

Idaho at a Glance: CLIMATE OVERVIEW

Idaho's economy depends on its natural resources. From small farms to diverse agribusinesses, high-tech to hydropower, forests to forest products, and recreation technology to tourism, key economic drivers require clean water and healthy land. The changing climate is affecting Idaho's natural resources, posing risks and opportunities for Idaho businesses and communities. This *Idaho at a Glance* focuses on wildfire frequency, water availability, and human health – all of which impact Idaho's economy.

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Wildfire

Wildfire, climate, and precipitation are connected. Earlier spring snowmelt coupled with warmer summer temperatures results in drier vegetation and a longer period of fire potential in forests of the Northern Rockies. Earlier drought conditions also slow forest growthⁱ. Fire also leads to significant property damage, including loss of historical buildings and monuments. Increases in the fire season length could have major consequences for the wood and paper industry, which contributes \$1.3B to Idaho's gross domestic productⁱⁱ.

The Western U.S. wildfire season **increased from 5 months** in the 1970s **to 7 months today**ⁱⁱⁱ.

Since 1986, longer, warmer summers in the Western U.S. have resulted in **4X as many major wildfires** and **6X as much area of forest burned**, compared to 1970-1986. The **average timespan** of large fires has **increased** from **7.5** to **37.1** days.^{iv}

Warming since the 1970s

has been responsible for about half the **increased dryness** in Western U.S. forests.

The **drier** it was, the **more forest burned**.

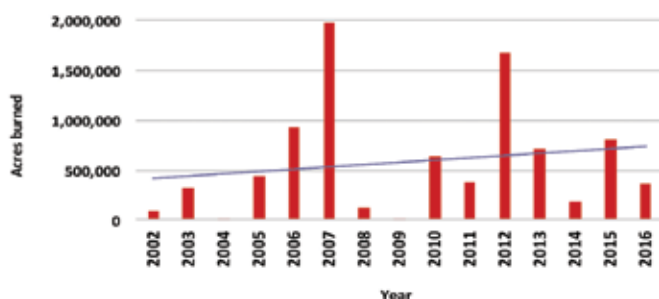
The **number of acres burned** in the Western U.S. **doubled** between 1984 and 2015, adding an extra **10M** acres of charred trees and an additional 10M acres of fire activity, equivalent to **1/5 of the state of Idaho**^v.

A changing climate can facilitate invasive species growth.

Invasive species, such as cheatgrass, **increase fuel loads** in grassland ecosystems and **contribute to fire frequency**.

Drought heightened by warming temperatures **weakens trees** and **increases susceptibility** to bark beetle attacks.

Wildland Acres Burned in Idaho, 2002-2016



In 2015: 804,000 acres burned in Idaho, with \$72,350,000 spent in fire suppression costs

SOURCE: National Interagency Fire Center

Water

Climate impacts water availability and water temperature, reflected in changing streamflow, spring snow water equivalent, and fish habitat. Outdoor recreation intersects with water, and is an important aspect of Idaho's economy.

Water availability: At most locations across Idaho, substantial **declines in spring snow water equivalent** have occurred over the past 50 years. The largest losses occurred below 3000 feet, consistent with **temperature increases** during winter and early spring. Observations from stream gauges across Idaho show a **15% decrease in cumulative annual streamflow** over the last half century^{vi, vii}.

Fish habitat: In the Boise River, **10-20% of bull trout stream habitat was lost** between 1993 and 2006, with **increasing water temperatures** impacting adult spawning and juvenile rearing. Stream **temperatures increase in recently burned watersheds**, further limiting habitat^{viii}.

Outdoor recreation in Idaho: Supports **37,000 jobs**, generates **\$154M** in annual state tax revenue, and produces **\$2.2B** annually in retail sales and services, accounting for more than **5%** of gross state product.

ⁱ Nez Perce Tribe Water Resources Division (2011). "Clearwater River Subbasin (ID) Climate Change Adaptation Plan.

ⁱⁱ University of Idaho (2017). Idaho Forest, Wildlife and Range Experiment Station Bulletin No. 105

ⁱⁱⁱ <https://e360.yale.edu/features/the-evidence-is-clear-a-warmer-world-means-more-wildfires>

^{iv} Klos PZ et al. (2015). "Indicators of Climate Change in Idaho: An Assessment Framework for Coupling Biophysical Change and Social Perception." *Weather, Climate, and Society*. 7: 238-254 and www.idahoclimate.org

^v Abatzoglou JT and PT Williams (2016). "Impact of Anthropogenic Climate Change on Wildfires across Western U.S. Forests." *Proceedings of the National Academy of Sciences*. 113: 11770-75.

^{vi} <http://waterdata.usgs.gov/nwis>

^{vii} Luce CH, Abatzoglou JT, Holden ZA (2013). "The Missing Mountain Water: Slower Westerlies Decrease Orographic Enhancement in the Pacific Northwest USA." *Science*. 342: 1360-64.

^{viii} Isaak DJ, Luce CH, Rieman BE, Nagel D, Peterson EE, Horan DL, Parkes S, Chandler GL (2010). "Effects of Climate Change and Wildfire on Stream Temperatures and Salmonid Thermal Habitat in a Mountain River Network." *Ecological Applications* 20: 1350-71.

^{ix} U.S. Centers for Disease Control and Prevention and U.S. Public Health Commission.

^x Dalton MM, Mote PW, Snover AK (2013). *Climate Change in the Northwest: Implications for Our Landscapes, Waters, and Communities*. Island Press.

^{xi} 3rd U.S. National Climate Assessment (2014). Chapter 12: Indigenous Peoples.

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Human Health

Human health is impacted by climate. Increasing temperatures lead to more fire, extreme heat, air pollution, and heat-related illness, influencing workforce productivity, healthcare costs, and property damage.

Air quality and human health intersect: **Allergies and asthma increase** with decreased air quality. Elderly and children are **most at risk** in conditions of extreme heat^{ix}.

Disease and climate intersect: West Nile Virus (WNV) is a vector-borne disease present in the Pacific Northwest (Idaho, Oregon, and Washington). During the last 10 years, Pacific Northwest cases peaked in 2006, with 1068 confirmed cases. Of these, **996 were in Idaho**, which led the U.S. **Increased temperatures** are correlated with **greater WNV distribution**^x.

Tribal Nations: A changing climate **threatens Native Peoples' access to traditional foods**, such as fish, game, and wild and cultivated crops. These provide sustenance, and cultural, economic, medicinal, and community health for generations^{xi}.

