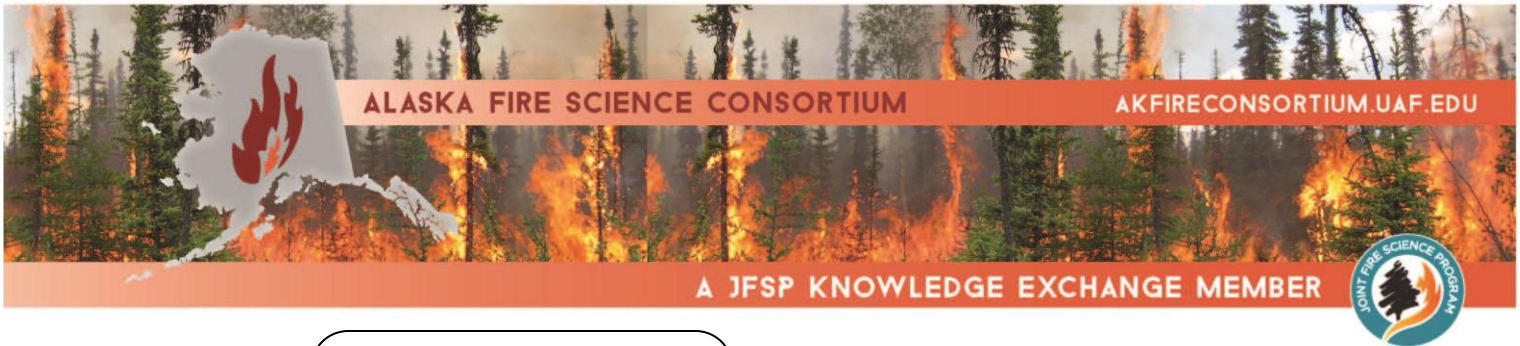


What have we learned in Alaska thanks to Joint Fire Science-sponsored research in the last several years? Let's review a few examples:

DEVELOPMENT OF A COMPUTER MODEL FOR MANAGEMENT OF FUELS, HUMAN-FIRE INTERACTIONS, AND WILDLAND FIRES IN THE BOREAL FOREST ALASKA (JFSP project no.01-1-1-02, PI – Scott Rupp, University of Alaska)

Did you know the idea for this project was spawned by scientist-manager meetings after the Frostfire research prescribed burn in 1999? At the request of managers, Boreal ALFRESCO—a spatially explicit 1-km vegetation succession model—was refined to an annual time step (ten Alaska resource agencies participated in the project). Over several years, the model was fine-tuned to simulate the response of vegetation to changes in disturbance regime as driven by changes in climate and fire management.

Paul Duffy's contribution to this project was the discovery that average June temperature explained a significant portion of the annual area burned in Alaska, and might be used to predict the risk of a mega-fire season in the current year.

Simulations with Boreal ALFRESCO indicated that changes in the frequency and extent of fire in interior Alaska may impact winter habitat for caribou; in particular, increasing fire decreases the area of spruce-lichen forests which the caribou depend on.

Investigators also modeled the long-term impact of fire management and fire policies on Refuges, Parks, and special management areas. All-in-all, this project and the Boreal ALFRESCO tool have been getting a lot of mileage in Alaska, and have spawned several additional cooperative studies!

RECONSTRUCTING FIRE REGIMES IN TUNDRA ECOSYSTEMS TO INFORM A MANAGEMENT-ORIENTED ECOSYSTEM MODEL (JFSP PROJECT NO. 06-3-1-23, PI – FENG HU, UNIVERSITY OF ILLINOIS)

Many land managers would like to manage for a "natural fire regime". However, what is "natural" can be tricky to define in tundra regions, where there are only about 50 years of fire records—yet fire return intervals can be in the hundreds of years. Hu and Phil Higuera used lake sediment charcoal records from a Noatak study area in northwest Alaska to identify cycles of past burning over the past 6000 years. Estimated fire-return intervals ranged from 30 to 720 years.

Fireweed in an old burn in the Noatak River drainage (photo by Charles Racine)

The most important variables correlating with area burned ***in tundra*** were a little different that in the boreal forest project (left). Together, average August temperature, January snowfall, July precipitation, and June precipitation—in that order—-explained about 85% of annual variability in the tundra area burned from 1950–2008.

Read the published paper in Ecological Applications: ***Higuera et al. 2011***

POST-FIRE STUDIES SUPPORTING COMPUTER-ASSISTED MANAGEMENT OF FIRE AND FUELS DURING A REGIME OF CHANGING CLIMATE IN THE ALASKAN BOREAL FOREST

(JFSP PROJECT NO. 05-2-1-07, PI – Scott Rupp, University of Alaska)

This study extended and developed additional management applications of the previous project creating Boreal ALFRESCO (above). Rupp and Dan Mann joined forces with agencies to study the effects of stand age, vegetation type, and weather/climate on burn severity and to predict climate change impacts on fire regime.

Some key findings were:

- Within the next 50 years, simulation results indicated that boreal forest vegetation will likely shift (and is perhaps already shifting—see Mann et al. 2011) from primarily spruce-dominated to deciduous-dominated.

- Despite the shift to less flammable deciduous species, simulation results predict increases in both fire frequency and number of acres burned annually. Model simulations suggest a general rise in fire activity through 2100, with the most rapid change occurring in the next 20–30 years. This is due to the strong influence of weather on risk of burning combined with the continuity of fire fuels in Alaska.

Today Boreal ALFRESCO is a core tool for including fire disturbance in spatially explicit climate change impact models in use by agencies as diverse as the U.S. FWS LCC's and the Department of Defense.

LINKS:

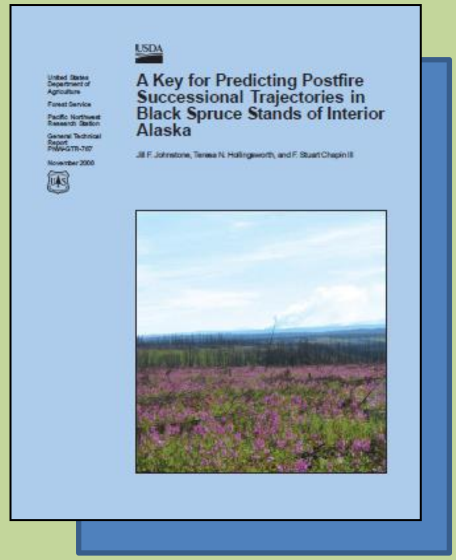
Read the JFSP Brief!

See how Boreal ALFRESCO is being used today at the SNAP website!

Read latest Research Brief on threshold change by Mann et al. 2011.

Authors may be reached at rjandt@alaska.edu or ayork@alaska.edu; http://akfireconsortium.uaf.edu

Jan. 10, 2014



Click to download the Key!

MANAGING FIRE WITH FIRE IN ALASKAN BLACK SPRUCE FORESTS: IMPLICATIONS OF FIRE SEVERITY ON SUCCESSIONAL TRAJECTORY AND FUTURE FOREST FLAMMABILITY

(JFSP project no. 05-1-2-06, PI – Teresa Hollingsworth, USFS)

This project—a Key for predicting fire-initiated changes in forest cover in Alaska's black spruce forests—was solicited by managers as they began to realize that previous succession models in use were over-simplified and poorly quantified. The four major components are:
(1) a key to classifying potential site moisture,
(2) a summary of conditions that favor black spruce self-replacement,
(3) a key to predicting postfire forest recovery in recently burned stands, and
(4) an appendix of photos to be used as a visual reference tool.

These are just a handful of the many research projects completed in Alaska with funding from the Joint Fire Science Program. See all of them at www.firescience.gov. I hope this little review reminds you of past research results and helps spark some ideas for new projects with results that managers can use!