

Arctic Landscape Conservation Cooperative

Integrated Ecosystem Model (IEM) for Alaska

The Big Picture

The physical and biotic components of arctic and boreal ecosystems - permafrost, hydrology, disturbance (e.g., fire), and vegetation - are tightly linked and sensitive to climate change. Managers need tools to visualize potential future landscapes that result from the interaction of ecosystem components and physical processes. IEM will provide a framework for forecasting ecosystem change and will help with vulnerability assessments, and guide inventory and monitoring activities.

Project ID: ARCT2010-05

Year Funded – 2010

Start – February 2010

End – September 2011

Budget – \$410,000

Research Partners:

UAF

The Wilderness Society

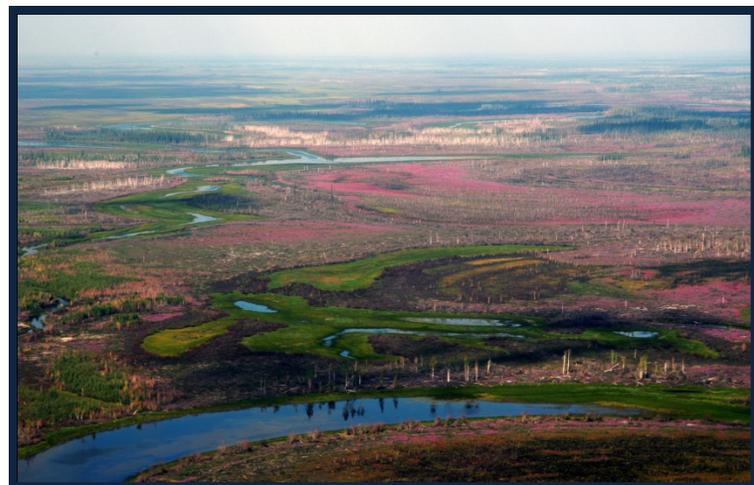
Improving our understanding of ecosystem change in response to changing climate

Project Description

Researchers from the University of Alaska Fairbanks (UAF) and collaborators from The Wilderness Society will create a framework for linking several existing models to produce a single integrated model that simulates vegetation succession, disturbance regimes, hydrology, and permafrost dynamics. The ultimate goal is to produce maps for the entire state that forecast ecological conditions under specified climate scenarios.

Why We Are Interested

Researchers have developed three models that forecast the response of permafrost, vegetation communities, and fire to changing climate. These models provide important information on how the Alaskan landscape may respond to climate change. However, an integrated model would provide resource managers with more accurate forecasts of future habitat conditions, in a more useable form.



Post-fire succession in Interior Alaska, Mark Bertram/USFWS.



What Will Be Done

Researchers will identify ways to link together the Boreal-ALFRESCO model, the Terrestrial Ecosystem Model (TEM), the Geophysical Institute Permafrost Model -1 (GIPL-1), and associated data (Figure 1). The work funded in 2010 is the first stage in what is anticipated to be a multi-year effort to implement a fully coupled model. The work is being coordinated by the University of Alaska Scenarios Network for Alaska Planning (SNAP).

Expected Outcomes

This project will develop a protocol for coupling the individual models together. This protocol will then be tested using the Yukon River basin as a study area. In addition, output from the individual models will be made available to the scientific community in a user-friendly format.

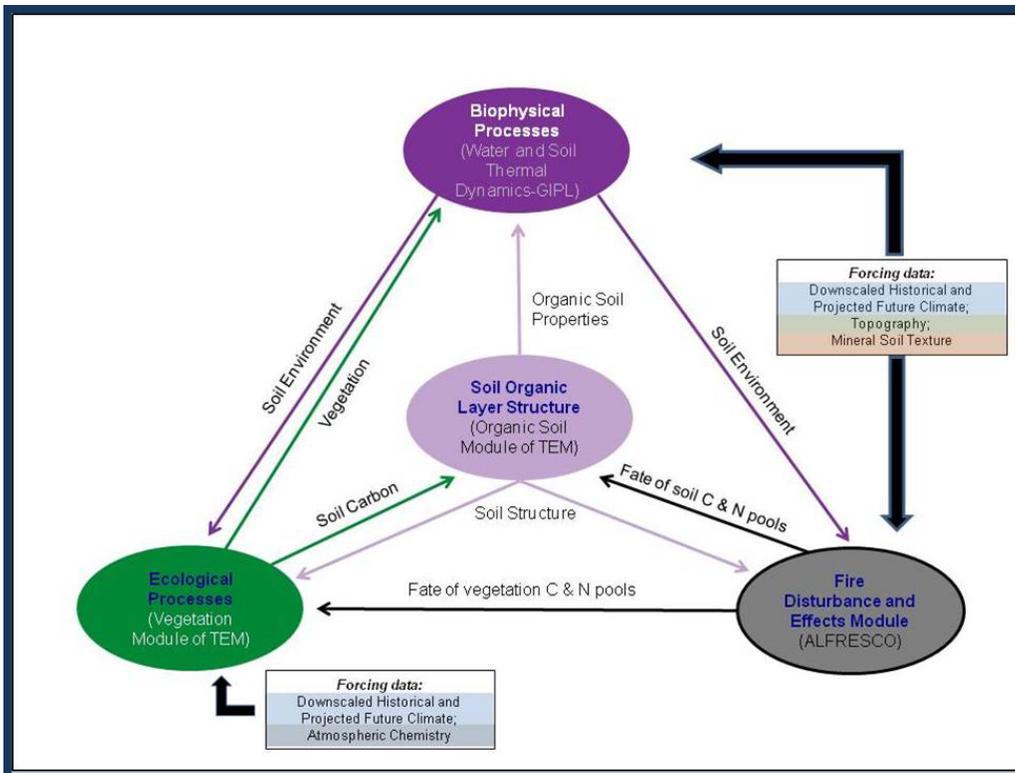


Figure 1: Conceptual model showing how data is passed among different components that make up the IEM.

Timeline

December 2010 – May 2011: Complete static coupling exercise

March 2011: Data from individual models posted to SNAP data server.

September 2011: Report and publication detailing modeling framework and results of coupling exercise.



The mission of the Arctic LCC is to identify and provide information needed to conserve natural and cultural resources in the face of landscape scale stressors, focusing on climate change, through a multidisciplinary program that supports coordinated actions among management agencies, conservation organizations, communities, and other stakeholders.

...

The IEM will improve our understanding of ecosystem change in response to changing climate and also could inform the structure, design, and location of monitoring activities across agencies.

May 2011

To learn more about this project and other Arctic LCC projects visit: articlcc.org
or contact Greg Balogh, Coordinator at greg_balogh@fws.gov
or Philip Martin, Science Coordinator at philip_martin@fws.gov