SUMMARIES OF MANAGEMENT AND RESEARCH ACTIVITIES RELATED TO ALASKA'S BOREAL FORESTS

SECOND EDITION

A PRODUCT OF THE
ALASKA NORTHERN FOREST COOPERATIVE

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Compiled by:
Robert A. Ott, Ph.D.
Alaska Department of Natural Resources
Division of Forestry
Forest Health Program
Fairbanks, Alaska

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INTRODUCTION

The Alaska Northern Forest Cooperative is an organization that addresses forest management opportunities and challenges that are of concern to the managers of Alaska's Northern (i.e. boreal) Forest. Members of the Cooperative include managers, researchers, and landowners of Alaska's boreal forest. The goals of the Cooperative are to: 1) Identify, evaluate, and rank technical needs of forest managers in the Northern Forest; 2) Coordinate and initiate the acquisition of information to address the highest priority needs; and 3) Facilitate the dissemination of existing and new information to forest land managers and land owners throughout the Northern Forest. The Cooperative has a technical focus and is not a political or advocacy organization.

This document is an effort by members of the Alaska Northern Forest Cooperative to partially address its three goals stated above. The purpose of this document is to summarize information related to ongoing and completed projects that are of interest to members of the Cooperative. Summarized projects consist of formal research studies as well as less formal activities where information relevant to forest management concerns (e.g. forest inventories, timber harvest maps) have been or are being collected.

This document will be periodically updated as projects are completed and new ones are initiated.

CLIMATE VARIABILITY AND FORESTS

ALASKA BIRCH AND BLACK SPRUCE TREE GROWTH AND CLIMATE

Date Revised: 12 February 2004

Project Status: Ongoing

Contact Person or Agency: Glenn P. Juday, Forest Sciences, School of Natural Resources and Agricultural Sciences, University of Alaska Fairbanks, Fairbanks, AK 99775-7200, ffgpj@uaf.edu

Cooperators: Valerie Barber and Rob Solomon both with the University of Alaska Fairbanks Forest Sciences Department.

Project Description: We examined the climate/growth relationship and factors that best promote and most limit growth of black spruce and Alaska birch at some sites around Interior Alaska. Birch had two opposite growth responses: positive responders grow more in warm summers, less in cool summers (one site); negative responders grow best in cool summers, worst in warm summers (three sites). Four climate predictive relationships were identified for black spruce: positive responders that grow best following warm late winters; trees with a negative response to midsummer warmth; and trees that respond to a mixed climate signal (positive for late winter warmth and negative for late spring warmth. We will be sampling more sites around Interior Alaska and will also be looking at density and isotope ratios in annual rings of both species to help delineate climate affects through multiple proxies.

Project Site Location(s): Central Interior Alaska

Relevance to Forest Management: Scientists and policy makers are intensely interested in the climate sensitivity of the boreal forest, because of uptake and storage of carbon dioxide from the atmosphere. Changes due to a warmer climate are not well known. Equations developed in this project are providing answers to this question. Preliminary results indicate a warming of 3˚ to 5˚ C would produce years with a predicted zero growth for negative responding birch and black spruce, suggesting they wouldn't survive. For positive responder black spruce, warming would increase average growth about fifty percent by the year 2100, but permafrost would thaw, probably leading to widespread tree death.

Key Words: Black spruce, white spruce, climate, isotopes, density, radial growth

ARCTIC CLIMATE IMPACT ASSESSMENT

Date Revised: 12 February 2004

Project Status: Completed, although chapters are in final review.

Contact Person or Agency: Glenn P. Juday, Forest Sciences, School of Natural Resources and Agricultural Sciences, University of Alaska Fairbanks, Fairbanks, AK 99775-7200, ffgpj@uaf.edu.

Cooperators: Valerie Barber, Steve Sparrow, Scott Rupp, and Carol Lewis, all with the University of Alaska Fairbanks School of Natural Resources and Agricultural Sciences.

Project Description: The Arctic Council, representing Canada, Russia, Iceland, Norway, Sweden, Finland, Denmark (Greenland), and the United States, launched the Arctic Climatic Impact Assessment (ACIA) three years ago. Strong climate warming has occurred across much of the Arctic in recent decades, and possible future climate warming is predicted to be greatest in the far north. The member nations have funded an international scientific synthesis on the effects of climate change and increased ultraviolet light from ozone depletion in the Arctic. Involving over two hundred authors, the scientific document describes current understanding of past climate changes and their effects, recent trends the arctic climate, risks and vulnerabilities to society from climate change, and an analysis of the effects of five climate change scenarios. The UAF Agricultural and Forestry Experiment Station is providing the lead author and contributing authors for the chapter on Forests, Land Management, and Agriculture. Final versions of all chapters have been completed.

Project Site Location(s): Circumpolar North

Relevance to Forest Management: ACIA is an important summary and information reference for the public, natural resource managers, scientists, and policy makers in anticipating, planning for, and dealing with arctic climate change consequences. Under the scenario conditions used in the ACIA analysis, climate conditions would reduce tree growth on several site types in western North America and central and eastern Siberia because of moisture limitation; tree growth would increase primarily at marginal treeline sites; and the risk of large-scale insect-caused tree death in productive stands would increase greatly. Collaborative, broad-based international scientific and policy groups are already planning new investigations and reports on priority topics that have emerged from the work so far.

Key Words: Arctic, climate

HOW WHITE SPRUCE SURVIVES: GROWTH, REPRODUCTION, FIRE, AND CLIMATE VARIABILITY

Date Revised: 12 February 2004

Project Status: Ongoing,

Contact Person or Agency: Glenn P. Juday, Forest Sciences, School of Natural Resources and Agricultural Sciences, University of Alaska Fairbanks, Fairbanks, AK 99775-7200, ffgpj@uaf.edu.

Cooperators: Valerie Barber and Martin Wilmking, both with University of Alaska Forest Sciences Department.

Project Description: A synthesis of boreal forest research comparing long-term records of white spruce radial growth, seed production, climate data, and fire records to better understand growth and reproduction. Interior Alaska alternates between one- to four-decade-long periods with either warm and dry or cool and moist summer climates. Summer climate during the nineteenth century was reconstructed. We identified the climate regime pattern and developed a standard numbering system for the summer temperature regimes of the Interior. The isotope/density record agrees with ring-width measurements on productive upland sites across the region. The late twentieth century was the warmest period since 1800, although two intervals nearly as warm are reconstructed in the mid-nineteenth century.

Project Site Location(s): Bonanza Creek Experimental Forest and Long-Term Ecological Research site

Relevance to Forest Management: For at least 200 years, interior Alaska white spruce have grown about twice as much during cool-moist periods compared to hot-dry periods. White spruce cone crops are infrequent and are generally associated with the first strong warm-dry year, or years following a few years of strong growth. The climate factors associated with large cone crops also promote wildland fires.This reproductive system appears to be an adaptive strategy to maximize the odds that white spruce seed crops are released into landscapes in which fires have recently occurred.

Key Words: White spruce, cone crop, reproduction, fire, climate

OPPOSITE TREELINE GROWTH RESPONSES IN WHITE SPRUCE AND A TEMPERATURE THRESHOLD

Date Revised: 12 February 2004

Project Status: Ongoing

Contact Person or Agency: Glenn P. Juday, Forest Sciences, School of Natural Resources and Agricultural Sciences, University of Alaska Fairbanks, Fairbanks, AK 99775-7200, ffgpj@uaf.edu.

Cooperators: Valerie Barber and Martin Wilmking, both with University of Alaska Fairbanks Forest Sciences Department.

Project Description: High-latitude forests provide important feedbacks to global climate. The treeline margin between tundra and forest should be a particularly sensitive environment in which to detect climate change effects. Analysis of tree ring samples from 1155 trees older than 100 years collected at thirteen sites showed three tree populations: one that increased in growth with spring (March/April) warmth; one that decreased in growth with previous July warmth; and one that did not respond to temperature. About 80% of trees belonged to the first two response types (40% each). The response pattern repeated itself at each of the thirteen sites in both mountain ranges. The negative growth response to warm temperatures is particularly surprising since warmth is usually reported to enhance tree growth at cold treeline sites and facilitate treeline advance. Growth decreases in the negative responding trees began for mean July temperatures at Fairbanks greater than 16˚ C (61˚ F). Temperatures above this threshold were more common after 1950 than before.

Project Site Location(s): Seven sites in the Brooks Range and six sites in the Alaska Range of Alaska.

Relevance to Forest Management: These types of tree response to climate appear to be valid across most of the mountain boreal regions of Alaska. This information can help resource managers determine the current health and possible future performance or survival of white spruce in the parks, refuges, and resource management areas that dominate the mountains of Alaska.

Key Words: White spruce, treeline

THE RESPONSE OF FOREST ECOLOGY AND GROWTH TO CLIMATE VARIABILITY

Date Revised: 12 February 2004

Project Status: Book chapter finished, research ongoing

Contact Person or Agency: Glenn P. Juday, Forest Sciences, School of Natural Resources and Agricultural Sciences, University of Alaska Fairbanks, Fairbanks, AK 99775-7200, ffgpj@uaf.edu.

Cooperators: Valerie Barber, Scott Rupp, and Martin Wilmking (all with University of Alaska Fairbanks Forest Sciences Department) and John Zasada, USDA Forest Service.

Project Description: The boreal forest is a natural climate-driven system, but with recent warming over the past several decades, it is important to distinguish climate change (warming) effect from natural variability of this system. This project overlaps with many of our other projects in determining radial growth responses to climate over the lifetime of a tree. We are interested in the 4 main species of the boreal forest, black and white spruce, birch and aspen. We are collecting cores and disks from all over boreal Alaska.

One goal of this project was to write a book chapter now published:
Juday, G.P., Barber, V., Rupp S., Zasada, J., Wilmking M.W. 2003. A 200-year perspective of climate variability and the response of white spruce in Interior Alaska. Chapter 12 Pp. 226-250. In: Greenland, D., Goodin, D., and Smith, R. (editors). Climate Variability and Ecosystem Response at Long-Term Ecological Research (LTER) Sites. Oxford University Press.

Project Site Location(s): Boreal Alaska

Relevance to Forest Management: These results suggest that there is a continuing high risk caused by climate warming in managing forest land in southcentral Alaska for spruce forest crops. Under recent climate conditions, and especially under scenarios of further climate warming, spruce bark beetle irruption potential will remain high. Small surviving understory spruce trees not susceptible to bark beetle attack in the region will mature to commercial forest dimensions and move into the prime susceptibility size and age classes to serve as hosts for spruce bark beetle. Under these circumstances, the regional environment would remain effectively saturated with spruce bark beetles because climate limitations on beetles have been removed. Investments in regeneration and early tending of new commercial stands of spruce would carry considerable risk because bark beetles would become effective agents of tree mortality at about the time that stands of spruce became large enough to generate commercial value.

Key Words: Black spruce, white spruce, birch, aspen, climate, radial growth, spruce bark beetles

FIRE MANAGEMENT

BAER (BURNED AREA EMERGENCY RESPONSE) STABILIZATION PLAN AND INVASIVE PLANT SURVEY: 2005 OVERVIEW

Date submitted: 01 November 2005

Project Status: Ongoing

Contact Person or Agency: Project &/or Data Inquiries: Ruth Gronquist (Wildlife Biologist/State Weed Coordinator), FDO (Fairbanks District Office) BLM, Ruth_Gronquist@blm.gov. **Map &/or Data Inquiries:** Crystal Schiffbauer (GIS [Geographic Information Systems] Specialist & Bio Tech for Plant Surveys), ECO (Environmental Careers Organization)-FDO BLM, c05schif@blm.gov.

Cooperators: BAER TEAM 2004: Bureau of Land Management (BLM), National Park Service (NPS), US Fish & Wildlife Service, Bureau of Indian Affairs, USDA Forest Service, Alaska Department of Natural Resources), Alaska Department of Transportation, Doyon Ltd., Tanana Chiefs Conference. **INVASIVE PLANT SURVEYS:** FDO BLM (Ruth Gronquist), NPS (Jeff Heys), University of Alaska Anchorage-Alaska Natural Heritage Program (Helen Cortes-Burns & Matt Carlson), Tanana Chiefs Conference (Jake Sprankle, Will Putman)

Project Description: Purpose—Conduct invasive plant surveys within management corridors to determine what kind of impacts fires and people movement have had on the post-burn environment. Data are used by the BAER Team (biologists, soil scientists, cultural anthropologists, etc.) to help them in preparing an Emergency Stabilization and Rehabilitation Plan for the areas burned. Several areas surveyed were within BLM managed forests along the Dalton Highway-the Dall City and Fort Hamlin Fires. Another objective was identifying potential sources and pathways for the introduction or spread of invasive plants and conducting manual control of invasive plants.

Project Site Location(s): Beaver Creek/White Mountains Corridor (June 2005). Dalton Management Unit (June–August 2005)—Conducted surveys from Yukon River Bridge Crossing up to Toolik Lake. Steese and White Mountains (July 2005).

Relevance to Forest Management: Most of the areas surveyed were BLM lands with some work conducted on adjacent State lands—often in black spruce forests Information sharing and cooperation between all groups (government and non-government alike) is a great benefit to everyone in terms of education and making people aware of what is happening on public lands and how people can help to decrease the amount of disturbance or number of introduced plants. The information is relevant and can help in determining the effects of natural disasters and the types of plants following in succession.

Key Words: Inventories, Mapping, Surveys, Fire, Forest Health, Biodiversity

DEVELOPMENT OF A COMPUTER MODEL FOR MANAGEMENT OF FUELS, HUMAN-FIRE INTERACTIONS, AND WILDLAND FIRES IN THE BOREAL FOREST OF ALASKA

Date Submitted: 19 February 2004

Project Status: Ongoing

Contact Person or Agency: Scott Rupp and Daniel Mann, University of Alaska Fairbanks; PO Box 757200, Fairbanks, AK 99775; 474-7535; scott.rupp@uaf.edu.

Cooperators: Randi Jandt, Alaska Fire Service; Karen Murphy, US Fish and Wildlife Service; Jennifer Allen, National Park Service; Layne Adams, US Geological Survey—Alaska Biological Science Center; Bruce Dale, Alaska Department of Fish and Game.

Project Description: Our goal is to develop a computer-based, fire-management modeling tool that is consistent with ecological processes in the boreal forest of interior Alaska and tested by field data. This model will depict the responses of vegetation to multiple scenarios of fire-management, fuel buildup, and climatic change. Model outputs will be transient depictions of vegetation, fuel, and fire extent over defined landscapes. The focus of our fieldwork will be stand-age analyses of forests representing the five major boreal forest fuel types. In future model runs, the abundance of these fuel types in a specific area will change, so we need to have age dependent, hazard-of-burning functions for each of them. These same functions will yield the first well-quantified and geographically representative estimates of fire frequency over the last several centuries in interior Alaska. Our fieldwork will take place along a climatic gradient stretching across interior Alaska.

Project Site Location(s): Multiple sites within each of the following regions (GPS coordinates available upon request): Ruby-Poorman Mining District, Nowitna Wildlife Refuge, Steese-White Mountains Conservation Area, Yukon Flats Wildlife Refuge, Venetie Tribal Lands, 40-mile Country.

Relevance to Forest Management: On average, wildland fires burn 1,000,000 acres in interior Alaska each year, and they routinely threaten the lives, property, and timber resources of the sparse but growing human population. Wildland fires threaten human values, but they also are crucial for the maintenance of the boreal forest. *How do we manage wildland fire in interior Alaska for the mutual benefit of humans and natural ecosystems?* Our proposed work is important because it addresses this question directly. The Boreal ALFRESCO model will output mapped depictions of changes in wildland fuels, fire risk, and vegetation under multiple future scenarios of fire-management, climate change, and human development. The model will serve as an integrative and adaptive planning tool for land managers designing fire-management plans that can safeguard both human and natural values.

Key Words: Climate and soil, Fire, Forest ecology, Forest health, Management and policy, Mensuration and inventories, Silviculture

FIRE BEHAVIOR MODELING AND ASSESSMENT FOR THE ANCHORAGE WILDLAND-URBAN INTERFACE

Date Submitted: 19 February 2004

Project Status: Ongoing

Contact Person or Agency: Dan Cheyette and Scott Rupp, University of Alaska Fairbanks; PO Box 757200, Fairbanks, AK 99775; 474-7535; scott.rupp@uaf.edu.

Cooperators: Sue Rodman, Anchorage Fire Department

Project Description: A recent spruce bark beetle outbreak killed a large number of spruce trees in the wildland-urban interface. Anchorage wildland fire managers believe the city is exposed to a significant wildfire risk due to the large number of people that live in the Anchorage bowl and the large number of dead spruce stands in the wildland-urban interface.

During the 2002 field season, we measured fuel loading at 150 plots in three major fuel types across Anchorage's wildland-urban interface. A suite of Fire Danger Rating System (FDRS) fire behavior variables was sampled to parameterize custom fuel models for use in the FARSITE fire behavior simulation model. FARSITE uses a variety of topographic, landscape, weather and fuel data themes to simulate the spread of fire across a landscape. Previous application of FARSITE to the study area identified major inconsistencies between the standard FDRS fuel models and the actual fuels present in the Anchorage Bowl. Accurate assessment of risk therefore warrants the development and application of custom fuel models.

Project Site Location(s): 150 plots throughout the Municipality of Anchorage (GPS coordinates available upon request).

Relevance to Forest Management: We are currently developing a set of baseline simulations, under a host of weather condition scenarios, of expected fire behavior. Model sensitivity analysis is directed at variables important in driving fire behavior and identifying parameter value thresholds that can direct mitigation efforts in the fuel reduction phase of the AWP program. For example, stand height, canopy closure, crown bulk-density and base height, and woody debris fuel loadings are important drivers of fire behavior and therefore need to be considered when developing fuel management strategies. The incorporation of our field and model results will identify specific areas of wildfire risk in the Anchorage bowl as well as management prescriptions that will most significantly reduce the variables that drive the predicted fire behavior.

Key Words: Fire, forest health, management and policy, mensuration and inventories, silviculture

FUELS TREATMENT DEMONSTRATION SITES IN THE BOREAL FORESTS OF INTERIOR ALASKA

Date Revised: November 2005

Project Status: Completed

Contact Person or Agency: Robert Ott, Forest Health Program, Alaska Department of Natural Resources, Division of Forestry, 3700 Airport Way, Fairbanks, AK 99709, (907) 451-2702, robert_ott@dnr.state.ak.us. (Research was conducted while employed at the Tanana Chiefs Conference, Forestry Program, Fairbanks, Alaska)

Cooperators: Bureau of Land Management Alaska Fire Service, Alaska Division of Forestry, US Army Alaska, Toghotthele Corporation.

Project Description: Three fuels treatment demonstration sites, in the form of shaded fuel breaks in black spruce stands, were created in the Tanana River watershed. Each demonstration site consists of four treatment plots and a control plot—all plots are 1 acre in size. At each site, tree densities in two of the treatment plots were reduced to 680 trees/acre; trees were pruned in one of the plots. Tree densities were reduced to 435 tees/acre in the other two plots at each site; trees were pruned in one of those plots as well. Within each 1 acre plot, tree measurements were recorded within five, square, 0.03 acre plots. Seedling and sapling measurements were recorded within 10, circular, 0.002 acre plots. Understory and overstory vegetation cover, active layer depth, and down woody fuels were measured along five sampling lines, 50 feet in length. Litter and duff measurements were taken in 10 excavated pits. Pre-treatment and post-treatment measurements were taken (2 sites in 2001 and 1 site in 2002). Plots were re-measured in year three (two years after treatment). Two of the plots were re-measured in the summer of 2003, the third was re-measured during the summer of 2004.

Project Site Location(s): Fort Wainwright (Fairbanks), Delta Bison Range (Delta), Toghotthele Corporation land (Nenana).

Relevance to Forest Management: Fire fighting agencies in interior and southcentral Alaska have been implementing fuels reduction programs, such as installation of firebreaks and shaded fuel breaks around settlements. However, the effectiveness of these programs has not been monitored, so comparison of various fuels reduction techniques is not possible. The objective of this project was to develop the first fuels treatment demonstration sites—in the form of shaded fuel breaks—in the boreal forests of interior Alaska. The sites will allow for the comparison of the effectiveness, environmental effects, and cost of four different fuels treatments in high density black spruce stands. In addition, the sites are available to the public for education purposes.

Key Words: Fire control, firebreaks, fuel reduction and vegetation management, biodiversity, forest ecology, ground vegetation, black spruce

HAZARD FUEL REDUCTION AND FUEL TYPE CONVERSION TECHNIQUES, AND RESULTING WOOD PRODUCT POTENTIAL IN MIXED SPECIES FORESTS

Date Revised: 13 April 2005

Project Status: Ongoing

Contact Person or Agency: Kathryn Tietz and Marc Lee, State of Alaska Division of Forestry, 3900 Airport Way, Fairbanks, AK 99709.

Cooperators: Dr. Edmond Packee and Tom St. Clair, University of Alaska Fairbanks.

Project Description: The University of Alaska Fairbanks and the Alaska Division of Forestry UAF and State are installing research plots where fuel type conversions that change a flammable vegetation type (spruce) to a less flammable type (hardwoods) will be studied. The project will look at standardized disturbance such as mechanical / hand harvesting which can scientifically be measured to determine the most effective technique to accomplish the conversion. Treatment methods will include hand falling and pile burning, masticating using a Bull Hog masticator; shear blading with windrows, shear blading with burning the material and shear blading with windrows material removed from the site. The research project will also explore the feasibility of developing useable products from the waste vegetative material resulting from the treatment. Product research includes producing road amendments which will be applied to a test site on Cache Creek road and testing the material product for a bio-mass fuel.

Project Site Location(s): Fairbanks, 10 mile Cache Creek logging road accessed off Murphy Dome Road; 15 miles northwest of Fairbanks; T. 1N, R. 4 W. Secs 21 & 28.

Relevance to Forest Management: Wildland fire plays a significant role in Alaska's ecological system. Cache Creek was chosen because this was the scene of a large fire in the 1950's. After the fire, hardwoods became the dominant species. Since then, the area has been converting back to spruce as seen by the dense understory of small diameter spruce trees. Lincoln Creek subdivision, Fairbanks North Star Borough land sales and other private lands have increased the number of residents living within this area. Because many Alaskans enjoy recreating and or living close to or within the wildlands, wildland fire can pose a threat to their homes and to their lives. Results form this project will provide information on effectiveness of fuel reduction methods, forest response to treatment, and economics (costs) of treatments to be used in future management decision-making.

Key Words: Economics, fire prevention, fire control, fuel reduction and vegetation management, fuel type conversion

LITTLE CHENA FUELS MANAGEMENT PROJECT

Date submitted: 20 April 2005

Project Status: Ongoing

Contact Person or Agency: Paul Keech (907) 451-2634, paul_keech@dnr.state.ak.us, or Robert Schmoll (907) 451-2636, robert_schmoll@dnr.state.ak.us, Alaska Department of Natural Resources Division of Forestry, 3900 Airport Way, Fairbanks, AK 99709.

Cooperators: Tom Paragi**,** Alaska Department of Fish and Game.

Project Description: Identify continuous black spruce forest adjacent to communities that pose a high fire risk. Lay out strategic locations for treatment by connecting less fire prone vegetation types like hardwood forests. The primary treatment method is mechanical removal of fuels (shearblading) and subsequent slash burning where appropriate. Shearblading consists of shearing off black spruce and pushing into windrows that would be later burned to remove the fuel hazard. This process would change the vegetation type from a volatile black spruce forest to a much more fire resistant birch/aspen forest.

Project Site Location(s): This project is located on the Two Rivers Logging Road approximately 18.5 mile on Chena Hot Springs Road northeast of Fairbanks.

Relevance to Forest Management: Hazardous fuels mitigation is becoming more important with fire exclusion in urban areas. The Fairbanks Area is of great concern due to the combination of high fuels concentrations in a fire prone ecosystem in close proximity to homes. This imminent fire threat can only be mitigated through extensive fuels treatment. The Fairbanks community has avoided a serious fire catastrophe through aggressive initial attack by DOF and its cooperators and a solid fire prevention program. However, failing to eliminate heavy fuel loadings on public lands adjacent to homes only puts off the inevitable tragedy fire.

Key Words: fire prevention, fire control, fuel reduction, hazard fuels, and vegetation management, fuel type conversion

NATIVE ALLOTMENT HAZARD FUEL ASSESSMENT

Date Revised: 30 January 2004

Project Status: Ongoing

Contact Person or Agency: Will Putman, Acting Forestry Director, Tanana Chiefs Conference, 122 First Ave., Suite 600 Fairbanks, AK 99701, wputman@tananachiefs.org.

Cooperators: None

Project Description: The assessment ranks the risk of allotments to fire damage by various threat components. Improvements are verified on the parcels and attributes are collected on the improvements with respect to the standing fuels. Each improvement is located with a global positioning system (GPS) receiver and the locations are incorporated into the Native allotment forest inventory geographic information system (GIS) dataset. Attributes include a digital photograph of the improvement, distance to flammable vegetation, defensibility, structure construction materials, fuel type and over all hazard ranking. Allotments with inhabited dwellings are placed highest on the hazard ranking list.

Project Site Location(s): Native allotment lands within the Tanana valley.

Relevance to Forest Management: The assessments will allow for determining areas suitable for hazard fuel reduction projects. Fire fighting agencies will also have access to the data to determine locations of remote cabins and other values at risk. The Tanana Chiefs Conference Fire Management Plan for Allotments has indicated the need to reduce the risk of fire adjacent to allotments, which in the long term will reduce the expense, uncertainty and damage resulting from uncontained wildfires.

Key Words: Wild fire, hazard fuels, Native allotments, defensible space

WESTERN TANANA FLATS VEGETATIVE FUEL MANAGEMENT PROJECT

Date Revised: 30 January 2004

Project Status: Ongoing

Contact Person or Agency: Will Putman, Acting Forestry Director, Tanana Chiefs Conference, 122 First Ave., Suite 600 Fairbanks, AK 99701, wputman@tananachiefs.org.

Cooperators: Alaska Division of Forestry, Fairbanks Area, and Alaska Department of Fish and Game, Fairbanks.

Project Description: Utilizing data collected in the Native Allotment Hazard Fuel Assessment, three allotments along the Wood River were mechanically treated to install holding lines in advance of a burnout. The burnout will occur prior to a scheduled prescribed burn within the Tanana Flats. By producing a black line around the parcels important cabin and other assets will be protected from fire. The black line will enable the prescribed fire to burn closer to the parcels without having extensive cabin protection measures in effect. A detailed budget has been produced for the project that utilizes local village Type II fire personnel and State Division of Forestry Fire Technicians.

Project Site Location(s): Native allotment lands along the Wood River between Fairbanks and Nenana. A second project is proposed for village, state and Native allotment lands north of Tanacross.

Relevance to Forest Management: Allotment fuel reduction activities will allow for the reintroduction of fire into various areas within the state. Many of these areas where large prescribed fires are proposed contain multiple allotment inholdings.

Key Words: Wild fire, hazard fuels, Native allotments, firebreaks, fuel reduction, vegetation management

WILDFIRE HAZARD FUEL REDUCTION PROJECT

Date Revised: 30 January 2004

Project Status: Ongoing

Contact Person or Agency: Dan Rees, US Army Alaska, 907-353-9318, dan.rees@wainwright.army.mil.

Cooperators: Tami DeFries, USDI Bureau of Land Management Alaska Fire Service

Project Description: The objective of this monitoring project is to tract the vegetation changes on a disturbed black spruce site. The project goal is to convert a black spruce site to a shrub/hardwood site through mechanical manipulation. Monitoring plots were established in mechanical treatments of a hazard fuel reduction project. Black spruce was either hydro-axed or shear-bladed windrowed and burned. Next, the forest floor was either grubbed or ripped with and dozer. Permanent plots tract vegetation response to the various treatments. Plots use a point intercept method of recording vegetation presence every 30cm along a 30m line. Shrub and hardwood stem density is estimated from a belt transect measuring 1m x 30m. 18 plots are established in the project area, 3 replicates in each treatment within one of two soil types.

Project Site Location(s): Fort Greely/Donnelly Training Area, Delta Junction, Alaska

Relevance to Forest Management: Different treatments were utilized in an attempt to convert a black spruce forest to a hardwood forest. The black spruce forest in this location, was determined to be a wildfire risk. A successful conversion from black spruce to hardwoods would reduce the risk of wildfire.

Key Words: Fire

FOREST COMMUNITY CLASSIFICATION

ECOLOGICAL CHARACTERISTICS OF STAND AGE CLASSES IN NORTHERN FORESTS: A LITERATURE REVIEW

Date Revised: 17 February 2004

Project Status: Ongoing

Contact Person or Agency: Nancy Fresco, UAF IGERT doctoral candidate, 452-5021, nancy@northern.org, and Alison Arians, Division of Forestry, Anchorage, 269-8450, alison_arians@dnr.state.ak.us.

Cooperators: Jan Dawe (Alaska Boreal Forest Council), Bob Ott (Tanana Chiefs Conference), Tom Paragi (Alaska Department of Fish and Game).

Project Description: Annotated bibliography referencing information on ecological characteristics of stand age classes in northern forests. Will include documentation of sources searched, last date of search, key words/phrases used in search, etc. to ensure future replication.

Project Site Location(s): Northern forests.

Relevance to Forest Management: Can help determine possible effects of rotation age for forest management, if stands much older than rotation age have different ecological characteristics than those harvested at the rotation age.

Key Words: Bibliography; northern forests; forest ecology—forest types, dynamics of natural forests

FOREST RESOURCE MANAGEMENT COMMUNITY TYPES

Date Revised: March 2005

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: J.D. Shaw, Ph.D., Certified Forester, USDA Forest Service Rocky Mountain Research Station Forest Inventory and Analysis Unit (Ogden); C-L Ping, Soil Scientist, UAF Agricultural and Forestry Experiment Station (Palmer, AK); Alaska Department of Natural Resources: Divisions of Forestry Northern Region and Southcentral Region, Mining, Land and Water, and Parks; University of Alaska Statewide Lands; USDA Forest Service Chugach National Forest; USDI Bureau of Land Management; USDI Fish and Wildlife Service Kenai National Wildlife Refuge; US Department of Defense Air Force, Elmendorf Air Force Base, Fort Richardson; Fairbanks-North Star Borough; Kenai Peninsula Borough; Mat/Su Borough; Ahtna, Inc; CIRI Corporation; Bean Ridge Village Corporation; Circle Village Corporation; Eagle Village Corporation; Eklutna Village Corporation; Minto Village; Northway Village Corporation; Tetlin Village Corporation. Alyeska Pipeline Company.

Project Description: Throughout much of North America, community types or habitat types are used in defining, ecological and management units. In Alaska, although many community types have been described, no systematic, comprehensive classification or description exists at the community type-soils level. Objective: Develop a classification system of forest community types based on vegetation and soils information for the Northern Forest in Alaska at a sufficiently refined level to aid in the development of forest management prescriptions. Permanent sample plots (PSPs) and other published/unpublished reports will be used to develop the classification. PSP data suggest that published forest cover types inadequately address the cover types of Alaska and their successional status. Ecological regions determined for the State. Community information component of S. Vogt (Aug 1999) and C. Rosner (Aug 2004) M.Sc. theses. Integration of soils information initiated as component of N Zaman M.Sc. thesis (expected Dec 2005).

Project Site Location(s): Throughout Northern Forest (white and black spruce-birch-aspen) of southcentral and interior Alaska.

Relevance to Forest Management: A classification system will permit broader application of forest stand management research, improved and less costly stand silvicultural prescription development and implementation, and ultimately reduce stand management costs.

Key Words: Silviculture, mensuration and inventory, climate and soils, forest ecology, fire

FOREST SOILS, FOREST STAND CHARACTERISTICS, AND FOREST PRODUCTIVITY ALONG A TOPOSEQUENCE

Date Revised: March 2005

Project Status: Ongoing

Contact Person or Agency: Chien-Lu Ping, Ph.D., Soil Scientist, Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (at Palmer, AK) or Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks.

Cooperators: USDA Natural Resources Conservation Service Soils Laboratory at Lincoln, Nebraska.

Project Description: Forest vegetation, forest productivity, and soils vary with position on slope from dry to wet. State factors involved are: solar radiation (heat or light), moisture (precipitation and soil moisture), topography, nutrients, biota, and time. Although, generally understood, detailed information is lacking for Alaska's Northern Forest. Objective: Describe forest vegetation and productivity and soils along a uniform gradient (toposequence) and determine relationships with state factors. Two transect have been established from ridge-top to wetland, from aspen dominated to black spruce dominated forest stands. PSPs, productivity, and soils have been described. Basis for L. Zhu (completed Dec. 2004) and N. Zaman (expected completion Dec. 2005) M.Sc. theses.

Project Site Location(s): University of Alaska Fairbanks' Arboretum, northwest corner along Miller Hill Road and Yankovich Road (six sites).

Relevance to Forest Management: Toposequence data will better document state factor controls on forest stand composition and productivity and help identify best management practices including site preparation, species selection, and stand maintenance options.

Key Words: Silviculture, mensuration and inventory, climate and soil

PERMANENT SAMPLE PLOTS (PSPS) FOR STAND CHARACTERIZATION

Date Revised: March 2005

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources Divisions: Forestry, Northern Region and Southcentral Region; Mining, Lands and Water; Parks; University of Alaska Statewide Lands; USDI Bureau of Land Management; USDI Fish and Wildlife Service Kenai National Wildlife Refuge; USDI National Park Service Wrangell-St. Elias National Park and Preserve; US Department of Defense, U.S. Air Force, Fort Richardson; Fairbanks-North Star Borough; Kenai Peninsula Borough; Mat/Su Borough; Ahtna, Inc; CIRI Corporation; Dot Lake Village Corporation, Northway Village Corporation, Tetlin Village Corporation.

Project Description: Establish fixed-area, PSPs for pure and mixed stands of native species; the program is a cooperative effort with the commitment of the land manager/owner. Three 0.1 acre plots/selected within a stand. Data collected include stand species (trees and non-tree understory) composition, structure characteristics, (tree diameter, height), top height of understory species, tree regeneration and mortality, cover class of all species, soils, other resource information. Establishment and remeasurement continues; PSPs remeasured at 5-year intervals; to date, 231 remeasured once and 12 remeasured twice. Basis for S. Vogt (Aug 2002) and component of C. Rosner (Aug 2004) M.Sc. theses and Ph.D. dissertation of E. Kane's Ph.D. dissertation (in progress).

Project Site Location(s): To date, 533 PSPs in groups of 3 = 178 stands throughout interior and southcentral Alaska; all plots are GPS'd.

Relevance to Forest Management: Characterizes stand and community species composition and structure, habitat biodiversity, fuel loading, and soil to better model and predict natural forest stand trajectories. Used to define/characterize vegetation community types, a basic resource management tool, wildlife habitat, forest health conditions, components of carbon sequestration, and fuel-loads—all essential for sustainable multiple-use forest management.

Key Words: Silviculture, mensuration and inventory, climate and soil, forest ecology, fire, forest health, wildlife, biodiversity

SOILS OF ALASKA'S BLACK SPRUCE FOREST

Date Revised: March 2005

Project Status: Ongoing

Contact Person or Agency: Chien-Lu Ping, Ph.D., Soil Scientist, University of Alaska Fairbanks (at Palmer) or Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks.

Cooperators: Alaska Department of Natural Resources Divisions of Forestry and Mining, Land, and Water, Northern Regions; USDA Natural Resources Conservation Service Soils Laboratory at Lincoln, Nebraska; USDI Bureau of Land Management, US Department of Defense U.S. Air Force; Northway Village Corporation; Tetlin Village Corporation.

Project Description: Alaska black spruce forest soils are poorly described; many have never been described. Until soils information is available, management of black spruce dominated ecosystems will be limited. Objectives: Describe soils of black spruce stands, especially, those with permanent sample plots or site index plots; correlate characteristics with stand conditions. Soil pits are dug, described, and sampled to at least 40 inches through permafrost and non-permafrost soils or to bedrock. Sampled material is sent to the USDA Natural Resources Conservation Service Soils Laboratory in Lincoln, Nebraska for analysis. Basis for N. Zaman (expected Dec. 2005) and component of C. Rosner (completed Aug 2004) M.Sc. theses.

Project Site Location(s): Currently, throughout interior and adjacent southcentral Alaska; primarily located in conjunction with PSPs or site index plots. Plan is to expand into southcentral Alaska in the future.

Relevance to Forest Management: Without soils information, understanding the limitations, potentials, and ecology of black spruce stands is limited. Soils information will improve stand prescriptions. Black spruce stands supporting trees in excess of 10 inches dbh have been found on both permafrost and non-permafrost sites; this suggests the importance of soil surface horizon characteristics because of the shallow rooting habit of black spruce. Additionally, surface soil moisture regimes affect the productivity of black spruce—poorly drained soils are commonly the least productive soils. Black spruce grows well on xeric and subxeric sites to aquic sites; it is found as pure or nearly stands on ridgetops, steep slide slopes, and sand dunes.

Key Words: Silviculture, mensuration and inventory, biology of forest trees, climate and soils, forest ecology, fire

SOILS OF ALASKA'S NORTHERN FOREST COMMUNITY TYPES

Date Revised: March 2005

Project Status: Ongoing

Contact Person or Agency: Chien-Lu Ping, Ph.D., Soil Scientist, University of Alaska Fairbanks (at Palmer) or Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks.

Cooperators: Alaska Department of Natural Resources: Divisions of Forestry Northern Region and Southcentral Region, Mining, Land and Water, and Parks; University of Alaska Statewide Lands; USDA Natural Resources Conservation Service Soils Laboratory at Lincoln, Nebraska; USDA Forest Service Chugach National Forest; USDI Bureau of Land Management; USDI Fish and Wildlife Service Kenai National Wildlife Refuge; Fairbanks-North Star Borough; Mat/Su Borough; Northway Village Corporation; Tetlin Village Corporation.

Project Description: Soils strongly impact forest stand productivity and species composition. Except locally or at the coarse soil survey level, the affect of soils on site productivity and forest stand species composition is poorly recognized. Treatment prescriptions can affect productivity negatively or positively. Objectives: Describe soils of forest stands with permanent sample plots or site index plots, identify limitations, management concerns, and correlate soil characteristics with species composition and productivity. Soil pits are dug, described, and sampled to at least 40 inches or bedrock. Sampled material is also sent to the Natural Resources Conservation Service Soils Laboratory in Lincoln, Nebraska for analysis.

Project Site Location(s): Throughout interior and southcentral Alaska; primarily located in conjunction with permanent sample plots or site index plots; expanded sampling to north of the Yukon Bridge along the Dalton Highway.

Relevance to Forest Management: Soils information is critical to understanding the limitations, potentials, and ecology of forest stands; vegetation and soils make up the ecosystem and hence, the community type. Soils information will improve stand prescriptions. Two examples are: Volcanic ash and loess caps over coarse materials are highly productive soils; severe disturbance of the cap such as disk trenching or plowing can destroy the water-holding capacity of the rooting zone (the cap) and reduce drastically productivity—no treatment or prescribed fire are preferred. Soil characteristics currently under a less desirable forest cover type (e.g., black spruce) can be used to identify sites suited to more desirable species (e.g., white spruce or birch).

Key Words: Silviculture, climate and soil, forest ecology, fire

VEGETATION AND COMMUNITY MAPPING OF THE TANANA VALLEY

Date Revised: 14 April 2005

Project Status: Ongoing

Contact Person or Agency: Marc Lee, Division of Forestry, Fairbanks, 451-2601, marc_lee@dnr.state.ak.us.

Cooperators: University of Alaska, Fairbanks, Department of Transportation/Public Facilities, Department of Community and Regional Affairs.

Project Description: Quickbird high-resolution satellite imagery (in areas with many structures) and medium-resolution satellite imagery is being acquired to complete a geographic information system (GIS) coverage for the Tanana Valley. After images are acquired, they are ground controlled and orthorectified. Then the imagery will be used to create vegetation maps of the area. One focus of this GIS information will be for fire-fighting, but it will also be used by the University, by DOT/PF for road mapping, and by the Department of Community and Regional Affairs for village maps. These data will be provided to the public when the project is complete.

Project Site Location(s): Tanana Valley

Relevance to Forest Management: Vegetation mapping could be useful tool for landscape scale management questions.

Key Words: Mensuration and inventories—measurements of trees, forecasting production, inventories of forest resources, remote sensing, surveying and mapping; management and policy—administration of forest enterprises; forest ecology—forest types, ground vegetation; fire—fire prevention, fire control

FOREST HEALTH

ANNUAL FOREST DAMAGE SURVEY PERMANENT PLOTS

Date Revised: 17 February 2004

Project Status: Ongoing

Contact Person or Agency: Roger Burnside, Division of Forestry, Anchorage 269-8460, roger_burnside@dnr.state.ak.us.

Cooperators: Jerry Boughton (US Forest Service State and Private Forestry).

Project Description: Annual aerial surveys are compiled in a GIS database and linked to USFS Forest Health monitoring clearinghouse. Go to: http://agdc.usgs.gov/data/projects/fhm/ (under "Available Datasets" select "Insect & Disease" link). See also http://www.dnr.state.ak.us/forestry/insects.htm/.

Project Site Location(s): Statewide assessment of forest damage on production forest lands.

Relevance to Forest Management: Managing pest populations in forests.

Key Words: Forest health, remote sensing, surveying and mapping, inventories of forest resources, insect pests, insect control, pest control, plant disease control

BARK BEETLE AND WOODBORER PHEROMONE TRAP MONITORING

Date Revised: 18 February 2004

Project Status: Ongoing

Contact Person or Agency: Roger Burnside, Forest Entomologist, Division of Forestry, Anchorage 269-8460, roger_burnside@dnr.state.ak.us

Cooperators: Doug Warner, Alaska Department of Natural Resources, Division of Agriculture; Mark Schultz, Research Entomologist, US Forest Service (USFS) State & Private Forestry, Alaska Region; Iral Ragenovich, Entomologist, USFS Pacific Northwest Research Station, Portland; James Labonte, Insect Taxonomist, Oregon Department of Agriculture; Christina Jewett, Animal and Plant Health Inspection Service/Plant Protection and Quarantine (APHIS/PPQ), Anchorage.

Project Description: Annual and periodic monitoring for potential non-native or exotic bark beetles (scolytids), wood borers, and other economic insect/arthropod pests (e.g., European Spruce Bark Beetle, *Ips typographus*; Gypsy Moth, *Lymantria dispar*; Pinewood Nematode, *Bursaphelencus* spp.) that have the potential for introduction and establishment in Alaska by displacing natural and endemic bark beetles and wood borers. Sites are chosen on various ownerships and at potential points of introduction (pathways) for establishment. The project is very high profile and a high priority due to major cooperator agencies' missions to prevent establishment of unwanted insects affecting U.S. commerce (e.g., USFS/APHIS RDESPP—Rapid Detection of Exotic Scolytids Pilot Project and APHIS CAPS—Cooperative Agricultural Pest Survey.

Project Site Location(s): Current monitoring locations at or near Fairbanks (Eielson Air Force Base), Anchorage, Juneau, and mainland Kenai Peninsula.

Relevance to Forest Management: The increasing volume and numbers of pathways for introduction of potentially damaging non-native and exotic insects and arthropod pests has generated concern at all agency and jurisdictional levels. The ability to rapidly detect and take action for eradication or mitigation of potential invaders will improve long-term management goals of all landowners of Alaska's productive forestlands.

Key Words: Forest health, insect pests, plant pathogenic nematodes, plant and animal quarantine and regulatory systems, pheromones, semiochemicals, insect control, pest control, biological control

CAN KENAI PENINSULA WHITE SPRUCE RESIST BEETLE ATTACK?

Date Revised: 25 March 2005

Project Status: Ongoing

Contact Person or Agency: Tricia L. Wurtz, USDA Forest Service, Boreal Ecology Cooperative Research Unit, Box 756780, University of Alaska Fairbanks, Fairbanks, AK 99775-6780, 907-474-5994, fftlw@uaf.edu or twurtz@fs.fed.us.

Cooperators: Jeff Graham and John Alden, Alaska Division of Forestry and Matt Macander, ABR Inc.

Project Description: In the 1980s, John Alden collected seed from spruce at 40 locations on the Kenai Peninsula, from stands not yet impacted by the spruce beetle infestations. In 1998, in concert with an exceptionally good spruce seedcrop statewide, we returned to those same stands and collected seed from uninfested or lightly infested trees at 27 of the original 1980s collection sites. Collection trees were marked and their locations recorded. Seedlings were grown and outplanted in June 2000. In this experiment, trees grown from seed collected in the 1980s will function as the "control" group. The level of resistance to beetle attack inherent in this group should be no different than the overall pre-infestation population. Trees grown from seed collected in 1998 will function as our "presumed resistant" group. By virtue of the survival of their parent trees to 1998, we hypothesize that this group has some genetically-based ability to resist beetle attack

Project Site Location(s): Five plantations were installed on State of Alaska land near Clam Gulch, on the Kenai Peninsula.

Relevance to Forest Management: The plantations preserve the two spruce genomes (pre-infestation and post-infestation) for a variety of types of future experimentation. When the trees have grown large enough that phloem samples can be harvested without unduly injuring them, resistance will be evaluated in the laboratory using extracts made from the phloem. In addition, when the boles of these trees reach about 10 cm (4 in) in diameter, they will be open to attack by spruce beetles. This could happen naturally or be induced in the plantations experimentally. This research will improve our understanding of infestation of Kenai Peninsula spruce by beetles.

Key Words: Silviculture, forest ecology, forest health, genetics and breeding, white spruce, spruce beetles.

DECAY OF WHITE SPRUCE IN PRE-COMMERCIALLY THINNED STANDS IN TOK, ALASKA

Date Revised: November 2005

Project Status: Completed

Contact Person or Agency: Lori Trummer, U.S.D.A. Forest Service, Alaska Region, State and Private Forestry, Forest Health Protection, 3301 C Street, Suite 202, Anchorage, AK, 99503. Phone: (907) 743-9460. Email: ltrummer@fs.fed.us.

Cooperators: Robert Ott, Tanana Chiefs Conference Forestry Program, Fairbanks, Alaska (now employed with the Alaska Department of Natural Resources, Division of Forestry, Forest Health Program, Fairbanks, AK).

Project Description: During pre-commercial thinning of a white spruce stand, concern was raised that tree thinners may be inadvertently leaving some trees with decay as leave trees, even though they were issued thinning guidelines. In June 1998 an evaluation of several thinned and unthinned areas within the thinning unit was conducted with the intent to: (1) identify causal agent(s) of internal decay in white spruce; (2) determine incidence of causal agent(s) across the thinning unit; and (3) on live standing trees, identify the external indicators that may be reliable predictors of internal decay.

Project Site Location(s): A Native allotment about 5 miles west of Tok, Alaska.

Relevance to Forest Management: It was determined that the primary decay organism in the thinning unit was *Phellinus chrysoloma*, a wood decay fungus that causes a white pocket trunk rot. External indicators of the decay fungus were identified. It was determined that adherence to the thinning guidelines would substantially reduce the incidence of *P. chrysoloma* in the residual spruce stand.

Key Words: Forest health, silviculture, forest ecology, white spruce, snowshoe hare, stem rots, fungal diseases, vertebrate pests, browsing damage

DETERMINATION OF HIDDEN DECAY IN WHITE SPRUCE TREES OF INTERIOR ALASKA

Date Revised: November 2005

Project Status: Completed

Contact Person or Agency: Robert Ott, Forest Health Program, Alaska Department of Natural Resources, Division of Forestry, 3700 Fairbanks, AK 99709, (907) 451-2702, robert_ott@dnr.state.ak.us. (Research was conducted while employed with the Tanana Chiefs Conference Forestry Program, Fairbanks, AK)

Cooperators: Lori Trummer, U.S.D.A. Forest Service, Alaska Region, State and Private Forestry, Forest Health Protection Unit.

Project Description: The error associated with decay estimation is one of the greatest errors associated with estimating the value of a timber sale. Different decay fungi can cause varying amounts of internal defect within a single tree species, and the same fungus species can cause varying amounts of internal defect in different tree species. Often, a fungus can be identified to species using evidence from one or several external indicators, or from the nature of the decay itself. White spruce trees in interior Alaska, however, normally do not exhibit readily noticeable external indicators of decay. At the time of this study (1997), no reliable method had been developed to estimate the extent of internal defect of individual white spruce trees in interior Alaska. This ***pilot study*** was initiated to: (1) determine if the primary decay fungi of white spruce in interior Alaska could be identified; (2) determine the extent of decay of the primary decay fungi,; and (3) determine if reliable external indicators of internal decay caused by various fungus species could be identified.

Project Site Location(s): Nenana Ridge along the Parks Highway, and the confluence of the Little Gerstle River and the Tanana River.

Relevance to Forest Management: The results of this study indicated that the primary decay fungi of white spruce in the study sites were: (1) *Inonotus tomentosus*, a white pocket rot that causes root and butt decay, and (2) *Phillinus pini*, a white pocket rot that causes heart rot. No reliable external indicators were identified for *I. tomentosus*, but the presence of punk knots was an indicator of *P. pini*. The two decay fungi could be identified by differences in increment cores. When estimating tree volume loss due to decay, it was determined that the presence of *I. tomentosus* resulted in the deduction of several feet of butt log, whereas the presence of *P. pini* toward the base of a tree resulted in deducting most of the tree volume.

Key Words: Forest health, white spruce, fungal diseases, stem rots, butt rots, root diseases, mensuration and inventories

DETERMINATION OF SPRUCE BUDWORM IMPACTS IN FOREST STANDS ON THE TANANA RIVER FLOODPLAIN

Date Revised: 19 February 2004

Project Status: Ongoing

Contact Person or Agency: Roger Burnside, Division of Forestry, Anchorage, 269-8460, roger_burnside@dnr.state.ak.us.

Cooperators: Doug Hanson (Tanana Chiefs Conference), Jerry Boughton (US Forest Service State and Private Forestry).

Project Description: Ground-sampled selected stands for spruce budworm. Data were gathered to develop a risk management model in spruce budworm impacted stands. Data not yet analyzed, report not yet written.

Project Site Location(s): Floodplain forests on the Tanana River between Tanana and Manley Hot Springs.

Relevance to Forest Management: Managing beetle populations in forests.

Key Words: Mensuration and inventories—surveying and mapping, inventories of forest resources; forest health—insect pests, plant disease control, insect control, pest control

EARLY DETECTION AND RAPID RESPONSE FOR EXOTIC SCOLYTIDS AND WOOD BORERS

Date submitted: 25 August 2005

Project Status: Ongoing

Contact Person or Agency: Iral Ragenovich USDA Forest Service-333 SW First Ave, P.O. Box 3623 Portland, OR 97208 iragenovich@fs.fed.us.

Cooperators: Jim Kruse, Angie Ambourn, Mark Schultz, and Melinda Brenton, USDA Forest Service-Forest Health Program**;** Roger Burnside and Graham Mahal, Alaska Department of Natural Resources Division of Forestry.

Project Description: Non-native invasive organisms are one of the greatest threats to forest ecosystems. Increased world trade and travel have increased the risks of these introductions, especially at ports and inland import sites. In the spring of 2000, the National Plant Board and North America State Foresters requested that USDA Animal and Plant Health Inspection Service (APHIS) and the USDA Forest Service combine efforts to start a rapid detection system to detect and respond to new infestations of exotic forest insects, diseases and plants. A charter for an Exotic Pest Rapid Detection Team and Memorandum of Understanding has been developed. A pilot project was run in 2001 and the project has been expanded across the United States. Protocols for trapping and processing have also been developed and are continually being adjusted based on experience and data acquired from the pilot project. Specifically traps throughout the state are targeting exotic scolytids and wood borers.

Project Site Location(s): 6 sites in Alaska—2 in Anchorage, 2 in Fairbanks, and 2 in Juneau. Four additional sites have been added to rapidly detect species of wood wasps in the genus *Sirex*.

Relevance to Forest Management: This project will rapidly detect invasive insects that threaten our forest ecosystems. Being able to rapidly detect these forest pests will enable us to eradicate or take measures to decrease the impact of these insects the native forests. Early detection of any invasive insect will allow us to gather baseline information such as phenology, host, distribution, and other behavioral data that will allow us to take proper management action in dealing with these forest pests in a timely manner.

Key Words: Invasive species, exotic pests, wood wasp, management

EFFECTS OF HERBIVORY ON WHITE SPRUCE ESTABLISHMENT IN FLOODPLAIN PLANT COMMUNITIES

Date Revised: 25 March 2005

Project Status: Ongoing

Contact Person or Agency: Tricia L. Wurtz, USDA Forest Service, Boreal Ecology Cooperative Research Unit, Box 756780, University of Alaska Fairbanks, Fairbanks, AK 99775-6780, 907-474-5994, fftlw@uaf.edu or twurtz@fs.fed.us.

Cooperators: Knut Kielland, University of Alaska Fairbanks, and Tom Hanley, USDA Forest Service.

Project Description: We are studying the role of herbivory, principally by moose, in the establishment of white spruce in the primary successional sequence of floodplain plant communities of the Tanana River. In 2002 and 2003, we established 12 new moose exclosures on the floodplain, and planted and sown spruce seed inside and outside them. We are following floodplain succession and spruce establishment with and without moose herbivory.

Project Site Location(s): On the Tanana River floodplain, adjacent to Bonanza Creek Experimental Forest.

Relevance to Forest Management: Improve our understanding of the role of moose in forest development.

Key Words: Forest ecology, wildlife, white spruce, moose

EFFECTS OF SPRUCE BUDWORM DEFOLIATION ON WHITE SPRUCE REGENERATION IN INTERIOR ALASKA

Date submitted: November 2005

Project Status: New

Contact Person or Agency: Graham Mahal, Forest Health Program, Alaska Department of Natural Resources, Division of Forestry, 550 West 7th Avenue, Suite 1450, Anchorage, AK 99501, (907) 561-2630, graham_mahal@dnr.state.ak.us.

Cooperators: Robert Ott, Forest Health Program, Alaska Department of Natural Resources, Division of Forestry; James Kruse and Angie Ambourn, USDA Forest Service, State and Private Forestry, Forest Health Protection.

Project Description: Forest managers were concerned that spruce budworm (*Choristoneura fumiferana*) is such a significant mortality agent of white spruce (*Picea glauca*) that planting efforts should be suspended during budworm outbreaks. The objectives of the study are to: (1) evaluate the efficacy of spruce budworm larvae in outbreak conditions as a mortality agent of white spruce regeneration; and (2) quantify the effects of spruce budworm damage of white spruce regeneration. Five, 3 to 5 year old, commercial clear cut units in the Tanana Valley State Forest were sampled in May 2005. At each site, white spruce seedlings were sampled at 10 foot intervals along a randomly placed line. 50 seedlings were sampled at each site; total sample size was 250 seedlings. Seedling basal diameters and height were recorded. Spruce budworm larvae were tallied for each seedling. Initial seedling damage was recorded. Seedlings were re-sampled in September 2005. No mortality was attributed to spruce budworm was recorded for the 2005 growing season; two (0.8%) seedlings died from other factors (drought and moose trampling). A significant shift from damage class 0 (0%) to damage class 1 (1-24%) was observed. There was a weak-positive correlation between spring larval presence and change in damage class. Despite the noticeable spruce budworm presence and damage, a significant increase in median height of spruce seedlings was measured. Another spring and fall re-measurement will be conducted in 2006.

Project Site Location(s): Rosie Creek Road and Standard Creek Road, Tanana Valley State Forest, near Fairbanks.

Relevance to Forest Management: Based on current project results, forest managers do not need to alter their reforestation schedules out of concern that spruce budworm mortality will have a significant impact on white spruce regeneration. (Note: This project will be continued during 2006, so final project results and conclusions may change)

Key Words: Silviculture, forest health, forest ecology, white spruce, insect pests, regeneration, defoliation, spruce budworm

EVALUATION OF STEM WOUNDS ON 80 YEAR-OLD WHITE SPRUCE NEAR TOK, ALASKA

Date Revised: November 2005

Project Status: Completed

Contact Person or Agency: Lori Trummer, U.S.D.A. Forest Service, Alaska Region, State and Private Forestry, Forest Health Protection, 3301 C Street, Suite 202, Anchorage, AK, 99503. Phone: (907) 743-9460. Email: ltrummer@fs.fed.us.

Cooperators: Robert Ott, Tanana Chiefs Conference Forestry Program (now employed with the Alaska Department of Natural Resources, Division of Forestry, Forest Health Program, Fairbanks, AK).

Project Description: White spruce trees with resin encrusted stem wounds of unknown origin were observed during a pre-commercial thinning operation. It was not known whether the wounds were caused by mechanical damage or a biological agent, such as a canker fungus. In July 1999, tree wounds were assessed in two unthinned white spruce stands. The objectives of the assessment were to: (1) identify the causal agents(s) of the wounds; and (2) determine if the wounds served as infection courts for wood decay fungi.

Project Site Location(s): Two Native allotments about 5 miles west of Tok, Alaska.

Relevance to Forest Management: It was determined that the stem wounds were the result of stem debarking by snowshoe hares that occurred an average of 41 years before the assessment was conducted. All wounds lacked decay. Forest managers can utilize this information to assist with predicting internal decay of white spruce in stands that have sustained injuries from snowshoe hares.

Key Words: Forest health, forest ecology, white spruce, snowshoe hare, stem rots, fungal diseases, vertebrate pests, browsing damage

ESTABLISHMENT OF THE FAIRBANKS FOREST HEALTH UNIT

Date Revised: 16 February 2004

Project Status: Ongoing

Contact Person or Agency: US Forest Service, State & Private Forestry (S&PF)

Jerry Boughton FH Leader
jboughton@fs.fed.us
3301 "C" St., Suite 202
Anchorage, AK 99503
907-743-9461

or

James Kruse
jkruse@fs.fed.us
3700 Airport Way
Fairbanks, AK 99709
907-451-2701

Cooperators: Alaska Division of Forestry

Project Description: This is a program expansion action to establish local forest Health expertise in the Fairbanks and northern forest area. The field office will be located in the Alaska Division of Forestry Northern Region Office with anticipated full staffing of one federal professional, one state professional and one biotech providing field support. The federal professional (Jim Kruse entomologist) is now hired on, and work is being done to hire the state professional and the biotech. There also appears to be new opportunity for collaboration with expanded ARS staffing. This staffing will result in a number of studies/projects relevant to insects, diseases, invasive plants, and other forest health issues in the northern forest area.

Project Site Location(s): Fairbanks, Alaska.

Relevance to Forest Management: This action will provide local on-site access to forest health expertise to Northern forest land managers.

Key Words: Forest health, silviculture, insects, disease, forest ecology

GALL APHIDS ON ALASKA WHITE SPRUCE

Date Revised: March 2005

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks.

Cooperators: Alaska Department of Natural Resources Division of Forestry Northern Region; USDA Forest Service State and Private Forestry.

Project Description: Gall-forming aphids, not true aphids, on planted white spruce can be a serious forest health problem—they stunt growth, curl twigs and leaders, delay budburst. Objectives: Determine: 1) Identify causal insect(s) (*Pineus similis* or *Adelges abietis*), 2) if infestation more serious in upper or lower crown, 3) if espacement affects infestation level, and 4) if shade impacts infestation level. Used LOGS plantations for sampling population. Gall abundance greatest below breast height and at wider espacements; abundance of galls not affected by overstory shade. Species identification incomplete; no infestation in summer 2003 or summer 2004. Basis for J. McArthur's B.Sc. thesis (May 2002).

Project Site Location(s): Bonanza Creek Experimental Forest west of Fairbanks.

Relevance to Forest Management: Results may influence nursery practices, seedling treatment, or planting espacement—all of which have economic repercussions.

Key Words: Silviculture, forest health

IPS BEETLE PHEROMONE RESEARCH

Date Revised: 17 February 2004

Project Status: Ongoing (as cooperative project thinning areas are identified).

Contact Person or Agency: Roger Burnside, Division of Forestry, Anchorage, 269-8460, roger_burnside@dnr.state.ak.us

Cooperators: Doug Hanson (Tanana Chiefs Conference), and the US Forest Service.

Project Description: This project aims to determine what attracts and repels bark beetles. In cooperation with the US Forest Service, it also helps landowners with managing beetle populations during thinning and harvest activities. Trapout methods determined from this research have been applied in further projects.

Project Site Location(s): Tok, Nenana, Standard Creek/Goldstream Valley, Tanacross Village.

Relevance to Forest Management: Managing beetle populations in forests.

Key Words: Forest health—insect pests, insect control, pest control, , repellents, biological control, chemical control, pesticides, pheromones, semiochemicals, bark beetles

IPS BEETLE TRAPOUT IN TANACROSS

Date Revised: 17 February 2004

Project Status: Ongoing

Contact Person or Agency: Roger Burnside, Division of Forestry, Anchorage, 269-8460, roger_burnside@dnr.state.ak.us.

Cooperators: Doug Hanson (Tanana Chiefs Conference), Mark Musitano (Alaska Fire Service), Ed Holsten (US Forest Service).

Project Description: This project was designed to mitigate the *Ips* beetle infestation that occurred after a fuels reduction effort around the village of Tanacross.

Project Site Location(s): Tanacross

Relevance to Forest Management: Managing insect populations in forests.

Key Words: Forest health—insect pests, insect control, pest control, repellents, biological control, chemical control; fire—fuel reduction and vegetation management, pheromones, semiochemicals, bark beetles

KENAI SPRUCE BARK BEETLE INVENTORY

Date submitted: 2 May 2005

Project Status: Completed

Contact Person or Agency: Bill van Hees and Beth Schulz, Pacific Northwest Research Station, Forest Inventory and Analysis, 33-01 C. St., Suite 200, Anchorage, AK 99503, bvanhees@fs.fed.us, bschulz@fs.fed.us.

Cooperators: USDA Forest Service Alaska Region

Project Description: A repeated inventory (1987, 2000) of forest resources was designed and conducted by the Forest Inventory and Analysis (FIA) program of the Pacific Northwest Research Station (PNW) to assess the effects of a widespread spruce beetle outbreak on mortality of spruce trees, fuel heights, and moss depths.

Project Site Location(s): Inventory data are available from PNW-FIA. Selected re-measurement analyses are summarized in the following publications:

Schulz, Bethany. 2003. Changes in downed and dead woody material following a spruce beetle outbreak on the Kenai Peninsula, Alaska. Research Paper PNW-RP-559. Portland, Oregon: USDA Forest Service, Pacific Northwest Research Station. 9 p.

van Hees, Willem W.S. 2005. 2005. Spruce reproduction dynamics on Alaska's Kenai Peninsula, 1987-2000. Research Paper PNW-RP-563. Portland, Oregon: USDA Forest Service, Pacific Northwest Research Station. 18 p.

Relevance to Forest Management: These inventories provide data and information to characterize the health, amount, kind, condition, ownership, and rates of accumulation or deterioration of forest resources to satisfy strategic, region-wide forest management planning needs.

Key Words: Mensuration and inventories, forest ecology, forest health

MONITORING *IPS* AND WOOD BORING BEETLE RESPONSE TO FIRE

Date submitted: 25 August 2005

Project Status : Ongoing

Contact Person or Agency: Jim Kruse, USDA Forest Service, State and Private Forestry, Forest Health Protection, 3700 Airport Way Fairbanks, AK 99709; jkruse@fs.fed.us.

Cooperators: Angie Ambourn, USDA Forest Service, State and Private Forestry, Forest Health Protection, Fairbanks, AK.

Project Description: White spruce stands adjacent to burned areas can be highly vulnerable to infestation from bark beetles. Data from Richard Werner already exists for the extent and spread of bark and wood boring beetles in burned/partially burned white spruce stands in the Interior. However, in light of the extensive fire season in 2004, plots were established to monitor which species are present, and to assess over the next few years the extent to which fading or undamaged trees are affected by such large-scale events. Each plot contained four Lindgren funnels traps that were baited with the one of the following: *Ips pertabatus* (spruce engraver) lure, *Dendroctonus rufipennis* (spruce beetle) lure, alpha pinene and ethanol, and alpha pinene and turpentine. Dependent on results from this season (2004), the study may be expanded for 2005.

Project Site Location(s): Two monitoring sites—one at 38.4 mile Steese Highway north of Fairbanks, and one at 5.5 mile Taylor Highway, north of Tok.

Relevance to Forest Management: A variety of forest management practices are currently in place for dealing with *Ips* and other wood boring beetle infestations. Monitoring this situation will keep managers informed to employ proper practices at the appropriate times to limit the spread of infestations into the healthy forest stands that surround the burned areas.

Key Words: monitoring, fire, burn area, bark beetles, wood borers

MONITORING THE AMBER-MARKED BIRCH LEAF MINER AND PARASITOID RELEASE

Date submitted: 25 August 2005

Project Status: Ongoing

Contact Person or Agency: Jim Kruse, USDA Forest Service, State and Private Forestry, Forest Health Protection, 3700 Airport Way Fairbanks, AK 99709, jkruse@fs.fed.us; Roger Burnside, Alaska Department of Natural Resources Division of Forestry, 550 W 7th Ave, Ste 1450, Anchorage, AK 99501, roger_burnside@dnr.state.ak.us

Cooperators: Chris MacQuarrie, University of Alberta; Richard C. Reardon, USDA APHIS; Scott Digweed, Canadian Forestry Service; and David Langor, University of Alberta

Project Description. The amber-marked birch leaf miner (AMBLM), *Profenusa thomsoni* (Konow), has recently become one of the most common insect pests affecting native and ornamental birch trees (*Betula* spp.) in south-central and interior Alaska. Birch leaf miners were introduced from Europe to North America in the early 1900s and have since become established throughout many parts of the northern U.S. and Canada. The first damage to birch was noticed in Anchorage in 1996, and by 2004, birch defoliation in the Anchorage Bowl extended over 138,000 acres. Damage is thought to be mainly aesthetic, rarely killing plants. However, the annual destruction of photosynthetic capacity may have long-term impacts on tree health.

In an effort to establish a long term control of this exotic insect in Alaska, a cooperative biological control program was initiated in 2002 with the following partners: USDA Forest Service; USDA Animal and Plant Health Inspection Service (APHIS); State of Alaska Division of Forestry, Canadian Forestry Service, and the University of Alberta. Small numbers of the ichneumonid parasitoids (*Lathrolestes luteolator)* were collected in Canada, and released in Anchorage (55 in 2004 and 158 in 2005). While these numbers are small, the figure for 2005 approaches the numbers released in Edmonton, which resulted in control in only a few years. Additional parasitoid releases are planned for Anchorage in years to come, the intent of which is to establish populations of the parasitoid that will eventually reduce the leaf miner populations to endemic levels. Future work, including establishing permanent photo points and involving additional students, cooperators, and technicians, will help determine and track the effects that the parasitoid is having on the leaf miner population.

Project Site Location(s): Anchorage, Fairbanks, Fort Wainwright, and Eielson Air Force Base

Relevance to Forest Management: It has not been determined what if any impact on native forests ecosystems the AMBLM will have. Forest management practices will have to be developed as more information and data are gathered as to how the AMBLM behaves in the larger native forest ecosystem. Damage is thought to be mainly aesthetic, rarely killing plants. However, the annual destruction of photosynthetic capacity may have long-term impacts on tree health.

Key Words: Amber-marked birch leafminer, invasive species, biological control.

PERMANENT MONITORING PLOTS FOR SPRUCE BARK BEETLE AND SPRUCE BUDWORM IMPACTS

Date Revised: 17 February 2004

Project Status: Ongoing

Contact Person or Agency: Roger Burnside, Division of Forestry, Anchorage, 269-8460, roger_burnside@dnr.state.ak.us.

Cooperators: Jim Kruse (US Forest Service, Fairbanks).

Project Description: 20 permanent plots were established in 1990, 10 to monitor spruce bark beetle and 10 to monitor spruce budworm. These plots have been measured 4 times, looking for tree condition and stand changes over time. 20 factors of tree condition were measured for evidence of disease.

Project Site Location(s): Along the Parks Highway near and within the Bonanza Creek Experimental Forest.

Relevance to Forest Management: Managing insect populations in forests.

Key Words: Forest health—insect pests; mensuration and inventories—surveying and mapping; forest ecology—plant succession, dynamics of natural forests, forest health monitoring

REFINED DISTRIBUTION MAP AND IDENTIFICATION OF HEALTHY TAMARACK STANDS IN ALASKA

Date submitted: November 2005

Project Status: New

Contact Person or Agency: Robert Ott, Forest Health Program, Alaska Department of Natural Resources, Division of Forestry, 3700 Airport Way, Fairbanks, AK 99709, (907) 451-2702, robert_ott@dnr.state.ak.us.

Cooperators: James Kruse, USDA Forest Service, State and Private Forestry, Forest Health Protection.

Project Description: Larch sawfly is an invasive defoliator in Alaska. Based on aerial survey data, it is estimated that 600,000-700,000 acres of tamarack forest in Alaska have been impacted by a larch sawfly infestation that began in 1999 and continues to a lesser degree to the present time. The mortality of tamarack affected by the larch sawfly has been documented to reach 80%. As a result, concern has been expressed that the extend of the tamarack mortality may necessitate genetic conservation measures.

Further information, however, is needed before an informed decision can be made regarding the true nature of the larch sawfly infestation on tamarack in Alaska. First, inaccuracies exist in the mapped distribution of tamarack in Alaska, as demonstrated by the fact that the larch sawfly infestation has been documented well outside the mapped distribution of tamarack. Second, the entire range of tamarack has not been surveyed for larch sawfly infestation. As a result, larch sawfly infestation has not been mapped over large expanses of the general distribution of tamarack in Alaska. Third, healthy stands of tamarack have been observed by aerial pest detection surveys crews, but the extent of these stands has not been documented.

We will be addressing the three points identified above so that a more informed decision can be made regarding the necessity of a gene conservation plan for Alaska's tamarack. Over a two year period, we will conduct additional aerial pest detection surveys (during the fall when tamarack needled are colored) in those part of the distribution of tamarack where larch sawfly infestation has not been documented. In the process, we will refine the distribution map of tamarack as well as map the extent of healthy stands of tamarack across its distribution. Field work is scheduled for the autumn of 2006 and 2007.

Project Site Location(s): Entire distribution of tamarack in interior Alaska.

Relevance to Forest Management: Results of this project will: (1) provide information necessary for making the determination whether to proceed with a genetic conservation program for tamarack; and (2) lead to a refined map of the distribution of tamarack in Alaska.

Key Words: Forest ecology, natural range, tamarack, larch, forest health, insect pests, larch sawfly, genetic resources of forest trees

RELATIONSHIPS BETWEEN CLIMATE AND SPRUCE BUDWORM POPULATION LEVELS IN INTERIOR ALASKA

Date submitted: November 2005

Project Status: New

Contact Person or Agency: James Kruse, USDA Forest Service, State and Private Forestry, Forest Health Protection, 3700 Airport Way, Fairbanks, AK 99709, (907) 451-2701, jkruse@fs.fed.us.

Cooperators: Robert Ott, Forest Health Program, Alaska Department of Natural Resources, Division of Forestry; Angie Ambourn, USDA Forest Service, State and Private Forestry, Forest Health Protection; Glenn Juday, Forest Sciences Department, University of Alaska Fairbanks; Richard Werner, USDA Forest Service, Pacific Northwest Research Station (retired).

Project Description: Spruce budworm is one of the most destructive insect pests of white spruce in North America. In Alaska, budworm has only recently become a major issue. The first recorded outbreak of the eastern spruce budworm occurred in interior Alaska in 1990-1996, with > 50,000 hectares of white spruce being defoliated along the Tanana and Yukon Rivers. In some areas, terminal leader mortality was observed in most trees following this outbreak, causing cone production to nearly cease. Moderate defoliation was observed in 2002-2004, and indications are that another severe spruce budworm outbreak has begun.

It is hypothesized that climatic warming is responsible for this change in budworm behavior in Alaska. Temperature is a more important regulator of insect species composition at northern latitudes than elsewhere; average annual temperatures have increased since 1980 in interior Alaska.

Insect population levels, including spruce budworm, have been monitored annually since 1974 in the Bonanza Creek Experimental Forest near Fairbanks, Alaska. These data will be analyzed against Fairbanks climate data to determine the role of climate in explaining the recent cycling of budworm populations. Data analysis will begin during the winter of 2005-2006.

Project Site Location(s): Fairbanks (climate data) and the Bonanza Creek Experimental Forest (spruce budworm population data).

Relevance to Forest Management: Understanding the relationship between climate and spruce budworm populations should allow forest managers to mitigate the effects of this insect pest on commercially valuable white spruce.

Key Words: Forest health, forest ecology, climatic change, climate, insect pests, spruce budworm

SNOWSHOE HARE BROWSE DAMAGE TO HARVEST-REGENERATED FOREST STANDS IN INTERIOR ALASKA

Date Revised: November 2005

Project Status: Completed

Contact Person or Agency: Robert Ott, Forest Health Program, Alaska Department of Natural Resources, Division of Forestry, 3700 Airport Way, Fairbanks, AK 99709, (907) 451-2702, robert_ott@dnr.state.ak.us. (Research was conducted while employed with the Tanana Chiefs Conference Forestry Program, Fairbanks, AK)

Cooperators: None

Project Description: In 1999, after a peak in the local snowshoe hare population, the extent of snowshoe hare damage was documented within 145 fixed-area plots (0.001 ha in size) in three harvest-regenerated stands. Tree regeneration in these stands was a combination of planted white spruce seedlings and natural regeneration of white spruce and deciduous species. Within each sample plot, the following data were collected for all seedlings: (1) height, (2) 1999 height growth, (3) basal diameter, (4) diameter at breast height if applicable, (5) browse damage class (low, medium, high), and (6) distance from snowshoe hare summer and winter cover. The results were reported in Karola Rueter's senior thesis (in German).

Project Site Location(s): Near the Soldier Slough region of the Tanana River north of Nanana.

Relevance to Forest Management: Results of this project can help forest managers understand the impact of snowshoe hare browse on forest regeneration. Results of this project also increase our understanding of the amount of natural regeneration that can occur after a winter harvest of white spruce stands.

Key Words: Silviculture, forest ecology, mensuration and inventories, forest health, vertebrate pests, browsing damage, wildlife, snowshoe hare, white spruce, balsam poplar, birch

STATE AND PRIVATE FORESTRY FOREST DISEASE PROJECTS

Date Revised: 16 February 2004

Project Status: Ongoing

Contact Person or Agency: US Forest Service, State & Private Forestry (S&PF)

Jerry Boughton		Lori Trummer
jboughton@fs.fed.us	or	ltrummer@fs.fed.us
3301 "C" St., Suite 202		3301 "C" St., Suite 202
Anchorage, AK 99503		Anchorage, AK 99503
907-743-9461		907-743-9460

Cooperators:

USFS – Sitka Wood Utilization Center	USFS – Madison Forest Products Lab
University of Northern British Columbia	Oregon State University

Project Description: A number of projects pertaining to information development and technology transfer to address disease related forest health issues are underway. These projects are primarily being coordinated through the S&PF forest pathology position located in Anchorage. Current activities include:

Birch staining and heartrot characterization: This is work to document the amount of staining and/or heartrot that is present in various ages of birch stands in the geographic areas of Fairbanks, Mat-Su and Kenai Peninsula. Some work being coordinated with Sitka Wood Utilization Center. It is anticipated this work will lead to guidelines for birch management and recognition of specialty value added marketing of this resource.

White spruce root disease (*Inonotus tomentosus*): several aspects of this root disease are being looked at to determine forest management implications. Much work is being completed in partnership with Dr. Kathy Lewis at University of Northern British Columbia.

Beetle killed spruce decay: several activities are underway to determine how quickly these trees deteriorate and which organisms are mainly responsible for the decay. This work is done in partnership with Dr. Mark Harmon, Oregon State University and with the USDA Forest Service Forestry Products Lab in Madison, WI.

Project Site Location(s): Various sites across southcentral and interior Alaska.

Relevance to Forest Management: These aspects of forest disease mgmt have implications for mgmt of existing white spruce, white spruce regeneration, fuels modeling and other ecological processes, and potential development of birch mgmt opportunities.

Key Words: Forest health, silviculture, biology of forest trees, birch, white spruce, root disease, birch staining, wood decay

STATE AND PRIVATE FORESTRY FOREST INSECT PROJECTS

Date Revised: 14 February 2004

Project Status: Ongoing

Contact Person or Agency: US Forest Service, State & Private Forestry (S&PF)

Jerry Boughton FH Leader		Ed Holsten		James Kruse
jboughton@fs.fed.us	or	eholsten@fs.fed.us	or	jkruse@fs.fed.us
3301 "C" St., Suite 202		3301 "C" St., Suite 202		3700 Airport Way
Anchorage, AK 99503		Anchorage, AK 99503		Fairbanks, AK
907-743-9461		907-743-9460		907-451-2701

Cooperators: Pacific Forest and Range Experiment Station (PNW).

Project Description: A number of projects pertaining to information development and technology transfer to address insect related forest health issues are underway. These projects have been primarily coordinated through the S&PF forest entomology position located in Anchorage (Ed Holsten) but will now see additional coordination through the new entomology position in Fairbanks (Jim Kruse). Activities include:

- Budworm studies; several past and on-going studies to understand the effects of budworm defoliation on spruce in Interior Alaska were being conducted with PNW (Skeeter Werner). This forest mgmt information development is anticipated to be continued and expanded.
- Ips bark beetles; same as the budworm…continuing this work especially in the Interior.
- Birch Leaf Miner; several actions are being done to inventory the extent of this exotic insect, to suppress its introduction (especially on Eielson AFB), and to conduct a biological control release. This work is being coordinated with APHIS and Canadians.
- Larch sawfly; this insect has had a tremendous effect in the last few years causing extensive mortality of larch in Interior Alaska. Several projects documenting the ecological impacts of this are anticipated in the next few years.

Projects better documenting the causal agents and effects of insect caused defoliation/mortality of Interior Alaska willows are anticipated.

Project Site Location(s): Various sites across southcentral and interior Alaska—Anchorage to Fairbanks.

Relevance to Forest Management: Forest insect management, or lack of management, can have substantial and long lasting effects. Following the spruce beetle infestation of the 1990s the effects of numerous other insects has continued to be prevalent (perhaps due to climate change) and this subject continues to be on forest managers radar screen.

Key Words: Forest health, silviculture, forest ecology, insects, birch leaf miner, spruce budworm, larch sawfly

STATE AND PRIVATE FORESTRY INVASIVE PLANTS PROJECTS

Date Revised: 14 February 2004

Project Status: Ongoing

Contact Person or Agency: US Forest Service, State & Private Forestry (S&PF)

Jerry Boughton		Michael Shephard
jboughton@fs.fed.us	or	mshephard@fs.fed.us
3301 "C" St., Suite 202		3301 "C" St., Suite 202
Anchorage, AK 99503		Anchorage, AK 99503
907-743-9461		907-743-9454

Cooperators: Alaska Cooperative Extension, Alaska Soil and Water Conservation Districts, Agricultural Research Service.

Project Description: The subject of invasive plants is increasing in attention and work within Alaska. S&PF is allocating $100k+ per year to facilitate the inventory and coordinated addressing of this subject. Current activities include:

- Established the first weed mgmt area with Soil and Water Conservation Districts (SWCD) in Juneau to address a garlic mustard problem;
- Working with SWCD to establish several more Weed Management Areas;
- Working with The Heritage program to develop an invasive plant ranking system;
- Working with National Park Service and the US Geological Survey developing inventory protocols and a statewide geographic information system;
- Developing a number of pamphlets/brochures for particular species;
- Conducting a variety of surveys.

Project Site Location(s): Activities are statewide. Focused activities have occurred in Juneau, Anchorage, Mat-Su, Fairbanks.

Relevance to Forest Management: Invasive plants may be the greatest threat to the sustainability of Alaska's native ecosystems. It was thought Alaska's remoteness would offer protection from this threat. This subject is just beginning to get attention and the more people look, the more species and locations are being found. However, many of these populations are small and cost effective eradication/control is a real possibility if action is taken quickly.

There currently is no identified (or funded) state or local level organizations with authority to identify and take management action to control invasive plants. There is considerable work needed to develop coordinated federal/state activities to address this issue.

Key Words: Forest health, biodiversity, forest ecology, invasive plants, inventory

USING REPEAT COLOR INFRARED PHOTOGRAPHY TO DETERMINE POPULATION TRENDS OF THE AMBER-MARKED BIRCH LEAF MINER AND THE SUCCESS OF ITS BIOCONTROL

Date submitted: 17 May 2005

Project Status: Ongoing

Contact Person or Agency: Cynthia L. Snyder, USDA Forest Service, State & Private Forestry, Forest Health Protection, 3301 "C" Street, Suite 202, Anchorage, AK 99503. clsnyder@fs.fed.us.

Cooperators : Angie Ambourn and Jim Kruse, USDA Forest Service, State & Private Forestry, Forest Health Protection, Fairbanks, AK.

Project Description: The amber-marked birch leaf miner (AMBLM), *Profenusa thomsoni* (Konow), has recently become one of the most common insect pests affecting native and ornamental birch trees (*Betula* spp.) in south-central and interior Alaska. Leaf miner larvae feed between the leaf surfaces in the mesophyll, removing photosynthetic tissue thus interfering with the tree's ability to produce food. Damage is thought to be mainly aesthetic, rarely killing plants. However, the annual destruction of photosynthetic capacity may have long-term impacts on tree health.

Aerial surveys provide much of the information required of Forest Health professionals in Alaska to estimate the damage caused by herbivorous insects. However, the technique is deficient when applied to the early stages of leaf miners or when only low level leaf mining is evident from ground-level. This project is designed to use color infrared photographs, systematically acquired from GPS referenced points, to discriminate canopy spectral characteristics that may not appear visible on ordinary photos and to quantitatively record changes in local forest canopy conditions in relation to the spread and intensity of amber-marked birch leaf mine and ultimately the success of its newly released parasitoid.

Project Site Location(s): Anchorage, Fairbanks, Kenai Peninsula, Mat-Su Valley

Relevance to Forest Management: It is planned that this repeat photography method will provide a valuable tool to monitor the spread and intensity of the AMBLM and, as populations increase, the spread and relative success of the introduced biological control.

Key Words: Amber-marked birch leafminer, biological control, repeat photography

FOREST INVENTORY

ANNUAL INVENTORY OF SOUTH-CENTRAL AND SOUTHEASTERN COASTAL ALASKA

Date submitted: 2 May 2005

Project Status: Ongoing

Contact Person or Agency: Bill van Hees, USDA Forest Service Pacific Northwest Research Station, Forest Inventory and Analysis, 33-01 C. St., Suite 200, Anchorage, AK 99503, bvanhees@fs.fed.us.

Cooperators: USDA Forest Service Alaska Region

Project Description: Forest Inventory and Analysis (FIA) is a nationwide project of the USDA Forest Service responsible for collection, analysis, and reporting of information about renewable resources of the nation's forests. The FIA program of the Pacific Northwest Research Station (PNW) is responsible for inventories in the states of Alaska, California, Oregon, Washington, and Hawaii. This inventory began in 2004. One-tenth of the plots established during the periodic inventory conducted between 1995 and 2003 are re-measured every year. Measurements include indicators of forest health.

Project Site Location(s): Inventory data are available from PNW-FIA:

Relevance to Forest Management: These inventories provide data and information to characterize the health, amount, kind, condition, ownership, and rates of accumulation or deterioration of forest resources to satisfy strategic, region-wide forest management planning needs.

Key Words: Mensuration and inventories, forest ecology, forest health

FOREST INVENTORY OF STATE LANDS

Date Revised: 12 April 2005

Project Status: Completed

Contact Person or Agency: Paul Maki, Alaska Division of Forestry, Northern Region, (907) 451-2661, paul_maki@dnr.state.ak.us.

Cooperators: None

Project Description: The Division of Forestry is the repository for the raw and compiled data of the inventory of 3.3 million acres of forested land in the Tanana Valley State Forest and other state lands in the Tanana Valley classified 'Forestry' by the Tanana Basin Area Plan. The inventory data were collected between 1983 and 1995. The project culminated in the report *Timber Resources on State Forestry Lands in the Tanana Valley*, which was published in June 1997.

Project Site Location(s): The data is at the Division of Forestry's Northern Region Office in Fairbanks.

Relevance to Forest Management: The project and inventory data are the basis for determining the allowable cut on the forest land base so that timber harvesting can be managed on a sustained yield basis.

Key Words: Mensuration and inventories—measurements of trees, volume and biomass tables, volume determination, forecasting production, yield regulation, inventories of forest resources; forest ecology—forest types.

FOREST INVENTORY PERMANENT PLOT DATA ON U.S. ARMY ALASKA LANDS

Date Revised: 30 January 2004

Project Status: Ongoing

Contact Person or Agency: Dan Rees, US Army Alaska, 907-353-9318, dan.rees@wainwright.army.mil

Cooperators: None

Project Description: Forest inventory permanent plot data, protocol follows USDA Forest Service's Forest Inventory and Analysis methodology. 10 percent of the plots are forest health monitoring plots collecting tree, down woody debris, fire fuel loading, and additional vegetation data according to USDA Forest Service's Forest Inventory and Analysis methodology.

Project Site Location(s): Fort Wainwright near Fairbanks; Alaska, Fort Richardson near Anchorage, Alaska; and Fort Greely/Donnelly Training Area near Delta Junction, Alaska

Relevance to Forest Management: The data is used to determine composition and growth of forests on Army lands in Alaska. The data is also used to track changes in forest health, composition, and structure of forested lands. Reports generated from the permanent plot data describe the forest condition, composition, and volume of the Army's forest resources.

Key Words: Mensuration and inventories, forest ecology, forest health

FOREST INVENTORY VARIABLE PLOT DATA ON U.S. ARMY ALASKA LANDS

Date Revised: 30 January 2004

Project Status: Completed

Contact Person or Agency: Dan Rees, US Army Alaska, 907-353-9318, dan.rees@wainwright.army.mil.

Cooperators: None

Project Description: Forest inventory variable plot data were collected on approximately 10 percent of the Army's forested lands. These areas represent the most accessible and heavily used portions of the Army's training lands. Data collected includes tree species composition, tree heights, tree diameter, and a seedling count within a 1/250 acre plot. 1 plot represented approximately 10 acres.

Project Site Location(s): Fort Wainwright near Fairbanks; Alaska, Fort Richardson near Anchorage, Alaska; and Fort Greely/Donnelly Training Area near Delta Junction, Alaska

Relevance to Forest Management: The data was used to determine composition and volume of forests on Army lands in Alaska in easily accessible and heavily used areas.

Key Words: Mensuration and inventories

NATIVE ALLOTMENT FOREST INVENTORIES

Date Revised: 30 January 2004

Project Status: Ongoing

Contact Person or Agency: Will Putman, Acting Forestry Director, Tanana Chiefs Conference, 122 First Ave., Suite 600 Fairbanks, AK 99701,wputman@tananachiefs.org.

Cooperators: None

Project Description: Land cover geographic information (GIS) data and a database associated with forest inventories conducted by the Tanana Chiefs Conference (TCC) Forestry Program for 2,600 individual Native allotments within Interior Alaska over the last 18 years. The Microsoft Access database contains individual tree edit lists, volume, site index, statistical summaries and stand table information. It also contains land attributes of owners and heirs, parcel action codes, and land status. The GIS contains ownership boundaries, land cover delineations and sampled stand locations. A map viewer displaying allotment parcel boundaries is on the TCC website (www.tananachiefs.org). The ability to query the Forestry Program's databases for ownership information is included in the map viewer. Allotment forest inventories have been prepared through Bureau of Indian Affairs funding to meet the Federal trust responsibility.

Project Site Location(s): Native allotment forest inventories encompass parcels throughout Interior Alaska within the Doyon Region.

Relevance to Forest Management: Land cover and forest inventory data can be used for various aspects of forest management to meet the basic Federal trust responsibility. This includes forestry activities, fire management and realty land transactions.

Key Words: White spruce, black spruce, tamarack, paper birch, quaking aspen, balsam poplar, volume, growth, allowable harvest, vegetation cover, Native allotment

NATIVE VILLAGE CORPORATION FOREST INVENTORIES

Date Revised: 30 January 2004

Project Status: Ongoing

Contact Person or Agency: Will Putman, Acting Forestry Director, Tanana Chiefs Conference, 122 First Ave., Suite 600 Fairbanks, AK 99701, wputman@tananachiefs.org.

Cooperators: None

Project Description: Land cover geographic information system (GIS) data and a database associated with forest inventories conducted by the Tanana Chiefs Conference (TCC) Forestry Program for 20 Interior Alaska Native Claims Settlement Act Village Corporations over the last 18 years. The Microsoft Access database contains individual tree edit lists, volume, site index, statistical summaries and stand table information. The GIS contains ownership boundaries, land cover delineations and sampled stand locations. A map viewer displaying land cover data associated with the inventories is on the TCC website (www.tananachiefs.org). The ability to query the Forestry Program's databases for timber volume information from these land cover maps is included in the map viewer. Forest inventories are prepared by request from villages interested in documenting their forest resource assets and thus are an ongoing project.

Project Site Location(s): Village inventories are located throughout Interior Alaska within the Doyon Region and Ahtna Regions.

Relevance to Forest Management: Land cover and forest inventory data can be used for various aspects of forest management where basic stand level information is used.

Key Words: White spruce, black spruce, tamarack, paper birch, quaking aspen, balsam poplar, volume, growth, allowable harvest, vegetation cover, village corporation

PERIODIC INVENTORY OF SOUTHCENTRAL AND SOUTHEASTERN COASTAL ALASKA

Date submitted: 2 May 2005

Project Status: Completed

Contact Person or Agency: Bill van Hees, USDA Forest Service Pacific Northwest Research Station, Forest Inventory and Analysis, 33-01 C. St., Suite 200, Anchorage, AK 99503. bvanhees@fs.fed.us.

Cooperators: USDA Forest Service Alaska Region

Project Description: Forest Inventory and Analysis (FIA) is a nationwide project of the USDA Forest Service responsible for collection, analysis, and reporting of information about renewable resources of the nation's forests. The FIA program of the Pacific Northwest Research Station (PNW) is responsible for inventories in the states of Alaska, California, Oregon, Washington, and Hawaii. This inventory began in 1995 and was completed in 2003. Plots measured in this effort are permanent and constitute baseline measurements for future re-measurement.

Project Site Location(s): Inventory data are available from PNW-FIA and are summarized in the following publications:

van Hees, Willem W.S. 2003. Forest resources of southeast Alaska, 2000 – Results of a single-phase systematic sample. Res. Pap. PNW-RP-557. Portland, OR: U. S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 96 p.

Campbell, Sally, Willem W.S. van Hees and Bert R. Mead. 2004. Southeast Alaska 2000 inventory highlights. Gen. Tech. Rep. PNW-GTR-609. Portland, OR: U. S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 28 p.

van Hees, Willem W.S. and Bert R. Mead. 2005. Extensive, strategic assessment of southeast Alaska's vegetative resources. Landscape and Urban Planning. 72:1-3 pp 25-48.

van Hees, Willem W.S., 2005. Forest resource statistics for southcentral Alaska. Res. Bul. PNW-RB-xxx. Portland, OR: U. S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. (in press).

Campbell, Sally, Willem W.S. van Hees and Bert R. Mead. 2005. Southcentral Alaska 2003 inventory highlights. Gen. Tech. Rep. PNW-GTR-xxx. Portland, OR: U. S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. (in press).

Relevance to Forest Management: These inventories provide data and information to characterize the health, amount, kind, condition, ownership, and rates of accumulation or deterioration of forest resources to satisfy strategic, region-wide forest management planning needs.

Key Words: Mensuration and inventories, forest ecology, forest health

NON-TIMBER FOREST PRODUCTS

ALASKA BIRCH BARK: CHEMISTRY AND PHARMACEUTICAL POTENTIAL

Date submitted: March 2005

Project Status: New

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks, (907) 474-5070, ffecp@uaf.edu.

Cooperators: Pavel Krasutsky,Ph.D., Chemical Extractives Program, Center for Applied Research and Technology Development, Natural Resources Research Institute (NRRI), University of Minnesota Duluth.

Project Description: Birch species found in Alaska's Northern Forest are not the same as found in the Lake States or Eurasia. Bark from the non-Alaskan species contain chemicals having high-value pharmaceutical potential (e.g., betulin, betulinic acid, lupeol, allobetulin. The project objective is to determine chemical extractives (and derivatives) and quantities in Alaska birch. Preliminary results for bark samples from Alaska submitted to NRRI for analyses indicate chemically, the presence of three species of birch (Kenai, Alaska paper, an unknown—possibly hybrid) and that the content of betulin/betulinic acid is substantially higher than for Lake States' birch suggesting Alaska birch is more desirable chemically.

Project Site Location: Throughout the Northern Forest from Kenai Peninsula to south slope of Brooks Range. Analyses being conducted by laboratories of the Natural Resources Research Institute, Duluth, Minnesota.

Relevance to Forest Management: In January 2005, a commercial contract was signed with International Specialty Products, Inc. for betulin use in cosmetics. Other high-value pharmaceutical uses of betulin and other chemicals and derivatives from birch bark include anti-herpes, anti-viral, and cancer drugs. Development of a bark harvesting and chemical extractive industry will diversify the Alaska forest industry and provide a use of not only directly harvested bark plus bark waste from other birch operations.

Key Words: Alaska paper birch, Kenai birch, bark, phytochemicals; wood chemistry

ALASKA BIRCH SAP PRODUCTION

Date Revised: 12 February 2004

Project Status: Ongoing

Contact Person or Agency: Glenn P. Juday, Forest Sciences, School of Natural Resources and Agricultural Sciences, University of Alaska Fairbanks, Fairbanks, AK 99775-7200, ffgpj@uaf.edu.

Cooperators: Kimberley Mahr, University of Alaska Fairbanks Forest Sciences Department.

Project Description: Alaska birch trees produce a sugar sap that can be tapped and sold as a natural product or distilled as a syrup. The potential for these products requires a better understanding of how much the trees produce under various conditions and the amount of properties desired by consumers (minerals, sugars) are present in the products. During the 2002 sap season nine sites (ninety trees total) were measured for phenology of sap season and daily sap production (volume and quality). The 2002 sap season was very different than 2001 with a much later start; once the sap did start flowing, the reduced length required a major project effort to keep up with events. Sap season started April 30 (ten days later than 2001) and data collection ended May 17 (two days earlier than 2001). Total sap production was less in 2002 than 2001 for the three sites that were tapped both years. Tree cores in these prime producing stands have earliest tree rings that date to the late 1930s at breast height, indicating that optimum production stands are in the range of 65 to 85 years old.

Project Site Location(s): Fairbanks

Relevance to Forest Management: This project is working closely with Alaska birch sap producers to advise them on expected rates of Alaska birch sap production, chemical properties of sap, climate control, and desirable characteristics of producing stands.

Key Words: Birch, sap, sugar, production

HARVESTING MOREL MUSHROOMS AFTER WILDFIRE IN ALASKA

Date revised: 3-24-05

Project Status: Completed.

Contact Person or Agency: Tricia L. Wurtz, USDA Forest Service, Boreal Ecology Cooperative Research Unit, Box 756780, University of Alaska Fairbanks, Fairbanks, AK 99775-6780, 907-474-5994, fftlw@uaf.edu or twurtz@fs.fed.us.

Cooperators: Amy Wiita, Institute of Social and Economic Research, University of Alaska Anchorage; Jane Smith, USDA Forest Service; Nancy Weber and Dave Pilz, Oregon State University; Richard Winder, Pacific Forestry Centre.

Project Description: We compiled what's known to date about the ecology of post-fire morel mushrooms with the results of a survey and market analysis of the commercial harvest of morels. The objective was to educate Alaskans about morel mushrooms in the wake of the record-setting 2004 fire year. The study has been published (Harvesting morels after wildfire in Alaska, T.L. Wurtz, A. L.Wiita, N. S. Weber, and D. Pilz, USDA Forest Service, PNW Research Station, Research Note, PNW-RN-546, February, 2005) and is available online at: http://www.fs.fed.us/pnw/pubs/pnw_rn546.pdf.

Project Site Location(s): Data came from all over Alaska, as well as the Yukon Territory, British Columbia, Oregon and Washington.

Relevance to Forest Management: Experts in the commercial harvest of non-timber forest products predict that trade in such products from Alaskan forests will increase substantially in the coming years, and the fires of 2004 have provoked lots of interest in morels. Forest managers need basic information about these products in order to properly manage this forest use.

Key Words: Non-wood forest products, forest ecology, fire, morels, edible wild mushrooms

LOWBUSH CRANBERRY PRODUCTION IN RESPONSE TO A PRE-COMMERCIAL THINNING OF WHITE SPRUCE IN INTERIOR ALASKA

Date Revised: November 2005

Project Status: Completed

Contact Person or Agency: Robert Ott, Forest Health Program, Alaska Department of Natural Resources, Division of Forestry, 3700 Airport Way, Fairbanks, AK 99709, (907) 451-2702, robert_ott@dnr.state.ak.us. (Research was conducted while employed with the Tanana Chiefs Conference Forestry Program, Fairbanks, AK)

Cooperators: Pat Holloway, University of Alaska Fairbanks.

Project Description: The response of lowbush cranberry production (weight and numbers of berries) to a pre-commercial thinning of white spruce was monitored for five years (1997-2001). The study was conducted within nine 1/5 acre tree monitoring plots—five treatment plots and four control plots. Within each of these larger tree monitoring plots, cranberry production was monitored within 16 systematically placed 1-m^2 cranberry monitoring plots. In addition, plant cover (%) was recorded for all species with a cover value greater than 5%. Lowbush cranberry cover was recorded down to 1%. Data have not yet been analyzed.

Project Site Location(s): Treatment plots are located on two Native allotments west of Tok along the Alaska Highway. Control plots are located on nearby State-owned and Native corporation-owned land.

Relevance to Forest Management: Results from this project will be used to help determine if lowbush cranberry production, a non-timber forest product, can be enhanced through reduction of the overstory tree cover.

Key Words: Non-wood forest products, non-timber forest products, lowbush cranberry, silviculture

THE ECOLOGY OF POST-FIRE MOREL MUSHROOMS

Date Revised: 25 March 2005

Project Status: Ongoing

Contact Person or Agency: Tricia L. Wurtz, USDA Forest Service, Boreal Ecology Cooperative Research Unit, Box 756780, University of Alaska Fairbanks, Fairbanks, AK 99775-6780, 907-474-5994, fftlw@uaf.edu or twurtz@fs.fed.us.

Cooperators: Jane Smith, USDA Forest Service; Nancy Weber and Dave Pilz; Oregon State University; Richard Winder, Pacific Forestry Centre.

Project Description: We're documenting the productivity of burned sites in interior Alaska for morel mushrooms, using a strip-plot sampling method. We're investigating the role of pre-fire forest type, slope, aspect, burn intensity, soil temperature, soil moisture, and soil type in mushroom fruiting body production.

Project Site Location(s): Because morels fruit in areas burned one or two years previously, the project location changes from year to year, as we move around to different recent burns.

Relevance to Forest Management: Widespread commercial harvesting of edible mushrooms began in the (U.S.) Pacific Northwest about 15 years ago. In 1992, approximately 1.8 million kg of wild mushrooms were sold there, with 590,000 kg of that being morels. Experts in the commercial harvest of non-timber forest products predict that trade in such products from Alaskan forests will increase substantially in the coming years. Forest managers need basic information about these products in order to properly manage this forest use.

Key Words: Non-wood forest products, forest ecology, fire, morels, edible wild mushrooms

RIPARIAN ZONE MANAGEMENT

BANK EROSION AND LARGE WOODY DEBRIS RECRUITMENT ALONG THE TANANA RIVER, INTERIOR ALASKA

Date Revised: November 2005

Project Status: Completed

Contact Person or Agency: Data analyses and interpretation—Robert Ott, Forest Health Program, Alaska Department of Natural Resources, Division of Forestry, 3700 Airport Way, Fairbanks, AK 99709, (907) 451-2702, robert_ott@dnr.state.ak.us (Research was conducted while employed with the Tanana Chiefs Conference Forestry Program, Fairbanks, AK). **Raw data, metadata, and website—**Will Putman, Forestry Program, Tanana Chiefs Conference, 122 First Ave., Suite 600, Fairbanks, AK 99701, (907) 452-8251 ext. 3373, wputman@tananachiefs.org.

Cooperators: Alaska Department of Natural Resources, Division of Forestry, Fairbanks, AK and Owen Mason, Alaska Quaternary Center, Fairbanks, AK.

Project Description: This project was initiated to quantify baseline conditions of the amount and spatial distribution of bank erosion, and the associated large woody debris (LWD) recruitment along the entire length of the Tanana River. River bank erosion and LWD recruitment were quantified for the 1978-80 to 1998-99 time period using change analysis within a Geographic Information System, and existing forest inventory data. Data were summarized by 10 km reaches.

Project Site Location(s): Entire Tanana River, interior Alaska.

Relevance to Forest Management: Information obtained from this project will allow resource managers to better understand natural processes of river bank erosion and LWD recruitment, and to highlight future research needs that can be used to assess the implications of management actions.

Key Words: Riparian forests, forest ecology, large woody debris

RELEVANT LITERATURE FOR AN EVALUATION OF THE EFFECTIVENESS OF THE ALASKA FOREST RESOURCES AND PRACTICES ACT: AN ANNOTATED BIBLIOGRAPHY

Date Revised: November 2005

Project Status: Completed

Contact Person or Agency: Robert Ott, Forest Health Program, Alaska Department of Natural Resources, Division of Forestry, 3700 Airport Way, Fairbanks, AK 99709, (907) 451-2702, robert_ott@dnr.state.ak.us. (Project was initiated while employed with the Tanana Chiefs Conference Forestry Program, Fairbanks, AK)

Cooperators: Angie Ambourn, USDA Forest Service, State and Private Forestry, Forest Health Protection; Fabian Keirn, Tanana Chiefs Conference Forestry Program; Alison Arians, Alaska Department of Natural Resources, Division of Forestry; Alaska Department of Fish and Game; Northern Alaska Environmental Center; Bering Sea Fisheries Association; Cook Inlet Keeper; and Sealaska.

Project Description: We compiled an annotated bibliography that identified projects that contribute to our knowledge of the 10 fish habitat and water quality variables identified in the Alaska Forest Resources and Practices Act (FRPA) and the impact of forest practices on these variables (channel morphology, clean spawning gravels, food sources, large woody debris, nutrient cycling, stream bank stability, stream flow, sunlight, water quality, water temperature). A total of 621 papers were annotated, with 276 Alaska references and 345 non-Alaska references.

Project Site Location(s): References were organized into eight sections; four Alaska sections (FRPA Region I, FRPA Region II, FRPA Region III, Alaska general) and four non-Alaska sections (Canada, Lower 48 states, International other than Canada, and Miscellaneous).

Relevance to Forest Management: The annotated bibliography produced from this project provides resource managers and other interested parties with the current state of knowledge related to the effectiveness of the Alaska Forest Resources and Practices Act in protecting water quality and fish habitat. In addition, the document will help resource managers identify information gaps, in order to help direct future research and monitoring efforts related to the effectiveness of FRPA riparian management standards.

Key Words: Management and policy, forest policy, land use, best management practices

RIPARIAN BUFFER VEGETATION DYNAMICS ALONG GLACIAL RIVERS IN INTERIOR ALASKA

Date Revised: November 2005

Project Status: Ongoing

Contact Person or Agency: Robert Ott, Forest Health Program, Alaska Department of Natural Resources, Division of Forestry, 3700 Airport Way, Fairbanks, AK 99709, (907) 451-2702, robert_ott@dnr.state.ak.us. (Both research projects were initiated while employed for the Tanana Chiefs Conference (TCC) Forestry Program, Fairbanks, AK. TCC is still in charge of the project on the Native allotment)

Cooperators:, Alaska Department of Natural Resources, Division of Forestry, Fairbanks, Alaska, and Dr. Edmond Packee, University of Alaska Fairbanks.

Project Description: The project objective is to document long-term vegetation dynamics of riparian buffer strips along glacial rivers in the absence of bank erosion in interior Alaska. There are actually two separate projects, one is in cooperation with the University of Alaska Fairbanks, and the other with the Alaska Department of Natural Resources, Division of Forestry. Three riparian buffers are being monitored on a 5 year re-measurement cycle. Live and dead trees are tagged and mapped. Vegetation dynamics being monitored include: (1) tree growth—diameter and height; (2) changes in tree species composition; (3) tree recruitment and mortality; (4) spatial changes in tree species composition, recruitment, and mortality; (5) large woody debris recruitment into the rivers; (6) changes in understory vegetation composition and cover. Five-year re-measurements were conducted for all three buffers. A 12 year re-measurement of the third buffer on a Native allotment was conducted during the summer of 2005. Reports for both the 5 year and 12 year re-measurements are in progress.

Project Site Location(s): (1) On a Native allotment along a slough of the Tanana River about 10 miles southwest of Fairbanks; (2) Adjacent to a slough on an island in the Tanana River on the west side of State timber sale—Unit 1 of Timber Sale Area NC-664-D Beetle Crunch III. Latitude and longitude: N 63º 52’ 10.0”, W 144º 46’ 26.3”; (3) Along the Tok River on the west side of State Timber Sale Area NC-219-T Tok River No. 3. Latitude and longitude: N 63º 07’ 53.6”, W 143º 15’ 54.1”.

Relevance to Forest Management: The management intent of the Alaska Forest Resources and Practices Act (FRPA) for riparian areas is to protect fish habitat and water quality from significant adverse effects of timber harvest. Retention of riparian buffer strips is the Best Management Practice (BMP) used to accomplish the intent of FRPA. This project is investigating how well riparian buffers maintain their integrity, in the absence of erosion, so they can provide the protections to fish habitat and water quality for which they are designed.

Key Words: Riparian forests, land use, forest ecology, ground vegetation, white spruce, balsam poplar

THE IMPACT OF WINTER LOGGING ROADS ON VEGETATION, GROUND COVER, PERMAFROST, AND WATER MOVEMENT ON THE TANANA RIVER FLOODPLAIN IN INTERIOR ALASKA

Date Revised: November 2005

Project Status: Completed

Contact Person or Agency: Robert Ott, Forest Health Program, Alaska Department of Natural Resources, Division of Forestry, 3700 Airport Way, Fairbanks, AK 99709, (907) 451-2702, robert_ott@dnr.state.ak.us. (Research was conducted while employed for the Tanana Chiefs Conference Forestry Program, Fairbanks, AK)

Cooperators: Alaska Department of Natural Resources, Division of Forestry

Project Description: Winter logging roads are used in interior Alaska to cross floodplain wetlands underlain by permafrost in order to access productive forest stands. Potential effects of winter roads in these areas include: changes of water movement, increased active layer depth, development of thermokarst topography, removal of soil, and delayed re-vegetation of roadbeds. During September 1997, the principal investigator quantified active layer depths, and vegetation and ground cover patterns, on 2 winter roads and adjacent undisturbed areas in 8 plant communities (4 forest, 4 shrub) underlain by permafrost. Within each plant community 4 to 5 sample lines, oriented perpendicular to the roadbed and centered over it, were spaced at 30 ft. intervals. Data that were collected at 2 ft. intervals along each sample line were: active layer depth, erect vegetation occurrence by life-form for 3 height strata (>6 ft., 3 to 6 ft., and <3 feet), occurrence of mat-forming (ground layer) vegetation by life-form, ground cover occurrence, and ground surface height.

Project Site Location(s): The study was conducted on the Tanana River floodplain near the village of Nenana in central Alaska.

Relevance to Forest Management: Results from this project will help forest managers determine the effectiveness of the Alaska Forest Resources and Practices Act (FRPA), and evaluate best management practices within the context of FRPA.

Key Words: Climate and soil, riparian forests, active layer, permafrost, land use, thermokarst, best management practices

SITE INDEX

SITE INDEX FOR SOIL SURVEY

Date Revised: 30 January 2004

Project Status: Completed

Contact Person or Agency: Dan Rees, US Army Alaska, 907-353-9318, dan.rees@wainwright.army.mil.

Cooperators: Trudy Pink, USDA Natural Resources Conservation Service

Project Description: Site Index data were collected for a soil survey to indicate forest productivity. All soils with major forest components were visited and site index data were collected for predominant tree species occurring on a given soil type. A minimum of three sites were sampled per soil type per tree species.

Project Site Location(s): Fort Greely/Donnelly Training Area, Delta Junction, Alaska

Relevance to Forest Management: The data collected from this effort will be used in the soil survey report. This will provide a means of comparing tree growth potential between soil types for a given tree species.

Key Words: Mensuration and inventories

SITE INDEX OF BALSAM POPLAR/BLACK COTTONWOOD IN ALASKA

Date Revised: January 2004

Project Status: Completed

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: C-L Ping, Soil Scientist, UAF Agricultural and Forestry Experiment Station (Palmer, AK); Alaska Department of Natural Resources: Divisions of Forestry and Mining, Land and Water, Northern Region and Southcentral Region; University of Alaska Statewide Lands; USDA Forest Service Chugach National Forest; USDI Bureau of Land Management; USDI Fish and Wildlife Service Kenai National Wildlife Refuge; US Department of Defense Elmendorf Air Force Base, Fort Richardson; Fairbanks-North Star Borough; Mat/Su Borough; Ahtna, Inc; Eklutna Village Corporation.

Project Description: No site index curves existed for balsam poplar-black cottonwood in Alaska. Objective was to develop polymorphic site index curves for poplar/cottonwood with a standard breast height index age of 50 years. Standardized stem analysis procedures are used for all species: age at stump and then at 4-foot intervals to the top 4-foot section and then the top; age, total diameter and annual incremental radius measured for each cross-section. Regression was used to develop site index curves involving 253 trees. Soils for majority of sites described and sampled to USDA NRCS standards. Juried papers published in 1998, 2000. Basis for J. Shaw M.Sc. thesis.

Project Site Location(s): 68 (35 interior and 30 southcentral) poplar-cottonwood stands throughout southcentral and interior Alaska were sampled.

Relevance to Forest Management: Site index is the major tool for quantifying forest stand productivity and provides access to other mensurational stand tables. It is used to develop stand treatment prescriptions, make better financial decisions, and predict stand structure and growth over time. Soils effort demonstrated that there are other soil-forming processes in addition to the standard for the Tanana River floodplain.

Key Words: Silviculture, mensuration and inventory, climate and soils

SITE INDEX OF BIRCH IN ALASKA

Date Revised: March 2005

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks, (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources: Divisions of Forestry, Northern Region and Southcentral Region; Mining, Lands and Water; University of Alaska Statewide Lands; USDI Bureau of Land Management; USDI Fish and Wild Service Kenai National Wildlife Refuge; Fairbanks-North Star Borough; Mat/Su Borough; Bean Ridge Village Corporation.

Project Description: Published Alaskan birch site index curves for are anamorphic and are unsuitable for modeling. Objective was to develop polymorphic site index curves for birch (*Betula kenaica* and *B. neoalaskana*) with a standard breast height index age of 50 years. Standardized stem analysis procedures were used for all species: age at stump and then at 4-foot intervals to the top 4-foot section and then the top; age, total diameter and annual incremental radius were measured for each cross-section. Regression was used to develop site index curves using approximately 266 trees. Initial curves being reworked and paper initiated for publication. Basis for M. Hoyt's M.Sc. thesis (May 1992).

Project Site Location(s): 54 birch-dominated stands throughout southcentral and interior Alaska were sampled; stands were dominantly *B. neoalaskana.*

Relevance to Forest Management: Site index is the major tool for quantifying forest stand productivity and provides access to other mensurational stand tables. It is used to develop stand treatment prescriptions, make better financial decisions, predict stand structure and growth over time, and develop growth correlations with environmental factors. Curves are being revised and tested to determine if it is necessary to separate the two species of birch.

Key Words: Silviculture, mensuration and inventory

SITE INDEX OF BLACK SPRUCE IN ALASKA

Date Revised: March 2005

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: J.D. Shaw, Ph.D., Certified Forester, USDA Forest Service Rocky Mountain Research Station Forest Inventory and Analysis Unit (Ogden); C-L Ping Soil Scientist, UAF Agricultural and Forestry Experiment Station (Palmer, AK); Alaska Department of Natural Resources: Divisions of Forestry and Mining, Land, ands Water, Northern Region and Southcentral Region, and Parks; University of Alaska Statewide Lands; USDA Forest Service Chugach National Forest; USDI Bureau of Land Management; USDI Fish and Wildlife Service Kenai National Wildlife Refuge; Fairbanks-North Star Borough; Mat/Su Borough.

Project Description: No site index curves exist for black spruce in Alaska. Objective is to develop polymorphic site index curves for black spruce with a standard breast height index age of 50 years. Standardized stem analysis procedures are used for all species: age at stump and then at 4-foot intervals to the top 4-foot section and then the top; age, total diameter and annual incremental radius measured for each cross-section. Regression was used to develop site index curves involving 229 trees. Soil described and sampled to USDA Natural Resources Conservation Service standards initiated in 2002. Manuscript for publication drafted and in in-house revision. Component of C. Rosner's (completed Aug 2004) and N. Naman (expected completion Dec. 2005) M.Sc. theses.

Project Site Location(s): 58 (33 interior and 25 southcentral) black spruce-dominated stands throughout southcentral and interior Alaska were sampled.

Relevance to Forest Management: Site index is the major tool for quantifying forest stand productivity and provides access to other mensurational stand tables. It is used to develop stand treatment prescriptions, make better financial decisions, predict stand structure and growth over time, and develop growth correlations with environmental factors.

Key Words: Silviculture, mensuration and inventory, climate and soils

SITE INDEX OF TAMARACK IN ALASKA

Date Revised: January 2004

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources: Divisions of Forestry and Mining, Land, and Water, Northern Region; University of Alaska Statewide Lands; Fairbanks-North Star Borough.

Project Description: No site index curves exist for tamarack in Alaska. Objective is to develop, if possible, polymorphic site index curves for tamarack with a standard breast height index age of 50 years. May have to settle for a form of anamorphic curves because of insect caused mortality. Standardized stem analysis procedures are used for all species: age at stump and then at 4-foot intervals to the top 4-foot section and then the top; age, total diameter and annual incremental radius measured for each cross-section. Regression is used to develop site index curves. To date, only 116 trees have been sampled.

Project Site Location(s): 29 stands have been sampled in the Tanana Valley downstream from the Gerstle River, many of these stands have succumbed to bark beetle or larch sawfly infestations.

Relevance to Forest Management: Site index is the major tool for quantifying forest stand productivity and provides access to other mensurational stand tables. It is used to develop stand treatment prescriptions, make better financial decisions, predict stand structure and growth over time, and develop growth correlations with environmental factors. Anamorphic curves will reduce accuracy.

Key Words: Silviculture, mensuration and inventory

SITE INDEX OF TREMBLING ASPEN IN ALASKA

Date Revised: March 2005

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: J.D. Shaw, Ph.D., Certified Forester, USDA Forest Service Rocky Mountain Research Station Forest Inventory and Analysis Unit (Ogden); C-L Ping, Soil Scientist, UAF Agricultural and Forestry Experiment Station (Palmer, AK); Alaska Department of Natural Resources: Divisions of Forestry, Northern Region and Southcentral Region; Mining, Land, and Water; and Parks; University of Alaska Statewide Lands; USDA Forest Service Chugach National Forest; USDI Bureau of Land Management; USDI Fish and Wildlife Service Kenai National Wildlife Refuge; US Department of Defense Elmendorf Air Force Base, Fort Richardson; Fairbanks-North Star Borough; Kenai Peninsula Borough; Mat/Su Borough; Ahtna, Inc; Bean Ridge Village Corporation; Circle Village Corporation; Eagle Village Corporation; Minto Village Corporation; Alyeska Pipeline Company.

Project Description: Published site index curves for aspen in Alaska are anamorphic and not suited for modeling. Objective is to develop polymorphic site index curves for aspen with a standard breast height index age of 50 years. Standardized stem analysis procedures are used for all species: age at stump and then at 4-foot intervals to the top 4-foot section and then the top; age, total diameter and annual incremental radius measured for each cross-section. Regression was used to develop site index curves involving 244 trees. Editing of draft peer-review paper for journal publication expected to be complete by Sep 2005. Soils described and sampled to USDA Natural Resources Conservation Service standards initiated in 2003.

Project Site Location(s): 60 (39 interior and 21 southcentral) aspen-dominated stands throughout southcentral and interior Alaska were sampled.

Relevance to Forest Management: Site index is the major tool for quantifying forest stand productivity and provides access to other mensurational stand tables. It is used to develop stand treatment prescriptions, make better financial decisions, predict stand structure and growth over time, and develop growth correlations with environmental factors. Correlation of soil properties with polymorphic site index equations will eventually permit assessment of bare land or land occupied by other cover types for suitability for aspen.

Key Words: Silviculture, mensuration and inventory, climate and soil

SITE INDEX OF WHITE SPRUCE IN ALASKA

Date Revised: January 2004

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources: Divisions of Forestry and Mining, Land, and Water, Northern Region and Southcentral Region; University of Alaska Statewide Lands; USDA Forest Service Chugach National Forest; USDI Bureau of Land Management; Fairbanks-North Star Borough; Mat/Su Borough; Eagle Village Corporation.

Project Description: Published site index curves for Alaskan white spruce are anamorphic and not suited for modeling nor sufficiently accurate for forest management. Objective is to develop polymorphic site index curves with a standard breast height index age of 50 years. Standardized stem analysis procedures are used for all species: age at stump and then at 4-foot intervals to the top 4-foot section and then the top; age, total diameter and annual incremental radius measured for each cross-section. Regression is used to develop site index curves. To date, 156 trees have been sampled; a major concern is locating and obtaining a total of 350 or more high quality, commercial white spruce trees to be sacrificed and sectioned for stem analysis.

Project Site Location(s): 39 (33 interior, 6 southcentral) white spruce-dominated stands throughout southcentral and interior Alaska have been sampled.

Relevance to Forest Management: Site index is the major tool for quantifying forest stand productivity and provides access to other mensurational stand tables. It is used to develop stand treatment prescriptions, make better financial decisions, predict stand structure and growth over time, and develop growth correlations with environmental factors.

Key Words: Silviculture, mensuration and inventory

TREE REGENERATION

BONANZA CREEK REGENERATION IN BLADE SCARIFIED PATCHES

Date Revised: February 2004

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources Division of Forestry Northern Region.

Project Description: Initiated in 1986 by USDA Forest Service Institute of Northern Forestry and Intensive Forest Management Program of the University of Alaska School of Agriculture and Land Resources Management. Objective: Determine effect of dozer blade on exposing patches of mineral soil on spruce regeneration. 20 patches not affected by 1983 Rosie Creek Fire compared to adjacent non-scarified plot; next assessment prior to 2005 planned harvest. Next assessment in 2005 prior to harvest. Initial results reported in Northern Journal of Applied Forestry.

Project Site Location: Southwest corner of Bonanza Creek Main Line and Camp 78 Road outside Experimental Forest boundary

Relevance to Forest Management: Initial results demonstrate that blade scarification is a successful approach to site preparation to encourage natural white spruce regeneration under moderately stocked mature spruce stand. Modification of approach to be done during logging activity can reduce scarification cost to zero.

Key Words: Silviculture

EARLY HEIGHT GROWTH OF NORTHERN FOREST TREE SPECIES IN ALASKA

Date Revised: March 2005

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources: Divisions of Forestry Northern Region and Southcentral Region, Mining, Land and Water, and Parks; University of Alaska Statewide Lands; USDA Forest Service Chugach National Forest; USDI Bureau of Land Management; USDI Fish and Wildlife Service Kenai National Wildlife Refuge; US Department of Defense Elmendorf Air Force Base, Fort Richardson; Fairbanks-North Star Borough; Kenai Peninsula Borough; Mat/Su Borough; Ahtna, Inc; CIRI Corporation; Bean Ridge Village Corporation; Circle Village Corporation; Minto Village; Eklutna Village Corporation. Alyeska Pipeline Company.

Project Description: Stand age is commonly and traditionally determined at breast height (4.5 feet above the ground) in the United States. In Alaska, estimates for years to reach breast height are based on little or no data. Age at which trees are free-to-grow depends upon the competitors; however, little or no information exists for height growth through 20 or 25 years. Objectives: Determine number of growing seasons required for planted or natural seedlings to reach breast height and also free-to-grow status (emphasis, here, is on non-tree competitors). Currently, have age and height measurements on over 8,000 trees (4 conifers, 3 hardwoods). Component of T. Heffernan, J. Hollingsworth, M. Hoyt, C. Rosner's (completed Aug 2004) M.Sc. theses; basis for A. Collins' B.Sc. thesis (May 2003).

Project Site Location(s): Throughout interior and southcentral Alaska. Typically, this data will be collected in conjunction with other studies, e.g., Levels-of-Growing-Stock, Site Index, special studies.

Relevance to Forest Management: Improved, documentable, estimates for individual trees and stands to reach breast height and curves for stand age through 20 years will improve management activities, including: rotation ages, calculation of mean annual increment, allowable cuts, stand prescriptions (species selection, site preparation stand release), and development of improved growth and ecological models. On better than average site quality, overstory aspen and birch competition reduce white spruce seedling/sampling height growth by +/- 25 percent.

Key Words: Silviculture, mensuration and inventory, forest ecology

INTERACTIONS OF WHITE SPRUCE AND SHRUBBY ALDER IN RECENTLY HARVESTED SITES

Date Revised: 25 March 2005

Project Status: Ongoing

Contact Person or Agency: Tricia L. Wurtz, USDA Forest Service, Boreal Ecology Cooperative Research Unit, Box 756780, University of Alaska Fairbanks, Fairbanks, AK 99775-6780, 907-474-5994, fftlw@uaf.edu or twurtz@fs.fed.us.

Cooperators: None

Project Description: This study was begun in 1990. It involved establishing mixed plantations of white spruce and shrubby alder on three recently clearcut sites around the state. The primary objective was to determine the long-term effect of nearby shrubby alder on white spruce growth. Two publications have resulted from this study to date; and after ten years, the spruce trees planted with alder were growing no differently than spruce trees planted without alder. However, such an effect may develop over longer time-scales, say 30 or 40 years. The plantations were very carefully installed, marked, and documented so they should be easy for someone to re-measure in the future.

Project Site Location(s): There are three study sites, one at Standard Creek, one at Trapper Creek and one at Cooper Landing. The exact locations and site maps can be found in this Forest Service publication: Wurtz, T.L. 2000. Interactions between white spruce and shrubby alders at three boreal forest sites in Alaska. PNW-GTR-481. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 29 p. (available on the web at http://www.fs.fed.us/pnw/pubs/gtr481.pdf)

Relevance to Forest Management: Improve our understanding of long-term plantation development. Improve our understanding of nitrogen dynamics in forest regeneration.

Key Words: Silviculture, forest ecology, white spruce, alder

NATURAL REGENERATION OF WHITE SPRUCE AT RESERVE WEST

Date Revised: 12 February 2004

Project Status: Ongoing

Contact Person or Agency: Glenn P. Juday, Forest Sciences, School of Natural Resources and Agricultural Sciences, University of Alaska Fairbanks, Fairbanks, AK 99775-7200, ffgpj@uaf.edu.

Cooperators: Rob Solomon, University of Alaska Fairbanks Forest Sciences Department.

Project Description: This long-term monitoring project measures survival and height growth of seedlings and saplings in an area burned in the 1983 Rosie Creek Fire. The year 2003 was the fifteenth year of measurement. All seedlings belong to the 1983, 1987, or 1990 seed crops. Mean 2003 growth of 1983 seed crop seedlings was 19.4 cm (7.6 in), which is about 25% less than the climatically favorable years of 2001-2002, reflecting a sharp dry period at the beginning of the 2003 growing season which was relieved by heavy rains in mid summer. The average total height of 1983s was 207 cm (82 in), and 74 percent of them were greater than breast height (137 cm or 4.5 ft), the benchmark for likely success as part of the dominant tree canopy. Average height of 1987 seedlings was 84 cm (33 in), and 16% were taller than breast height.

Project Site Location(s): Rosie Creek burn area near Fairbanks

Relevance to Forest Management: Regenerating white spruce is generally the biggest reforestation problem in the boreal forest region. Predictive equations of white spruce height growth indicate that cool early summer temperatures are critical for optimum height growth. The 3 climatically favorable years of 2000-2002 account for 40% of the total height growth of 1987 seedcrop seedlings. Growth measurement comparisons of one site to another must compare the same or similar set of climate years, otherwise the growth potential of the sites will be misrepresented.

Key Words: White spruce, regeneration, allometric

REGENERATION SURVEYS FOR HARVESTED TIMBERLANDS

Date Revised: 30 January 2004

Project Status: Completed

Contact Person or Agency: Will Putman, Acting Forestry Director, Tanana Chiefs Conference, 122 First Ave., Suite 600 Fairbanks, AK 99701, wputman@tananachiefs.org.

Cooperators: None

Project Description: Regeneration surveys have been completed for several landowners including Native allotments, village corporations and the State of Alaska. Regeneration surveys include data on species, trees per acre, and areas of un-stocked ground. Maps have been prepared for some of the surveys that indicate graphically various levels of stocking. Other surveys only include tabular data.

Project Site Location(s): Native village lands include Healy Lake and Nenana. Native allotments are located along the Chilkat River as inholdings within the Haines State Forest. State lands include areas along the Kuskokwim River near McGrath and areas along the Tanana River near Dot Lake and Delta Junction.

Relevance to Forest Management: Regeneration surveys provide the landowner with information about forest stocking on harvested lands. This data can be used to determine whether Forest Practices Act requirements have been met in terms of stocking levels. The data can also be used to determine number of trees to be ordered from seedling nurseries.

Key Words: White spruce, black spruce, tamarack, paper birch, quaking aspen, balsam poplar, stocking, regeneration

TREE THINNING

BIRCH THINNING STUDIES IN JENNY M CREEK, CHENA RIVER DRAINAGE

Date submitted: March 2005

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks, (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources, Division of Forestry, Fairbanks Area and Alaska Department of Natural Resources, Division of Mining, Land, and Water**.**

Project Description: Little data exists concerning the growth response of birch to thinning in interior Alaska. Two stands of predominantly pole-size birch were thinned. The stand was initially stocked with approximately 850 trees per acre; both stands were thinned to approximately 270 trees per acre. Thinning occurred in 1982. One-tenth acre permanent plots were established and have been remeasured at 5-year intervals. Next remeasurement is planned for 2007.

Project Site Location(s): Jenny M Creek Road off Chena Hotsprings Road.

Relevance to Forest Management: Twenty-five-year results will provide resource managers with information and recommendations concerning the growth response of pole-size birch stands to thinning in interior Alaska.

Key Words: Alaska paper birch, silviculture, thinning

BONANZA CREEK HARDWOOD REMOVAL FROM MATURE MIXED STAND

Date Revised: February 2004

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources Division of Forestry, Northern Region.

Project Description: Initiated in 1986 by USDA Forest Service Institute of Northern Forestry and Intensive Forest Management Program of the University of Alaska School of Agriculture and Land Resources Management. Special land use permit has expired; re-application planned for 2004. Superimposed on treatment area was blade scarification to encourage natural regeneration—reported in Northern Journal of Applied Forestry. Objective: Determine effect of hardwood removal and sanitation cut of white spruce on diameter growth and health of residual stand. Plan to harvest stand after 2005 measurement because stand condition is deteriorating. Problem: at least one study superimposed on stand—Principal Investigator unknown.

Project Site Location: Southwest corner of Bonanza Creek Main Line and Camp 78 Road outside Experimental Forest boundary

Relevance to Forest Management: Provides information on suitability/success of hardwood removal and sanitation cutting as a silvicultural prescription to improve diameter growth and quantity of clear wood production of mature white spruce.

Key Words: Silviculture, mensuration and inventory

BONANZA WEST SOUTH OF PARKS HIGHWAY ASPEN-WHITE SPRUCE THINNING TRIAL

Date Revised: February 2004

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources, Division of Mining, Land and Water, Northern Region.

Project Description: Initiated in 1981 by the Intensive Forest Management Program of the University of Alaska School of Agriculture and Land Resources Management. Thinning is commonly used to increase diameter growth and thus piece size of crop trees. Potential response of white spruce in a mixed aspen-white spruce stand on Inceptisols to thinning is poorly documented. Objective: Determine the response of white spruce in a mixed stand of variable stem density to a heavy thinning. A (65)-120-yr-old stand with moderately high site index was thinned from 2,425 trees of all species to 200 spruce trees per acre. The 5 plots are remeasured at 5-yr intervals.

Project Site Location: South of Parks Highway (Mile 334), T2S, R4W, S18, S1/2; 25 miles west of Fairbanks.

Relevance to Forest Management: Provides essential information on white spruce response to thinning for developing silvicultural prescriptions.

Key Words: Silviculture, mensuration and inventory

BONANZA WEST WHITE SPRUCE THINNING TRIAL

Date Revised: February 2004

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources Division of Mining, Land and Water, Northern Region.

Project Description: Initiated in 1981 by the Intensive Forest Management Program of the University of Alaska School of Agriculture and Land Resources Management. Thinning is commonly used to increase diameter growth and thus piece size of trees. Potential response of white spruce on Inceptisols to thinning is not well documented. Objective: Determine the response of white spruce in a mixed stand of variable stem density to a heavy thinning. A (65-120) yr-old stand with a moderately high site index was thinned from 430 trees of all species to 105 spruce trees per acre. The 16 plots are remeasured at 5-yr intervals.

Project Site Location: North of Parks Highway (Mile 334), T2S, R4W, S18, S1/2; 25 miles west of Fairbanks.

Relevance to Forest Management: Diameter and volume increment response to heavy thinning, +/- 200 trees per acre, of pole-sized trees is unknown for Alaskan Inceptisols. Thus, this complements existing thinning data for improved silvicultural prescriptions.

Key Words: Silviculture, mensuration and inventory

EFFECTS OF THINNING AND MILITARY TRAINING ON A HARDWOOD (BIRCH) STAND

Date Revised: 30 January 2004

Project Status: Ongoing

Contact Person or Agency: Dan Rees, US Army Alaska, 907-353-9318, dan.rees@wainwright.army.mil.

Cooperators: None

Project Description: The purpose of this project is to study to effects of thinning and military training on a birch stand. A birch stand was thinned to a 16 foot spacing and a 24 foot spacing. Permanent forest health monitoring plots were established in each thinning according to USDA Forest Service's Forest Inventory and Analysis methodology. The plots will track residual tree health and provide a method of tracking tree damage from a thinning operation.

Project Site Location(s): Fort Wainwright's Yukon Training Area, Fairbanks, Alaska

Relevance to Forest Management: A mature birch forest was thinned to different spacing levels to test the impact and feasibility of military training activities. Monitoring plots will also measure tree growth and response to the different spacing levels.

Key Words: Forest health, silviculture

GOLDSTREAM WHITE SPRUCE SAPLING SPACING TRIAL—STANDARD CREEK ROAD

Date Revised: February 2004

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources Division of Forestry, Northern Region.

Project Description: Initiated in 1983 by the Intensive Forest Management Program of the University of Alaska School of Agriculture and Land Resources Management. Overstocked seedling and sapling stands commonly have reduced diameter growth. Management objectives commonly are to achieve earlier merchantable diameters and individual tree dominance at an early age. Spacing reduces stand density and results in increased stem diameter growth on residual stems. Objective: Determine the effect of three levels of spacing (300, 450, and 600 crop trees per acre) on height and diameter growth of residual trees. 18 plots remeasured at 5-year intervals—last remeasurement in 2003.

Project Site Location: Standard Creek Road south of the Goldstream Bridge, Tanana Valley State Forest; 15 miles northwest of Fairbanks.

Relevance to Forest Management: Data essential for developing espacement and spacing prescriptions for white spruce. Also, the importance of ensuring that all stems of cut trees are cut below the last live branch or "turn-up" of live branches occurs and thus can increase total stems per acre.

Key Words: Silviculture, Mensuration and inventory

LEVELS-OF-GROWING-STOCK (LOGS) PLANTATIONS

Date Revised: March 2005

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources Division of Forestry.

Project Description: Initiated in May 1986 at Bonanza Creek—white spruce and tamarack; and in August 1992 at Tok—white spruce, black spruce, tamarack, lodgepole pine. Initial espacement (distance between trees = stems per acre) affects yield per acre, size and quality of stems, and wood quality. Espacement 4x4, 6x6, 8x8, 10x10, 12x12 feet. Height measured annually, breast height diameter measured annually once majority have reached breast height until trees 20 or 25 years old and then once every 5-years. Competing vegetation removed routinely to keep-free-to-grow status. Bonanza Creek installations established May 1986; Red Fox installations established August 1992. Component of J. Hollingsworth's M.Sc. thesis and basis for C. Bosveld, A. Collins, J. MacArthur's B.Sc. theses (May 2002, May 2003, May 2002, respectively). Additionally, numerous small spacing (pre-commercial thinning) and thinning trials established prior to 1983 are being monitored. Tamarack at Bonanza Creek after 18 years about 30% survival.

Project Site Location(s): LOGS plantations at Bonanza Creek (west of Fairbanks) established May 19: 2 white spruce (2,388 trees), 1 tamarack failed due to insect-caused mortality Red Fox (north edge of Tok): 1 white spruce, 1 black spruce, 1 tamarack, 1 lodgepole pine (5,144 trees total). Spacing and thinning trials located near Fairbanks (West Bonanza Creek, Standard Creek, Chena Hot Springs road).

Relevance to Forest Management: Provide appropriate espacement guidelines. Optimize plantation establishment costs and reduce stand maintenance (release and spacing) costs as well as produce better quality, higher value products. See: 1999. Agroborealis 31(1):24-27.

Key Words: Silviculture, mensuration and inventory, forest ecology

POLE-SIZED BIRCH THINNING IN THE STANDARD CREEK AREA

Date submitted: March 2005

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks, (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources, Division of Forestry, Fairbanks Area and Alaska Department of Natural Resources, Division of Mining, Land, and Water.

Project Description: Little data exists describing the response of pole-sized Alaska paper birch in interior Alaska to thinning. Potential response of birch growing on Inceptisols to thinning is not well documented. Objective: Determine the growth and mortality response of a stand of birch to a heavy thinning. Fully stocked stand was thinned in 1983 to approximately 260 trees per acre. Stand is on approximately a 30% slope. Six 1/10 acre plots were established in the treatment unit and two 1/10 acre plots were located in the surround (controls). The 8 plots are remeasured at 5-yr intervals. Next remeasurement in 2008.

Project Site Location: Southwest of Fairbanks off Standard Creek Road on Fitzsimmon Loop Road.

Relevance to Forest Management: Twenty-five year results will provide resource managers with information and recommendations concerning thinning pole-sized white birch stands in Alaska.

Key Words: Alaska paper birch, thinning, silviculture

POLE-SIZED SPRUCE THINNING IN STANDARD CREEK

Date submitted: March 2005

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks, (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources, Division of Forestry, Fairbanks Area.

Project Description: Little data exists describing the response of pole sized white spruce-black spruce to thinning in interior Alaska. The response of white spruce on deep loess Inceptisols to thinning is not well documented. Objective: Determine the growth and mortality response of a mixed white and black spruce stand to a heavy thinning. Stand was thinned in 1983 to approximately 390 trees per acre. Stand is on approximately a 30% slope. Six 1/10 acre plots were established in the treatment unit and two 1/10 acre plots were located in the surround (controls). The 8 plots are remeasured at 5-yr intervals. Next remeasurement is in 2008.

Project Site Location: West of Fairbanks on Standard Creek Road at mile 4.2.

Relevance to Forest Management: Twenty-five-year results will provide resource managers with information and recommendations concerning thinning pole-sized white spruce-black spruce stands.

Key Words: White spruce, black spruce, thinning, silviculture

SLASH DECOMPOSITION FOLLOWING THINNING

Date Revised: March 2005

Project Status: Complete

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources Division of Forestry, Northern Region; USDI Bureau of Land Management Alaska Fire Service.

Project Description: Initiated: Spring 2004. Many natural spruce stands appear to be overstocked. Fuel management prescriptions often call for thinning and pruning of remaining trees. A major concern in both situations is the resulting slash. Not only is quantity of slash poorly known, but also decomposition or lack thereof is a major concern in terms of fuel loading. Costs of physical slash removal are excessive. The objective of this study was to determine fuel loadings following two thinning regimes and determining residency of slash in terms of fuel loading. Emphasis was on a 1982 white spruce thinning trial in the Tanana Valley State Forest about 20 miles west of Fairbanks. Basis for C. Swisher (completed May 2005) B.Sc. thesis.

Project Site Location: Throughout Tanana Valley, especially Fairbanks area.

Relevance to Forest Management: Thinning adds to the amount of slash on the ground. Thinned stand without slash removal had 24 to 25 (range = 15 to 37) tons of slash per acre 22 years after thinning compared to 2.5 tons for one plot with slash removed. The control plot had 10 tons of natural slash per acre. Greatest amount of slash loading was in the 1 to > 3-inch size class. Thinning alone, without slash abatement, will result in a severe risk for 25 or more years after treatment.

Key Words: Silviculture, fire, slash, fuel loading, thinning

THINNING POLE-SIZE WHITE SPRUCE STANDS ALONG NENANA RIDGE

Date submitted: March 2005

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks, (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources, Division of Forestry, Fairbanks Area and Alaska Department of Natural Resources, Division of Mining, Land, and Water.

Project Description: Little data exists describing the response of pole-sized white spruce to thinning in interior Alaska. Three stands were thinned to various stocking levels in 1981. Stands were predominantly pole-sized white spruce trees. One-tenth acre plots were established to monitor growth and mortality. Tree diameter and height are remeasured at 5 year intervals. Next remeasurement in 2006.

Project Site Location(s): West of Fairbanks—Mile 333.9 Parks Highway; Bonanza West Area.

Relevance to Forest Management: Twenty-five-year results will provide resource managers with information and recommendations concerning thinning pole-sized white spruce stands.

Key Words: White spruce, thinning, silviculture

UNDERSTORY WHITE SPRUCE RESPONSE TO RELEASE FROM OVERSTORIES OF BALSAM POPLAR AND QUAKING ASPEN

Date Revised: November 2005

Project Status: Ongoing

Contact Person or Agency: Robert Ott, Forest Health Program, Alaska Department of Natural Resources, Division of Forestry, 3700 Airport Way, Fairbanks, AK 99709, (907) 451-2702, robert_ott@dnr.state.ak.us. (Research was initiated while employed with the Tanana Chiefs Conference (TCC) Forestry Program, Fairbanks, Alaska. TCC is still in charge of the project)

Cooperators: None

Project Description: Understory white spruce response to release cuts from a balsam poplar and a quaking aspen overstory are being monitored. Within each forest type, three control and three treatment plots are installed. All tree monitoring plots are 1/10 acre in size. Pre-treatment tree data were collected in the balsam poplar stand, but not in the quaking aspen stand. Pre-treatment tree densities in the aspen stand were determined by conducting stump counts in the treatment plots after treatment. All live trees are tagged in all plots. Tree regeneration is being monitored within five 0.002 acre plots within each tree monitoring plot. Data collected are: (1) tree species, diameter, height, height to live crown, and crown symmetry; (2) tree regeneration (seedling counts) by species; (3) overstory and understory vegetation cover. A five year re-measurement is planned.

Project Site Location(s): Two Native allotments near the village of Nenana

Relevance to Forest Management: Release cutting in forest stands is generally not conducted unless a positive benefit:cost ratio is expected as a result of the treatment. This project will provide much needed information regarding the nature of the response of white spruce to release from overstories of balsam poplar and quaking aspen in interior Alaska. The degree of the response can then be compared to the cost of the conducting the treatments, thereby allowing for more accurate cost-benefit analyses to be conducted in the future.

Key Words: Silviculture, mensuration and inventories, thinning, stand characteristics, white spruce, balsam poplar, quaking aspen

WEST BONANZA WHITE SPRUCE THINNING AND FERTILIZER INTERACTION TRIAL

Date Revised: February 2004

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources Division of Mining, Land and Water, Northern Region.

Project Description: Initiated in 1981 by the Intensive Forest Management Program of the University of Alaska School of Agriculture and Land Resources Management. Thinning and the application of nitrogen fertilizers are commonly used to increase diameter growth and thus piece size of trees. Potential response to such treatments by white spruce on Inceptisols is not well established. Objectives: Determine effect of thinning, fertilization, and thinning X interaction on white spruce. A 65-yr-old stand with 2000 stems per acre having a moderately high site index was thinned to 200 and 130 trees per acre and then fertilized with 100 pounds of nitrogen fertilizer (urea or ammonium nitrate).

Project Site Location: North of Parks Highway (Mile 334), T2S, R4W, S. 18, W1/2 SE1/4; 25 miles west of Fairbanks.

Relevance to Forest Management: Data supports thinning and fertilization guidelines for white spruce stand treatments. Demonstrates that thinning or partial cutting can open stands to environmental stresses including wind or snow breakage, windthrow, and insect problems (*Ips* beetles). Slash is another consideration in terms of access within the stand and fire fuel load.

Key Words: Silviculture, mensuration and inventory

WHITE SPRUCE RESPONSE TO PRE-COMMERCIAL THINNING ON NATIVE ALLOTMENTS IN INTERIOR ALASKA

Date Revised: November 2005

Project Status: Ongoing

Contact Person or Agency: Robert Ott, Forest Health Program, Alaska Department of Natural Resources, Division of Forestry, 3700 Airport Way, Fairbanks, AK 99709, (907) 451-2702, robert_ott@dnr.state.ak.us. (Research was initiated while employed with the Tanana Chiefs Conference (TCC) Forestry Program, Fairbanks, Alaska. TCC is still in charge of the project)

Cooperators: Alaska Department of Natural Resources, Division of Forestry.

Project Description: White spruce response to a pre-commercial thinning is being monitored in five treatment plots and four control plots. All tree monitoring plots are 1/5 acre in size, with a smaller 1/10 acre plot located within the control plots. All live trees are tagged in the treatment plots. In the control plots, all live trees with a diameter of one inch or greater are tagged within the internal 1/10 acre plot, and all trees with a diameter of two inches or greater are tagged outside of the 1/10 acre plot. Pre-treatment tree densities in the treatment plots were determined by conducting stump counts after treatment. Tree regeneration is being monitored within five 0.002 acre plots within each larger tree monitoring plot. Understory vegetation cover is being monitored within 16 1-m^2 plots within each larger tree monitoring plot. Data collected are: (1) tree species, diameter, height, height to live crown, defect, and crown symmetry; (2) tree regeneration (seedling counts) by species; (3) understory species composition and cover. The six year re-measurement of all plots was conducted during the summer of 2004. A report is in progress and scheduled for completion by September 2006.

Project Site Location(s): Treatment plots are located on two Native allotments west of Tok along the Alaska Highway. Control plots are located on nearby State-owned and Native-corporation owned land.

Relevance to Forest Management: Tree thinning in forest stands is generally not conducted unless a positive benefit:cost ratio is expected as a result of the treatment. This project will provide much needed information regarding the nature of the response of white spruce to a pre-commercial thinning in interior Alaska. The degree of the response can then be compared to the cost of the conducting the treatment, thereby allowing for more accurate cost-benefit analyses to be conducted in the future.

Key Words: Silviculture, mensuration and inventories, thinning, stand characteristics, white spruce

TREE VOLUME EQUATIONS

INDIVIDUAL TREE VOLUME EQUATIONS: ASPEN

Date Revised: January 2004

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources: Divisions of Forestry and Mining, Land, and Water, Northern Region and Southcentral Region; University of Alaska Statewide Lands; Mat/Su Borough.

Project Description: Several volume tables/equations (statewide and local) exist for aspen in Alaska; differences occur among them. No equations are available addressing taper, bole cambial area, or bole biomass. Objective: Develop statewide or regional cubic-foot volume, taper, cambial area, and biomass tables/equations for Alaskan aspen. For a robust sample, use standardized procedure for range of tree sizes: measure diameter at 4-foot intervals from 6-inch stump to top of 4-foot sections and, then, the top. Regression is used to develop the equations. To date, 136 trees have been sampled. An estimated 500 more trees needed. Basis for T. Malone M.Sc. thesis (expected completion Dec 2005).

Project Site Location(s): Throughout interior and southcentral Alaska.

Relevance to Forest Management: Improved equations will contribute to better management practices including fiber volume estimates for sales, determining mean annual increment annual allowable cuts, stand prescriptions and management options, wildlife habitat manipulation, and ecological modeling. Sample size will be sufficient to determine if regional adjustments are necessary. Accurate tables/equations, also, will benefit efforts to attract forest industry to Alaska.

Key Words: Mensuration and inventory

INDIVIDUAL TREE VOLUME EQUATIONS: BALSAM POPLAR/BLACK COTTONWOOD

Date Revised: January 2004

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: J.D. Shaw, Ph.D., Certified Forester, USDA Forest Service Rocky Mountain Research Station FIA Unit (Ogden); Alaska Department of Natural Resources: Divisions of Forestry and mining, Land, and Water, Northern Region and Southcentral Region; University of Alaska Statewide Lands; USDA Forest Service Chugach National Forest; USDI Bureau of Land Management; USDI Fish and Wildlife Service Kenai National Wildlife Refuge; US Department of Defense Elmendorf Air Force Base, Fort Richardson, Fairbanks-North Star Borough; Mat/Su Borough; Ahtna, Inc; Eklutna Village Corporation.

Project Description: The statewide volume table for Alaskan balsam poplar/black cottonwood is a composite that includes birch (smaller trees); no tables/equations specific to poplar exist for volume, taper, bole cambial area, or bole biomass. Objective: Develop statewide or regional cubic-foot volume, taper, cambial area, and biomass tables/equations for Alaskan poplar. For a robust sample, use standardized procedure for range of tree sizes: measure diameter at 4-foot intervals from 6-inch stump to top of 4-foot sections and, then, the top. Regression is used to develop the equations. To date, >250 trees have been sampled; another 250+ large trees are needed. The challenge is locating large trees that can be felled for measurement.

Project Site Location(s): Throughout interior and southcentral Alaska.

Relevance to Forest Management: Improved equations will contribute to better management practices including fiber volume estimates for sales, determining mean annual increment annual allowable cuts, stand prescriptions and management options, wildlife habitat manipulation, and ecological modeling. Sample size will be sufficient to determine if regional adjustments are necessary. Accurate tables/equations, also, will benefit efforts to attract forest industry to Alaska.

Key Words: Mensuration and inventory

INDIVIDUAL TREE VOLUME EQUATIONS: BIRCH

Date Revised: January 2004

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources: Divisions of Forestry and Mining, Land, and Water, Northern Region and Southcentral Region; US Department of Defense Elmendorf Air Force Base; Mat/Su Borough.

Project Description: The statewide volume table for Alaskan birch is a composite that includes balsam poplar (larger trees); no tables/equations specific to birch exist for volume, taper, bole cambial area, or bole biomass. Objective: Develop statewide or regional cubic-foot volume, taper, cambial area, and biomass tables/equations for Alaskan birch. For a robust sample, use standardized procedure for range of tree sizes: measure diameter at 4-foot intervals from 6-inch stump to top of 4-foot sections and, then, the top. Regression is used to develop the equations. To date, 274 trees have been sampled. An estimated 500 more trees needed. Basis for T. Malone M.Sc. thesis (expected completion Dec 2005).

Project Site Location(s): Throughout interior and southcentral Alaska.

Relevance to Forest Management: Improved equations will contribute to better management practices including fiber volume estimates for sales, determining mean annual increment annual allowable cuts, stand prescriptions and management options, wildlife habitat manipulation, and ecological modeling. Sample size will be sufficient to determine if regional adjustments are necessary. Accurate tables/equations, also, will benefit efforts to attract forest industry to Alaska.

Key Words: Mensuration and inventory

INDIVIDUAL TREE VOLUME EQUATIONS: BLACK SPRUCE

Date Revised: March 2005

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: J.D. Shaw, Ph.D., Certified Forester, USDA Forest Service Rocky Mountain Research Station Forest Inventory and Analysis Unit (Ogden); Alaska Department of Natural Resources: Divisions of Forestry and Mining, Land and Water, Northern Region and Southcentral Region; University of Alaska Statewide Lands; USDA Forest Service Chugach National Forest; USDI Bureau of Land Management; USDI Fish and Wildlife Service Kenai National Wildlife Refuge; Fairbanks-North Star Borough; Mat/Su Borough.

Project Description: No tables/equations exist for black spruce for volume, taper, bole cambial area, or bole biomass. Objective: Develop statewide cubic-foot volume, taper, cambial area, and biomass tables/equations for Alaskan black spruce. For a robust sample, use standardized procedure for range of tree sizes: measure diameter at 4-foot intervals from 6-inch stump to top of 4-foot sections and, then, the top. Regression is used to develop the equations. Sampling completed with 1,050 trees. This is part of C. Rosner's M.Sc. thesis completed Aug 2004. Paper for publication expected in late 2005 or early 2006.

Project Site Location(s): Interior and southcentral Alaska.

Relevance to Forest Management: Improved equations will contribute to better management practices including fiber volume estimates for sales, determining mean annual increment annual allowable cuts, stand prescriptions and management options, wildlife habitat manipulation, and ecological modeling. No regional adjustments are believed to be necessary. Accurate tables/equations, also, will benefit efforts to attract forest industry to Alaska.

Key Words: Mensuration and inventory

INDIVIDUAL TREE VOLUME EQUATIONS: WHITE SPRUCE

Date Revised: March 2005

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources: Divisions of Forestry and Mining, Land, and Water, Northern Region and Southcentral Region; University of Alaska Statewide Lands; USDI Bureau of Land Management; USDI Fish and Wildlife Service Kenai National Wildlife Refuge; US Department of Defense Elmendorf Air Force Base, Fort Greely, Fort Richardson; Fairbanks-North Star Borough; Kenai Peninsula Borough; Mat/Su Borough; Delta School District; Ahtna, Inc; CIRI; Chitina Village Corporation; Ninilchik Village Corporation; Salamatof Village Corporation; Tetlin Village Corporation; Togotthele Village Corporation; Alyeska Pipe Line Company; Delta Baptist Church.

Project Description: Numerous volume tables/equations (statewide and local) exist for white spruce in Alaska; significant differences occur among them. No equations are available addressing taper, bole cambial area, or bole biomass. Objective: Develop statewide or regional cubic-foot volume, taper, cambial area, and biomass tables/equations for Alaskan white spruce. For a robust sample, use standardized procedure for range of tree sizes: measure diameter at 4-foot intervals from 6-inch stump to top of 4-foot sections and, then, the top. Regression is used to develop the equations. To date, 2,024 trees have been sampled. Bark thickness equations addressed and additional sampling to be completed in spring 2005. Objective is to develop one volume equation for Alaska. Basis for T. Malone M.Sc. thesis (expected completion Dec 2005).

Project Site Location(s): Throughout interior and southcentral Alaska.

Relevance to Forest Management: Improved equations will contribute to better management practices including fiber volume estimates for sales, determining mean annual increment annual allowable cuts, stand prescriptions and management options, wildlife habitat manipulation, and ecological modeling. Sample size is sufficient to determine if regional adjustments are necessary. Accurate tables/equations, also, will benefit efforts to attract forest industry to Alaska.

Key Words: Mensuration and inventory

WILDLIFE

ASPEN REGENERATION FOR WILDLIFE HABITAT

Date Revised: 19 December 2003

Project Status: Ongoing

Contact Person or Agency: Tom Paragi (907-459-7327, Tom_Paragi@fishgame.state.ak.us) and Dale Haggstrom (459-7259, Dale_Haggstrom@fishgame.state.ak.us), Alaska Department of Fish and Game, Division of Wildlife Conservation,1300 College Road, Fairbanks, Alaska 99701.

Cooperators: Alaska Bird Observatory; Alaska Department of Natural Resources, Division of Forestry; Ruffed Grouse Society; University of Alaska-Fairbanks, Department of Biology and Wildlife.

Project Description: In 1999 we began documenting effectiveness and cost of regenerating aspen stands for wildlife habitat in the absence of fiber harvest. Chain saw felling, dozer shearblading, and prescribed fire have been applied during dormancy on 5-45 acre sites since 1996, and the sprouting response was measured after two growing seasons (goal: $\geq$12,500 stems/ac for grouse cover and herbivore browse). Response covariates are debris loading and soil temperature for mechanical treatments and proportional mortality to mature trees and terrain parameters for fire. An associated survey of songbird habitat selection was conducted at Nenana Ridge in 2002 and 2003. Debris loading on mechanical treatments reduces soil temperature and sprouting response, and future studies will address potential negative effects of debris on wildlife (hinders access and may increase predation risk for grouse chicks). Permanent 1x5 m plots will be revisited every 5 years for stem counts and growth parameters.

Project Site Locations:
Nenana Ridge (chain saw felling on 430 ac and prescribed fire on 67 ac, 30 miles SW of Fairbanks)
Two Rivers (chain saw felling on 42 ac, 20 miles E of Fairbanks)
Heritage Forest (dozer shearblading on 78 ac, 6 miles N of North Pole)
Delta Bison Range (dozer shearblading and windrowing on 150 ac, 20 miles SE of Delta Junction)

Relevance to Forest Management: Maintaining a mixture of age classes in quaking aspen provides forage and cover for many species of wildlife. Broadleaf forest also provides much lower risk of spreading intense crown fires than coniferous forest, thus is useful in fire management near the wildland-urban interface. Until a market develops for aspen fiber, forest and wildlife managers will be challenged to maintain vigorous condition in existing clones that were spread and maintained by wildland fire. Our studies will also provide forest managers in the Interior with practical knowledge of site treatments for optimizing biomass production should a market develop for aspen fiber.

Key Words: Prescribed fire, felling, shearblading, wildlife, aspen

DISTRIBUTION AND ABUNDANCE OF LANDBIRDS IN THE TANANA VALLEY STATE FOREST, ALASKA 2002-2003

Date Revised: 30 September 2005

Project Status: Completed

Contact Person or Agency: Susan Sharbaugh, Alaska Bird Observatory, P.O. Box 80805, Fairbanks, AK 99708, phone 907-451-7159, ssharbaugh@alaskabird.org

Cooperators: Alaska Department of Fish and Game, Division of Wildlife Conservation

Project Description: The distribution, abundance, and habitat associations of breeding passerine birds was sampled during June at four sites. Randomly-selected points (n = 426 in 2002 and 421 in 2003) were chosen within habitat strata, birds were identified by sight or vocalization at points, and vegetation was characterized within a 50-m radius. Researchers detected 57 species composed of 4130 individuals at three spruce sites and 1846 individuals at two aspen sites (control and treatment). Mean bird abundance and mean species diversity were higher in treatment sites than in control sites for aspen forest in 2002 but not in 2003. The bird community in white spruce forest had more individuals and greater species diversity than in aspen forest. Within spruce forest types, both abundance and diversity were highest in older and mature-mixed stands and in mature spruce-dominated stands. Logistic regression models identified site characteristics associated with presence of Townsend's warblers and varied thrushes.

Project Site Locations:
Nenana Ridge (aspen management: chain saw felling on 430 ac and prescribed fire on 67 ac, 30 miles SW of Fairbanks)
West Site (spruce harvest on both sides of Parks Highway, 25 miles SW of Fairbanks)
Rosie Creek (spruce salvage after 1983 fire, 18 miles SW of Fairbanks
Bonanza Creek (limited spruce harvest near research site, 20 miles SW of Fairbanks)

Relevance to Forest Management: Although site- and stand-scale characteristics influence habitat selection by wildlife, long-distance migrants additionally respond to landscape-scale changes in forests. Thus, the spatial pattern and timing of forest management can influence the number of bird species and their abundance in a given area. These community-level surveys provided a baseline inventory in mature spruce and initial response to aspen regeneration from which to monitor future changes in species diversity as forest development occurs. Surveys of bird communities also begin to define habitat requirements for individual species (e.g., Townsend's warbler, varied thrush) in parts of their range where life history is poorly understood.

Key Words: Aspen, paper birch, white spruce, biodiversity, wildlife

GROUSE HABITAT IMPROVEMENT ON MAT-SU VALLEY MOOSE RANGE

Date Revised: 19 December 2003

Project Status: Ongoing

Contact Person or Agency: Tony Kavalok, Alaska Dept. Fish and Game, Palmer 907-746-6325.

Cooperators: Ruffed Grouse Society; Alaska Dept. Natural Resources, Division of Forestry.

Project Description: We will contract felling of 50-100 acres of aspen annually to promote regeneration of aspen stands for wildlife cover and food and stand health. Age diversity afforded by forest regeneration will benefit grouse, moose, and other wildlife species associated with these stands.

Project Site Location: Matanuska Valley Moose Range (between Hatcher Pass and Glenn Highway above Chickaloon).

Relevance to Forest Management: Treatments will improve stand health and allow forest regeneration in the absence of traditional timber harvest and naturally occurring wildfires.

Key Words: Aspen, moose

LANDSCAPE-SCALE PRESCRIBED FIRE FOR WILDLIFE HABITAT

Date Revised: 19 December 2003

Project Status: Ongoing

Contact Person or Agency: Tom Paragi (907-459-7327, Tom_Paragi@fishgame.state.ak.us) and Dale Haggstrom (459-7259, Dale_Haggstrom@fishgame.state.ak.us), Alaska Department of Fish and Game, Division of Wildlife Conservation, 1300 College Road, Fairbanks, Alaska 99701.

Cooperators: Alaska Department of Natural Resources, Division of Forestry; University of Alaska-Fairbanks, Department of Forest Sciences.

Project Description: We are evaluating the efficacy of using aerial ignition for landscape-scale prescribed fires to restore shrubs and young broadleaf stands typical of early-successional wildlife habitat in boreal forest. Our objectives within the burned area were ≥50% mortality of trees and spatially-varying burn severity to promote regeneration by root or crown sprouting and by seed germination on mineral soil. We are conducting change detection on the East Fork prescribed burn and comparing costs of aerial photography to high-resolution satellite imagery. Color infrared photos from 1981/1983 (1:63,360-scale) and 2002 (1:12, 670-scale) were digitized and geo-referenced to a 2002 Quickbird image (2.6 m multispectral / 0.6 m panchromatic). Ground truthing of the classification is underway in 2003, and we will incorporate a digital elevation model to examine change in vegetation type with respect to slope,aspect, and elevation.

Project Site Location:

East Fork, Dennison Fork, Fortymile River, centered 40 miles NE of Tok (52,000 ac, 21 July 1998)

Other prescribed burns accomplished or planned:

Mosquito Flats, centered 35 miles N of Tok (6,760 ac, 12-13 May 1999)
Kechumstuk Creek, centered 50 miles N of Tok (30,780 ac, 3 August 1999)
Robertson River, centered 15 miles S of Dot Lake (planned)
Western Tanana Flats, centered 25 miles SE of Nenana (planned)

Relevance to Forest Management: Suppression of wildland fire in the 20th Century has had a noticeable effect on the distribution and composition of wildlife habitat in parts of interior Alaska. Landscape-scale prescribed burns have been conducted for <$1/acre because fixed costs of the small crews used in aerial ignition can be spread over large treatment areas. Aside from rejuvenation of shrubs and broadleaf forest for wildlife habitat, large fires reduce continuity of conifer fuels, thus future short-term risk of intense crown fires. Knowledge of how fire prescriptions produce desired vegetation changes will improve future planning of prescribed burns to meet specific resource objectives.

Key Words: Prescribed fire, aerial ignition, wildlife, classification, change detection

POST-LOGGING SITE TREATMENTS FOR WILDLIFE HABITAT IN FLOODPLAIN WHITE SPRUCE

Date Revised: 19 December 2003

Project Status: Ongoing

Contact Person or Agency: Tom Paragi (907-459-7327, Tom_Paragi@fishgame.state.ak.us) and Dale Haggstrom (459-7259, Dale_Haggstrom@fishgame.state.ak.us), Alaska Department of Fish and Game, Division of Wildlife Conservation, 1300 College Road, Fairbanks, Alaska 99701.

Cooperators: Alaska Bird Observatory; Alaska Department of Natural Resources, Division of Forestry; Tetlin National Wildlife Refuge; University of Alaska-Fairbanks, Department of Biology and Wildlife.

Project Description: We are evaluating the efficacy of blade scarification, disk trenching, and broadcast burning to regenerate shrubs and broadleaf forest following white spruce harvest in the floodplain of the Tok River (projected start of harvest: winter 2003-04). Twelve cutblocks of 11-29 ha were chosen for a randomized block design. Baseline data on stem counts of woody deciduous species, depth of active layer, and horizontal and vertical cover were collected on permanent plots in 2000. Counts of moose pellet groups and furbearer tracks have been done annually to index habitat use. An associated survey of songbird habitat selection was conducted during 2000 and 2001, and small mammal trapping will begin in 2004. Snags and cavity trees were paint-marked for retention as habitat on the entire sale area; those standing in study cutblocks following the timber sale will be marked for a persistence study. Oblique aerial photographs were taken during snow-free and winter periods for tracking visual changes in forest appearance.

Project Site Location: The proposed 880-acre timber sale (NC-837-T) composed of 51 cutblocks is about 15 miles south of Tok in Management Unit 14 of the Tanana Valley State Forest. The 12 study cutblocks are centered east of the Tok Cutoff highway across from the ADNR Clearwater Campground.

Relevance to Forest Management: Wildland fire and flooding are the primary disturbances from which boreal forest regenerates. Timber harvest is often conducted during winter in the Interior because of access across frozen surfaces, but machinery scarification is limited, especially if snow is deep. Natural regeneration after winter harvest is a challenge on sites where the organic soil layer and ground moss is thick or bluejoint grass (*Calamagrostis canadensis*) becomes a prolific competitor. Our study will examine how a harvest of white spruce $\geq$9 inches dbh and subsequent site treatments to expose mineral soil for seed germination influences secondary succession and vegetative response in floodplain forest.

Key Words: Scarification, prescribed fire, wildlife, grass, white spruce; silviculture

SCARIFICATION TO REGENERATE UPLAND BROADLEAF FOREST FOR WILDLIFE HABITAT

Date Revised: 19 December 2003

Project Status: Ongoing

Contact Person or Agency: Tom Paragi (907-459-7327, Tom_Paragi@fishgame.state.ak.us) and Dale Haggstrom (459-7259, Dale_Haggstrom@fishgame.state.ak.us), Alaska Department of Fish and Game, Division of Wildlife Conservation, 1300 College Road, Fairbanks, Alaska 99701.

Cooperator: Alaska Department of Natural Resources, Division of Forestry.

Project Description: We are evaluating the efficacy of blade scarification and disk trenching to regenerate shrubs and young broadleaf forest for wildlife habitat. Experiments are underway on harvested cutblocks and within unharvested upland forest of low conifer stocking, particularly where grass or alder have dominated the understory. Treatments were done in late summer or early autumn, when forbs and gramminoids are senescing, to expose mineral soil for birch seedfall over autumn and winter and willow seedfall the following spring and summer. Ten permanent plots per site (more where appropriate covariates are found) will be established for an initial seedling count after 2 growing seasons, followed by revisits every 5th year for density estimates.

Project Site Locations: All sites are timber sales in the Tanana Valley State Forest:

Standard Creek, centered 40 miles W of Fairbanks (37 ac, white spruce-paper birch-alder stand, [never harvested], scarified 2002)
Nenana Ridge, centered 30 miles W of Fairbanks (12 ac, paper birch harvested 1991, scarified 2003)
Gerstle, east of Delta (25 ac, white spruce harvested 1997-98, scarified 2002)

Relevance to Forest Management: Timber harvest is often conducted for fuelwood (various species) and conifer sawlogs during winter in the Interior because of access across frozen surfaces, but machinery scarification is limited, especially if snow is deep. Natural regeneration after winter harvest is a challenge on sites where the organic soil layer and ground moss is thick or bluejoint grass (*Calamagrostis canadensis*) becomes a prolific competitor. Our study will examine how scarification influences secondary succession of broadleaf and conifer species on upland forest.

Key Words: Blade scarification, disk trenching, paper birch, willow, grass, alder, silviculture

SILVICULTURAL SYSTEM FOR ASPEN MOOSE BROWSE PRODUCTION

Date submitted: March 2005

Project Status: New

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks, (907) 474-5070, ffecp@uaf.edu.

Cooperators: Alaska Department of Natural Resources, Division of Forestry, Fairbanks Area; Tom Paragi, Alaska Department of Fish and Game, Fairbanks.

Project Description: The aspen forest cover type in Alaska provides many management opportunities: fiber, wildlife habitat, firebreaks. Specific age classes provide different habitat conditions for wildlife; young aspen stands provide ruffed grouse and moose habitat. The objective of the study was to determine if clear-felled, 2 and 4-year old clearcut aspen stands without mature stem removal provide readily available browse for moose. Amount of suckers, current annual growth biomass, and utilization of browse; the effect of distance from mature stand edge analyzed; and relation of leader diameter to current annual growth biomass determined. Basis for T. Nicholls' M. Sc. Thesis (completion May 2005).

Project Site Location: Nenana Ridge, west of Fairbanks, Tanana Valley State Forest.

Relevance to Forest Management: Preliminary results suggest that 1) clear-felling without removal of cut stems does not negatively impact availability of browse; 2) browse utilization decreases from mature stand edge to 75 m (250 feet) into the clearcut; 3) felled stems do not decrease number of suckers below desired wildlife targets; 4) current annual growth biomass of the two age classes are similar (approximately 800 kg/ha [706 lbs/acre]); and 5) diameter of current year leader at bud-scale scar is a reasonable predictor of individual stem current annual growth biomass—a more efficient method of estimating stem biomass. Clearcutting to produce and even-aged coppice stand without removing the harvested stems is an effective silvicultural system for producing moose browse and ruffed grouse habitat.

Key Words: Aspen, coppice, clearcut, browse, wildlife habitat, moose, ruffed grouse

TIPS ON MAINTAINING WILDLIFE HABITAT IN BOREAL FOREST OF ALASKA

Date Revised: 18 February 2004

Project Status: Ongoing

Contact Person or Agency: Tom Paragi (907-459-7327, Tom_Paragi@fishgame.state.ak.us), Alaska Department of Fish and Game, Division of Wildlife Conservation, 1300 College Road, Fairbanks, Alaska 99701.

Cooperators: Alaska Department of Natural Resources, Division of Forestry; Tanana Chiefs Conference, Forestry Program.

Project Description: A brief handbook for contractors is being developed to explain and illustrate practices that foresters may recommend or require for wildlife habitat during timber harvest or post-logging site treatments in boreal forest of interior Alaska. Practices are distinguished by whether they influence early-seral or late-seral habitat. Most early-seral practices involve improvement of site condition (soil temperature, germination medium, reduced competition for resources) to enhance regeneration of deciduous woody vegetation. Maintenance of late-seral features in managed forest often focuses on retention of large woody debris, snags, and cavity trees. The handbook will be updated periodically as more is learned about how specific forest practices influence bird and mammal populations. A literature review of the ecological principles used in producing this guide is also being developed for resource professionals.

Project Site Locations: N/A

Relevance to Forest Management: Modification of forest practices can improve habitat conditions. Often these practices require little or no extra work or financial burden on contractors, but they may require marking of retention features to train field crews. One example is identification of a common heartwood defect in white spruce (red ring rot / white pocket rot) from external “punk knots.” Provided that it does not pose a safety risk to workers, leaving a defect tree that has low value as dimensional lumber will save the contractor time and money and maintain a potential cavity tree for wildlife in the stand.

Key words: forest practices, habitat, wildlife

WILLOW REGENERATION FOR WILDLIFE HABITAT

Date Revised: 19 December 2003

Project Status: Ongoing

Contact Person or Agency: Tom Paragi (907-459-7327, Tom_Paragi@fishgame.state.ak.us) and Dale Haggstrom (459-7259, Dale_Haggstrom@fishgame.state.ak.us), Alaska Department of Fish and Game, Division of Wildlife Conservation, 1300 College Road, Fairbanks, Alaska 99701.

Cooperators: Alaska Department of Natural Resources, Division of Forestry; Safari Club International.

Project Description: The ADF&G has experimented with the use of dozers to enhance floodplain willows since the early 1980s. Willows (primarily feltleaf willow [*Salix alaxensis*], redstem willow [*S. arbusculoides*], and Bebb [*S. bebbiana*]) were crushed during late winter to stimulate crown and stem sprouting in mature stands. ADF&G also worked with ADNR Division of Forestry at Standard Creek near Fairbanks to plant feltleaf cuttings during summer on upland sites during the late 1990s following white spruce harvest. Prescribed fire was also used to prepare the harvested timber sale that was planted in 1997 and 1998. ADF&G and university cooperators have done quantitative evaluations of the Tok River crushing site for stem production, and both the Tok River and Goldstream Creek crushing sites for winter use by moose (pellet group counts, forage nutritional quality). The ADF&G has estimated initial survival rates within permanent plots on the planted stems at Standard Creek.

Project Site Locations:
Tok River (dozer crushing on approx. 1,850 ac, 20 miles S of Tok, 1982–1986 and 1998)
Goldstream Creek (dozer crushing on 290 ac, 5 miles NW of Fairbanks, 1996)
Heritage Forest (dozer crushing on 111 ac, 5 miles E of Fairbanks, 1997)
Standard Creek (planting of feltleaf cuttings on approx. 40 ac, 15 miles SW of Fairbanks, 1995–1998)

Relevance to Forest Management: Stands of willows provide forage and cover for many species of wildlife but are especially beneficial as winter forage for moose. Maintaining willows near the urban interface also reduces the risk of spreading wildland fires near homes in forested environments. Willow is the main cultivated feedstock for biofuels in Sweden because of its high yield from coppice, low nutrient requirements, and ease in mechanical harvest. Our study sites provide the opportunity to examine growth rates for biomass production should a market develop for willow fiber.

Key Words: Willow, cuttings, silviculture, wildlife

WOOD PRODUCTS TESTING AND MARKETING

AN EVALUATION OF THE RETAIL MARKET POTENTIAL FOR LOCALLY PRODUCED PAPER BIRCH LUMBER IN ALASKA

Date submitted: 27 May 2005

Project Status: Completed

Contact Person or Agency: David L. Nicholls, Forest Products Technologist, USDA Forest Service, Pacific Northwest Research Station, Wood Utilization Center, 204 Siginaka Way, Sitka, AK 99835, phone—(907) 747-4312, FAX—(907) 747-4294, dlnicholls@fs.fed.us, web page: http://www.fs.fed.us/pnw/sitka.

Cooperators: None

Project Description: In recent years, several hardwood sawmills in Alaska have purchased dry kilns and are now actively drying lumber. This study evaluated the retail market potential for random width, kiln-dried, birch lumber in Alaska. Information was obtained from diverse sources, including retail lumber managers, birch lumber producers, and secondary processors. Results indicate generally favorable potential for Alaska birch lumber sold within local markets. Key issues that were identified include:

1) The ability of lumber producers (i.e. sawmills) to secure dependable log supplies;
2) Consistent moisture content control and dimensional stability of kiln-dried lumber;
3) Appearance features that could influence consumer preferences for lumber products, including the presence of heart stain, knots, bark pockets, and other character features;
4) Finding suitable selling arrangements (and consistent supply) between relatively small lumber producers and larger retailers.

Project Site Location(s): Research conducted through the Wood Utilization Center (Sitka, AK). Site visits and interviews conducted in Anchorage (including Mat-Su valley), Fairbanks, and the Kenai peninsula.

Relevance to Forest Management: This research area explores utilization of Alaska birch resources for a variety of non-timber and solid wood products, including lumber, kitchen cabinets, and craft products. Studies have focused on efficient sawmill practices, marketing options for small businesses, and consumer preferences. Our work is relevant to forest management in that it helps landowners and wood products manufacturers evaluate options for recovering value from birch resources removed through scheduled harvests, thinnings, land clearings, and/ or hazardous fuel removals.

Key Words: Paper birch, economics, non-wood forest products, forest ecology, fire, forest health, land use

ALASKA BIRCH CRAFT AND GIFT SURVEY—AN EVALUATION OF MARKETING PRACTICES AND FIRM DEMOGRAPHICS

Date submitted: 27 May 2005

Project Status: Completed

Contact Person or Agency: David L. Nicholls, Forest Products Technologist, USDA Forest Service, Pacific Northwest Research Station, Wood Utilization Center, 204 Siginaka Way, Sitka, AK 99835, phone—(907) 747-4312, FAX—(907) 747-4294, dlnicholls@fs.fed.us, web page: http://www.fs.fed.us/pnw/sitka.

Cooperators: Rose Braden, University of Washington, Center for International Trade in Forest Products (CINTRAFOR).

Project Description: The birch gift and craft industry in Alaska has a strong potential to create high value products while utilizing non-timber components, waste materials, and/or low value lumber from primary processors. A wide range of products are being created by more than 100 firms in Alaska, and include turned bowls, cutting boards, utensils, decorative items, and bark products. By studying the current marketing practices of craft firms in Alaska we provide insights into the future direction of this industry.

Project Site Location(s): Surveys conducted through the Wood Utilization Center (Sitka, AK), by staff at the University of Washington / CINTRAFOR (Seattle, WA).

Relevance to Forest Management: This research area explores utilization of Alaska birch resources for a variety of non-timber and solid wood products, including lumber, kitchen cabinets, and craft products. Studies have focused on efficient sawmill practices, marketing options for small businesses, and consumer preferences. Our work is relevant to forest management in that it helps landowners and wood products manufacturers evaluate options for recovering value from birch resources removed through scheduled harvests, thinnings, land clearings, and/ or hazardous fuel removals.

Key Words: Paper birch, economics, non-wood forest products, forest ecology, fire, forest health, land use

EVALUATING THE POTENTIAL FOR INCREASED GRADE RECOVERY OF ALASKA BIRCH LUMBER

Date submitted: 27 May 2005

Project Status: Completed

Contact Person or Agency: David L. Nicholls, Forest Products Technologist, USDA Forest Service, Pacific Northwest Research Station, Wood Utilization Center, 204 Siginaka Way, Sitka, AK 99835, phone—(907) 747-4312, FAX—(907) 747-4294, dlnicholls@fs.fed.us, web page: http://www.fs.fed.us/pnw/sitka.

Cooperators: Ken Kilborn (retired) and Travis Allen (former intern), USDA Forest Service, Pacific Northwest Research Station, Wood Utilization Center, Sitka, AK.

Project Description: Portable band sawmills are common in Alaska as they are well suited for processing small amounts of lumber. However accurate positioning and rotating logs is often difficult to achieve, resulting in losses in sawing efficiency and product value. This study compared 2 sawing techniques (live sawing and grade sawing) to evaluate which would be most appropriate for Alaska's birch sawmills. Sixty-one birch logs were graded and then processed at a sawmill in Fairbanks, AK. Average lumber value for live sawing was $403 per thousand board feet (MBF), while average value for grade sawing was $445 per MBF. The higher lumber grades showed the greatest change in product value between sawing methods.

Project Site Location(s): Research conducted through the Wood Utilization Center (Sitka, AK). Sawmill study conducted in Fairbanks, Alaska.

Relevance to Forest Management: This research area explores utilization of Alaska birch resources for a variety of non-timber and solid wood products, including lumber, kitchen cabinets, and craft products. Studies have focused on efficient sawmill practices, marketing options for small businesses, and consumer preferences. Our work is relevant to forest management in that it helps landowners and wood products manufacturers evaluate options for recovering value from birch resources removed through scheduled harvests, thinnings, land clearings, and/ or hazardous fuel removals.

Key Words: Paper birch, economics, non-wood forest products, forest ecology, fire, forest health, land use

INVESTIGATING THE POTENTIAL FOR DEVELOPING ALTERNATE GRADING RULES FOR ALASKA BIRCH

Date submitted: 27 May 2005

Project Status: Completed

Contact Person or Agency: David L. Nicholls, Forest Products Technologist, USDA Forest Service, Pacific Northwest Research Station, Wood Utilization Center, 204 Siginaka Way, Sitka, AK 99835, phone—(907) 747-4312, FAX—(907) 747-4294, dlnicholls@fs.fed.us, web page: http://www.fs.fed.us/pnw/sitka.

Cooperators: None

Project Description: Alaska birch lumber is often characterized by small knots and other character defects that can reduce value when lumber is graded by standard hardwood rules. Recent market research in Alaska has shown that consumers are willing to accept some degree of defect in birch lumber. This research considers developing an alternative grading rule for birch lumber, in which small defects (less than 0.5 inches in diameter) are not considered to reduce lumber grade and value. It was found that significant increases in lumber value (an average of $138 per thousand board feet of lumber) were possible under the alternate grading rule.

Project Site Location(s): Research conducted through the Wood Utilization Center (Sitka, AK).

Relevance to Forest Management: This research area explores utilization of Alaska birch resources for a variety of non-timber and solid wood products, including lumber, kitchen cabinets, and craft products. Studies have focused on efficient sawmill practices, marketing options for small businesses, and consumer preferences. Our work is relevant to forest management in that it helps landowners and wood products manufacturers evaluate options for recovering value from birch resources removed through scheduled harvests, thinnings, land clearings, and/ or hazardous fuel removals.

Key Words: Paper birch, economics, non-wood forest products, forest ecology, fire, forest health, land use

KITCHEN CABINETS FROM ALASKA BIRCH—CONSUMERS PREFERENCES FOR CHARACTER-MARKED WOOD

Date submitted: 27 May 2005

Project Status: Completed

Contact Person or Agency: David L. Nicholls, Forest Products Technologist, USDA Forest Service, Pacific Northwest Research Station, Wood Utilization Center, 204 Siginaka Way, Sitka, AK 99835, phone—(907) 747-4312, FAX—(907) 747-4294, dlnicholls@fs.fed.us, web page: http://www.fs.fed.us/pnw/sitka.

Cooperators: Geof Donovan, USDA Forest Service, Pacific Northwest Research Station, Portland, OR.

Project Description: Potential market opportunities for birch products are numerous, however birch lumber is often characterized by knots, heart stain, and other defects. This study evaluated consumer preferences for 2 groups of kitchen cabinet doors produced from Alaska birch lumber. It was found that there is generally a strong potential for use of character-marked material, and high levels of grain variation, bark pockets, and knots were appealing to consumers. Consumer preferences for cabinet styles differed between Anchorage and Fairbanks markets.

Project Site Location(s): Research conducted through the Wood Utilization Center (Sitka, AK)

Relevance to Forest Management: This research area explores utilization of Alaska birch resources for a variety of non-timber and solid wood products, including lumber, kitchen cabinets, and craft products. Studies have focused on efficient sawmill practices, marketing options for small businesses, and consumer preferences. Our work is relevant to forest management in that it helps landowners and wood products manufacturers evaluate options for recovering value from birch resources removed through scheduled harvests, thinnings, land clearings, and/or hazardous fuel removals.

Key Words: Paper birch, economics, non-wood forest products, forest ecology, fire, forest health, land use

MISCELLANEOUS

ALASKA COMMUNITY FORESTRY PROGRAM

Date Revised: 12 April 2005

Project Status: Ongoing

Contact Person or Agency: Alaska Division of Forestry, 550 W. 7th Ave, Suite 1450, Anchorage, AK, 99501-3566; Patricia Joyner, Education Coordinator-Patricia_Joyner@dnr.state.ak.us; (907)269-8465.

Cooperators: Alaska Community Forest Council (advisory); U.S.D.A. Forest Service, State & Private Forestry (program direction, funding and support); National Arbor Day Foundation (recognition); Cooperative Extension Service; local governments.

Project Description: Community, or urban forestry is the management of forests and related natural resources in communities. The community forestry program assists local government and communities establish programs to care for their valuable natural resources by: (1) Providing program development grants to establish sound management systems for the natural resources within Alaskan communities; (2) Fostering partnerships between government, business, non-profits and volunteers to promote community forestry; (3) Providing information, training and technical assistance to local government, tree care professionals and volunteers; (4) Encouraging and supports projects within communities that demonstrate good arboricultural and community forestry practices; (5) Administering federally funded grants for pilot programs, research projects and demonstrations that support the program objectives; and (6) Encouraging the private sector to support and fund community forestry projects.

Project Site Location(s): Five communities have received grants to develop community forest programs: Fairbanks, Homer, Juneau, Sitka and Wasilla.

Relevance to Forest Management: The mission of the Alaska Community Forestry Program is to ***help communities build effective, self-sustaining urban forestry programs with strong local support.*** This grant program is intended to help communities that are just starting development of community forestry programs at the local government level or communities that have received previous program initiation grants to implement a local community forestry program. Grant funds may be requested to: (1) revise and update public tree inventories and management plans; (2) implement management plans and annual work plans; (3) provide training for local government and private tree care workers; (4) provide educational opportunities for the public; (5) support local nonprofit community forestry organizations; and (6) develop interpretive programs, demonstration sites, or publications

Key Words: Alaska urban forestry; Alaska community forestry; Alaska arboriculture; Alaska certified arborists; Alaska Community Forest Council; Tree City USA; Tree Line USA

ALASKA DIVISION OF FORESTRY GIS DATABASE ARCHIVE

Date Revised: 12 April 2005

Project Status: Ongoing

Contact Person or Agency: Gordon Worum; Alaska Division of Forestry, Northern Region; (907) 451-2671; gordon_worum@dnr.state.ak.us.

Cooperators: Tanana Chiefs Conference Forestry Program, University of Alaska Fairbanks, Fairbanks North Star Borough, Golden Valley Electric Association, Alaska Department of Environmental Conservation, Alaska Department of Transportation and Public Facilities, Alaska Department of Fish and Game.

Project Description: The geographic information system (GIS) database consists of overlays, or layers, of natural and man-made features, developments and disturbances in the Tanana Valley. The GIS data is based on field measurements and other collections of data from the Division of Forestry's aerial photos and satellite imagery, and well as some data acquired from other cooperators and sources, both public and private. Much of the data have been created in collaboration with other partners and cooperators. The Division is in the process of developing an ARCIMS site so the information can be viewed by both DNR employees, other agencies, and the public.

Project Site Location(s): The data are at the Division of Forestry's Northern Region Office in Fairbanks.

Relevance to Forest Management: The archive provides the basis for making maps and other data for use by foresters, wildland fire managers, and other land and resource managers so they can make informed decisions and visually demonstrate to the public and other interested parties the results of a management decision, or expected outcome of a proposal.

Key Words: Mensuration and inventories—inventories of forest resources, surveying and mapping, remote sensing; management and policy—management plans and planning, administration of forest enterprises, forest ownership, forest policy, information services

FOREST VEGETATION SIMULATOR (FVS) AND STAND VISUALIZATION SIMULATOR (SVS) AND GROWTH AND YIELD MODELS

Date Revised: January 2004

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu, or John D. Shaw, Ph.D., Certified Forester, USDA Forest Service Rocky Mountain Research Station, Ogden, UT.

Cooperators: Alaska Department of Natural Resources Division of Forestry Northern Region; Tanana Chiefs Conference.

Project Description: Forest growth and yield models are used to forecast stand development and management options throughout North America. No management models exist for Northern Forest stands in Alaska. A review of existing models indicates that the USDA Forest Service FVS coupled with SVS is an excellent basic model that provides both quantitative and visual models of stand treatments. No variant for Alaska's Northern Forest exists. Objective: Obtain necessary data and develop a Northern Forest variant with the USDA Forest Service. Funding is needed for USDA Forest Service participation.

Project Site Location(s): Throughout Alaska's Northern Forest (interior and southcentral).

Relevance to Forest Management: FVS and SVS model current and potential stand conditions following various treatment options in both a quantitative and visual format. This permits comparison of treatments and the selection of the best for the intended objectives. FVS and SVS provide proposed treatment results in a format easily understood by professional land managers and owners and the general public. The models should improve stand management prescriptions, reduce prescription failures, and improve communications among professionals and the public.

Key Words: Silviculture, mensuration and inventory

LODGEPOLE PINE INTRODUCTION IN ALASKA

Date Revised: 12 February 2004

Project Status: Ongoing

Contact Person or Agency: Glenn P. Juday, Forest Sciences, School of Natural Resources and Agricultural Sciences, University of Alaska Fairbanks, Fairbanks, AK 99775-7200, ffgpj@uaf.edu.

Cooperators: Alina Cushing, John Alden

Project Description: This project involves a multidisciplinary consideration of lodgepole pine plantations in Alaska and other northern countries. Plantations at Glenallen and Samuels Farm outside Delta were remeasured. In general, mortality from snowshoe hare was less than initially estimated at Glenallen, and growth at Delta and Fairbanks continued at high levels in recent years. A complete, updated database will be maintained at the Bonanza Creek LTER. Interviews of key people involved in decisions about the introduction of lodgepole pine in Iceland and Sweden were conducted and transcribed in July, August, and September, 2003. Seventeen interviews were carried out in Iceland, and nine in Sweden. In general, few reservations were expressed about lodgepole pine in Iceland, but both support and opposition were expressed in Sweden. Tree-ring analyses shows lodgepole pine registers climate sensitivity in Iceland and Alaska, but not Sweden, and grows in Alaska from 2 to 4 mm annually.

Project Site Location(s): Fairbanks

Relevance to Forest Management: Initial introduction of lodgepole pine into Alaska was in the mid 1970s to mid 1980s. Publications documented the performance of plantations in the first 10 to 15 years. While early growth and survival of the better provenances was promising, some of the older plantations have now reached the stage of closed canopy and full tree form, and remeasurement will give a realistic measure of early commercial growth potential. Data are being put into accessible, permanent archive files. This study addresses the range of factors influencing policy for the species, including performance, risks, attitudes, and experience in other northern boreal regions.

Key Words: Lodgepole pine, plantation, growth, introduction, exotic species

MANAGING SMALL DIAMETER FOREST STANDS IN INTERIOR ALASKA: A MODEL-BASED ANALYSIS OF FUELS MITIGATION, WILDLIFE HABITAT ENHANCEMENT, AND FIBER SUPPLY

Date Submitted: 30 September 2005

Project Status: Ongoing

Contact Person or Agency: Scott Rupp, Forest Sciences Department, University of Alaska, Fairbanks, Alaska, 99775, phone 907-474-7535, scott.rupp@uaf.edu; Tom Paragi, Alaska Department of Fish and Game, Division of Wildlife Conservation, 1300 College Road, Fairbanks, Alaska 99701, phone 907-459-7327, tom_paragi@fishgame.state.ak.us.

Cooperators: Alaska Department of Natural Resources, Division of Forestry; USDA Forest Service, Boreal Ecology Cooperative Research Unit

Project Description: In 2005 we began a two year pilot project to modify an existing spatially-explicit model of forest stand dynamics (ALFRESCO) for predicting changes in forest stand type and age class from silvicultural treatments in the greater Fairbanks area. Our goal is to collaborate with fire management and forestry professionals to assess treatments of the appropriate type and scale needed for tactical fire suppression in the wildland urban interface. Facets of the project include modeling fire spread through fuel types and terrain with simulated wind vector; field assessment of site conversion from black spruce to hardwoods following mechanical disturbance; influence of fuel clearing on density of late-seral features (snags, cavity trees); and risk of moose-vehicle collision with respect to proximity of early-seral habitat. The model would serve as a vehicle to assess the potential fiber supply for industry at different output scales and the social acceptability of transportation networks and forest development. Model outputs would provide some of the economic, ecological, and social data of interest to capital investors for three scales of fiber supply (small, moderate, large) over a given period.

Project Site Location: Fairbanks and adjacent communities within 50 km

Relevance to Forest Management: Fire suppression for several decades near Interior communities has increased the proportion of conifer fuels through forest succession. Lack of markets for small diameter trees (black spruce and hardwoods) has hindered forest management that would reduce fire risk for infrastructure and timber and maintain productive young forest for game habitat in accessible areas. Local or export markets for value-added products from fiber may emerge (pharmaceuticals, textiles, methane, ethanol), and solid fuels (including municipal waste) could augment residential and municipal energy needs without the gain of atmospheric carbon associated with fossil fuels. A spatial model for applying forest management near Fairbanks is needed to predict fiber yield and assess strategies for reducing wildland fire risk and enhancing wildlife habitat.

Key Words: black spruce, fire risk, site conversion, wildland-urban interface

NEW CROPS III: CARBON CROPPING POTENTIAL IN THE BOREAL FOREST OF ALASKA

Date Revised: 12 February 2004

Project Status: Ongoing

Contact Person or Agency: Glenn P. Juday, Forest Sciences, School of Natural Resources and Agricultural Sciences, University of Alaska Fairbanks, Fairbanks, AK 99775-7200, ffgpj@uaf.edu.

Cooperators: Valerie Barber, John Yarie and David Valentine (all with University of Alaska Fairbanks Forest Sciences Department) (John Yarie and Dave Valentine are working on their own components, modeling and soils, respectively and will give their own project summaries.)

Project Description: The Agricultural and Forestry Experiment Station Tree-ring Lab has a growing publication record relating the annual radial growth of different tree species in different regions and site types in Alaska to climate. The goal of this research is to (1) perform carbon isotope and density analysis of black spruce wood to confirm the preliminary interpretation of the ring-width/climate results, (2) to examine the climate controls on the 3rd major forest species in boreal Alaska –paper birch, and (3) expand the geographical coverage and add different site types for the tree growth/climate database so that the values are valid across more of Alaska. To date the Tree-ring Lab has developed predictive equations for radial growth of white spruce on over 20 productive commercial upland sites across central Alaska (Barber et al. 2000), 4 black spruce sites, and a few birch sites. In both species some populations grow better with warming and some grow less.

Project Site Location(s): Fairbanks, Delta, Nenana, Tok Bonanza Creek LTER and points in between

Relevance to Forest Management: The boreal forest takes up and stores a significant fraction of human additions of carbon dioxide to the atmosphere. Forest scientists and managers can obtain a net transfer of benefits (payments or offset credits) if they can identify where the uptake occurs, how much occurs, and how forest management actions can sustain or enhance carbon uptake. Carbon uptake in Alaska may be one of the most valuable products in the Alaska boreal forest. Systems of payments or offset credits are emerging, and if Alaska is to benefit it must have an accurate and verifiable system of tracking carbon.

Key Words: Carbon credits, boreal forest, black spruce, white spruce, birch, forest ecology, climate, radial growth, density, isotopes

NORTHERN FOREST TREE SPECIES AND HYBRIDS

Date Revised: March 2005

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu.

Cooperators: J. McBeath, Ph.D., Professor of Biotechnology, Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (black and white spruce hybridization only).

Project Description: Recent taxonomical reviews have changed species for some woody forest tree and shrub species in Alaska. Additionally, limited data and observations suggest that some tree species hybridize. Taxonomic changes and hybridization confuse species identification. A need exists to reconcile species' names and confirm species hybridization. Balsam poplar and western black cottonwood are taxonomically the same species but are now considered subspecies. Tree birch species in Alaska are now *Betula commutata, B. kenaica, B. neoalaskana, and B. papyrifera*. The latter is only found in southeast Alaska. Chemical analyses of bark suggests three species in the Northern Forest, two are B. kenaica and B. neoalaskana; the tird could be B. commutata or a hybrid. Tree birch species have been divided into four species. Black and white spruce can hybridize, but hybrids are rare. Emphasis, initially, is on birch, alder, and spruce. Birch and alder will be addressed using the recent taxonomic literature. White and black spruce hybrid confirmation will use morphological characteristics and DNA analyses. Spruce effort is basis for H. Lingenfelter's B.Sc. thesis (completed spring 2005).

Project Site Location: Throughout Alaska's Northern Forest

Relevance to Forest Management: Clarify species names and variability to minimize confusion and environmental concerns. Establish standardized names.

Key Words: Biology of forest trees, silviculture, genetics and breeding

RE-EVALUATION OF THE WILLOW ISLAND PROJECT

Date Revised: 25 March 2005

Project Status: Ongoing

Contact Person or Agency: Tricia L. Wurtz, USDA Forest Service, Boreal Ecology Cooperative Research Unit, Box 756780, University of Alaska Fairbanks, Fairbanks, AK 99775-6780, 907-474-5994, fftlw@uaf.edu or twurtz@fs.fed.us.

Cooperators: John Zasada, USDA Forest Service

Project Description: Study was begun by John Zasada in 1980 to consider silvicultural alternatives in floodplain white spruce. Compares clearcutting and two levels of partial overstory retention, and compares mechanical scarification with broadcast burning. Several publications have resulted from a variety of different aspects of this study. Our current effort is to complete a re-evaluation, begun in 1999, that focuses on aspects of forest regeneration on the island. We're also documenting the fate of the retained overstory (which despite being called a shelterwood, was never logged off) and the long-term soil temperature trends on the island.

Project Site Location(s): Southwest of Fairbanks, on Tanana River floodplain, adjacent to Bonanza Creek Experimental Forest

Relevance to Forest Management: It is a direct examination of different silvicultural techniques, and so is directly relevant to forest management.

Key Words: Silviculture, forest ecology, white spruce

STAND DENSITY INDICES (SDI)

Date Revised: January 2004

Project Status: Ongoing

Contact Person or Agency: Edmond C. Packee, Ph.D., Certified Forester; Agricultural and Forestry Experiment Station, University of Alaska Fairbanks (UAF), (907) 474-5070, ffecp@uaf.edu, or John D. Shaw, Ph.D., Certified Forester, USDA Forest Service Rocky Mountain Research Station, Ogden, UT

Cooperators: Alaska Department of Natural Resources Division of Forestry Northern Region; Tanana Chiefs Conference.

Project Description: Stand Density Indices (SDI) provide comparative tree stocking information without the need for age or site index; only number of trees per acre and tree diameter at breast height are required. Objective: Develop Reineke's Stand Density Indices for Alaskan forest cover types including pure and mixed species stands and single and multi-aged stands. Literature review documents the methodology for mixed species and multi-aged stands. Have over 12,000 candidate plots from various sources.

Project Site Location(s): Throughout the Northern Forest in Alaska (interior and southcentral). During 2004 will request local managers and landowners to identify fully stocked or overstocked stands in their areas for temporary plot establishment—these are needed to identify/confirm maximum SDI values.

Relevance to Forest Management: SDI values will be used to objectively quantify stand stocking and cost effective management options: spacing and thinning (yes or no, intensity of treatment feasible or desirable), wildlife browse production, understory vegetation management (e.g., aesthetics, screening, berry production, grass control), and long term fuel loading.

Key Words: Silviculture, mensuration and inventory, non-wood forest products, wildlife, biodiversity

STATE AND PRIVATE FORESTRY FOREST MANAGEMENT PROGRAMS

Date Revised: 14 February 2004

Project Status: Ongoing

Contact Person or Agency: USDA Forest Service, State & Private Forestry (S&PF)

Steve Bush—Cooperative Forestry Leader
sbush@fs.fed.us
3301 "C" St., Suite 202
Anchorage, AK 99503
907-743-9451

Cooperators: Alaska Division of Forestry, Alaska Resource Development Council.

Project Description: Two recent aspects of the S&PF Cooperative Forestry program may be of interest to the Alaska Northern Forest cooperators. These are:

Dry Kiln facility grants—Eighteen grants were issued to develop or expand dry kiln facilities to enhance the ability of local mill owners to produce competitive value-added forest products. Locations within the Northern Forestry Cooperative area of these include; Copper Center, Nenana, Fairbanks, North Pole, Delta Junction, Chuathbaluk, Wasilla, Willow.

Non-timber forest product conferences—The first ever Alaska-wide conference for non-timber products was held November 2001 in Anchorage. The intent of this conference was to promote consideration of all potentially commercial aspects of Alaska's forest resources. The proceedings of this conference is available as PNW Station publication (PNW-GTR-579). A second such conference is currently scheduled for April 16-18, 2004 in Sitka, Alaska.

Project Site Location(s): Anchorage and Ketchikan, Alaska.

Relevance to Forest Management: Conferences such as this are one way of promoting consideration of the full developmental aspects of Alaska's forest resources. Perhaps Fairbanks could be the location of a third such conference.

Key Words: Non-wood forest products, non-timber forest products, forest products, economics

TANANA VALLEY FOREST USE SURVEY

Date Revised: 4 February 2004

Project Status: Ongoing

Contact Person or Agency:
Scott Bates
Alaska Boreal Forest Council
PO Box 84530
Fairbanks, Alaska 99708
Phone 907-457-8453
Fax 907-457-5185
Email: scott.abfc@ak.net

Cooperators:
Andriy Boyar, Graduate Student, University of Alaska Fairbanks, School of Management;
Jan Dawe, Alaska Boreal Forest Council;
Pete Fix, University of Alaska Fairbanks, School of Natural Resources and Agricultural Sciences;
Bernardo Hernandez, Community Planning Department, Fairbanks North Star Borough;
Chris Maisch, Division of Forestry, Alaska Department of Natural Resources;
Roselynn Smith, Division of Lands, Department of Natural Resources;
Alaska Conservation Foundation;
AmeriCorps*VISTA Program of Alaska.

Project Description: The Tanana Valley Forest Use Survey (FUS) is creating a database of how households use the natural resources of the watershed in which they live. To date, the survey has been conducted in 2000 and 2003. The FUS is gathering information beyond the hunting, fishing, and large scale commercial uses which is the typical focus of resource agency surveys. The FUS aims to answer at least two important questions: "What activities, in addition to timber harvesting, occur in the forest?" and, "Can current resource use patterns be used to predict future trends?"

Project Site Location(s): The Tanana River Watershed: including sixteen communities from Northway to Manley Hot Springs and south to Healy.

Relevance to Forest Management: The statistically valid information being collected includes an inventory of household activities occurring in and around the forest in its various successional stages. The FUS is intended for use as a tool for land and resource managers to make more fully informed decisions and avoid unnecessary user conflicts.

Key Words: Ecological economics, ecosystem services, economics, forest products, forest use, household activities, land use, management and policy, non-timber forest products, non-wood forest products, resource use inventory, resource use valuation