

Toward Advances and Applications for Landscape-Scale Coordinated Monitoring Networks in Alaska and Northwest Canada

Matthew L. Druckenmiller*, National Snow and Ice Data Center, Univ. of Colorado Boulder, Boulder, USA

Edda Mutter, Yukon River Inter-Tribal Watershed Council, Anchorage, Alaska, USA

Lauren Divine, Ecosystem Conservation Office, Aleut Community of St. Paul Island, St. Paul, Alaska, USA

* Corresponding author; Email: Druckenmiller@colorado.edu

Across Alaska and northwest Canada, numerous monitoring networks are implemented by a variety of organizations, including Indigenous communities, government agencies, industry and research institutions, with little coordination or connection among them. Monitoring programs led by government agencies, research institutions, or industry are often limited in their ability to gather data in remote regions due to logistical challenges, whereas community-based monitoring programs often face challenges around inadequate capacity and resources. As a result, there remain substantial gaps in data and knowledge regarding the unprecedented changes in human and natural systems in these Arctic and sub-arctic regions, the impacts of these changes, and how to effectively facilitate adaptation and mitigation strategies. In 2016, a series of resilience-focused surveys and workshops held in rural Alaska and facilitated by the Northwest Boreal Landscape Conservation Cooperative (NWB LCC), Aleutian and Bering Sea Initiative, regional Alaska Native Organizations, and non-governmental organization partners, highlighted the need to greatly improve coordination of monitoring programs around shared research priorities and among a diverse group of stakeholders, and provided concise recommendations to improve and strengthen community-based monitoring programs. The International Arctic Science Committee (IASC), Arctic Observing Summit (AOS) initiative, and the Sustaining Arctic Observing Networks (SAON) program have similarly recognized the need for sustainable and coordinated Arctic observing networks to make informed policy decisions and to craft adaptation and mitigation strategies for a rapidly changing and increasingly unpredictable Arctic.

Understanding and responding to changes occurring in the Arctic often require information that spans local to landscape scales, the latter of which is rarely addressed due to logistical constraints, complexity of implementation, and abstraction of landscape-scale issues (e.g. maintaining migration corridors, adapting to changing watershed dynamics, tracking the spread of diseases and invasive species, informing large-scale land use planning). As such, there is opportunity to fill critical knowledge gaps through landscape-scale coordinated monitoring networks (CMNs) that can gather and synthesize information across large geographies. Investing in landscape-scale CMNs has potential to also strengthen individual local monitoring programs and their ability to address local-scale impacts of a rapidly changing environment on communities and natural resources (e.g. infrastructure vulnerabilities, tracking changes in local subsistence populations, local forecasting of extreme events, improving local water quality, enhancing land and resource stewardship by local communities).

A newly-funded U.S. National Science Foundation (NSF) Navigating the New Arctic (NAA) project, led by the NWB LCC, aims to enhance the coordination, design, and development of transboundary landscape-scale CMNs in the Northwest Boreal region of Alaska, Yukon, Northwest Territories, and

British Columbia. The NWB LCC is a self-directed science-management partnership that promotes integrated science, sustainable natural and cultural resource management, and conservation to address environmental change. The project will be guided by representatives from multiple expert groups, including Indigenous Peoples, scientists and engineers, and resource managers. Over a period of two years, this diverse group will engage regularly through workshops and multiple working groups to explore options for developing CMNs and to create and implement strategies for overcoming existing collective challenges in order to leverage resources, identify data gaps, build capacity and expertise, reduce duplication, and facilitate synergy among programs.

This project will address critical issues at the landscape scale while also strengthening individual programs and their ability to address social-environmental issues at local scales. This project will build strategies for CMN results to be more effectively applied to important decision-making processes around community resilience, maintaining cultural heritage, land and resource management, climate adaptation and land use planning, sustainable economic development, engineering strategies, and hazard mitigation. We aim to foster integrated and collaborative research across communities, institutions, and political boundaries by utilizing our large network to identify and provide opportunities for cross-border and cross-sector learning through in-person convenings, webinars, and other forms of outreach. In addition, drawing from best practices and strategies developed through this project, an education curriculum will be developed and shared across a broad Arctic community of practitioners. At the core of this project, we recognize the need for researchers to better understand the diversity of interests, perspectives, and values of Arctic communities.