

**Interagency Information Cooperative  
Projects and Accomplishments  
2019-2020**

by

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## Summary of Accomplishments

The [Interagency Information Cooperative](#) (IIC) enhances the development and use of forest resource data in Minnesota. Every two years the IIC is to submit a report of accomplishments to the [Minnesota Forest Resources Council](#).

Since 2018, the IIC has supported the following projects:

- Surveying silvicultural practices in the state
- Developing new growth and yield models for the state's forest types
- Publishing an online application serving timber inventory information
- Resolving an issue affecting recent forestland area estimates in the state
- Developing a GIS data portal for the Arrowhead Landscape Pilot Project
- Advancing forest planning methodologies, including coordination across ownerships
- Examining new forest inventory technologies and analyses
- Enhancing a forest wildlife habitat framework

These projects have produced the following outputs:

- 4 peer-reviewed journal articles
- 3 staff papers
- 7 research notes
- 1 online application
- 1 GIS data portal
- 9 presentations/posters/webinars/talks at state and national conferences

In the last two years, the IIC has reestablished its Advisory Body and increased communications with stakeholders. Specific actions taken include:

- Three meetings of the IIC Advisory Body
- Publication of the first IIC newsletter
- Maintaining and updating an IIC website
- Periodic meetings with MFRC staff

The remainder of this report includes information on the IIC Advisory Body, recent communication efforts, and brief descriptions of the projects. Project information includes a list of the key personnel and outputs. Readers interested in learning more about any of these projects are welcome to contact the IIC or the contact listed. Many projects have outputs in the form of an article or report that are available online, which would be another source for more detailed information about the project.

## **IIC Advisory Body**

In the last two years the Advisory Body has met three times to review IIC accomplishments and discuss future work plans.

### Advisory Body Membership

Chris Edgar	Department of Forest Resources	University of Minnesota
John Zobel	Department of Forest Resources	University of Minnesota
George Host	Natural Resources Research Institute	University of Minnesota
John Duplissis	Natural Resources Research Institute	University of Minnesota
Mark Nelson	Northern Research Station	United States Forest Service
Joshua Bixby	Chief Information Office	United States Forest Service
John Rickers	Chippewa National Forest	United States Forest Service
Doug Tillma	Division of Forestry	Department of Natural Resources
Scott Hillard	Division of Forestry	Department of Natural Resources
Greg Bernu	Land Department	Carlton County

## **IIC Communications**

The IIC published its first newsletter in May of 2019. The newsletter was sent via email to more than 90 natural resource professionals throughout the state. The IIC maintains a [website](#) where updates are periodically posted.

## SURVEY OF SILVICULTURAL PRACTICES

### Contact

Dr. Marcella Windmuller-Campione, Department of Forest Resources, [mwind@umn.edu](mailto:mwind@umn.edu)

### Description

A survey of silvicultural practices and forest health priorities and threats in Minnesota was undertaken in 2018. Previous surveys were conducted in 1991, 1996, and 2008 and this new survey is a valuable update providing insights of trends in practices and concerns over the past 26 years.

### Output

Windmuller-Campione, M.A., and C. Blinn. 2018. Update on silvicultural practices and the logging sector in Minnesota. A webinar given for the Sustainable Forests Education Cooperative, May 15, 2018. <https://youtu.be/dmoh2cD0Diw>

Russell, M.R., M.A. Windmuller-Campione, E. Sagor and M. Rodman. 2018. How are we managing forest health? An assessment of silvicultural strategies used in Minnesota. A poster presented at the Upper Midwest Invasive Species Conference in Rochester, MN, October 15-18, 2018.

Windmuller-Campione, M.A., M.B. Russell, E. Sagor, and R.R. Peterson. 2019. Current status and trends of silvicultural and forest health practices in Minnesota: A 2017 assessment. Staff Paper Series No. 252. St. Paul, MN: Dept. of Forest Resources, University of Minnesota. 56 p. <http://hdl.handle.net/11299/216283>

Windmuller-Campione, M.A., E. Sagor, M.A. Russell, and M.G. Rodman. 2019. Silvicultural strategies used in Minnesota over the past 25 years. A presentation given at the National Silviculture Workshop, US Forest Service. Bemidji, MN.

Windmuller-Campione, M.A., M.B. Russell, E. Sagor, A.W. D'Amato, A.R. Ek, K.J. Puettmann, and M.G. Rodman. 2020. The decline of the clearcut: 26 years of change in silvicultural practices and implications in Minnesota. *Journal Forestry* 118(3): 244-259.

<https://doi.org/10.1093/jofore/fvaa007>

## DEVELOPING NEW GROWTH AND YIELD MODELS

### Contact

Dr. Alan Ek, Department of Forest Resources, [aek@umn.edu](mailto:aek@umn.edu)

### Description

New growth and yield models for major forest types in the Upper Great Lakes were developed. This effort made use of Forest Inventory and Analysis (FIA) plots, many of which have been measured multiple times since the adoption of the annual design in 1999.

### Output

Wilson, D.C., and A.R. Ek. 2019. Whole stand growth and yield models for major forest types in the upper Great Lakes region. Staff Paper Series No. 254. St. Paul, MN: Dept. of Forest Resources, University of Minnesota. 50 p. <http://hdl.handle.net/11299/216428>

Wilson, D.C., and A.R. Ek. 2020. Description and implementation of the Great Lakes Forest Projection System (GLFPS). Minnesota Forestry Research Notes 310. St. Paul, MN: Dept. of Forest Resources, University of Minnesota. <http://hdl.handle.net/11299/216450>

## ONLINE APPLICATION OF TIMBER INVENTORY INFORMATION

### Contact

Dr. Christopher Edgar, Department of Forest Resources, [cedgar@umn.edu](mailto:cedgar@umn.edu)

### Description

This project developed a web-based tool that visually summarizes timber resources across Minnesota, Wisconsin, and Michigan. Data include land area, volume, growth, removals, and mortality of timber resources and can be filtered by area, year, merchantable size, land ownership, and species groups. Estimates are derived from Forest Inventory and Analysis (FIA) data. This tool is intended for land managers and stakeholders interested in broadly quantifying timber resources.

### Output

The application is available [online](#) and can be accessed by visiting [iic.umn.edu](http://iic.umn.edu).

Edgar, C.B., M. Carson, and J. Young. 2019. Minnesota forest land area estimation using national forest inventory data. Staff Paper Series No. 256. St. Paul, MN: Dept. of Forest Resources, University of Minnesota. <http://hdl.handle.net/11299/216430>

Edgar, C.B., P.A. Klockow, and R. Toot. 2020. Online web application for assessing timber resources of the Great Lakes region. Poster and lightning talk presented at the Forestry and Wildlife Research Review, Cloquet Forestry Center, Cloquet, MN. January 9, 2020.

<https://youtu.be/hKbil7oeElQ>

Edgar, C.B., P.A. Klockow, and R. Toot. 2020. Assessment of timber resources of the Lake States using an online application. Presentation give at the Minnesota Society of American Foresters Meeting, Brainerd, MN. February 19-20, 2020.

Edgar, C.B., P.A. Klockow, and R. Toot. 2020. Online web application for assessing timber resources of the Great Lakes region. Poster presented at the Minnesota Society of American Foresters Winter Meeting, Brainerd, MN. February 19-20, 2020.

## ISSUE AFFECTING RECENT FORESTLAND AREA ESTIMATES

### Contact

Dr. Christopher Edgar, Department of Forest Resources, [cedgar@umn.edu](mailto:cedgar@umn.edu)

### Description

Early in 2019 several researchers and analysts in the state identified sizeable changes in recent estimates of forestland area by owner category in Minnesota. The reason for the change was not clear and not traceable back to any known change in ownership. Chris Edgar of the UMN, Mark Nelson of the USFS, and Scott Hillard of the MN DNR jointly conducted an examination of the Forest Inventory and Analysis (FIA) data and estimation procedures, eventually pinpointing the cause of the error. FIA fixed the issue, published new data, and put in place safeguards to detect errors of this type in the future.

### Output

A new version of the database with 2017 and 2018 errors corrected was posted at the USFS FIA [DataMart](#) on November 18, 2019.

## **ARROWHEAD LANDSCAPE PILOT PROJECT**

### **Contact**

Dr. Paul Klockow, Department of Forest Resources, [pklockow@umn.edu](mailto:pklockow@umn.edu)

### **Description**

This project constructed an ArcGIS Online spatial data portal for a Shared Stewardship project located on approximately 500,000 acres of northeastern Minnesota. The site integrates data (e.g. stand-level inventory, roads, planned treatments) from the U.S. Forest Service, Minnesota DNR, and St. Louis County to be used by team members, managers, and policy-makers for informing project decisions.

### **Output**

An ArcGIS Online group containing forest resource data in the Arrowhead Landscape Pilot Project Area. Arrowhead Landscape Pilot Project data team members can access the group resource.

## ADVANCES IN FOREST PLANNING

### Contact

Dr. Howard Hoganson, North Central Research and Outreach Center, [hogan001@umn.edu](mailto:hogan001@umn.edu)

### Description

This effort consisted of two projects in forest management and planning. The first project was a study of forest management scheduling involving multiple ownerships and production of timber and old forest. The second project considered integrating ecological and economic objectives across two large public ownerships.

### Output

De Pellegrin Llorente, I., H.M. Hoganson, M. Windmuller-Campione, and S. Miller. 2018. Using a marginal value approach to integrate ecological and economic objectives across the Minnesota landscape. *Forests*, 9, 434. <https://doi.org/10.3390/f9070434>

De Pellegrin Llorente, I., H.M. Hoganson, M. Windmuller-Campione, and S. Miller. 2018. A marginal value approach to integrate multiple objectives across the Minnesota landscape. Presentation given at the 2018 Society of American Foresters National Convention, Portland, OR, October 3-6, 2018.

Bixby, J.J., H.M. Hoganson, and Y. Wei. 2019. Potential gains from spatially-explicit coordinated planning between two large public ownerships in Minnesota. *Forest Ecosystems* 6:11. <https://doi.org/10.1186/s40663-019-0176-0>

## FOREST INVENTORY TECHNOLOGIES AND ANALYSES

### Contact

Dr. Paul Klockow, Department of Forest Resources, [pklockow@umn.edu](mailto:pklockow@umn.edu)

### Description

Numerous investigations of forest inventory and resource analysis have been conducted with findings of those results of broader interest published in research notes. Topics included: major considerations on the cost-effectiveness of forest inventory designs, rapid forest change in Minnesota, association between forest cover type and physiographic conditions, hardwood stand modeling, and volume/biomass equations.

### Output

Ek, A.R., D. Wilson, C.B. Edgar, and J. Zobel. 2018. Cost-effective forest inventory designs: Field data collection. Minnesota Forestry Research Notes 304. St. Paul, MN: Dept. of Forest Resources, University of Minnesota. <http://hdl.handle.net/11299/216444>

Wilson, D.C., and A.R. Ek. 2018. Evidence of rapid forest change in Minnesota. Minnesota Forestry Research Notes No. 305. St. Paul, MN: Dept. of Forest Resources, University of Minnesota. <http://hdl.handle.net/11299/216445>

Wilson, D.C., J.M. Zobel, and A.R. Ek. 2018. Forest cover type and productivity as related to physiography. Minnesota Forestry Research Notes No. 306. St. Paul, MN: Dept. of Forest Resources, University of Minnesota. <http://hdl.handle.net/11299/216446>

Wilson, D.C., and A.R. Ek. 2019. Hardwood stand modeling using the forest vegetation simulator. Minnesota Forestry Research Notes No. 307. St. Paul, MN: Dept. of Forest Resources, University of Minnesota. <http://hdl.handle.net/11299/216447>

Wilson, D.C., and A.R. Ek. 2019. Stand volume, biomass and carbon equations for the Upper Great Lakes Region. Minnesota Forestry Research Notes No. 308. St. Paul, MN: Dept. of Forest Resources, University of Minnesota. <http://hdl.handle.net/11299/216448>

Wilson, D.C., R.S Morin, L. Frelich, and A. R. Ek. 2019. Monitoring disturbance intervals in forests: A case study of increasing forest disturbance in Minnesota. *Annals of Forest Science* 76, 78 (2019). <https://doi.org/10.1007/s13595-019-0858-3>

## FOREST WILDLIFE HABITAT FRAMEWORK

### Contact

Dr. John Zobel, Department of Forest Resources, [jzobel@umn.edu](mailto:jzobel@umn.edu)

### Description

This project developed a framework of assessment of forest wildlife habitat in support of multiple-use forest management. The framework (Wildlife Habitat Indicator for Native Genera and Species or WHINGS) describes changes in forest wildlife habitat and its connections to forest management.

### Output

Zobel, J., A. Ek, and C.B. Edgar. (In press). Assessing the impact of 41 years of forest management on native wildlife habitat in Minnesota, USA. *Journal of Forestry*.

Zobel, J.M. and A.R. Ek. 2020. Rapid assessment of forest wildlife habitat using traditional forest inventories. *Forestry and Wildlife Research Review*, Cloquet Forestry Center, Cloquet, MN. January 9, 2020. <https://youtu.be/RGgX3VPDMKU>

Zobel, J.M., A.R. Ek, and C.B. Edgar. 2019. Determination of forest type and stand size class across FIA inventory years. *Minnesota Forestry Research Notes No. 309*. Department of Forest Resources, University of Minnesota, St. Paul, MN. <http://hdl.handle.net/11299/216449>