WHAT IS CLIMATE CHANGE?

Basic Information[1]

Earth's climate has changed many times over the course of the planet's history, ranging from ice ages to long periods of intense heat. Until now, these changes have occurred in response to natural events, like volcanic eruptions or variations in the amount of energy produced by the sun. However, in the 18th century during the time of the Industrial Revolution, human activities began to significantly contribute to a worldwide warming trend. People began to burn fossil fuels like coal and oil and deforest the land at rates unprecedented in Earth's history. These activities have changed the composition of the atmosphere and Earth's climate.

Climate change is a complex problem stemming from unsustainable policies and practices in almost every corner of the world. Yet the basic science behind climate change is quite simple. The sun radiates vast amounts of energy onto Earth. Most of the energy bounces off the surface of the planet and returns to space. But some of the energy is trapped by greenhouse gases, like carbon dioxide and methane, which form a sort of buffer around the planet. The heat-trapping effect is vital for life to exist because it keeps the planet far warmer than it otherwise would be. Without greenhouse gases, the planet would be far too cold to inhabit.

Naturally occurring levels of greenhouse gases allow life to flourish on Earth. Yet over the past two centuries, certain human activities have caused an overabundance to build up in the atmosphere. Carbon dioxide, a by-product of burning fossil fuels, is one major contributor to climate change. This problem is intensified by deforestation: cutting down the trees that use carbon dioxide to grow. Because all plants are made of carbon, forests are one of the most important storehouses of carbon on the planet.[2] Human activities, like transportation, livestock management, and agriculture, add more greenhouse gases to the atmosphere every year.

As greenhouse gas concentrations increase, too much heat is trapped around the planet. This leads to rising global temperatures, and many other associated effects. The average temperature in the United States has increased by 1.3°F to 1.9°F over the last 100 years, and most of this increase has occurred since 1970.[3] July 2016 was the hottest month in recorded history, the 10th record hot month in a row, according to NASA.[4]

2008 Ethan Fire along Gila River

Increased warming, drought, and insect outbreaks, caused by or linked to climate change, have increased wildfires and impacts to people & ecosystems in the Southwest. Source: U.S. National Climate Assessment. Photo: 2008 Ethan Fire along Gila River, GRIC DEQ.

While such a small change may seem insignificant, Earth's delicate balance has been disrupted, leading to rapid environmental change. Temperatures are projected to rise another 2°F to 4°F in most areas of the United States over the next few decades. Climate models project that by the end of this century, air temperatures in the United States will rise roughly 3°F to 5°F under a lower emissions scenario, which would require substantial reductions in greenhouse gas emissions, and a 5°F to 10°F rise for a higher emissions scenario assuming we continue on our current path of increasing emissions.[5]

Terminology

- *Mitigation:* Dealing with causes. Actions that reduce level of greenhouse gases in the atmosphere.
- *Adaptation:* Dealing with effects. Actions that minimize climate change impacts and vulnerabilities (susceptibility to harm).

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Tribes experiencing climate change

Communities around the globe are already experiencing the effects of a changing climate, such as increased food and water insecurity (e.g., shortages or scarcity), rapid erosion, persistent extreme weather events, and observed changes in the timing of seasons. Tribal communities are among those observing and experiencing these impacts first and foremost. According to the U.S. National Climate Assessment, "[t]he peoples, lands, and resources of indigenous communities in the United States, including Alaska and the Pacific Rim, face an array of climate change impacts and vulnerabilities that threaten many Native communities. The consequences of observed and projected climate change have and will undermine indigenous ways of life that have persisted for thousands of years."[6]

Gila River Indian Community: Planning & Preparing for Climate Change Impacts

Tribes all over the country have started to conduct vulnerability assessments and develop adaptation plans. Tribes in the Southwest have prepared drought contingency plans, multi-hazard mitigation plans, and conducted vulnerability assessments. However, to our knowledge, GRIC will be one of the first Tribal communities in the Southwest to develop a full adaptation plan. Some of the reasons Tribes are planning and preparing for climate change impacts include, to:

- Protect traditional lifestyles, cultural resources, food, water, and human health,
- Involve community & leadership to create awareness & buy-in,
- Be **proactive** instead of reactive; costs less and will make the Tribe better equipped to handle change,
- Use resources efficiently and ensure Tribal government services and infrastructure remain effective in future climate conditions; and
- Be ready for funding opportunities, research, and studies to fill data gaps.

GRIC community members participate in workshop to inform the GRIC climate adaptation plan.

Gila River Indian Community is taking a multi-sector, holistic approach to adaptation. The specific planning topics in GRIC's adaptation planning process include: water, agriculture, cultural resources, emergency management, fire management, public health, and transportation.

For additional information and to learn how you can get involved in preparing GRIC for climate change impacts, contact:

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[1] Text in this section was adapted from the Institute for Tribal Environmental Professionals' Tribes and Climate Change Website, http://www7.nau.edu/itep/main/tcc/Basic/

[2] Ingerson, A. 2007. U.S. forest carbon and climate change. Washington, DC: The Wilderness Society.

[3] Melillo, J. M., T.C. Richmond, and G. W. Yohe, eds. 2014 Climate Change Impacts in the United States: The Third National Climate Assessment. Washington, DC: U.S. Global Change Research Program. http://nca2014.globalchange.gov/

[4] Seth Borenstein. 2016. NASA: Last month was Earth's hottest in recorded history. *Business Insider*, August 15, http://www.businessinsider.com/ap-nasa-last-month-was-earths-hottest-in-recorded-history-2016-8

[5] Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, eds. 2014. Climate Change Impacts in the United States: The Third National Climate Assessment. Washington, DC: U.S. Global Change Research Program. http://nca2014.globalchange.gov/

[6] Bennett, T.M.B., N.G Maynard, P. Cochran, R. Gough, K. Lynn, J. Maldonado, G. Voggesser, S. Wotkyns, and K. Cozzetto. 2014. Indigenous peoples, lands, and resources. In *Climate change impacts in the United States: the third national climate assessment*, ed. J.M. Melillo, T.C. Richmond, and G.W. Yohe. Washington, D.C.: U.S. Global Change Research Program. http://nca2014.globalchange.gov/report/sectors/indigenous-peoples

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