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ALASKA FIRE SCIENCE CONSORTIUM

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International Arctic Research Center
IARC
University of Alaska Fairbanks

UAF UNIVERSITY OF ALASKA FAIRBANKS

Funded by the federal Joint Fire Science Program

Part of a National Network for Better Collaboration Between Research and Management in Wildland Fire

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Advisory Board

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JFSP funding supports science delivery and research development but not research per se

Alaska Fire Science Consortium

Delivery methods:
- Workshops, webinars, meetings, briefings
- Research briefs, guides
- Online tools (sites map, reference database)
- TBD 2016: Remote sensing applications workshop

Science issues:
- Climate change
- Permafrost, hydrology and soil moisture
- Landscape level landcover and vegetation mapping
- New tools/data for model validation

Research projects:
- Fuels treatment effectiveness: economic and ecological perspectives (J. Little)
- Improved seasonal climate forecasting (U. Bhatt)
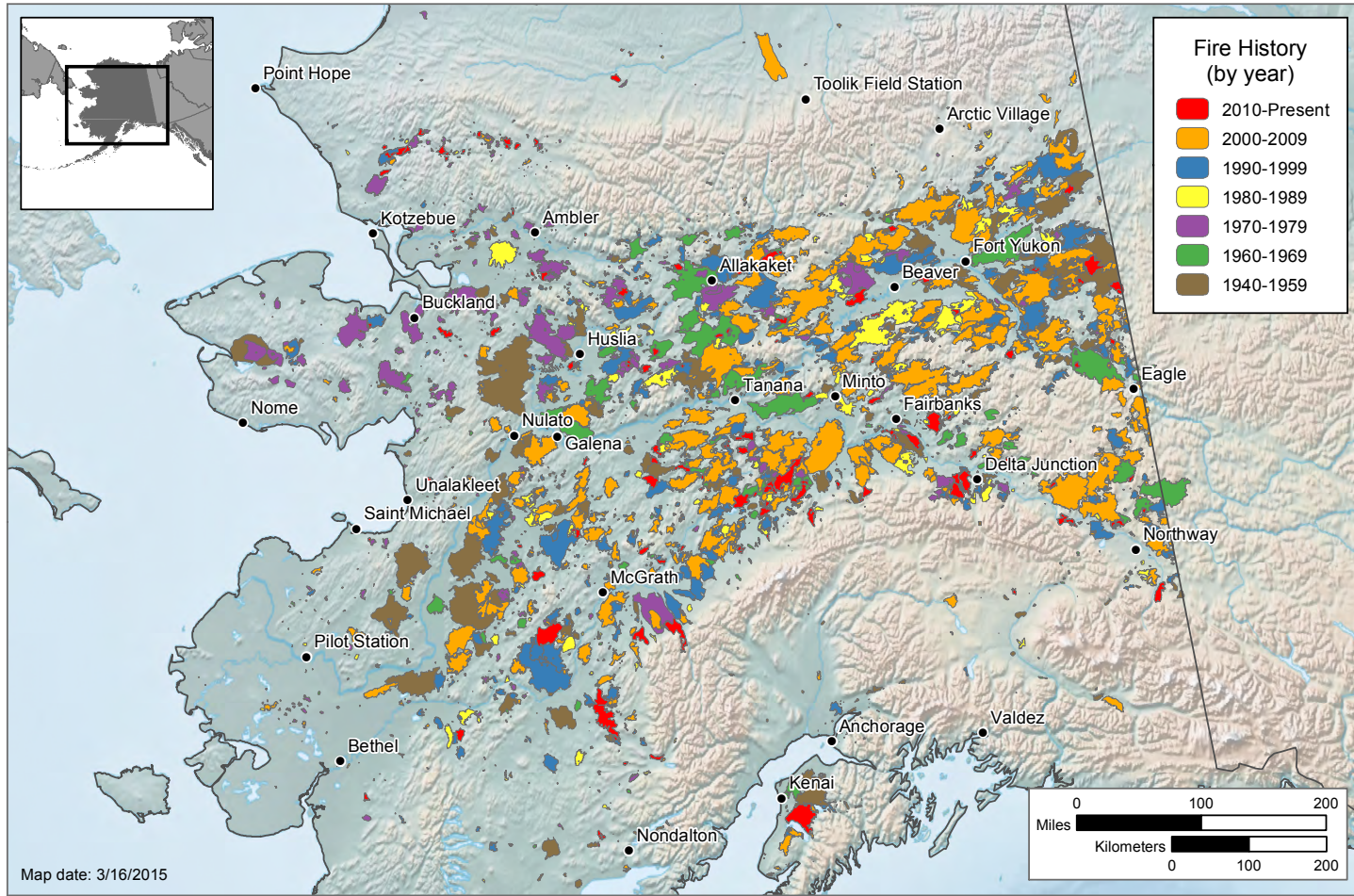- Using SMAP data for soil moisture in boreal systems (J. Fochesatto)

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How does wildfire management work in Alaska?
What information do agencies need to support decisions?

About half of Alaska fires are caused by humans, but majority of acres burn in lightning-caused fires.
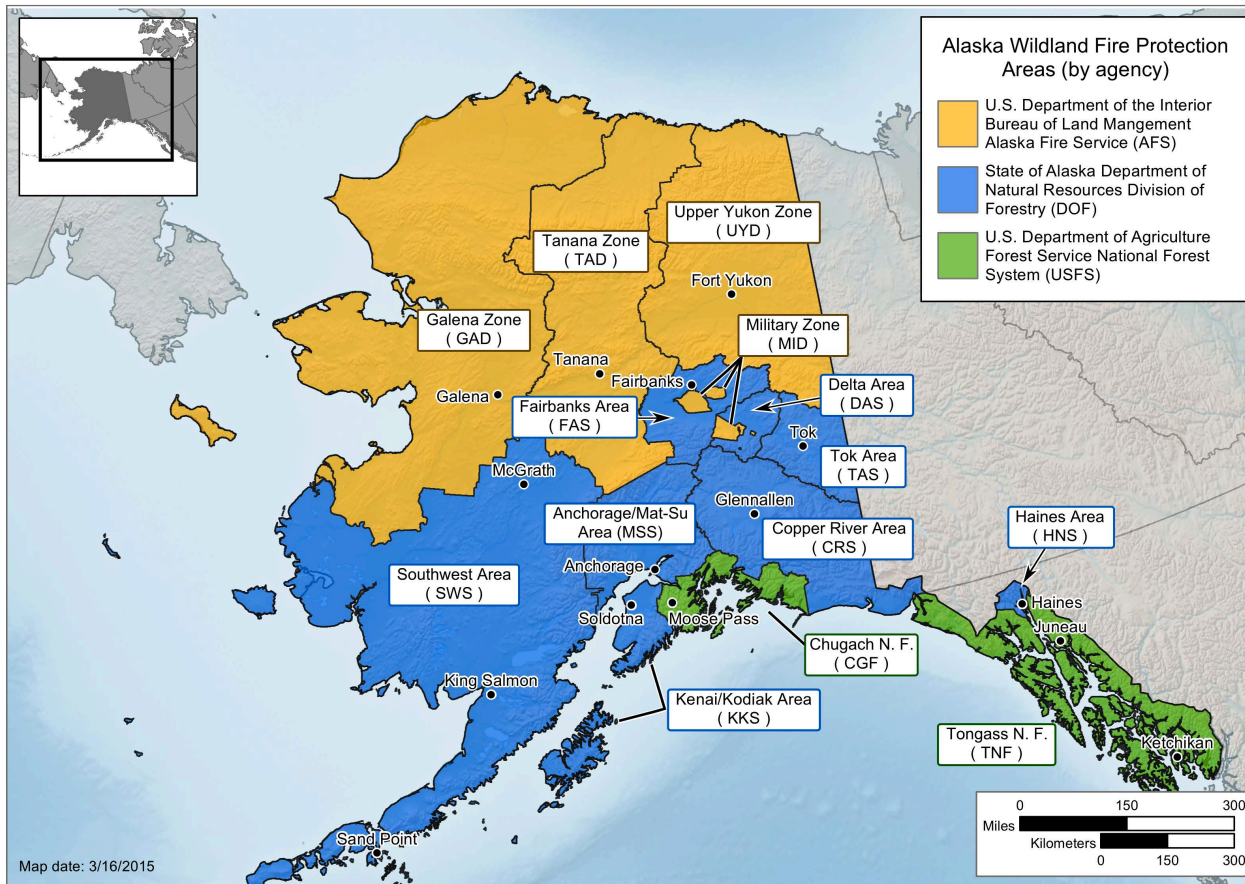

Map date: 3/16/2015

This map shows perimeters of known wildfires that ignited naturally (e.g., lightning) or were caused by humans (e.g., escaped campfire).   For wildfires occuring before 1987, emphasis was placed on mapping perimeters at least 1000 acres in size. From 1987 forward, emphasis was placed on mapping wildfires with perimeters of at least 100 acres. Although this is a comprehensive dataset, it is not complete. Most, but not all known fire perimeters are shown on this map.

Disclaimer: This map is intended for display purposes only. No warranty is made by the Bureau of Land Management or the Alaska Fire Service as to the accuracy, reliability, or completeness of information displayed. Fire Perimeters are provided by the Alaska Fire Service itself. Other data were compiled from various public sources. This spatial information may not meet National Map Accuracy Standards. This product was developed through digital means and may be updated without notification.

Interagency agreement since 1984
3 protecting agencies cooperate with jurisdictional agencies

- BLM-Alaska Fire Service: 194 million acres
- State of Alaska: 150 million acres
- US Forest Service: 26 million acres

Fire Management Options 2015

Critical   Full   Modified   Limited

CRITICAL - These are the highest priority areas/sites for suppression actions and assignment of available firefighting resources. Lands in wildland urban interface and other populated areas where there is an immediate threat to human life, primary residences, inhabited property, community-dependent infrastructure, and structural resources designated as National Historic Landmarks qualify to be considered for this designation. This classification is applicable to an entire village or town as well as a single inhabited structure.

FULL - This option provides for protection of cultural and paleontological sited, developed recreational facilities, physical developments, administrative sites and cabins, uninhabited structures, high-value natural resources, and other high-value areas that do not involve the protection of human life and inhabited property. Structures on or eligible for inclusion on the National Register of Historic Places and non-structural sites on the National Register are placed within this category. Either broad areas or specific sites qualify to be designated as Full.

MODIFIED - This option provides a management level between Full and Limited. The intent is to balance acres burned with suppression costs and to accomplish land and resource management objectives when conditions are favorable. Site-specific actions are taken as warranted.

LIMITED - Designated for broad, landscape-scale areas where the low density and wide distribution of values to be protected best allows for fire to function in its ecological role. Sites that warrant higher levels of protection may occur within the boundaries of Limited areas and actions to protect these sites will be taken when warranted without compromising the intent of this management option.

Types of management decisions

A. Scene-of-action decisions

Wind?

RH?

Fuels?

Flame height?

Rate of spread?

B. "Headquarters" decisions

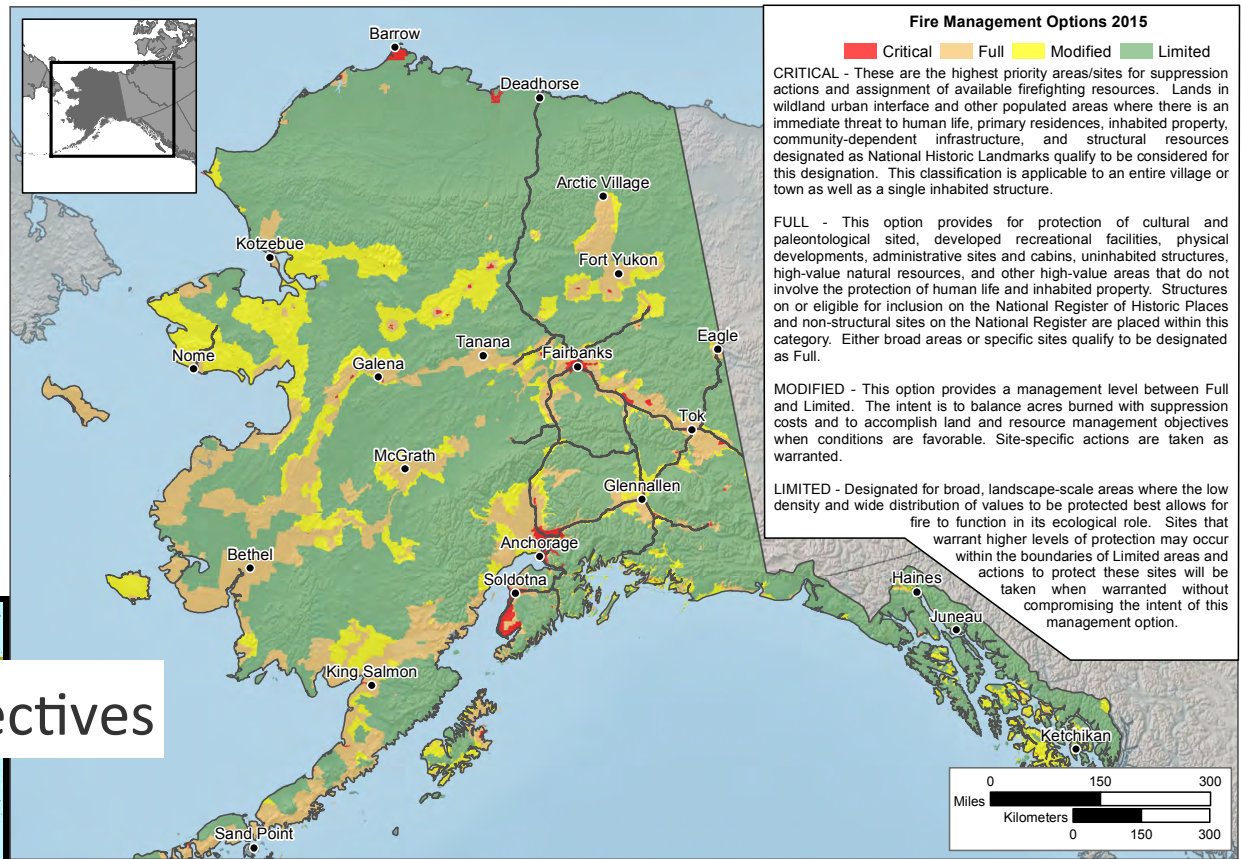Risk Analysis

Resource Allocation

Staffing Levels

Weather forecast?

Fire danger by region?

Fuels inventory

Resources at risk?

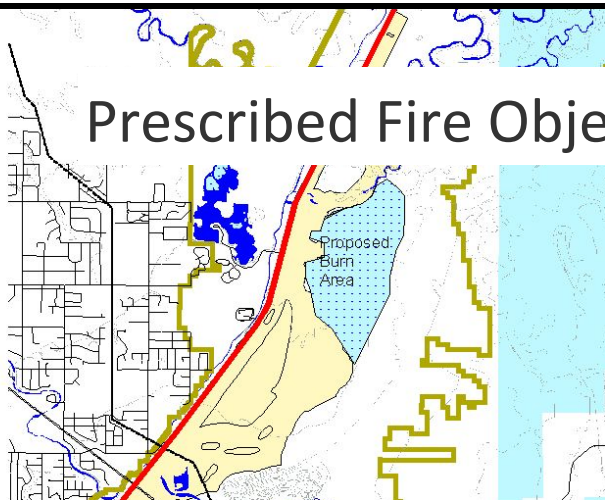# C. Planning Decisions

Alaska Interagency Fire Management Plan

Fire Management Options 2015

Critical   Full   Modified   Limited

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Prescribed Fire Objectives

Fire Protection Options

What are key wildfire research issues from the perspective of Alaskan fire protection agencies and land managers?

Outlined in Research Needs List, updated every 2 years

1. Validating, Understanding, and Improving Systems to Model Fire Danger, Fire Behavior, Forecasts and Fire Effects/Emissions

FBP (Canada) and BEHAVE (US) are 2 models used to predict fire behavior under given fuel and weather conditions.

Canada

Methodology

P Empirical. Equations are based on field experiments and documented wildfires.

US

Methodology

P Theoretical. Based on laboratory experiments for Rothermel's surface fire spread model.

ALASKA
FFMC
AUG 16, 1999

○ 85 – 89
● 64 – 85
● < 64

CFFDRS = Canadian Forest Fire Danger Rating System, yields "indices" of fuel moisture from remote weather station readings.
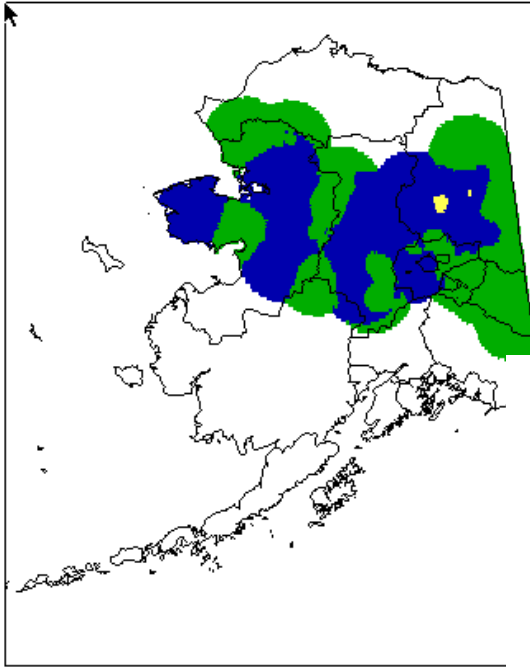
ALASKA
F.FFMC
JUL 7, 1999

● 92 +
● 89 – 92
● 85 – 89
● 64 – 85
● < 64
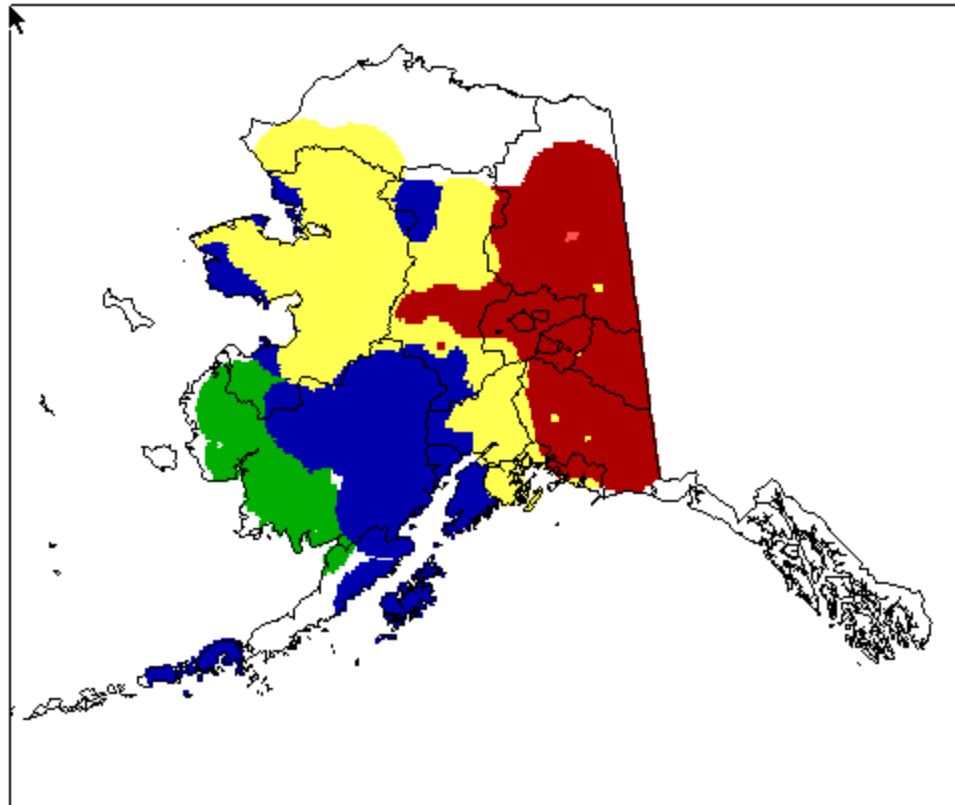
Models/Algorithms from Canada forest types used to estimate relative fire risk in different regions.

- Managers desire validation of Canadian **F**ire**W**eather**I**ndex models for Fire Danger ratings. . . Can remotely sensed data provide this?

- and to refine their relationship to measured fuel moisture :

    - Can the model fit be improved in AK ecotypes?

    - Does the model work on AK permafrost sites, given the hydrologic differences?

    - Does the use of the "overwintering factor" make sense relative to observed soil saturation in the spring in AK?

How dry is dead moss layer?

Near-real-time validation?

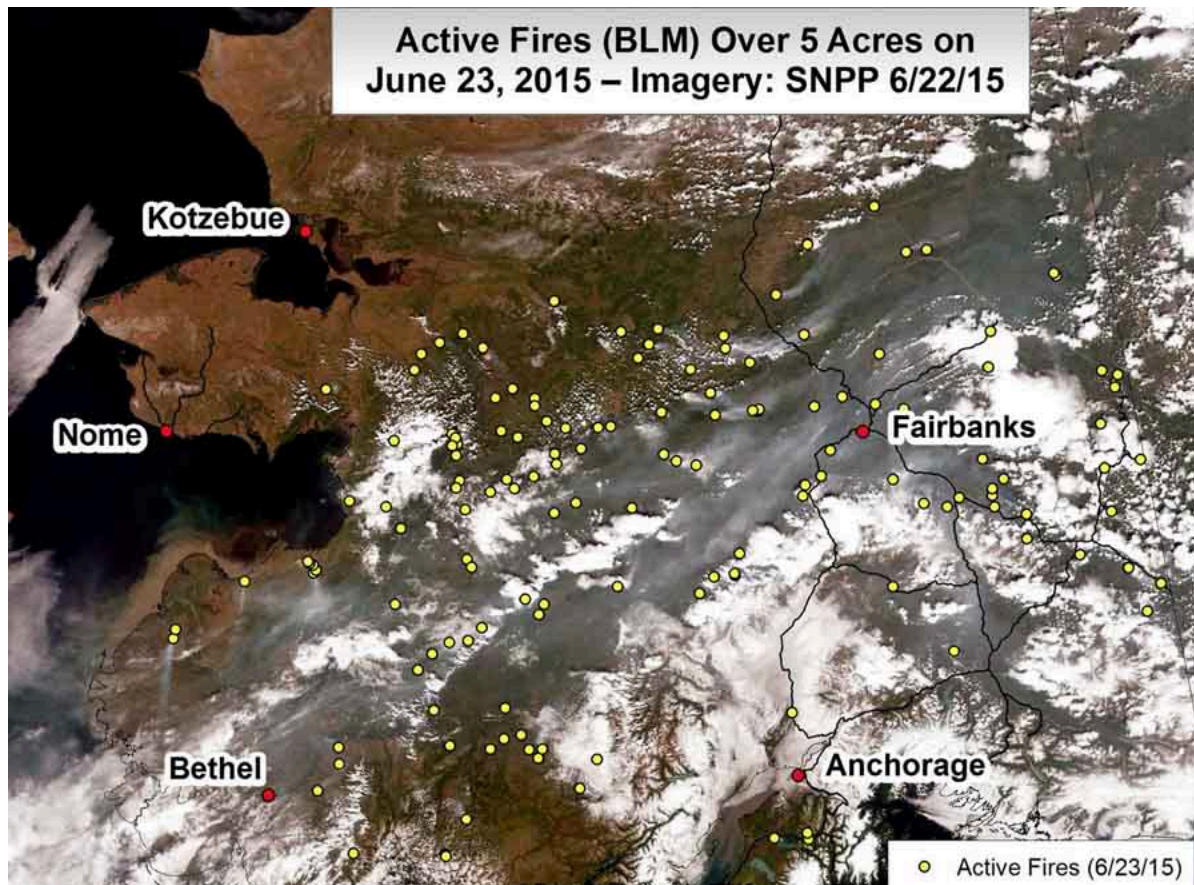# 2. Fire Management:
Cumulative Effects & Climate Effects

What are the effects of current fire management strategies, and could changes in management make a difference on outcomes related to C, permafrost or threshold changes?

Protection Zone	Natural Fire Rotation
interior	**381** yr
critical	381 yr
full	342 yr
modified	**188** yr
limited	188 yr

Preliminary data: not for citation.

- ■ = Critical
- ■ = Full
- ■ = Modified
- ■ = Limited
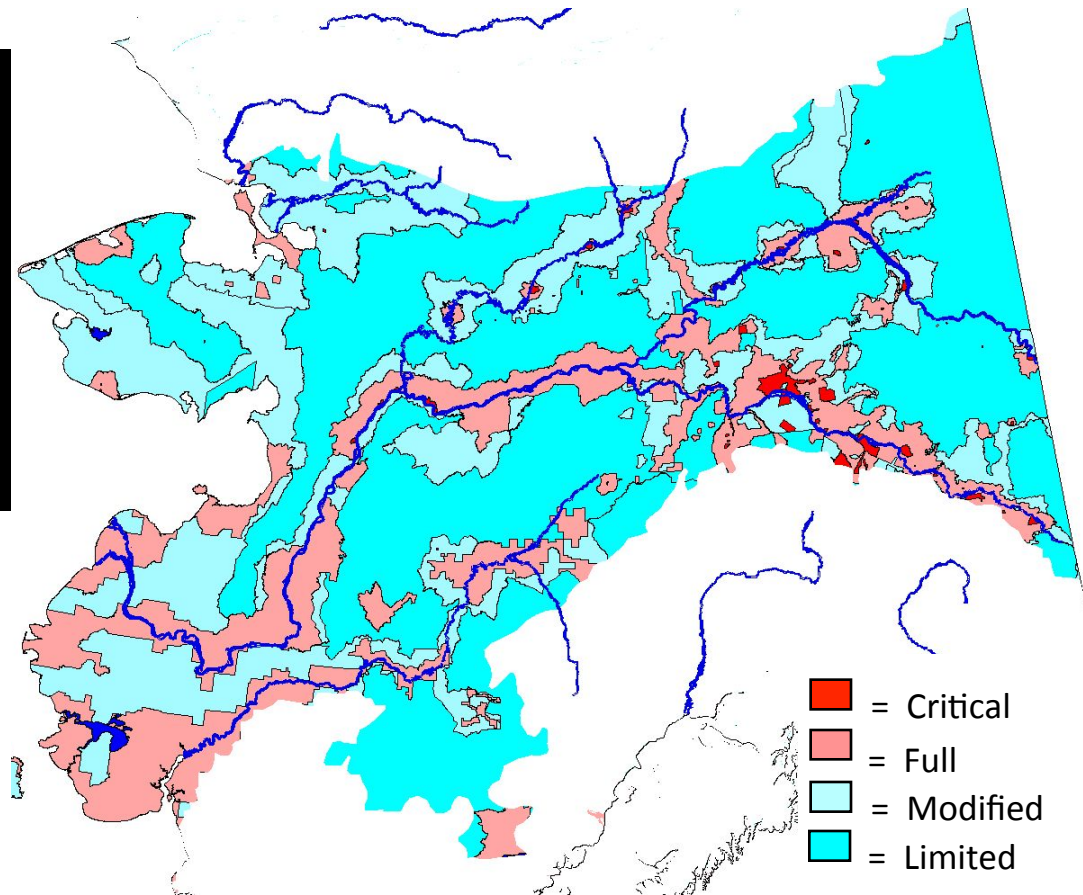
Improved forecasting of smoke

Active Fires (BLM) Over 5 Acres on June 23, 2015 – Imagery: SNPP 6/22/15

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