SPEAK UP & ACT NOW: SHORT GUIDES TO ADDRESS CLIMATE CHANGE[i]

EXTREME WEATHER

QUESTION: Why are we having more extreme weather and how is it harmful?

ANSWER: First, it is important to understand the difference between weather and climate. Weather refers to the short-term state of the atmosphere at a specific time and place, while climate describes the average weather conditions of a region over a long period, typically decades. Climate trends affect weather. Global average air and ocean temperatures are markedly increasing. Both hit record highs in 2023 and 2024. This is due to human-caused climate change—the rapid buildup of carbon dioxide and other greenhouse gases in the atmosphere from human activities, particularly the burning of fossil fuels. Warmer temperatures increase the likelihood and size of extreme weather events. Often these effects are not linear. The details are complex, but the basic idea is that a small shift in climate can have outsized impacts on weather.

Severe Storms, Including Hurricanes. Climate trends are causing more severe storms. Warmer temperatures cause more evaporation. And warmer air holds more moisture. This results in more precipitation. Warmer temperatures alter atmospheric circulation, too. The polar jet stream is becoming "wavier" and slower, causing storms to stay put longer. Warmer ocean water also provides more energy for hurricanes to form and intensify. Climate change made the high ocean temperatures that fueled Hurricane Helene 200-500 times more likely. Scientists also concluded Hurricane Helene's wind speed was about 10% higher due to climate change and rainfall was from 10-50% greater (World Weather Attribution, 2024; Risser, North, and Wehner, 2024). Wind damage increases exponentially with intensity, meaning the 10% increase made Hurricane Helene twice as destructive.

Droughts. Climate trends are causing more droughts. Droughts are worsened by less frequent, more intense rainfall, which rapidly saturates the soil. This causes much of the rain to run off rather than soak into the ground. Droughts are resulting in longer fire seasons and causing water and food scarcity around the world. According to a March 2022 article in *Nature Climate Change*, in the southwestern U.S. the last two decades [2000-2021] have been the driest in at least 1,200 years.

Extreme Heat. Climate trends are causing extreme heat. Global warming is not just causing an increase in average global temperature, the entire temperature range for particular times and places has shifted, too. This means that the hottest temperatures are getting hotter. In addition to the direct impacts of extreme heat, hotter years typically have more wildfires. Globally, the frequency of extreme wildfire events has more than doubled in the last 20 years.

WHY IS THIS EXTREME WEATHER HARMFUL?

The flooding, high winds, and wildfires of extreme weather cause massive destruction to infrastructure and property, and a large number of injuries, illnesses, and deaths. These events often result in extended periods where communities are without water, electricity, communication, or the ability to travel in or out of the area. Extreme weather has a huge economic impact—to households and

individual businesses and also entire communities, regions, and nations. It also wreaks havoc on insurance markets, which use historical norms to predict future risk. As the climate changes, those predictions become less reliable. Then, when faced with higher-than-expected claims, insurers raise premiums, reduce coverage, or pull out altogether, leaving individuals and businesses without protection. According to the International Chamber of Commerce, extreme weather events have cost the global economy over $2 trillion from 2014-2023. In 2023, extreme weather events damage in the U.S. alone amounted to over $93 billion according to the National Oceanic and Atmospheric Administration.

Extreme heat is a public health crisis, affecting the very young and old, chronically ill, poor, and unhoused as well as outdoor workers. Smoke inhalation from wildfires causes more hospitalizations than any other type of air pollution. And in the U.S., two-thirds of waterborne disease outbreaks have followed extreme storms.

ACTIONS – WHAT CAN WE DO?

1. **REDUCE GREENHOUSE GASES RELEASED INTO THE ATMOSPHERE TO SLOW GLOBAL WARMING.** The burning of fossil fuels is the leading cause of greenhouse gas emissions. We must reduce our reliance on fossil fuels by powering our electrical grid with renewable energy and electrifying everything. For more actions, see "Speak Up & Act Now: Short Guides to Address Climate Change" on home energy use; transportation; food production, consumption, and waste; plastic; renewable energy; government action; and fossil fuel and utility companies.
2. **ADAPT AND BETTER PREPARE FOR THESE EXTREME EVENTS, ENSURING THAT ACTIONS PROTECT VULNERABLE POPULATIONS.**
    - Keep emergency supplies on hand; create an emergency "Go Bag" and family emergency plan, including an evacuation plan.
    - Advocate for local infrastructure upgrades and emergency backup systems designed for more severe storms, droughts, and extreme heat, and for managed retreat from coastal areas experiencing sea level rise and larger storm surges.
    - Support funding for climate change adaptation and resilience projects, particularly for lower-income communities and countries.

RESOURCES – WHERE CAN I LEARN MORE?

- Extreme Weather and Climate Change, NASA
- Mapped: How Climate Change Affects Extreme Weather Around the World by Robert McSweeney and Ayesha Tandon, Carbon Brief
- Special Series: Weather Volatility in the United States, Resources for the Future
- How to Prepare for Extreme Weather with Community-Powered Resilience by Katie O'Reilly, *Sierra*, the magazine of the Sierra Club

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[i] Prepared by members of the University of Richmond Osher Special Interest Group on addressing the climate crisis (2024-25)