

April 2005



Project Leader's Report

Ecology and Silviculture of Northern Great Lakes Forests



NC 4101: Ecology and Silviculture of Northern Great Lakes Forests
USDA Forest Service,
North Central
Research Station,
Grand Rapids, MN
55744

Research Unit Update

Welcome! Many of you know us for our long-term research on regeneration and growth and yield of important Lake States timber species, as well as development of management guides for Lake States forests.

While we maintain elements of this research, our program has evolved and focused on areas that better reflect the needs and interests of a diverse group of clients.

Our primary interests are in evaluating forest management practices for effects on ecosystem composition, structure, and function and devising and testing alternative management approaches that maintain or restore ecological integrity, in-



cluding native species diversity and water quality, while maintaining options for wood and fiber production.

Our work encompasses a range of important natural resource issues, including fire risk and fuels, invasive plants, forest biodiversity, riparian management, forest productivity, and ecological forestry.

We use observational data, management experiments, and modeling to accomplish our research objectives.

We work across spatial scales, guided by the premise that we must un-



Forestry Sciences Lab, Grand Rapids MN

derstand stand-scale management effects in a landscape context.

In this newsletter, I want to reacquaint you with our program by highlighting recent efforts related to research, technology transfer, outreach, publications, and more.

Thank you,
Brian Palik,
Project Leader

Inside this issue:

Research Unit Update	1
Hot Topics	1
Featured Research	2
Program Delivery	2
Outreach	2
Pubs/Funding	3
Meetings	3
Personnel	3
News from Cooperators	3
History	4
Research Portfolio	4

Hot Topics/Coming Events

Proceedings of the Great Lakes Silviculture Summit (NC GTR 254): get the latest information on silvicultural research needs for the Great Lakes region. (www.ncrs.fs.fed.us/pubs/)

Managing forests for ecological complexity: September 8-9, 2005, two-day workshop teaching the ba-

sics of managing forests using natural disturbance and stand development principals. Drs. Jerry Franklin, Eric Zenner, Brian Palik instructors.

5th North American Forest Ecology Workshop-Aylmer, Quebec, June 12-16. There will be four Unit presentations by Palik and

cooperators from Ohio State, Iowa State, and the University of Minnesota.

Estimating Riparian Area Extent and Land Use in the Midwest (NC GTR 248): highlights forest and non-forest riparian areas in seven mid-western states. (www.ncrs.fs.fed.us/pubs/)

Featured Research

David Lytle, together with The Nature Conservancy, has been working with public landowners to understand the cumulative impacts of forest management in the Border Lakes region of Minnesota and Canada. Like most forest landscapes, the ownership pattern in the Border Lakes is highly fragmented, with lands managed by industrial and non-industrial private owners intermixed with public lands. Because land owners make man-

agement decisions independently from each other, there are situations in which the actions of adjacent landowners are not compatible with each other. These incompatibilities can limit the ability of all landowners to meet goals related to fuels and fire, species composition, wildlife, recreation opportunities, and aesthetics.

Using computer software that projects the conse-

quences of forest management, David is evaluating how current management impacts the future forests. These simulations allow land owners to identify if their actions meet management goals, and where opportunities exist for cooperation among landowners.

Initial work focused on the 400,000 acre Trout Lake landscape. The group is

expanding its efforts to include the entire 5 million acre Border Lakes region. Partners include the Superior National Forest, the Minnesota DNR, Quetico Provincial Park, Ontario Ministry of Natural Resources, and the Minnesota Forest Resources Council Northeast Landscape Committee. Funding has been provided by the National Fire Plan, TNC, Superior National Forest and the Minnesota Forest Resources Council.

Program Delivery and Technology Transfer

Web-delivered Manager's Guides—Working in collaboration with USFS State and Private Forestry and the University of Minnesota, we are developing a prototype model for internet delivered, interactive forest management guides for the upper Mid-West. The guides will include a wide range of landowner objectives, comprehensive forest health information, and an interactive economics component. A guide for red pine will be featured first.

Revamped Unit Web Site—Coming soon—We are revamping our Unit's web site. Please visit www.ncrs.fs.fed.fs in the near future to get the details of our program.

Riparian Science Technical Committee, Minnesota Forest Resources Council—Brian Palik is member of this team, which meets regularly over 18 months in '04 and '05. The team's charge is to assess and summarize the state of science regarding effects of forest management on riparian

functions. Findings will shape the revision of riparian management guidelines for the state of Minnesota, as well as neighboring states that use MN guidelines as a basis for their own guides.

Developing a Decision Support System for the management of fuels and fire risk—David Lytle is working with colleagues at the University of Missouri-Columbia to develop a computer software tool that will allow forest managers to evaluate strategies for the management of

hazard fuels and mitigation of fire risk in forest landscapes.

Paper birch manager's handbook—We have contracted with John Zasada, retired scientist with NCRS 4101, to produce a manager's handbook for paper birch in the Great Lakes region, with special emphasis on non-timber forest products. John is consulting with the Great Lakes Indian Fish and Wildlife Commission and the Menominee Nation on this effort.

Outreach, Education, and Partnership Building Highlights

Nov 04: Terry Strong and Christel Kern reviewed hardwood management activities for The Nature Conservancy's North Manitowish project.

Dec 04: Christel Kern presented an overview of our research program at a partnership building meeting with the USGS scientific staff, La Crosse WI.

Dec 04 Brian Palik, Dave Lytle, Rick Voldseth, and Christel Kern met with Bill Bergeson, NRRI-UMN to discuss current research activities on forest productivity. We also met with UMN North Central Res. And Outreach Center forestry staff to discuss opportunities for collaboration.

Jan 05: Brian Palik ad-

ressed the Chippewa National Forest Leadership Team on the current status of red pine management experiments on the National Forest.

Feb. 05: Brian Palik met with Cheryl Adams of Blandin UPM to update the status of riparian management experiments and to discuss opportunities for further collaboration.

March 05: Brian Palik met with wetland managers from across MN for a discussion on forest management impacts on small wetlands and waterfowl.

March 05: Rick Voldseth, Dave Lytle, and Brian Palik presented at the 4th Annual Minnesota Forest and Wildlife Research Review.

Publications and Funding

Recent Publications

-Zasada, J., B. Palik, D. Gilmore, and T. Crow. 2004. Emulating natural forest disturbance: applications for silvicultural systems in the northern Great Lakes region of the United States. *Pages 230-242 in Emulating natural forest landscape disturbances: Concepts and Applications*. Perera, A.H., Buse, L. J., and Weber, M. G., (eds.). Columbia University Press, New York, NY.

-Palik, B. and Levy, L. 2004. *Proceedings of the Great Lakes Silviculture Summit*. GTR NC 254. (www.ncrs.fs.fed.us/pubs/)

-Batzer, D. P., B. Palik, and R. Buech. 2004. Relationships between environmental charac-

teristics and macroinvertebrate assemblages in seasonal woodland ponds of Minnesota, U.S.A. *Journal of the North American Benthological Society* 23: 50-68.

Kirkman, L. K., Goebel, P. C., Palik, B., West, L. 2004. Predicting plant species diversity in a longleaf pine landscape. *Ecoscience* 11: 80-93.

Aunan, T., Palik, B., Verry, S. 2005. A GIS Approach for Delineating Variable-Width Riparian Buffers Based on Hydrological Function. Report RR-0105: Minnesota Forest Resources Council. (<http://www.frc.state.mn.us/Info/MFRCdocs.html>)

Seymour, Jim Guldin, and Dave Marshall on an invited presentation on large-scale, long-term silvicultural experiments at the '05 IUFRO World Congress.

Rick Voldseth attended the International LTSP meeting in British Columbia (July 04). Topics included status of LTSP installations and data collection efforts research publications and content, and database management.

Schulz, K., Zasada, J., and Nauertz, E. 2004. Annual, local, and individual variation in the inflorescence and fruit production of eastern leatherwood. *J. Torrey Botanical Society* 131: 292-304.

Coleman, M. D.; Friend, A. L.; Kern, C. C. 2004. Carbon allocation and nitrogen acquisition in a developing *Populus deltoides* plantation. *Tree Physiology*. 24: 1347-1357.

Kern, C. C.; Friend, A. L.; Johnson, J. M.-F.; Coleman, M. D. 2004. Fine root dynamics in a developing *Populus deltoides* plantation. *Tree Physiology*. 24: 651-660.

Recent Funding Developments

Brian Palik and Mike Ostry (NC

4502) Year 1 (\$40,000) of a two year study of black ash decline in the Lake States funded by USFS Forest Health Monitoring Program.

Dave Lytle received supplemental National Fire Plan funding of \$197,623 in '05 to continue work on *Optimizing fuel reductions in time and space..*

David Lytle and Eric Gustafson (NCRS 4153) will be awarded \$100,000 in Agenda 2020 funds in FY06-07 to work on The Working Forest Initiative.

Palik (\$39,500) and Lytle (\$50,000) received final year installments for ongoing AF & PA, Agenda 2020 projects on

Scientific Meetings

Brian Palik will give an invited presentation in June at the 5th North American Forest Ecology Workshop on Managing for ecological complexity in Great Lakes pine ecosystems.

Palik will give an invited presentation on Emulating natural disturbance with silviculture at the October 2005 National SAF conference.

Palik is co-author with Bob

David Lytle will give a presentation on the Border Lakes project in June at the North American Forest Ecology Workshop.

Personnel News

Welcome to Ebrahim Abdela and Gentry Carlson. Ebrahim is a remote sensing/GIS specialist employed by the Univ. of Minnesota and working with us in Grand Rapids as part of a research joint venture agreement. Gentry is a

GIS Student Intern from Itasca Community College.



News from our Cooperators

Scenario Planning in the Border Lakes Region of Minnesota and Ontario.

Submitted by Meredith Cornett, Director of Conservation Science, The Nature Conservancy

Conservation of landscapes challenges organizations such as The Nature Conservancy.

Our planning paradigm assesses current conditions of landscapes and defines spatially explicit desired future conditions. These steps are key to achieving success, but are difficult at large spatial scales. They are compounded in multi-ownership situations, such as the Border Lakes region of Minnesota and northwestern On-

tario. A collaborative Fire Learning Network, provided by The Nature Conservancy, US Forest Service, and Department of the Interior, is developing an integrated framework for achieving multi-ownership objectives in the Border Lakes region. Each participating organization, including federal, state, provincial, and private, have

developed individual management plans. Using forest dynamics models, the group is exploring synergies among management plans (see *Featured Research in this issue*). Scenario modeling shows great promise for developing a collaborative vision. Stay tuned for further progress reports about this exciting initiative.



NC 4101: Ecology and Silviculture
of Northern Great Lakes Forests
USDA Forest Service,
North Central Research Station,
Grand Rapids, MN 55744

Forestry Sciences Lab
1831 Hwy 169 E
Grand Rapids MN 55744

Phone: 218-326-7116
Fax: 218-326-7123
Email: bpalik@fs.fed.us

Our Mission: To develop knowledge and tools
that balance ecological and economic
objectives in the Nation's forests.

We're On The Web!
www.ncrs.fs.fed.us/4101/

Unit History Factoid: The Growing Stock Levels in Red Pine Study

The Growing Stock Levels in Red Pine Study was installed in 1949 on the Cutfoot Experimental Forest in north central Minnesota. The intent of the study was to examine the effects of stocking densities on growth and yield of older red pine (trees were over 80 years old at the time of study establishment). At that time, American foresters relied on European tables for stocking densities. Zig Zasada and Paul Zengraff established this study to document density-growth relationships directly for red pine in the Lake States. Since establishment, stands have been thinned seven times, with the eighth thinning planned for 2006 in what is now 138 year old red pine. Early results from this study are incorporated into Robert Buckman's red pine stocking level tables for the Lake States. There is little experience but growing interest in managing extended rotation Great Lakes pine stands. The North Central Research Station, by maintaining this legacy study, is providing guidance to a growing number of organizations that have identified long-rotations as a management goal for pine systems.



Our Research Portfolio

Fire and Fuels

- The Border Lakes Project: Evaluating the cumulative impacts of forest management at landscape scales
- Developing a Decision Support System for management of fuels and fire at the landscape scale

Invasive Species

- Invasibility and Restoration of Oak Ecosystems in the Midwest

Watersheds and Riparian

- Testing the Efficacy of Buffers for Protecting Seasonal Ponds, Amphibians, and Forest Songbirds in Northern Minnesota
- Evaluating Riparian Timber Harvesting Guidelines

Disturbance/Restoration

- Using Spatially variable Overstory Retention to restore structural and compositional complexity in Pine Ecosystems
- Productivity and plant diversity in extended rotation red pine stands
- Managing for old-growth characteristics in second-growth stands

Forest Productivity

- Aspen Long-term Soil Productivity (LTSP)
- Linking Soil Productivity To Intensity Of Silviculture
- Identifying opportunities for enhancing forest and economic productivity of red pine stands
- The Working Forest Project: Conserving biodiversity in forests managed for fiber production

Long-term Silviculture Studies

- Northern Hardwood Cutting Methods (2nd growth)
- Northern Hardwoods Cutting Methods/Growing Stock (old-growth)
- Red pine Growing Stock Levels

Research Work Unit Staff & Students

John Elioff –Forestry Technician
Christel Kern -Ecologist/Forester
David Lytle –Research Ecologist
Doris Nelson –Physical Sciences Technician
Brian Palik-Project Leader, Research Ecologist
Julie Rollins –Business Management Assistant
Terry Strong –Research Forester
Eric Troumbly –Maintenance Mechanic
Rick Voldseth –Post-doctoral Research Ecologist
John Zasada –Research Forester, Retired
Andy Arola-Student Worker
Ebrahim Abdela –GIS/Remote Sensing Specialist
Brian Birt-Student Worker
Doug Kastendick –Forester/Graduate Student UMN
Tricia Knoot –Graduate Student, Iowa State University
Rachael Tarpey –Graduate Student, Michigan Tech. Univ.
Dan Teersteg – Graduate Student, UMN