The Great Lakes Policy Report

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The Great Lakes Policy Report is a quarterly news report published by the Little Traverse Bay Bands of Odawa Indians Natural Resource Department's Environmental Services Program. The report features Great Lakes policy updates and relevant initiatives, projects, and issues.

The report is meant to be an educational document, and does not express an opinion on the subjects discussed. Stories and information cited in this report are taken from a variety of sources including news articles, non-governmental reports, interviews, and government documents.

Climate Change Introduction

The Earth's climate is changing. Warming atmospheric temperatures over the last century, monitored by scientifically precise tools (such as satellites), reveal the presence of climate change. The relatively simple act of measuring and recording the Earth's atmospheric temperature at the present day is not complicated or controversial. More complicated, however, are methods of measuring past atmospheric temperatures, projecting what impacts current temperature increases may cause in the future, and how to best prepare for future conditions. This article is intended to explore natural processes that govern the Earth's climate and how humans can influence these processes.

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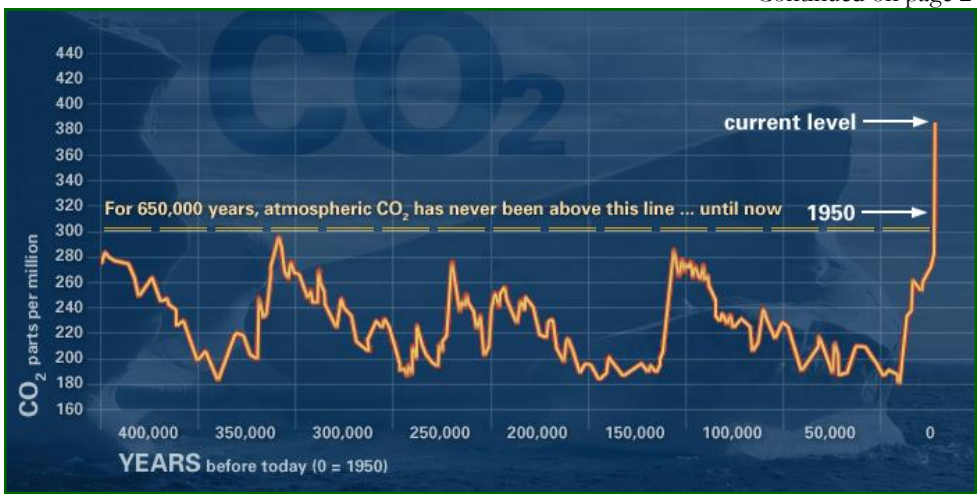

The graph provides evidence that atmospheric carbon dioxide (CO_2) levels have increased since modern human industry to levels not seen in over four hundred thousand years. Photo credit: NOAA

Safe Great Lakes Beaches: Water Quality Monitoring

It's summer and that means many of us head to the beach to enjoy cool fresh water and sandy shores. Living in the Great Lakes region, we have access to five of the largest fresh water lakes in the world and countless smaller inland lakes. But even with all the clear fresh water , it's important to protect ourselves from exposure to potential health concerns at the beach. Usually water quality of the Great Lakes and inland lakes is good and poses no health concerns, but every so often beaches are unsafe for swimming. Thanks to beach water monitoring, beachgoers can reduce health risks with access to up-to-date information on beach advisories and closings.

Beach water monitoring detects bacteria

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Climate Change Introduction continued from page 1

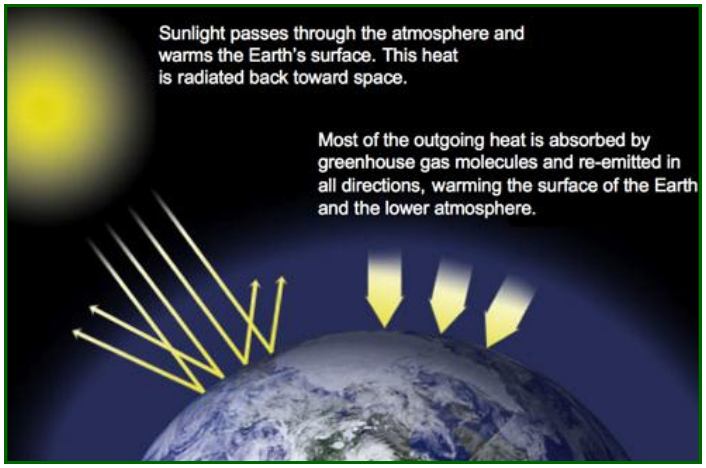
The Earth's climate has changed numerous times over its 4.5 billion year existence. These changes have caused varied physical and biological periods; from the entire planet's surface being covered in a jungle and forest-type ecosystems to large areas, such as most of North America, being covered in glaciers. It is believed that human civilization as we know it is the result of the most recent naturally occurring change in the Earth's climate. According to the National Aeronautics and Space Administration (NASA)'s Global Climate Change website "in the last 650,000 years there have been seven cycles of glacial advance and retreat, with the abrupt end of the last ice age about 7,000 years ago marking the beginning of the modern climate era — and of human civilization."

So what causes changes in the Earth's climate? Changes in the Earth's climate can occur from a variety of causes and over varying timeframes. For example, volcanic eruptions that release large amounts of water and carbon dioxide (CO_2) cause temperature increases. However, the CO_2 produced is considered insignificant compared to carbon emissions created by humans. Volcanoes also release particulate matter (ash) and gasses which block out sunrays and have a cooling effect. A single large volcanic eruption generally only impacts the Earth's atmosphere, and thus climate, for a few years.

The oceans also play an important role in shaping Earth's climate. Atmospheric and ocean temperatures interact, with each impacting the other. For example, deep ocean circulation moves cold water from the North and South Poles toward the equator; at the same time warm water is circulated from the equator toward the poles. Without the ocean circulating the cold and warm water, the ocean near the poles would be colder and the ocean near the equator would be warmer. These global ocean currents significantly influence surface air pressure and temperatures. Additionally, the interactions between the ocean and the atmosphere produce natural processes known as El Niño and La Niña, which help shape our climate. El Niño/La Niña refers to climate patterns that occur across the tropical Pacific Ocean, every 3-4 years, where surface water temperature warms (El Niño) and cools (La Niña) and therefore change the air pressure causing variations in normal weather and patterns.

However, most changes to the Earth's long term climate are "attributed to very small variations in Earth's orbit that change the amount of solar energy our planet receives" according to NASA. Consequently, the amount of energy the Earth "receives" and, just as important, retains from the sun is dictated by the heat-trapping gases present in the atmosphere. The presence of these gases cause what is known as the greenhouse effect. Over the last century human activities have been changing the natural greenhouse effect by emitting greenhouse gases into the atmosphere, therefore increasing the quantity of some gases.

Significant greenhouse gases include water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). These gases trap thermal energy released from the Earth's surface, preventing heat from leaving the atmosphere, which increases the temperature in the lower atmosphere. This has a similar result to a greenhouse or the inside of your car heating up on a sunny day.



Visualization of the greenhouse gas effect of Earth's atmosphere. Photo credit: NASA

If the climate can change naturally and natural processes govern the climate, how do we know that humans are the cause of modern climate change? First, we must recognize that climate change (natural or man-made) is mainly caused by warming, or cooling, of the atmosphere over the long term.

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Human activities release a lot of different gases and particulate matter into the atmosphere, including carbon dioxide (CO_2) and methane (CH_4). CO_2 is mainly released through the use of coal and oil; both are carbon-based fuels. When an automobile burns its fuel (gasoline), CO_2 is emitted as a by-product. The same is true when a power plant burns coal to produce electricity – it releases CO_2 through its smoke stack. According to the U.S. EPA (2012), about 71% of the United States' CO_2 emissions since 1990 come from transportation (31%) and electricity production (40%).

Methane (CH_4) is another significant greenhouse gas that humans release into the atmosphere. There are three key activities that release methane in the U.S. First is the burning of natural gas, another carbon-based fuel, for energy needs (e.g. heat, electricity, fuel). The second is from ruminant livestock production. Animals such as cows and sheep have microorganisms in their stomach that release methane which the animal belches into the air. "Globally ruminant livestock produce about 80 million metric tons of methane annually, accounting for about 28% of global methane emissions from human-related activities…with about 100 million cattle in the U.S. and 1.2 billion…in the world, ruminants are one of the largest methane sources. In the U.S., cattle… (are) accounting for 20% of U.S. methane emissions" (U.S. EPA 2007). The third leading source of methane release in the U.S. are landfills. Once trash is buried, microorganisms feed on it and release methane into the air.

Human activities, such as gasoline use, energy production, and livestock rearing, release large amounts of greenhouse gases into the atmosphere, thus increasing the concentration (quantity) of those gases. Increased concentrations of heat trapping gases in the atmosphere result in a warmer climate because it is harder for heat to escape. The Intergovernmental Panel on Climate Change – an international organization of thousands of climate related scientists – came to the conclusion in 2007 that humans are significantly impacting Earth's climate. "Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic (human) greenhouse gas concentrations" (IPCC 2007).

In future articles, our focus will turn to projected climate change impacts on the Great Lakes region and how we as humans can best address critical impacts.

Sources: NASA Global Climate Change, http://climate.nasa.gov/; U.S. EPA 2007, http://www.epa.gov/rlep/faq.html; U.S. EPA 2012, http://www.epa.gov/climatechange/ghgemissions/gases.html; IPCC 2007, http://www.ipcc.ch/publications_and_data/ar4/wg1/en/spmsspm-understanding-and.html

Great Lakes Geography

The difference between climate and weather

When discussing climate change in a specific region it is important to remember that climate is not the same thing as weather. It is easy to get confused over the difference since climate and weather are directly related, but the word 'climate' describes a long term pattern (decades to centuries) of weather events. The Michigan Sea Grant distinguishes the two in this way: "Weather is day-to-day conditions at a specific place, while climate is the weather that prevails in a region over a long period of time. In other words, climate is average or typical weather."

"Understanding climate and weather in the Great Lakes region is important because we use that information to guide many significant personal and societal decisions" says the Michigan Sea Grant. For example, we use historic climate patterns to decide when to plant specific crops in the spring months, or when to check for fish to catch at a river mouth. Weather, on the other hand, helps us decide when to water out garden during the week, and if we should go to the beach on a specific day.

The Great Lakes climate is the reason we live in a "four seasons" region. The Great Lakes climate has dictated what plant and animal species have lived here for the last several hundred years. It also determines when certain things happen. For example, when birds migrate over winter, and when bears hibernate are based on these species evolving for hundreds of years in the specific climate.

When 'climate change' is used to describe climate processes we now know that its meaning should be reserved for observed or likely changes based on long term (decades to centuries) historical records and future projections.

GREAT LAKES POLICY WATCH

In this section you can find current legislation and proposed regulations related to the Great Lakes. When applicable public comment periods and information on how to comment will be given.

Rules and Regulations

The Michigan Senate has passed SB 1130 – A bill to modify the rules for development of property designated as critical dunes and the process for designating critical dunes. The State House sent the bill back to the Senate for further review.

Policy

The proposed U.S. House of Representatives 2013 budget reduces $50 million from the Great Lakes Restoration Initiative. The bill funds the program at $250 million for fiscal year 2013, a reduction from the President's proposed $300 million and fiscal year 2012 funding level of $300 million—and is almost half of the $475 million allocated in fiscal year 2010.

The International Joint Commission (IJC) is inviting public comment on the final report of its International Upper Great Lakes Study, "Lake Superior Regulation: Addressing Uncertainty in Upper Great Lakes Water Levels." Comments will be accepted at public hearings and by mail, email and on-line until August 31, 2012. Visit http://www.ijc.org/iuglsreport/ for more information.

Great Lakes Beaches Water Quality Monitoring

that are associated with pathogens from sewage or fecal contamination that pose health risks to humans. According to the EPA, "people swimming in water contaminated with these types of pathogens can contract diseases of the gastrointestinal tract, eyes, ears, skin, and upper respiratory tract."

These pathogens can have a number of different sources, including stormwater, sewer system overflows, waste water treatment plant errors, and pet and wildlife waste. When monitoring detects high levels of bacteria, local or state governments issue beach advisories or closures. The USGS says, "Beach advisories and closures are intended to protect swimmers from illness caused by fecal contamination." Once additional monitoring shows that the water quality is meeting applicable standards the advisory or closure is lifted.

As beach managers and water quality researchers continue to address this issue, new tools have been developed to aid the public in receiving up-to-date information about beach advisories and closures. The Michigan Department of Environmental Quality's Beach Guard website displays the current beach advisories for public and private beaches in Michigan. Users can also access the advisory history, sampling results, and monitoring information of 1,238 public and 485 private beaches in Michigan. Visit http://www.deq.state.mi.us/beach/ to access the Beach Guard website.

The Great Lakes BeachCast website is another regionally specific beach advisory tool. This site has an interactive map that can display monitoring results and warnings based on the user's zip code. The website also has a free download for the MyBeachCast app for the Android smartphones. The app allows users to access real time information on beaches for all of the Great Lakes states. Visit http://glin.net/beachcast/ to access Great Lakes BeachCast.

A day at the beach can be a great way to spend a hot summer day. But it's important to be safe while enjoying the cool fresh water. By using the tools and information discussed above, beachgoers can have a safe, relaxing day at the beach this summer. For more information on beach water monitoring and research visit: USGS's Great Lakes beaches website at http://greatlakesbeaches.usgs.gov/ and EPA's Beach Monitoring website at http://water.epa.gov/type/oceb/beaches/beaches_index.cfm/.

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Great Lakes RESTORATION

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