow drifts or banks to collapse killing those inside. If sufficient snow does not accumulate the dens may not be structurally sound or not be built at all. It could also reduce the thermal properties the snow walls provide to keep the altricial cubs warm. In addition, the layer of permafrost, where dens are built and can remain for over 200 years, is predicted to be reduced 50% by 2100. Loss of permafrost in these peat bank dens built under spruce trees will make the vegetation drier and more likely to combust reducing the amount of dens available or exposing bears to fire. Last, animals not normally seen as far north as the Arctic Circle have been reported to be migrating north as temperatures rise. The Grizzly Bear is one

POLAR BEAR FACTS

25-35 years Lifespan:

Average weight: males 660-1760 lbs. and females

330-660 lbs.

Number of offspring: 1-4 (typically 2) Time to weaning: 30 months Sexually mature: 5-6 years

Predators: Humans or male polar bears

Prey: Seals

Behavior:

Adaptations: Black skin to absorb heat

Clear fur that allows sunlight to warm skin, but reflects UV rays Broad forepaws for swimming and distributing weight on ice

Solitary except during mating or

mothers caring for cubs



of the animals that have recently been spotted in polar bear habitat. Their presence could pose a threat to polar bear cubs and to the genetics of the population in general. Grizzlies and polar bears have successfully interbred in captivity and could possibly do so in the wild as well.

Research has shown that there are 10% fewer cubs than 20 years ago. Although scientists do not have sufficient information to report trends in polar bear population over time yet, long-term projections are not good. And unlike animals in many other habitats, polar bears are limited in that they can not move further north than they already are to find the cooler temperatures they are accustomed to. Polar bears are top predators in the simple food web that exists in this extreme environment so effects on their population should be taken as a warning.

While we debate about signing the Kyoto Protocol or taking other steps to curb the production of greenhouse gases, polar bears face dramatic consequences. Effects from global warning are not unique to Arctic ecosystems. We are seeing repercussions worldwide. Populations in some North American species are already plummeting due to changing temperatures. The Pika, a close relative of the rabbit found in mountain habitat, prefers cool moist climates and as temperatures rise they are being forced to migrate across low elevation valleys, very high risk, to reach higher ground. Local extinctions of the species is resulting. The resiliency of many reptiles will be tested as well. Temperature determines sex for these species and research suggests that future hatching ratios will favor females over males. For the human animal, melting icecaps mean rising sea levels leading to the loss of many homes and businesses, and changing weather patterns impacting the viability of our main food and water sources.

Although polar bears and their Arctic habitat seem so far away, there is something we can do. According to the EPA, 20% of US carbon dioxide emissions come from the home, and the US produces more greenhouse gases then any other country. That means that each of us can contribute significantly to the effort to reduce greenhouse gases by taking steps in our own home. (See below) As James Thurber said," Let us not look back in anger or forward in fear, but around in awareness."

EPA TIPS TO REDUCE RELEASES OF GREENHOUSE GASES FROM YOUR HOME

- Insulate your home and furnace
- Replace or clean furnace filters once a month. (Dirty filters reduce airflow and waste energy.)
- Plant trees or shrubs to shade air-conditioning units. (This could reduce energy use by 10%)
- Install low flow showerheads. (This will reduce hot water expenses by 10-16%.)
- Shorten showers
- Turn off lights and other appliances when not in use. Replace incandescent light bulbs with compact fluorescent bulbs. (These lights use 75% less energy.)

Vocabulary

Adipose tissue - a kind of body tissue containing stored fat that serves as a source of energy and cushions and insulates vital organs Altricial – animals that are naked, blind, and helpless when born. They are dependent upon adults for care.

Find out more

- EPA: Global Warming

http://yosemite.epa.gov/oar/globalwarming.nsf/content/index.html

- Arctic Climate Impact Assessment

http://www.acia.uaf.edu/PDFs/Testimony.pdf

- Integrative and Comparative Biology April 2004 http://www.findarticles.com/p/articles/mi qa4054/is 200404/ai n9356419

- Defenders of Wildlife

http://www.defenders.org/wildlife/globalwarming/wildlife.html

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