

**Regional Assessments of Vulnerability and Environmental Security (RAVENS) Phase 1:
Water Security in a Changing Coastal Environment**

PI: Philip A Loring, PhD. Alaska Center for Climate Assessment and Policy, Institute of Northern Engineering, University of Alaska Fairbanks (UAF)

Co-PI: William E. Schnabel, PhD., P.E., Water and Environmental Research Center (WERC), UAF

Co-PI: S. Craig Gerlach, PhD. ACCAP, Center for Cross Cultural Studies, and the Center for Alaska Native Health Research (CANHR), UAF

Impacts of climate change on Alaska's coastal communities through changes in sea level, storminess, permafrost, and precipitation can contribute to numerous vulnerabilities for rural livelihoods and environmental security. Water security, which we define as reliable availability of and access to safe fresh water resources, underpins food and environmental security for every community. Water and wastewater systems in many coastal Alaska communities are vulnerable to climate change impacts such as storm surge and coastal erosion. In order to achieve and maintain water security, especially in the face of these rapid and unprecedented ecological changes, communities need relevant and timely information to minimize vulnerabilities of their water resources and infrastructure.

However, communities in rural Alaska are already taxed with the "double exposure" of climatic change and socioeconomic change, and many community and tribal governments are locked into a pattern of short-term mitigation. Thus, locally- and regionally-scaled vulnerability assessments and adaptation plans for ensuring water resources in Alaska remain constrained, by a lack of high-quality baseline data about assets such as water sources and sanitation infrastructure, and by a lack of high-technology decision support tools that integrate with the best available climate data and projections.

The primary goal of this project, therefore, is to mobilize an integrated assessment framework that links broad-scale assessment and inventories of adaptive capacity with geospatial computing (i.e., GIS) and with local-scale ethnographic research to provide a composite and truly integrated assessment of communities responding to change. Future phases of RAVENS will transition this hybrid assessment/ethnographic approach for use in other regions of Alaska and the United States, and for other sectors of environmental security including food, energy, and health.