Boreal Forest Fires:
Additional Resources

Additional resources to engage and extend student learning

The Boreal Ecosystem

Fire in Ecosystems: Boreal Forest, an article by the National Park Service, features a before and after photo of a forest in the early stages of succession after a fire.

From the Alaska Department of Fish and Game, this document (PDF) illustrates the steps of forest succession in the boreal forest.

This article from the Woodwell Climate Research Center contains graphics that show the amount of emissions that are produced by the stored carbon in the ground layers of the boreal forest.

Engaging Students with Data

The Global Forest Change map by GLAD allows students to zoom into different places on Earth to see where forests have been burned or logged. The map also shows those locations where forests are recovering.

The National Interagency Fire Center provides daily statistics on 1) the number of active fires burning in the U.S., 2) the acres burned by the fires, 3) the number of wildland firefighters and support personnel assigned to those fires, and 4) the states in which the fires are burning.

The Fire Information for Resource Management System US/Canada from the United States Forest Service and NASA provides an interactive fire map where students can check where active fires are burning in the U.S. and Canada each day. Again, this is a real-time data resource that students can check on their own in the future.

The **Forest Service** is an agency of the U.S. Department of Agriculture (USDA) that manages public lands in national forests and grasslands. This comprehensive website includes data, multimedia resources, information about fire management, educator and student materials, and more. In particular, you may want to use resources from the Wildland Fire section as an extension for helping students better understand how fires are managed.

The National Interagency Fire Center provides historical year-end fire statistics by state. Scroll down to the bottom of the page to view state-level data. These data break down the statistics by type of agency reporting (e.g. forest service, bureau of land management, state trust land and other agencies) and separates out human caused and lightning caused fires.

The Carbon Cycle

There is uncertainty in terms of the relationship between boreal forest fires and carbon storage in light of climate change. As this article by EOS states, "As one of the largest forest ecosystems on the planet, the boreal forest plays a significant role in the global carbon cycle, simultaneously being a "sink," "stock," and "source" of carbon. As sinks, forests absorb carbon by converting carbon dioxide from the atmosphere into organic material. As stocks, forests store carbon over long periods of time, for example, in deep organic soils, peatlands, and permafrost. As sources, forests release carbon, for example, through wildfires, organic matter decomposition, or melting permafrost. The relationship between these factors creates the "carbon balance.""

Forest Succession

The Future of Forests Unit is a 9-lesson middle/high school unit centered around the anchoring phenomenon of post-fire landscape recovery, with each lesson tied to NGSS Life Science Standards (LS2.C: Ecosystem Dynamics, Functioning, and Resilience). When you have completed the Wildfire Module, you may wish to have your students complete this unit as a follow on. The unit's driving question is "How do landscapes recover after a wildfire?"

In the boreal forest, most fires are started by lightning strikes in the summer months. The Climate Program Office contributed to a study published in Journal of Applied Meteorology and Climatology that focused on climate change and an increase in lightning strikes.

Thinking Globally

The United Nations Environment Programme released a report, Spreading like Wildfire: The Rising Threat of Extraordinary Landscape Fires. This report focuses on the scale and extent of the global wildfire crisis. From the report, “Fire is changing because we are changing the conditions in which it occurs…. anthropogenic climate change, land-use change, and poor land and forest management mean wildfires are more often encountering the fuel and weather conditions conducive to becoming destructive. Wildfires are burning longer and hotter in places they have always occurred, and are flaring up in unexpected places too, in drying peatlands and on thawing permafrost…... We must learn to better manage and mitigate the risk of wildfires to human health and livelihoods, biodiversity, and the global climate. This report provides a roadmap for doing just that.”