YALE UNIVERSITY PROJECT UPDATE

Refinement and Development of Fire Management Decision Support Models Through Field Assessment of Relationships Between Stand Characteristics, Fire Behavior and Burn Severity

JFSP Project Number: 04-2-1-96

Understanding the Dynamics Between Forest Succession and Fire Behavior in the Black Spruce Forests of Interior Alaska.

FALL 2005

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NOTE:
This September marks the end of the second and final field season of this joint project between Alaska Fire Service, Colorado State University, Yale University, the National Park Service, the U.S. Fish and Wildlife Service and the State of Alaska, Department of Natural Resources. This project utilizes data from existing projects conducted by the Pacific Wildland Fire Sciences Laboratory in Seattle, WA and the Missoula Fire Sciences Laboratory in Missoula, MT to answer questions pertinent to the management of wildland fires in Alaska at a reduced total cost. This update has been prepared for board members of the Joint Fire Sciences Program to provide information on components of this project assigned to Yale University. **This update does not contain comprehensive information regarding Colorado State University's work to date on this project.**

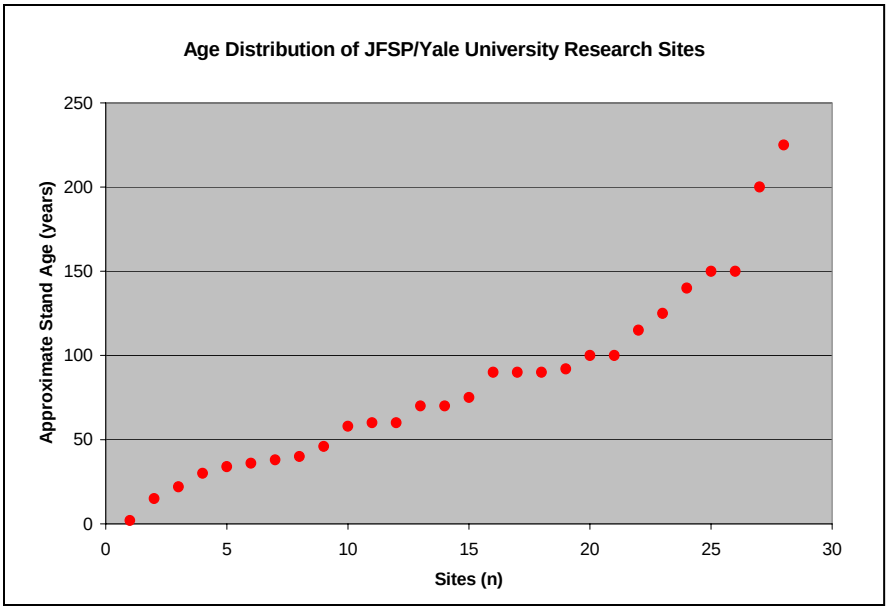
This update will provide a review of the project tasks assigned to Yale University. This includes a review of background information, objectives, the current accomplishments and anticipated work.

Background. Throughout interior Alaska it is well known among land managers and fire management personnel that recently burned areas of black spruce can serve as a fuel break during most wildland fires. Recently burned black spruce forests are an important tool during wildland firefighting operations because they serve as critical points to control fires in a landscape that sometimes has few other natural barriers to fire. While the ability of regenerating forests to slow or stop fires is well known there is little information as to how long regenerating black spruce forests serve as a reliable fuel breaks. There is also a lack of research that focuses on how the fuel complex of black spruce forest transforms as the forest matures. These transformations are responsible for a shift in fire behavior that advances from smoldering surface fires to high intensity crown fires.

Typical Example of Seral Stages of Black Spruce Forest in Interior Alaska

Objectives. Based a combination of field data, direct wildfire measurements, and fire behavior modeling recommendations based on research conducted by Colorado State University, Yale University will determine the age bracket that regenerating black spruce forests can function as a reliable fuel break. Research will also seek to reveal the changes in the fuel complex of a developing stand that cause such a dramatic change in fire behavior.

State of the Project (Project Accomplishments). Over the past two field seasons Yale University, with extensive help from partners mentioned in the beginning of this update established intensive stand evaluation plots at 30 sites throughout interior Alaska. The group of plots has been designed to measure a variety of forest characteristics for each site including the fuel model inputs for custom fuel model component of BehavePlus. Of these 30 sites 18 were situated in areas that were likely to burn over as a result of wildfires. Of these 18 sites 14 eventually burned over and at nine sites corresponding fuel moisture, fire weather and fire video data (Colorado State University) were collected. Sites that contain the full complement of data range in age from 30 years old to over 200 years old. This has provided researchers participating in this project direct fire measurements from black spruce forests in a wide range of seral stages.



The remaining 13 sites were established in relatively young stands to build a dataset that will show how the fuel complex of black spruce forests change as they develop into forests that support intense wildfires. These stands range in age from 2 to 97 years old.

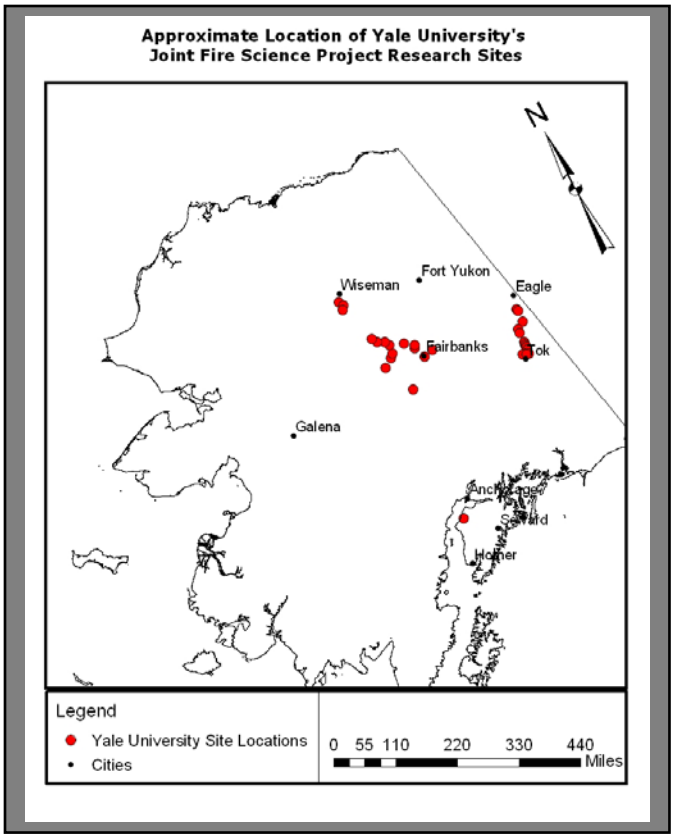
Site index and stand age data is being assessed through the collection of basal cross sections from trees at each site. These samples will provide information on the variation of forest growth among sites. Stand age is being pinpointed using a combination of Alaska Fire Service management records and fire scar analysis.

Data collected from the 2004 field season was entered into a digital database in Fall 2004 and analysis of stand age data was completed in Spring of 2005.

Anticipated Work. For Fall 2005 data entry for data collected during the 2005 field season will be completed and two technicians will be hired at Yale University to complete the stand age and site productivity analysis. Once data entry has been completed analysis of the project data will begin. This will include determining trends over an age gradient of black spruce forests and using fire behavior models recommended by Colorado State University to understand how fire behavior changes with seral development of this forest type. Publications will be completed during the Spring and Summer of 2006.

Summary of Research Sites and Data Collected

Site ID	Site Name	Burn Location	Site Burned?	Fire Behavior & Fire Weather Data Collected
1	Mystery Creek Prescribed Fire 3B	YES	NO	NO
2	Wall Street Fire 1	YES	YES	NO
3	Chicken Fire 5-6	YES	YES	YES
4	Porcupine Fire 1	YES	YES	YES
5	Porcupine Fire 3	YES	NO	NO
6	Porcupine Fire 4	YES	YES	YES
7	Porcupine Fire 5	YES	YES	NO
8	Porcupine Fire 6	YES	YES	YES
9	Porcupine Fire 9	YES	NO	NO
10	Porcupine Fire 11a	YES	YES	YES
11	Porcupine Fire 11b	YES	YES	YES
12	Porcupine Fire 12	YES	YES	NO
13	King Creek Fire 1	YES	YES	NO
14	King Creek Fire 2	YES	YES	YES
15	Clear Air Station Fire	NO	NO	NO
16	Mile Marker 51Fire	NO	NO	NO
17	Chapman Creek Fire 1	YES	YES	YES
18	Chapman Creek Fire 2	YES	NO	NO
19	Chapman Creek Fire 3	YES	YES	NO
20	Lost Horse Creek Fire 1	YES	YES	YES
21	Fire A235	NO	NO	NO
22	Fire Y85	NO	YES	YES
23	Trooper Fire	NO	NO	NO
24	Sawtooth Mountain Fire	NO	NO	NO
25	Minto Fire	NO	NO	NO
26	Colorado Creek Fire	NO	NO	NO
27	Ericsson Creek Fire	NO	NO	NO
28	Wickersham Dome Fire	NO	NO	NO
29	Yukon River Fire	NO	NO	NO
30	Pasture Fire	NO	NO	NO



Yale University gratefully acknowledges the following for their support and assistance throughout this project.

Alaska Fire Service
Bureau of Land Management
Colorado State University
Missoula Fire Sciences Laboratory
National Park Service
Pacific Wildland Fire Sciences Laboratory
State of Alaska, Department of Natural Resources
Student Conservation Association
University of Alaska, Fairbanks
U.S. Fish & Wildlife Service