

New Climate Extremes Keep Piling Up

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(700 words)

Across the USA we are getting hit by one climate extreme after another. Yet, we keep thickening the blanket of greenhouse gases that hold in heat. This not only raises the Earth's average temperature, but this added heat energy is also the driving force behind storms, droughts, floods, and all other kinds of weather we experience. For decades, climate scientists have been predicting more climate extremes. People across the Earth are now experiencing worse extremes year after year.

New terms like “bomb cyclone”, “atmospheric river”, “polar vortex”, and “mega-drought” have now become part of our everyday vocabulary. In just the last month we have seen bomb cyclones hit the Northeast, and most recently the West coast, as waves in the climate change-destabilized polar vortex keep blowing by from west to east. We have seen the damage caused by these extreme storms, but even they have not been enough to refill our large western reservoirs drained by long-term mega-drought.

Of course, in the Western US we need every drop, but it sure would be nice if the downpours didn't happen all at once. If only the rain could come slowly enough to soak into the ground and nurture plants. These extreme storms eat away at our pocket books. Winter storm Elliott resulted in \$5.4 billion insurance losses across 42 states. Costs of the West Coast storm are still coming in. Now the Southeast is getting hit by more frequent and more intense tornadoes. The costs of climate disasters aren't just from extreme storms. In 2020 the US lost \$111.5 billion to climate disasters including storms, flooding, drought, and wildfires. In 2021 it was \$152.6 billion, and in 2022 it was over \$170 billion.

In Flagstaff and across Northern Arizona, we are familiar with the economic and many other costs of extreme weather. Climate change is drying out our rangelands and forests, and many folks have lost their homes to wildfire and the flooding that follows. Monsoon downpours have become more intense, and this only worsens the flooding and erosion of our watersheds and riverbeds. We're still repairing watershed damage from the 2010 Schultz Fire, and we have a huge need for armoring and expanding our runoff infrastructure if we want to avoid more floods like the ones we've had for the last two summers.

New heat extremes are affecting us directly and indirectly in Northern Arizona. As summer temperatures continue to climb, more of us are contemplating the cost of cooling systems for our homes. Folks in Central Arizona are now looking to escape summer temperatures that are regularly above 110°F (= 43°C) with extremes now

above 120°F (= 49°C). This pressure on our weekend rental and second home markets will continue to strain our supply of affordable housing.

We all know that the current megadrought is drying up the Colorado River and its reservoirs. While most of us in Northern Arizona do not get our drinking water from the Colorado, it still affects us. It provides 36% of Arizona's water, less and less of which is used for agriculture as our cities grow and as our water tables drop. Acres of agricultural land have been declining in Arizona since 1980, and crop yields are projected to decline by 12% for each 1°C (=1.8°F) rise in temperature.

Yes, a lot of our food comes from out of state, but new climate extremes are affecting farmers everywhere. High winds and heat have made corn production in Iowa more erratic while corn production in northern Alberta is rising steadily. More frequent and more intense drought is driving corn, bean, and melon farmers off the land in Guatemala, El Salvador, and Honduras. New rainfall patterns have brought in new coffee diseases in these countries making it harder for coffee growers. Many of these farmers and their dependents have become climate refugees, and some flee to our southern border. We know that food prices are rising. At what point will we see the kinds of food shortages that people are experiencing in other parts of the world?

What can we expect in 2023? One thing is for sure. We will see many more new climate extremes. Perhaps it's time to cut our greenhouse gas emissions...?

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