

**Final Report for the  
Joint Fire Sciences Program**

**Project Number 00-2-23**

**Entitled:**

**Managing Fuels and Forest Structure in the Southern  
Boreal Forest on Minnesota's National Forests.**

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Prepared by:  
Daniel W. Gilmore  
[dilmore@umn.edu](mailto:dilmore@umn.edu)  
Department of Forest Resources  
University of Minnesota  
1861 Highway 169 East  
Grand Rapids, MN  
55744-3396

Investigators and Cooperators:  
Marty Christensen, and  
John C. Zasada  
USDA Forest Service  
Forest Sciences Laboratory  
1831 Highway 169 East  
Grand Rapids, MN 55744

The project objectives were to:

1. Demonstrate the effectiveness of alternative treatments for managing the quantity and distribution of fuels, and forest structure in these sub-boreal ecosystems. Our intent was to provide interested professionals and the public with quantified pre-treatment descriptions of fuels and forest structure, alternative treatment descriptions, and site conditions for which these different treatments seem most appropriate.
2. Monitor and quantitatively describe the short-term effects of these fuels treatments on selected aspects of succession, tree/plant composition and structure, insect populations, and fungal associations. Using these data and other currently available information and models, we will describe the most likely scenarios of fuel dynamics and pathways of forest succession for the different forest structures created in these demonstration areas. We will provide prescriptions for various types of sites and disturbances and the most likely forest ecosystems in the short and long run to interested parties.

Funding from this project has contributed to the writing of nine publications, including a paper in the Society of American Foresters Proceedings, a USDA Forest Service Research Note, and several informational notes in newsletters. Five presentations have been partially supported from project funds including a presentation to the Minnesota Forest Resource Council. Project funds have also partially supported travel to present 11 posters.

Citations for these presentations are provided below. Those marked with an asterisk are included on the enclosed CD. Note that the posters were often presented at multiple meetings.

Project funds have also partially supported collaboration with Dr. Terry Daniel of the University of Arizona and Dr. Brian Orland of The Pennsylvania State University. They have constructed a website to provide a visualization of fuel loadings in various forest types in North America. Their website is: <http://www.imlab.psu.edu/gunflint/>

## **Publications**

### 2001

\*Anderson, P.J., D.W. Gilmore, L.S. Yount and J.C. Zasada. 2001. Effects of blow-down and salvage/fuel reduction activity on forest succession pathways in northern Minnesota. Poster Abstract. Pp. 496-500 In *Proceedings of the Society of American Foresters National Convention*, Washington, DC

Gandhi, K. J. K. 2001. Responses of sub-boreal beetles to a severe windstorm event to silvicultural activities and to prescribed fire in northeastern Minnesota. *Minnesota Department of Natural Resources, Forest Insect and Disease Newsletter*, June Issue

Gandhi, K.J.K, P.J. Anderson, D.W. Gilmore, R.A. Haack, W.J. Mattson, J.C. Zasada, and S.J. Seybold. 2001. Responses of sub-boreal beetles to a severe wind disturbance event and silvicultural activities in northeastern Minnesota. In Volney, W.J.A., Spence, J.R., Lefebvre, E.M., Editors. *The North American Forest Insect Work Conference Proceedings*. May 14-

18, 2001. Edmonton, Alberta. Nat. Resour. Can., Can. For. Serv., North. For. Cent. Edmonton, Alberta. Inf. Rep. NOR-X-381.

Gilmore, D.W., P.J. Anderson, D. Kastendick, L.S. Yount and J.C. Zasada. 2001. Pre- and post-blow down stand structure of two cover types in northern Minnesota. Poster Abstract p. 116 In Yount, L.S., Editor. Third North American Forest Ecology Workshop Program, Issues of Scale – From Theory to Practice. June 24-27, 2001, Duluth, Minnesota

Gilmore, D.W., and J.C. Zasada. 2001. Silviculture research needs and issues. Pp. 15-18. *In*: Mattson, W.J. and D.S. Shriner (editors) Northern Minnesota Independence Day Storm: A Research Needs Assessment. USDA Forest Service General Technical Report NC-216.

Warren, J., Gandhi, K.J.K., Gilmore, D., Seybold, S.J., and Zasada, J. 2001. Research projects initiated in the blowdown: Vegetative and insect monitoring along the Gunflint Trail. *Minnesota Extension Service, Forest Tree Notes* 1 (2): 4-5.

## 2002

Gandhi, K.J.K., Gilmore, D.W., Seybold, S.J., and Zasada, J.C. 2002. Vegetation and insect monitoring along the Gunflint Trail. *Minnesota Extension Service, Forest Tree Notes* 3(1): 1-2.

\*Gilmore, D.W., S.J. Seybold, J.C. Zasada, P.J. Anderson, D.N. Kastendick, K.J.K. Gandhi, and H.P. Johnson. 2002. Cumulative effects of a severe windstorm and subsequent silvicultural treatments on plant and arthropod diversity in the Gunflint Corridor of the Superior National Forest in northern Minnesota: Project Design. Pp 364-379 *In* Proceedings Society of American Foresters 2001 National Convention, Denver, Colorado. SAF Publication 02-01. Bethesda, MD. 469 p.

## 2003

\*Gilmore, D.W., D.N. Kastendick, J.C. Zasada, and P.J. Anderson. 2003. Alternative fuel reduction treatments in the Gunflint Corridor of the Superior National Forest: Second year results and sampling recommendations. USDA Forest Service Research Note NC-381. 8 p.

## **Presentations**

### 2000

Gilmore, D.W. and J.C. Zasada. 2000. Silviculture Issues: Monitoring the effects of blow-down and salvage/fuel reduction activity on forest succession pathways in northern Minnesota. Presented to the Minnesota Forest Resources Council April Field Meeting at the USDA Forest Service Gunflint Guard Station.

Gilmore, D.W., J.C. Zasada and P.J. Anderson. 2000. Monitoring effects of blow-down and salvage/fuel reduction activity on forest succession pathways in the Gunflint Corridor Area, Superior National Forest: Project design and preliminary data. Presented to: Northern Minnesota Storm Recovery Research Needs Planning Workshop; March 14-16, 2000; Earle Brown Conference Center, University of Minnesota – St Paul Campus

## 2001

Gilmore, D.W., L.S. Yount, and M. Theimer. 2001 Gunflint Lowdown Blowdown. Field Tour along the Gunflint Trail. SAF North American Forest Ecology Workshop. Duluth, MN.

Seybold, S.J., R.A. Haack, D.W. Gilmore. M.A. Albers. 2003. Potential for movement of native forest insect pests within North America. Presented during the Forest Health Management Technical Session during the February 3-5, 2002. MN SAF 2003 Winter Meeting at the Maplelodge Cross-Country Ski Resort and Conference Center, Callaway, MN. Invited speaker.

## **Posters**

### 2000

\*Anderson, P.J., D.W. Gilmore, L.S. Yount and J.C. Zasada. 2000. Effects of blow-down and salvage/fuel reduction activity on forest succession pathways in northern Minnesota. Poster Presentation. Society of American Foresters. Washington, DC.

Gandhi, K.J.K, D.W. Gilmore and S. J. Seybold. 2000. Assessing the Impact of Wind Disturbance on Forest Insect Populations in Northern Minnesota. Rhinelander, WI.

Gandhi, K.J.K, P.J. Anderson, D.W. Gilmore, R. Haack, W. Mattson, S. J. Seybold and J.C. Zasada. 2000. Response of boreal beetles to a severe windstorm event and subsequent fuel reduction activity in northern Minnesota. Poster Presentation. Entomological Society of America. Montreal, Quebec.

### 2001

\*Gandhi, K.J.K., Anderson, P.J., Gilmore, D.W., Haack, R.A., Mattson, W.J., Zasada, J.C., and Seybold, S.J. 2001. Responses of sub-boreal beetles to a severe windstorm event and silvicultural practices in northeastern Minnesota. Poster Presentation. North Central Forest Pest Workshop, October 1-4, 2001. Big Bay, Michigan

\*Gandhi, K.J.K., Anderson, P.J., Gilmore, D.W., Katovich, S.A., Mattson, W.A., Zasada, J. C., and Seybold, S.J. 2001. Responses of sub-boreal beetles to a severe wind-disturbance event and silvicultural activities in Minnesota. Annual Meeting of the Minnesota Forestry Association, Minnesota.

\*Gandhi, K.J.K., Gilmore, D.W., Katovich, S.A., Mattson, W.A., Zasada, J. C., and Seybold, S.J. 2001. Sub-boreal beetles in wind-disturbed and prescribed-burned forests. North American Forest Insect Work Conference, Edmonton, Alberta.

### 2002

Gandhi, K.J.K, Gilmore, D.W., Katovich, S.A., Mattson, W.J., and Seybold, S.J. 2002. Cerambycids as primary colonizers of live jack pines. Poster at the North Central Forest Pest Workshop, October 21st-24th, Potosi, Missouri.

\*Gandhi, K.J.K., Gilmore, D.W., Katovich, S.A., Mattson, W.A., Zasada, J. C., and Seybold, S.J. 2002. Sub-boreal beetles in wind-disturbed and prescribed-burned forests. USDA-Forest Service Forest Health Monitoring Meeting, New Orleans.

\*Gandhi, K.J.K., Gilmore, D.W., Katovich, S.A., Mattson, W.A., Zasada, J. C., and Seybold, S.J. 2002. Sub-boreal beetles in wind-disturbed and prescribed-burned forests. "Research Review: Forest Systems of the Upper Midwest", University of Minnesota, USDA Forest Service, and the Minnesota Forest Resources Council, Cloquet, Minnesota.

### 2003

\*Gandhi, K.J.K., P.J. Anderson, D.W. Gilmore, R.A. Haack, W.J. Mattson, J.C. Zasada, and S.J. Seybold. 2003. Sub-boreal beetles in wind- disturbed and prescribed-burned forests. Joint Fire Science Program Principal Investigator Workshop, Phoenix, Arizona. March 11-13, 2003. Poster presentation.

\*Gandhi, K.J.K., P.J. Anderson, D.W. Gilmore, R.A. Haack, W.J. Mattson, J.C. Zasada, and S.J. Seybold. 2003. Sub-boreal beetles in wind- disturbed and prescribed-burned forests. Great Lakes Silviculture Summit, Houghton, MI, April 22-23, 2003. Poster presentation.

\*Kastendick, D.N, PJ Anderson, JC Zasada, DW Gilmore. 2003. Cumulative Effects of a Severe Wind Disturbance and Silvicultural Treatments on Forest Structure and Fuel Loadings, Superior National Forest, Northeastern Minnesota. Joint Fire Science Program Principal Investigator Workshop, Phoenix, Arizona. March 11-13, 2003. Poster presentation.

\*Kastendick, D.N, PJ Anderson, JC Zasada, DW Gilmore. 2003. Cumulative Effects of a Severe Wind Disturbance and Silvicultural Treatments on Forest Structure and Fuel Loadings, Superior National Forest, Northeastern Minnesota. Great Lakes Silviculture Summit, Houghton, MI, April 22-23, 2003. Poster presentation.

### 2004

\*Gandhi, K.J.K., D.W. Gilmore, M. Mielke, and S.J. Seybold. 2004. Use of Prescribed Fire as a Management Tool for Enhancing Pyrophilous Beetle Populations in Sub-boreal Coniferous Forests of Minnesota. Poster presentation to the USDA Forest Service Forest Health Monitoring Annual Principal Investigators Meeting. Sedona, Arizona. February 9-12, 2004