

## Proposed Process for Use of Western Science, Citizen Based Monitoring, and Traditional Knowledge in Ecosystem Models

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Traditional knowledge can help detect changes in terrestrial Arctic ecosystems and guide potential adaptation responses. As the cryosphere changes, climate feedbacks may become more complex and changes in Arctic systems may occur more rapidly. Traditional knowledge, along with the systematic collection of information, can assist in identifying the effects of climate change on habitats and their use by human society. Observations of landscape conditions and trends are commonly achieved through different means of monitoring. The selection and monitoring of sites where climate feedbacks are observable is possible using existing networks and the data obtained through western science, citizen based monitoring, and the inclusion of traditional knowledge. These types of data collection build capacity for identifying, understanding, predicting, and responding to diverse environmental changes throughout the Arctic.

The inclusion of traditional knowledge into the planning for ecosystem science and adaptation strategies for climate change remains a challenge. To meet the challenge, the Interagency Arctic Research Policy Committee (<http://www.iarpccollaborations.org/about.html>) established a milestone that would attempt to use local traditional knowledge, GIS data and integrated climate models to help understand the relationships among climate, land use change, ecosystem services, village subsistence systems, and food security. This milestone will attempt to bring monitoring data and information from a wide variety of sources together for potential input to existing climate and ecosystem models that assess spatial and temporal aspects of climate predictions and ecological change. When possible, traditional knowledge will be utilized to evaluate and enhance the modeled predictions. The climate and ecosystem models will, in turn, be available to traditional knowledge holders to assess projected changes in subsistence resources as well as an aid for fish and wildlife management.

To implement this milestone, six of the 12 IARPC Collaboration Teams will potentially be involved: Terrestrial Ecosystems, Arctic Data, Modeling, Arctic Observing, Arctic Communities, and Chukchi-Beaufort Seas. Figure 1 shows a generalized depiction of the process. Solid lines indicate direct and open transfer of information to/from organizations. Dashed lines indicate selected information transferred from/to traditional knowledge holders depending on the need and proprietary nature of the traditional knowledge in question; the Traditional Knowledge (TK) GIS component is totally separate from the rest of the processes as far as connectivity because some of the TK information is considered sensitive and proprietary to the local knowledge holders. This process however, would give TK GIS owners the ability to accept a wide range of information to analyze in their GIS systems, but also allowing them to release what they consider appropriate for public or limited government use. Thus, the resulting GIS data and spatial applications represents a potentially valuable source of information for subsistence users, resource managers, and scientists studying climate and ecosystem processes.

Figure 1. IARPC Implementation of Milestone 3.2.3.a - Using collaboration teams to help transfer different types of knowledge for climate associated management and adaptation decision making.

