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AK CASC Alaska Climate Adaptation Science Center

CLIMATE ADAPTATION SCIENCE CENTERS

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Glacier Change Impacts to Alaska's Coastal Ecosystems

The Gulf of Alaska is one of the most productive marine ecosystems on Earth, supporting salmon fisheries that provide nearly $1 billion per year in economic benefits to Southeast Alaska. The region also has a vibrant and growing tourism industry, valued at $1.2 billion in 2015. Glaciers are central to many of the area's natural processes and economic activities, but are melting faster than glaciers almost anywhere else, impacting coastal ecosystems.

WHAT:

Rates of glacier loss are increasing in Southeast Alaska in response to warming temperatures, with a 26-36% reduction in total glacier volume expected by the end of the century. Scientists and managers collectively synthesized the impacts of glacier change on the region's coastal ecosystems and determined related research needs. As a follow-up, researchers are taking an "icefield to ocean" approach and integrating datasets from diverse disciplines to quantitatively describe the effects of glacial melting on the Gulf of Alaska's water cycle – a priority identified by multiple state and federal agencies.

FINDINGS:

Melting glaciers are expected to have cascading negative effects on the economy and ecology of Southeast Alaska, especially its valuable fishing and tourism industries.

As glaciers melt, their contents – namely, large quantities of freshwater, sediment, and nutrients – are released into streams and the ocean. Changes to waterways affect land cover, ocean currents, and habitat for fish and wildlife, which in turn have consequences for human activity.

SIGNIFICANCE:

Results will be incorporated into management products including the North Pacific Landscape Conservation Cooperative's Conservation Planning Atlas and the Chugach and Tongass National Forest climate vulnerability assessments. Data will inform several high-priority glacier-influenced management issues in the Gulf of Alaska region, ranging from (but not limited to) tourism and viewshed evolution, changes in hydropower potential, vulnerability of shipping infrastructure, stream and lake contamination, and salmon habitat conservation and restoration.

WHO:

PROJECT LEADS: Alaska Climate Adaptation Science Center, casc.usgs.gov/centers/alaska

PARTNERS: USGS Alaska Science Center | University of Alaska Southeast | University of Alaska Fairbanks Geophysical Institute | Oregon State University | Alaska Coastal Rainforest Center | U.S. Army Corps of Engineers | Alaska Division of Geological and Geophysical Surveys | Microsoft Research

STAKEHOLDERS: North Pacific Landscape Conservation Cooperative | U.S. Forest Service | Bureau of Land Management | National Park Service