



Figure: An overview of the design and approach of the Alaska NSF EPSCoR Fire and Ice project.

Fire and Ice:

Navigating Variability in Boreal Wildfire Regimes and Subarctic Coastal Ecosystems

Alaska EPSCoR's "Track-1" proposal to the National Science Foundation consists of a 5-year (2018-23), \$20 million effort to study changes to fire risk and behavior in **Alaska's boreal forest**, and changes to physical and chemical variables impacting biological communities in the nearshore **Gulf of Alaska**. Researchers from all three UA campuses, including five new faculty hires, will employ remote sensing, fieldwork, lab experiments, and modeling to study these climate-driven changes to critical ecological systems.

A **Boreal Fires** team will identify large-scale climate drivers relevant to fire weather, use hyperspectral remote sensing to better map and measure fuel condition and active fire behavior, and conduct social science research into fire management in the wildland-urban interface and impacts of fire to ecosystem services in subsistence communities. Researchers will develop novel techniques and algorithms for evaluating boreal fire risk, enhanced data processing workflows for high latitudes, improved fire spread models, web-based forecast tools, and associated outreach products for managers.

A **Coastal Margins** team will determine how climate change is altering material flux across the Gulf of Alaska coastal margin and in turn influencing nearshore biological communities. The team will assess impacts of large-scale ocean drivers on the nearshore marine environment; establish how nearshore biological community composition and productivity vary across a spectrum of glacial and non-glacial systems; determine how organisms' physiological responses to physical drivers vary along these gradients; and study fishers' responses to changes in availability of key marine species. Researchers will generate biological, physical and chemical data and vulnerability assessments to support proactive resource management.

A **Diversity, Education and Workforce Development** team will partner with research teams to involve more than 1,500 Alaskans in Fire and Ice activities, including K-12 out-of-school programs and teacher workshops; scientific expeditions for high-school girls; UA mentoring, courses and training; visualization events; and economic development initiatives. DEW will also conduct research into science identity formation in first-generation college students, who will be a focus of F&I diversity efforts, along with women and Alaska Natives.