University of Idaho
McClure Center for
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IDAHO AT A GLANCE

Idaho's Economy & Climate Change

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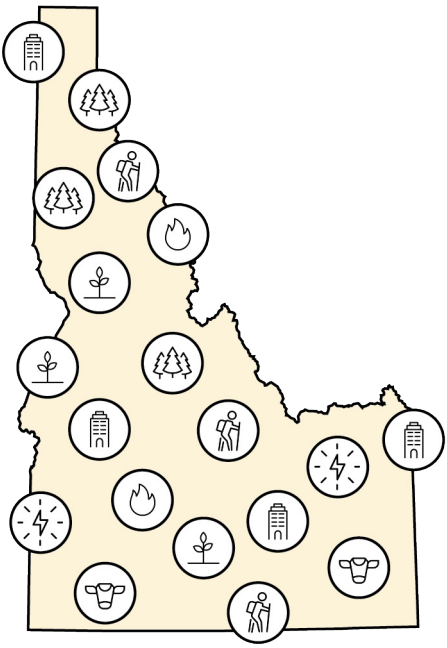
CLIMATE-ECONOMY CONNECTION

Idaho's climate varies substantially from the dry rangelands of southern Idaho to the temperate wet forests of the panhandle. The **diverse climate** across the state shapes many natural resources that **sustain Idaho's economy.**

Idaho's major economic sectors, including agriculture, energy, forests, infrastructure, human health, rangelands, and recreation and tourism, are all influenced by three interrelated aspects of climate—**temperature, precipitation, and snowpack.** Climate change impacts all three.



Changes in Idaho's climate include:

Increasing
Average temperature
Freeze-free season
Multi-year snow drought
Periods of heavy rain
Rain-on-snow events
Summer drought
Winter and spring soil moisture

Decreasing
Precipitation as snow
Severe cold temperatures
Summer precipitation
Summer soil moisture
Summer streamflow

Increasing extreme weather events, such as periods of heavy rain, **lead to increasing hazards,** including avalanches, drought, floods, landslides, mudslides, smoke, and wildfires.

Changes in climate impact Idaho's economic sectors. This *Idaho at a Glance* provides a brief look at potential risks and opportunities. The information presented is drawn from the Idaho Climate-Economy Impacts Assessment, which provides further detail for each economic sector.

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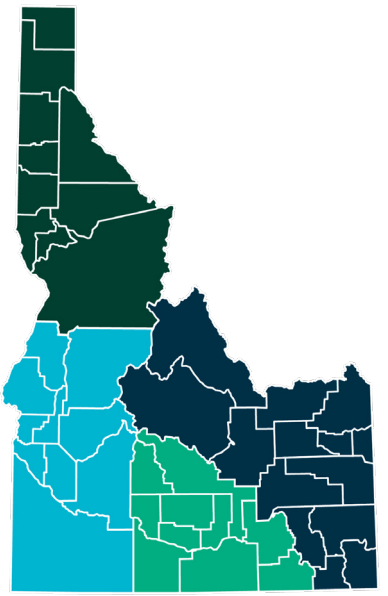
ECONOMIC SECTORS

AGRICULTURE

Agriculture and food processing accounted for **13% of Idaho's gross domestic product (GDP)**, or 18% percent of total economic sales, in **2020**. Changes in climate can stress Idaho's agriculture, resulting in challenges for Idaho's agricultural producers and processors.



North – The primary crops are wheat, beans, dry peas, and pulses. The northern region will experience **snowmelt earlier** in the season, which can **increase pest and weed pressure** on crops due to higher soil temperatures.

West – Western Idaho is home to several region-specific crops, including onions and hops. From 2040 to 2069, the percentage of area experiencing **heat stress** is expected to **increase** by more than **threefold**. While higher temperatures are associated with higher hop yields, extreme heat can be detrimental to yield and quality.

Central – Dairy industries are concentrated in central Idaho. Central Idaho is expected to experience an **increase in high heat days,** which will expand the potential for heat stress and **heat illness in livestock.** Heat stress impacts both productivity of livestock and food supply for livestock.

East - While eastern Idaho is projected to experience **less severe changes** in climate compared to other parts of the state, the **potato growing season** is expected to start **earlier** and be **shorter** in length.

Idaho farmers and stakeholder partners are already experimenting with new practices and methods to **reduce risks connected to climate change.** These include:

- Improving and switching to more **efficient irrigation** systems that coincide with crop needs.
- Adjusting **crop rotations** and planting **heartier varieties**.
- Improving **soil health**, such as through soil regeneration.

FORESTS

Forests cover over 40% of Idaho's land, and provide multiple uses, including timber, recreational opportunities, carbon sequestration, and habitat. In **2020**, the forest industry supported direct and indirect **employment of 31,414 people,** and contributed **$2.4 billion, about 4%, to Idaho's GDP.**

Changes in climate lead to forest disturbances, such as wildfires and insect and pathogen outbreaks. In recent decades, wildfires and bark beetle outbreaks have killed millions of acres of trees across Idaho's forests. These disturbances are expected to increase with climate change. In 2014, wildfire suppression cost Idaho $30 million, and in 2015, $60 million. Suppression cost is expected to increase greatly through 2100.

Forest management practices are available that can help forests adapt to stress, including:

- Thinning and prescribed burning to **reduce wildfire extent and severity.**
- Facilitating establishment of new tree **species better suited** to a location after a severe wildfire or drought.
- **Assisted migration** of trees and planting of tree species in locations more suitable to future climate.

ENERGY

Idaho's energy supply comes from three primary sources: **renewable, natural gas, and petroleum.** Idaho's energy use is divided into four sectors:

Industrial	Transportation	Residential	Commercial
			
31% of use	29% of use	23% of use	16% of use

In **2020**, the state's **energy industry** contributed up to **$6.3 billion** toward **Idaho's GDP**. Hydropower, a renewable energy source, accounts for more than 60% of Idaho's energy generation. Changes in streamflows are projected to continue as Idaho's climate changes, which will adversely impact hydro-dependent energy providers and consumers.

The potential for decreased hydropower coincides with increases in power demand during warmer and drier portions of the summer, with population growth, and as demand for irrigated agriculture increases.

Opportunities exist to prepare Idaho for climate-related impacts to energy, which include:

- Increasing generation of **renewable,** intermittent resources like solar and wind, which will reduce carbon emissions, create jobs, and spur economic growth.
- Expanding exploration and implementation of clean and **economically competitive nuclear** energy options. Idaho National Laboratory and other national labs are working on this source of **firm power**.
- **Expanding research** and implementation of **microgrids** to enhance local resilience to increasing extreme weather events, and protect critical community electricity infrastructure.

INFRASTRUCTURE

Infrastructure consists of road and rail systems, airports, water and wastewater facilities, energy networks, and information and communication networks that facilitate the operation of Idaho's economy.

Idaho's changing climate increases the risk of **extreme weather events** that can have detrimental short-term effects and can cause long-term impacts. Weather events in one infrastructure system, such as stormwater management, often **affect other systems,** such as roads and energy, **increasing economic impacts**.

Climate change-related impacts to Idaho's infrastructure systems include:

- Increasing likelihood of avalanches, mudslides, and wildfires, which disrupt communities' communication and electrical power services.
- Increasing flood risk and embankment instability, which increase bridge and road surface erosion. In 2018, flooding cost Madison County $475,000, nearly ten times the average annual road budget.

Emphasizing connectivity between infrastructure and communities can prepare Idaho for impacts related to changes in climate, for example:

- Increasing **reliable access** to communication, energy, transportation, and water services for rural communities.
- Expanding roads and infrastructure that **connect rural communities** to urban centers could prevent significant delays in transportation of goods due to climate-related impacts.
- Increasing access to reliable power supplies, as well as phone and internet service, can help **prepare communities** to withstand **weather-related emergencies.**

SPOTLIGHT ON SMOKE

Air quality has generally improved across Idaho over the past several decades, except for **increasing episodes of wildfire smoke** that cover large portions of the Gem State during warmer months. Smoke can travel far distances, impacting communities not near wildfires. A few examples of economic impacts due to smoke include:

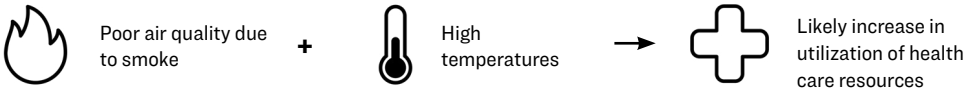
Agriculture
Crop damage, slower crop growth, and impacts to livestock, such as reduced milk production.

Energy
Solar energy production can be reduced by as much as 30% during smoke events.

HUMAN HEALTH

Human health is significantly **impacted by extreme weather events,** such as wildfires, drought, and floods, as well as heat waves. Climate change is often referred to as a **threat multiplier,** worsening existing health conditions and creating new challenges and disparities across all economic sectors.

Idaho's most widespread impacts of climate change:



Not all Idahoans will experience health-related impacts of climate change in the same way. Idaho's geographical diversity and differences in access to medical services, population, age, race, and more will impact an individual's vulnerability to health-related climate impacts.

Idahoans can prepare for climate-related health impacts through:

- Developing **communication resources** regarding climate-related health risks and avoidance measures that meet literacy and language needs.
- Increasing awareness of, and access to, **systems and facilities that accommodate climate-related health risks,** such as cooling shelters.

RANGELANDS

In Idaho, **rangelands occupy 54% of the total land area**—nearly **28.8 million acres**—covering most of southern Idaho where the majority of Idaho's population resides. Rangelands provide areas for grazing livestock, places to recreate, and habitat for wildlife.

Livestock production and ranching on rangelands support **$1.8 billion in annual livestock sales.**

Recreation on Bureau of Land Management rangelands in Idaho supported **$259 million in revenue,** $33 million in taxes, 2,559 jobs, and $85 million in salaries and wages (2016).

Warmer temperatures and variation in the timing and amount of precipitation contribute to changing rangeland conditions in Idaho. These changes pose risks to the many economic and ecological benefits rangelands provide.

Rangeland users are preparing rangelands for changes in climate, such as:

- Identifying **alternative forage sources** in cases of drought, and adapting breed of livestock to better match future climate conditions.
- Working with specialized **cooperatives and partnerships** to address risks associated with weeds, wildfires, and the changing climate.
- Continuing to develop **new tools** to adapt to changes in climate.

Human Health
Increases in the number of smoke-related illnesses, including an estimated doubling of premature deaths due to smoke by 2100.

Land
Burned areas in the inland Northwest will likely increase 2-3 times their current size by 2050.

Infrastructure
Changes to hospital usage, reallocation of hospital resources, increasing need for air filtration systems, and reductions in outdoor labor productivity and wages.

Recreation & Tourism
Decreases in tourism during fire season due to unhealthy air quality and fire activity.

RECREATION & TOURISM

Recreation and tourism adds **$3.7 billion** annually to Idaho's economy. The outdoor recreation sector accounted **for over 2.7% of Idaho's GDP** in **2020**. Over **100,000 Idahoans** work in industries related to recreation and tourism.

6+ million visitors annually to Idaho State Parks, generating **$184+ million in spending** (2016).

Hunting, fishing, and trapping generate **$1.4+ billion** per year and support 14,000 jobs.

Idaho ski resorts provided 5,345 jobs and **$242 million** in revenue (2016-2017).

Changes in Idaho's climate can influence the timing, type, and amount of recreation that takes place in Idaho, impacting Idaho's recreation and tourism sector.

In summer, high temperatures, seasonal wildfires, smoke, and timing and amount of precipitation will affect outdoor recreation and tourism by posing **health risks, limiting access,** and **reducing visitation and revenue.**

In winter, increasing temperatures, precipitation variability, and decreasing snowpack **will decrease the winter recreation season length,** impacting ski resorts and communities that depend on revenue from winter recreation.

Opportunities for adaptation within the recreation and tourism sector include:

- Ski resorts could continue or expand snowmaking and **diversify year-round revenue** streams. In 2016, summer revenue from eight Idaho resorts totaled $43 million.
- Increasing **wildfire mitigation** efforts that help reduce risk to recreation and tourism.
- Attracting **winter sport enthusiasts from areas of the country** more severely affected by the changing climate.
- Increasing recreation and tourism **opportunities in shoulder seasons.**

SPOTLIGHT ON SPECIES

Altered timing of precipitation, warmer air temperatures, and reduced snowpack affect Idaho's native species. Examples include:

- A **decline in habitat quality** for **native salmon and trout** is expected in large rivers (with increase in habitat for non-native trout). This can **impact revenue** from recreational fishers and revenue for outfitters and guides.
- **Changes in snowpack** directly and indirectly impact ungulates, which in turn, can **impact hunting and tourism.**
- Climate change is expected to facilitate upward movement of treeline, thereby **reducing alpine areas.** Some species will experience range shifts in response to climate change, either upward in elevation or northward in latitude.

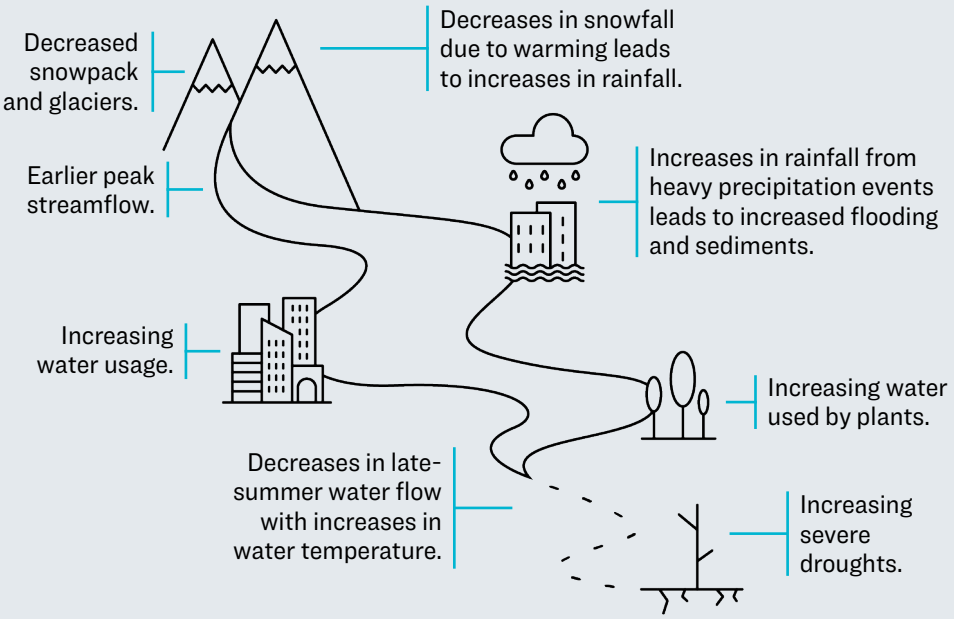
SPOTLIGHT ON WATER

The water cycle in Idaho is driven by accumulation of snowpack in the mountains, which serves as a vast natural reservoir for water storage in winter and spring. The gradual melting and runoff of that water in spring and summer provides streamflow in the warmer, drier months. The availability of water in sufficient quantities at the right place and right time is central to many aspects of Idaho's economy and the well-being of Idahoans.

Heavy precipitation and rapid snowmelt can result in extremely high streamflow volumes earlier in the year and lower volumes in summer and fall. This leads to **water being available before it is needed,** and for a **shorter window of time.**

This shift in Idaho's water cycle will impact economic activities, such as agriculture, forestry and forest products, flood control, hydropower, and recreation and tourism.

Climate Impacts on Water



SOURCE: THE IDAHO CLIMATE-ECONOMY IMPACTS ASSESSMENT

The Idaho Climate-Economy Impacts Assessment is a nonpartisan, science-based resource to help Idahoans plan for a productive, prosperous, and resilient Idaho economy. The assessment includes economic analyses of the agriculture, energy, health, infrastructure, land (forest and range), and recreation and tourism sectors. Analyses connect the latest science on Idaho's changing climate with economic risks and opportunities for innovation and economic development. View the full assessment at **uidaho.edu/iceia.**

SPECIAL THANKS: Idaho Climate-Economy Impacts Assessment research leads and teams for providing the foundational research for this *Idaho at a Glance.* Thank you also to our external reviewers and advisory board members.

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