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Endangerment of Ecosystems by Climate Change Caused by Greenhouse Gases from Human Activities

Comment on U.S. Environmental Protection Agency proposed rule
Docket EPA–HQ–OAR–2025–0194

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Published scientific evidence shows that climate change caused by greenhouse gases from human activities endangers natural ecosystems around the world and in the United States, including in U.S. national parks, as shown in the latest report of the Intergovernmental Panel on Climate Change (IPCC 2022). The scientific evidence shows that the emissions of greenhouse gases from human activities that cause climate change endanger the public health and public welfare of current and future generations. This strongly supports maintaining the endangerment finding of the U.S. Environmental Protection Agency (US EPA 2009).

IPCC specifically assesses detection and attribution research that uses field observations and that finds that human-caused climate change dominates other factors in causing numerous impacts on natural ecosystems (Parmesan et al. 2022). Detection examines if a change is statistically significantly different from natural variation. Attribution analyzes the relative weight of anthropogenic climate change compared to agricultural expansion, deforestation, urbanization, air and water pollution, natural variability, or other non-climate change factors in causing detected changes.

Some major examples:

(1) **Wildfire** - Anthropogenic climate change doubled burned area above natural levels across the western U.S. from 1984 to 2015 (Abatzoglou and Williams 2016) and tripled burned area above natural levels in California from 1996 to 2021 (Turco et al. 2023). Climate change dominated other factors in increasing the area burned by wildfire above natural levels in western North America, southern South America, Central Asia, and southern Australia from 2003 to 2019 (Burton et al. 2024). These research efforts analyzed historical burned area, established empirical relationships of burned area to observed temperature and aridity, and calculated the fraction of burned area attributable to anthropogenic climate change.

(2) **Animal extinctions and extirpations** - Anthropogenic climate change has driven to extinction two animal species: the golden toad (*Incilius periglenes*) in Costa Rica, due to lifting of the cloud deck in tropical forest, allowing infection by a lethal pathogen (Pounds et al. 2006), and the Bramble Cay melomys rodent (*Melomys rubicola*) in Australia, due to sea level rise inundating its island habitat (Waller et al. 2017). Climate change has also caused extirpations (local disappearances) of over 400 plant and animal species (Wiens 2016). For example, climate change has reduced bumblebee species richness as much as one-third in parts of North America and Europe (Soroye et al. 2020).

(3) **Tree mortality** - Through drought, wildfire increases, and bark beetles, climate change doubled tree mortality across the western U.S. from 1955 to 2007 (van Mantgem et al. 2009) and increased tree mortality 25% in California from 2012 to 2021 (Robbins et al. 2022).

(4) **U.S. national parks** - Spatial analyses of climate change across the entire United States and all U.S. national parks (417 in 2018) showed that anthropogenic climate change increased temperatures of the national park area at double the rate of the country as a whole and caused more declines of precipitation proportionally in the national park area than the country as a whole (Gonzalez et al. 2018). The field research documenting wildfire increases above natural levels (Abatzoglou and Williams 2016, Turco et al. 2023) and tree mortality increases (van Mantgem et al. 2009, Robbins et al. 2022) used data from Yellowstone, Yosemite, Sequoia, Grand Canyon, and Rocky Mountain National Parks.

Wildfire that exceeds natural levels endangers people, homes, and ecosystem integrity. Wildfire that exceeds natural levels, increased tree mortality, and the loss of native plant and animal species endanger the integrity of national park ecosystems and impair the conservation of national parks. Natural ecosystems provide clean water, food, inspiring places, and other services essential for human well-being (Diaz et al. 2019).

Therefore, strong scientific evidence supports maintaining the endangerment finding of the U.S. Environmental Protection Agency (US EPA 2009).

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