Integrated Ecosystem Model for Alaska

Project Title: Development and Application of an Integrated Ecosystem Model for Alaska

Brief Summary (Abstract): This project aims to develop an Integrated Ecosystem Model for Alaska to forecast landscape responses to climate change.

Project Location: Alaska

Partners: Researchers from the University of Alaska-Fairbanks.

Background: Ongoing climate change throughout Alaska has the potential to affect terrestrial ecosystems and the services that they provide to the people of Alaska and the nation. These services include the provisioning of food and fiber by Alaskan ecosystems, the importance of ecosystems to recreation, cultural, and spiritual activities of people in Alaska, and the role Alaska ecosystems play in regulating the climate system. Assessments of the effects of climate change on ecosystem services has in part been hindered by the lack of tools capable of forecasting how landscape structure and function might change in response to climate change. In Alaska, such tools need to consider how ecological processes play out in both space and time. Landscapes may change substantially in time and space because of shifting composition of species dominance (e.g., an increase of shrubs in tundra) and species migration (e.g., treeline advance). These shifts in landscape structure and function may be caused by changes in disturbance regimes (e.g., fire, insects, wind throw), permafrost integrity, and hydrology across the landscape.

Project Goals: In this study, researchers are developing and applying an ecosystem model for Alaska that is capable of forecasting how landscape structure and function might change in response to how climate change influences interactions among disturbance regimes, permafrost integrity, hydrology, vegetation succession, and vegetation migration. This tool provides scenarios of changes in landscape structure and function that could be used by resource-specific impact models to assess the effects of climate change on specific natural resources.

Strategy Goals Implemented: Goal 5, Strategy 5.3, Action 5.3.4.: Develop and use models of climate-impacted physical and biological variables and ecological processes at temporal and spatial scales relevant for conservation.