

Status and Trends in Forest Habitat Types of the Boreal Hardwood Transition

**Mark D. Nelson
U.S. Forest Service
Northern Research Station**

**17 April 2018
Ashland, MN**



Boreal Hardwood Transition = Bird Conservation Region 12

BCR 12

BCR 12 IN USA

BCR 12 COUNTIES

HABITAT TYPE VS. HABITAT?

- Habitat Type:

...the type of vegetation association in an area or to the potential of vegetation to reach a specified climax stage. (Daubenmire, 1968)

HABITAT TYPE



Quaking Aspen, Sawyer County, Wisconsin
Steven Katovich, USDA Forest Service, Bugwood.org



Black Spruce, Beltrami County, Minnesota
Steven Katovich, USDA Forest Service, Bugwood.org

HABITAT

- Habitat Type:

...the type of vegetation association in an area or to the potential of vegetation to reach a specified climax stage. (Daubenmire, 1968)

- Habitat:

“...the *resources* and *conditions* present in an area that produce occupancy—including survival and reproduction **by a given organism.**” (Hall et al., 1997)

KIRTLAND'S WARBLER HABITAT



UGA1400054

Kirtland's Warbler Jack Pine Plantation, H-M NF, Michigan
Linda Haugen, USDA Forest Service

HABITAT TYPE \neq HABITAT

- Habitat Type:

...the type of vegetation association in an area or to the potential of vegetation to reach a specified climax stage. (Daubenmire, 1968)

- Habitat:

“...the *resources* and *conditions* present in an area that produce occupancy—including survival and reproduction by a given organism.” (Hall et al., 1997)

HABITAT FEATURE



Daniel Kaisershot, USDA Forest Service

CONSERVATION FILTERS

- Coarse filter
 - Ecosystems
 - Habitat types

- Mesofilter
 - Many species
 - Habitat features

- Fine filter
 - Single species
 - Habitats

A Mesofilter Conservation Strategy to Complement Fine and Coarse Filters

MALCOLM L. HUNTER JR.

Department of Wildlife Ecology, University of Maine, Orono, ME 04469-5755, U.S.A., email hunter@umenfa.maine.edu

Abstract: Setting aside entire ecosystems in reserves is an efficient way to maintain biodiversity because large numbers of species are protected, but ecosystem conservation constitutes a coarse filter that does not address some species. A complementary, fine-filter approach is also required to provide tailored management for some species (e.g., those subject to direct exploitation). Mesofilter conservation is another complementary approach that focuses on conserving critical elements of ecosystems that are important to many species, especially those likely to be overlooked by fine-filter approaches, such as invertebrates, fungi, and nonvascular plants. Critical elements include structures such as logs, snags, pools, springs, streams, reefs, and hedgerows, and processes such as fires and floods. Mesofilter conservation is particularly appropriate for seminatural ecosystems that are managed for both biodiversity and commodity production (e.g., forests managed for timber, grasslands managed for livestock forage, and aquatic ecosystems managed for fisheries) and is relevant to managing some agricultural and urban environments for biodiversity.

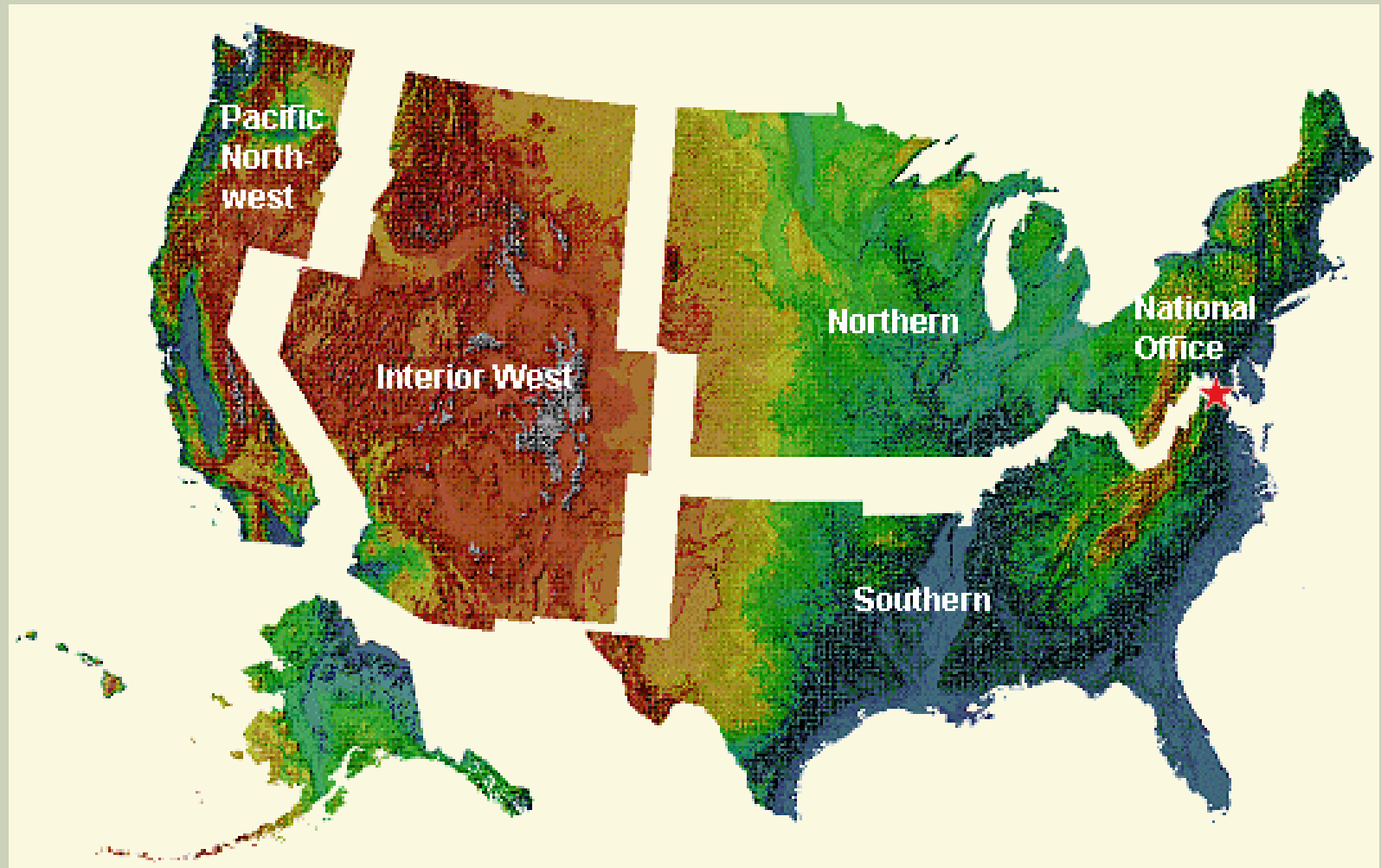
Key Words: coarse-filter conservation, ecosystem management, fine-filter conservation, matrix management

FOREST INVENTORY & ANALYSIS

Enhance the understanding of forest resources.



FIA REGIONAL PROGRAMS



FIA PRODUCT LINES

- **Bio-physical**

- Tree/Forest type, volume, biomass, etc.

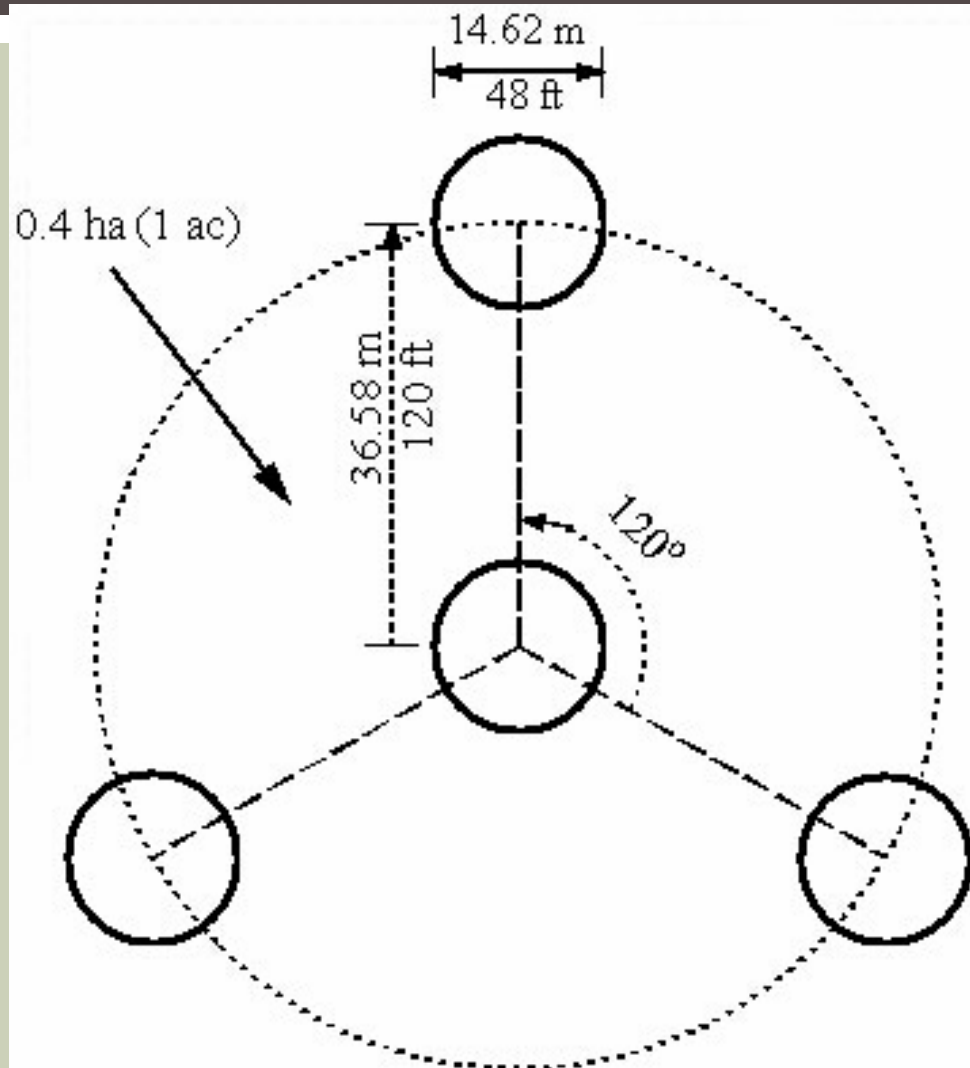
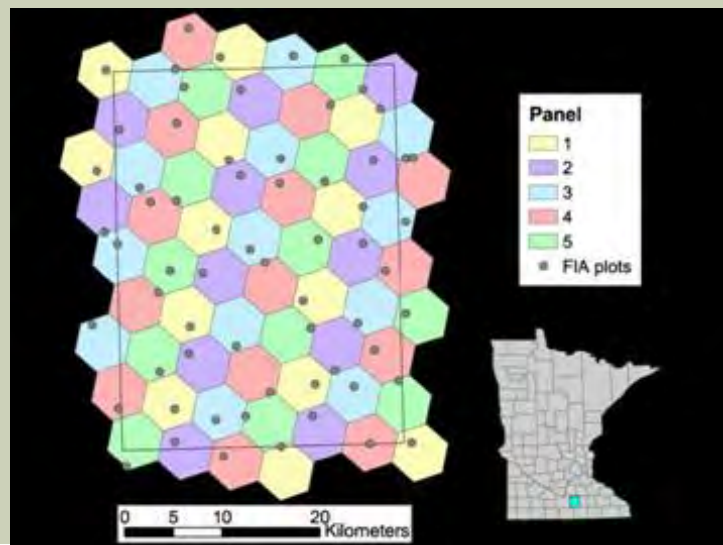
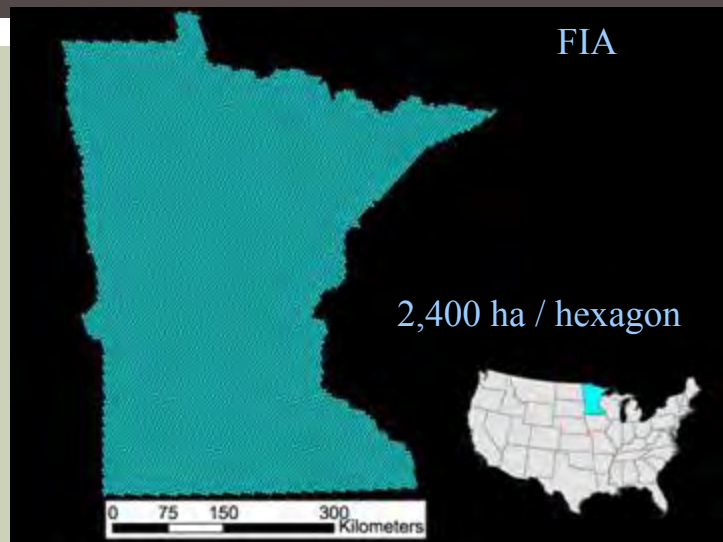
- **Economic**

- Timber Products Output (TPO)

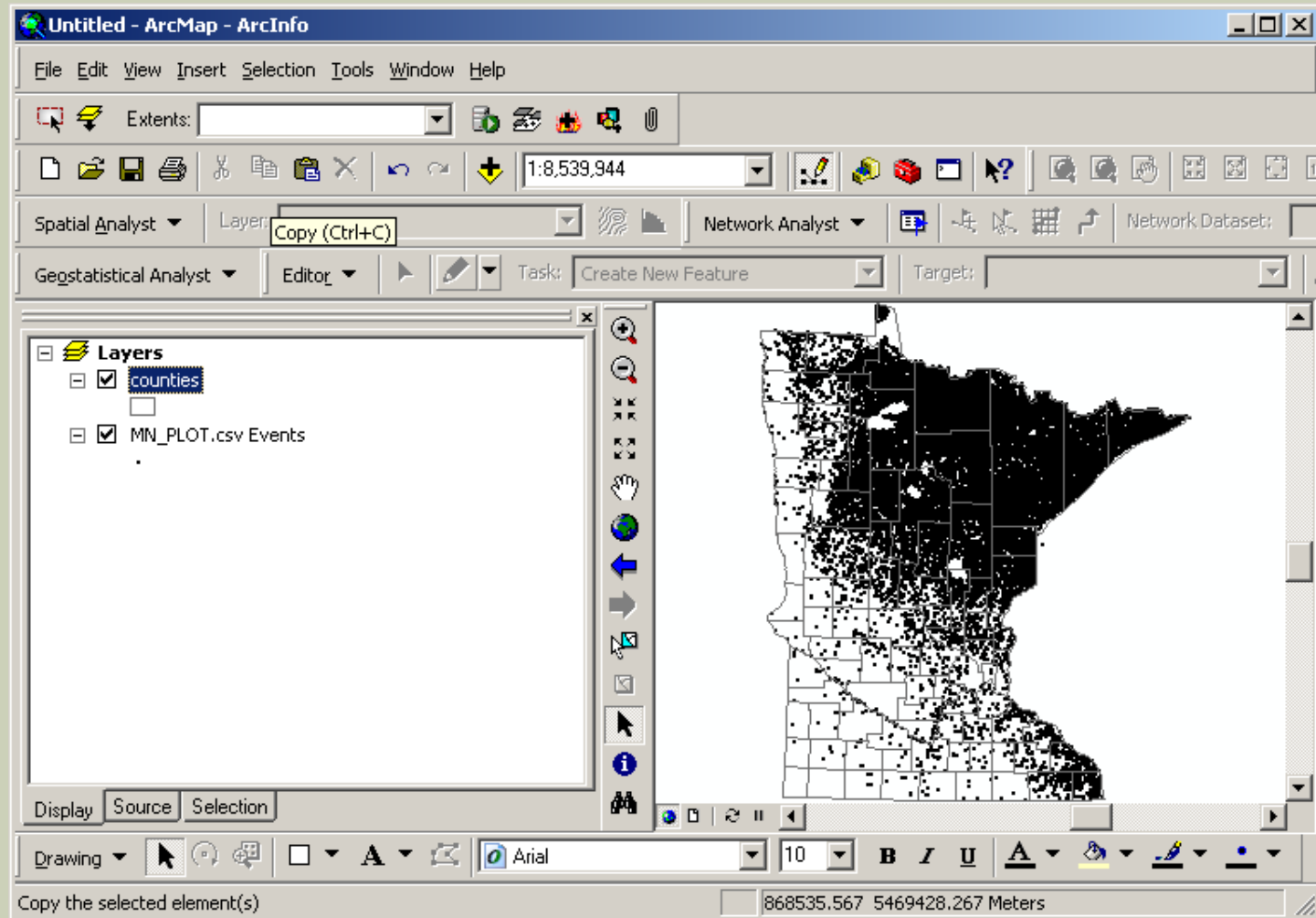
- **Social**

- National Woodland Owner Survey (NWOS)


SAMPLE AND PLOT DESIGNS



FOREST INVENTORY & ANALYSIS



FIA DATA & TOOLS

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DATIM



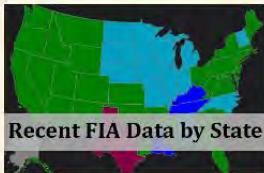
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FIA Data Mart




Urban Data Mart




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Other Data



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FIA EVALIDATOR

EVALIDator Version 1.6.0.03a - View report

Estimate for Area of timberland, in acres

Stand age 20 yr classes (0 to 100+) (based on values from the Current inventory).	Total	0-20 years	21-40 years	41-60 years	61-80 years	81-100 years	100+ years	Mixed (or used in Northeast States for periodic inventories)
RSCD=23 EVALID=277701 MINNESOTA 1977	5,157,699	1,235,596	1,366,507	2,004,725	444,676	96,195	9,999	
RSCD=23 EVALID=279001 MINNESOTA 1990	5,058,057	1,399,649	991,045	1,602,296	908,372	131,297	23,500	
RSCD=23 EVALID=270301 MINNESOTA 1999;2000;2001;2002;2003	4,651,516	1,449,890	1,027,375	1,303,486	766,296	86,883	17,594	
RSCD=23 EVALID=270701 MINNESOTA 2003;2004;2005;2006;2007	4,632,330	1,470,690	1,143,681	1,116,822	784,234	102,144	14,761	
RSCD=23 EVALID=271101 MINNESOTA 2007;2008;2009;2010;2011	4,712,249	1,525,634	1,252,739	1,040,750	772,196	102,586	18,343	
RSCD=23 EVALID=271501 MINNESOTA 2011;2012;2013;2014;2015	4,616,848	1,415,636	1,367,501	994,626	657,492	162,629	18,968	

Sampling errors in percent for Area of timberland, in acres

Stand age 20 yr classes (0 to 100+) (based on values from the Current inventory).	Total	0-20 years	21-40 years	41-60 years	61-80 years	81-100 years	100+ years	Mixed (only used in Northeastern States for periodic inventories)	not measured	other
RSCD=23 EVALID=277701 MINNESOTA 1977	1.52	3.45	3.28	2.64	5.94	12.60	41.43	0.00	0.00	0.00
RSCD=23 EVALID=279001 MINNESOTA 1990	1.34	2.86	3.44	2.64	3.58	9.65	22.89	0.00	79.51	0.00
RSCD=23 EVALID=270301 MINNESOTA 1999;2000;2001;2002;2003	2.15	4.22	5.23	4.55	6.14	19.15	42.56	0.00	0.00	0.00

FIA INVENTORY YEARS

State	1980's	1990's	2005	2010	2015
Minnesota	1977	1990	2001-2005	2006-2010	2011-2015
Wisconsin	1983	1996	2001-2005	2006-2010	2010-2015
Michigan	1980	1993	2001-2005	2006-2010	2010-2015

FIA INVENTORY YEARS

Periodic




State	1980's	1990's	2005	2010	2015
Minnesota	1977	1990	2001-2005	2006-2010	2011-2015
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FIA INVENTORY YEARS

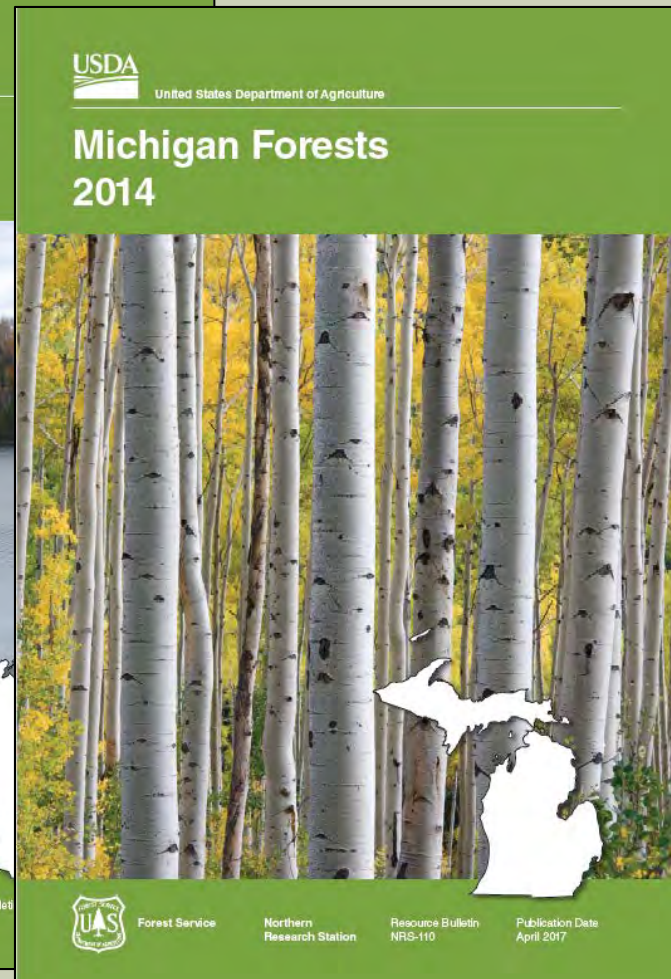
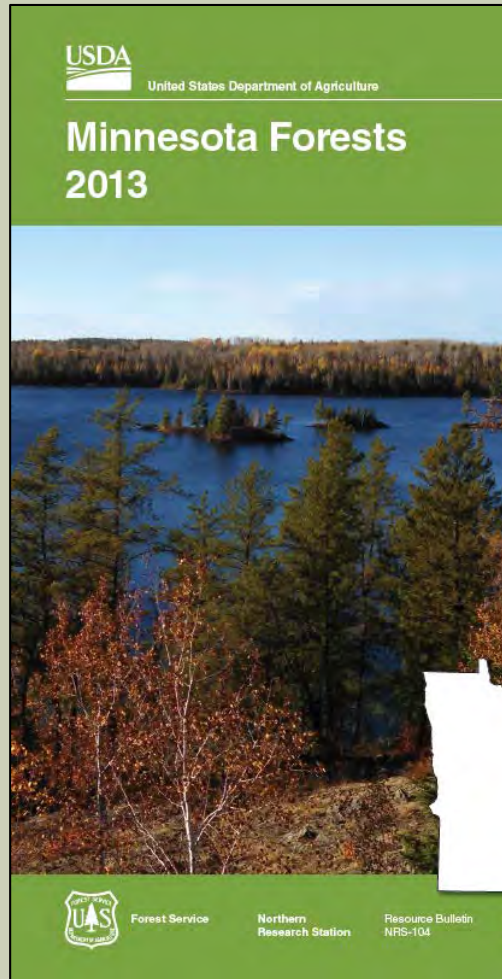
Periodic

Annual



State	1980's	1990's	2005	2010	2015
Minnesota	1977	1990	2001-2005	2006-2010	2011-2015
Wisconsin	1983	1996	2001-2005	2006-2010	2010-2015
Michigan	1980	1993	2001-2005	2006-2010	2010-2015

RESOURCE INFORMATION

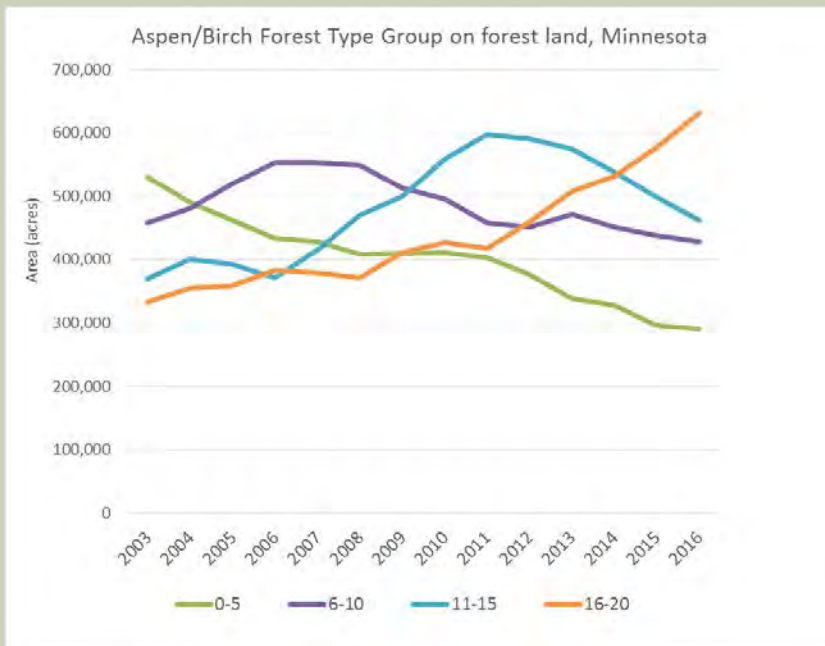


FIA → CONSERVATION SCALES

Coarse Filter

Meso-Filter

Fine Filter

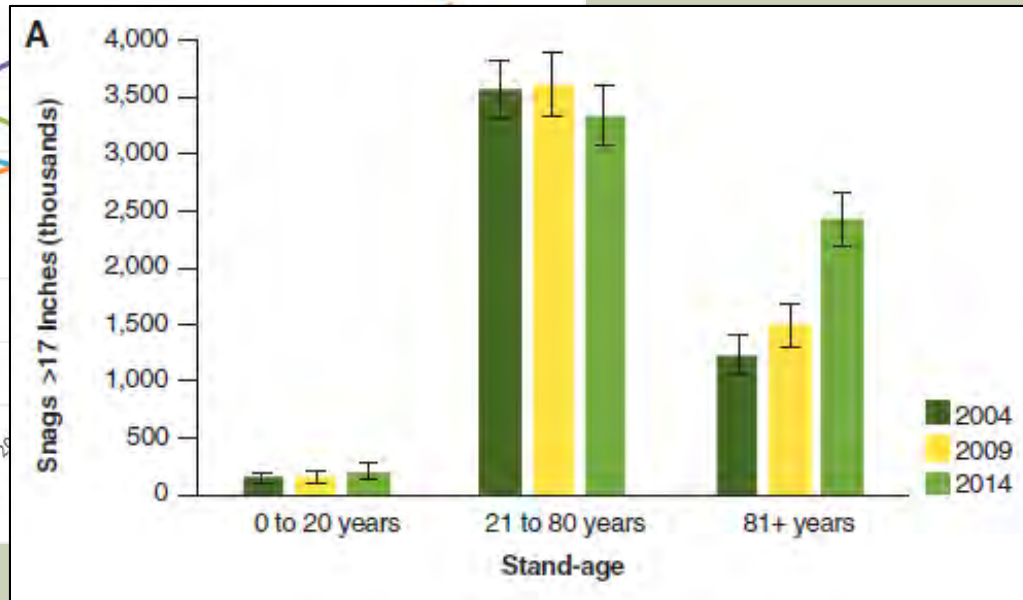
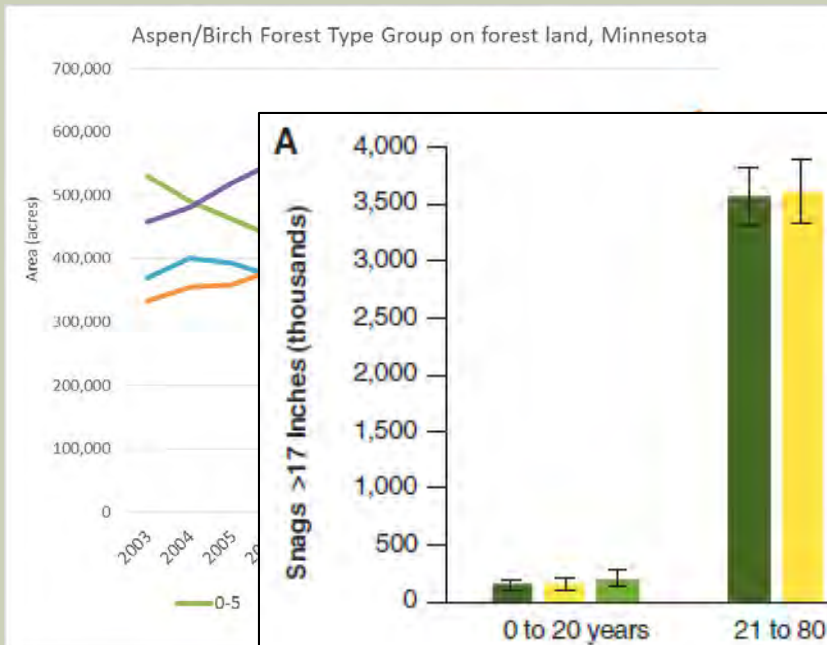


FIA → CONSERVATION SCALES

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Fine Filter

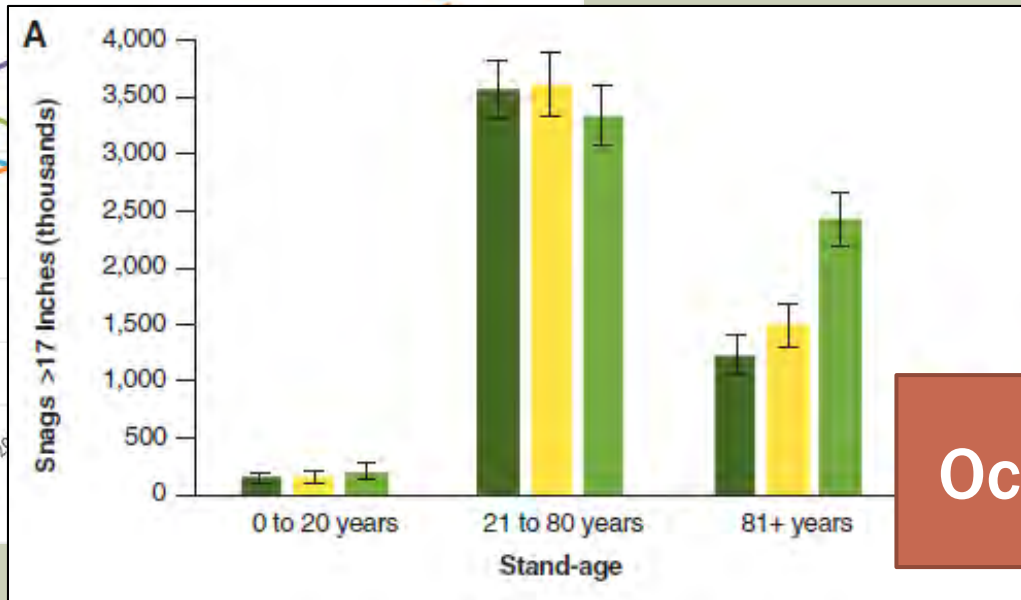
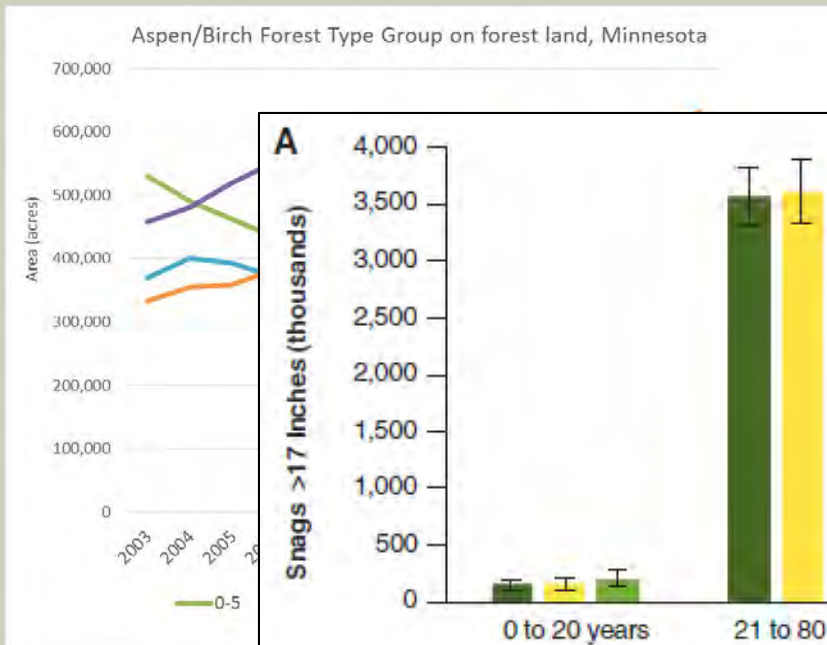


FIA → CONSERVATION SCALES

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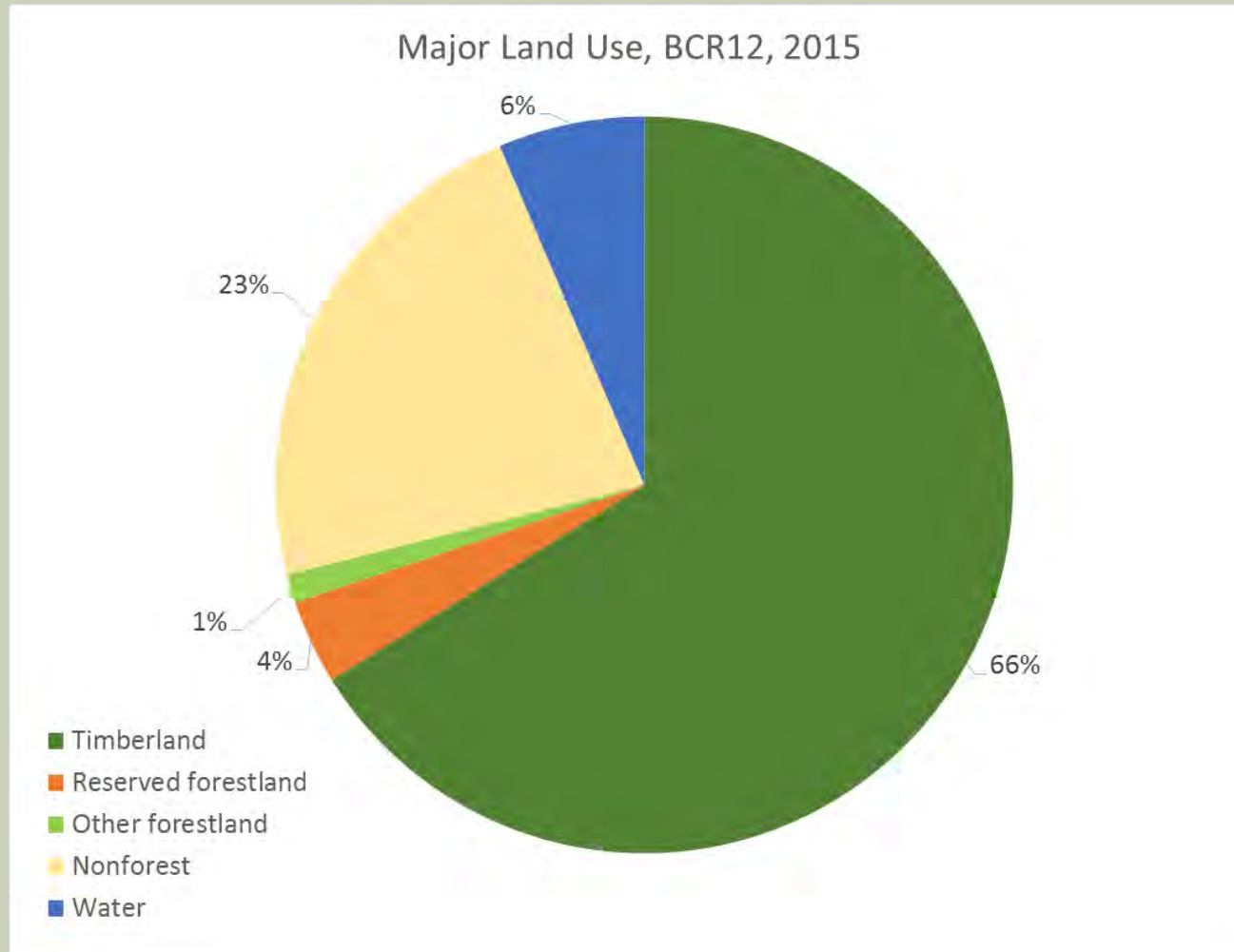


Occasionally...

HABITAT TYPE ESTIMATES

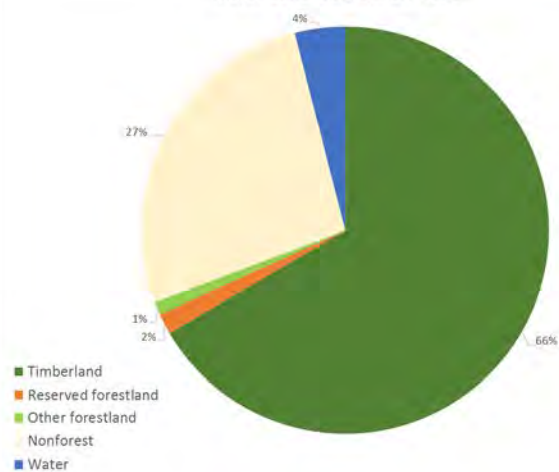
- Major Land Use
- Timberland
 - Ownership
 - Size Class
 - Type-Group
 - Standing Dead Trees
- Geographic variation
- Trends
- Cutting and Disturbance
- Other Products

LAND USE

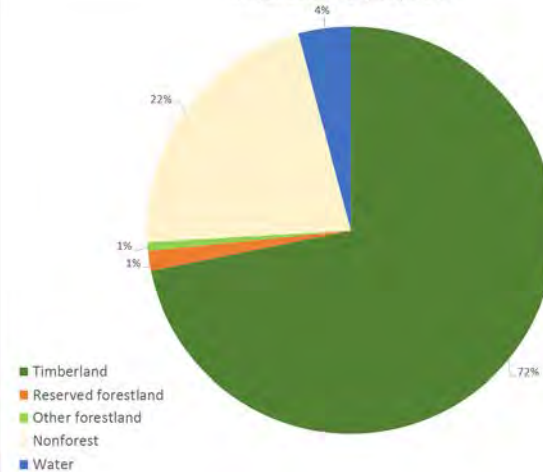


LAND USE

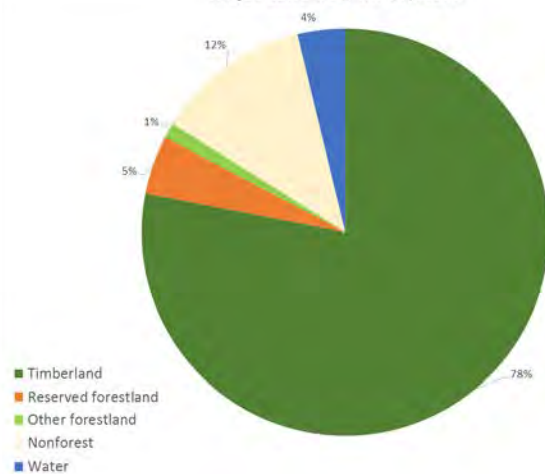
Major Land Use, MI-LP, 2015



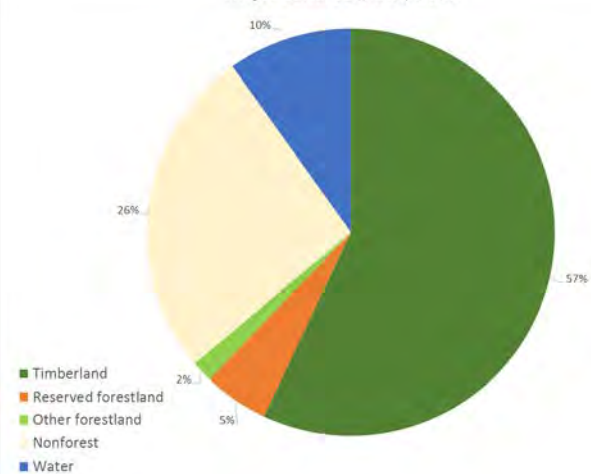
Major Land Use, WI, 2015



Major Land Use, MI-UP, 2015

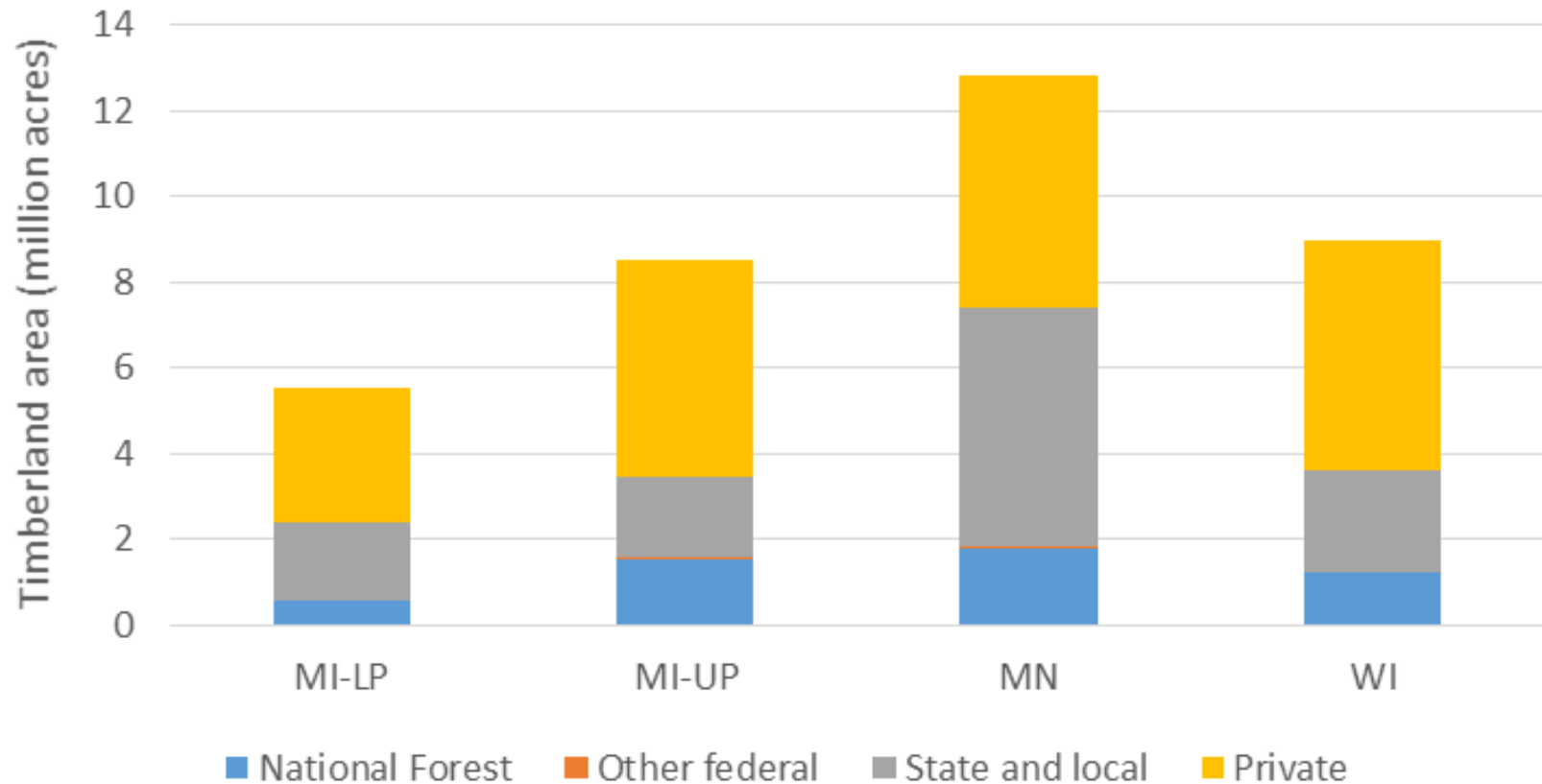


Major Land Use, MN, 2015



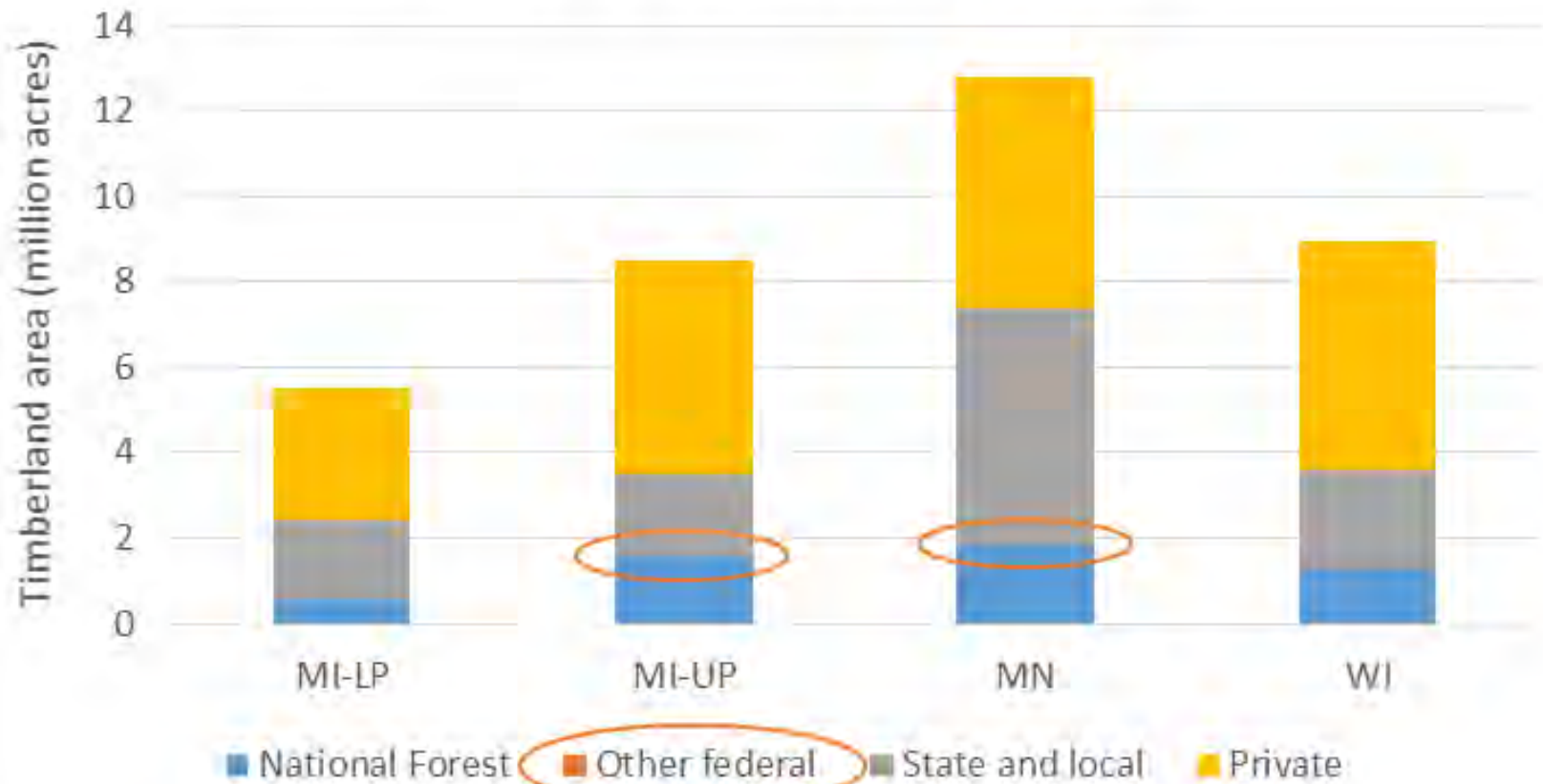
OWNERSHIP

Timberland Ownership, 2015

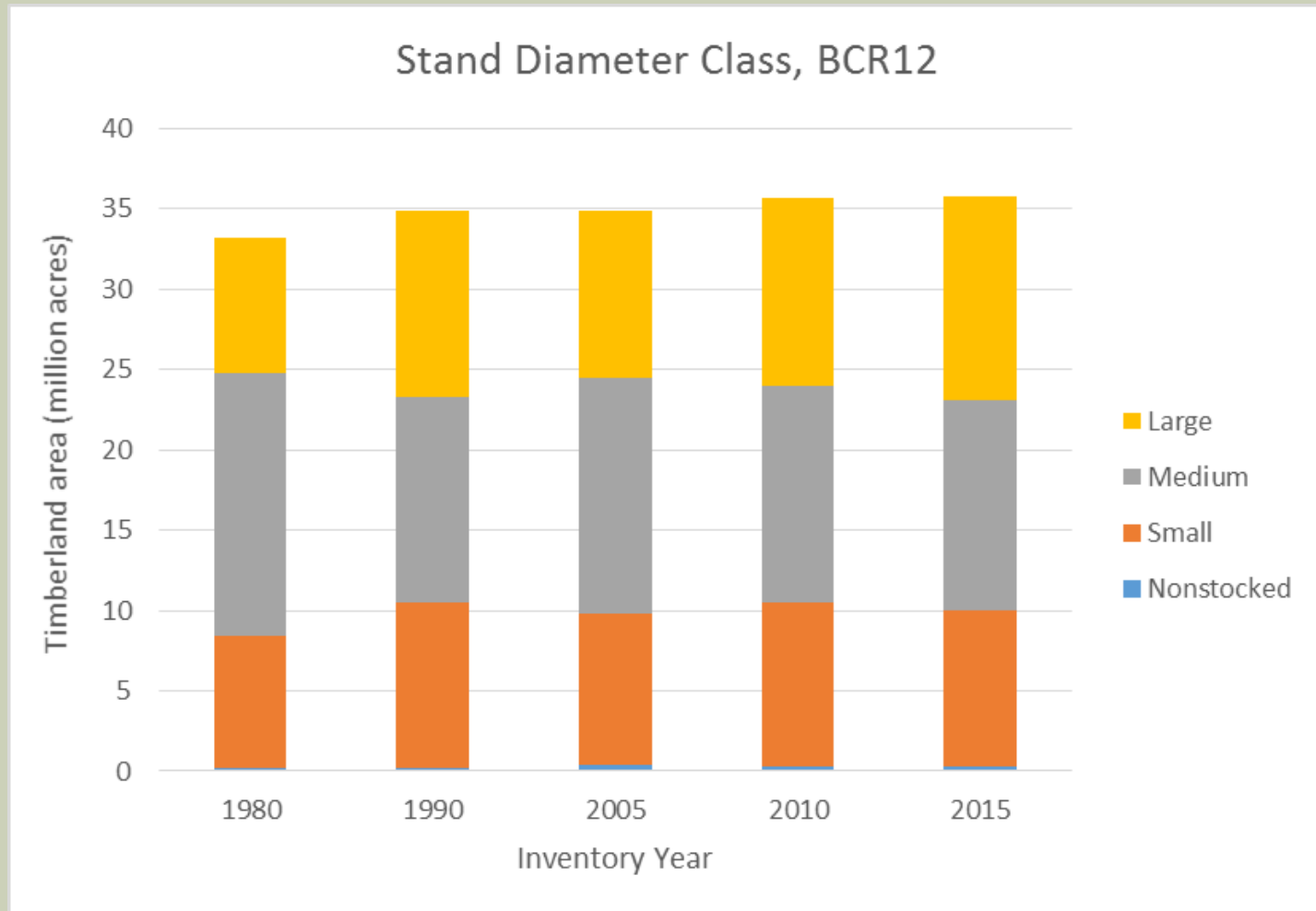


OWNERSHIP

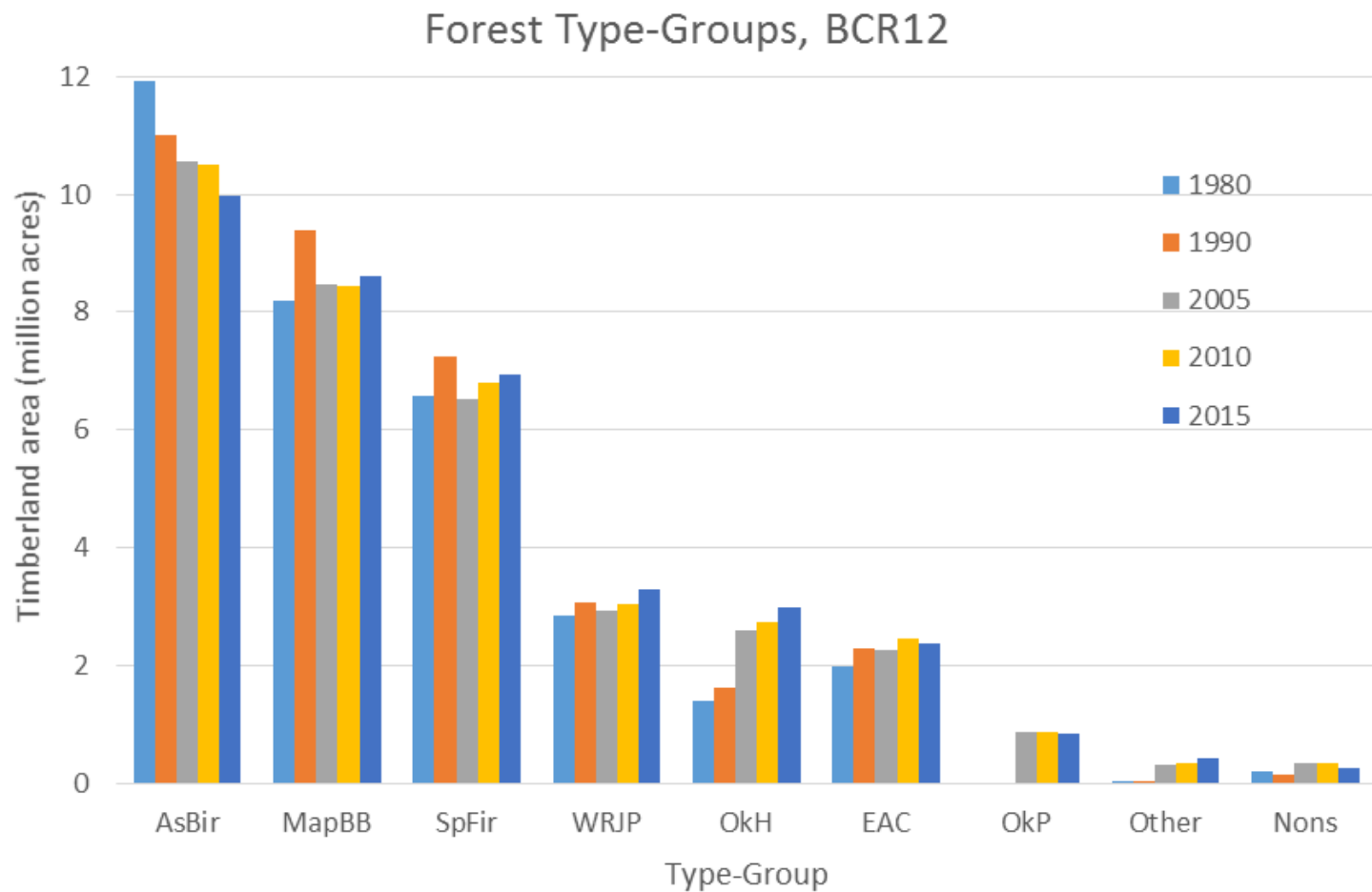
Timberland Ownership, 2015



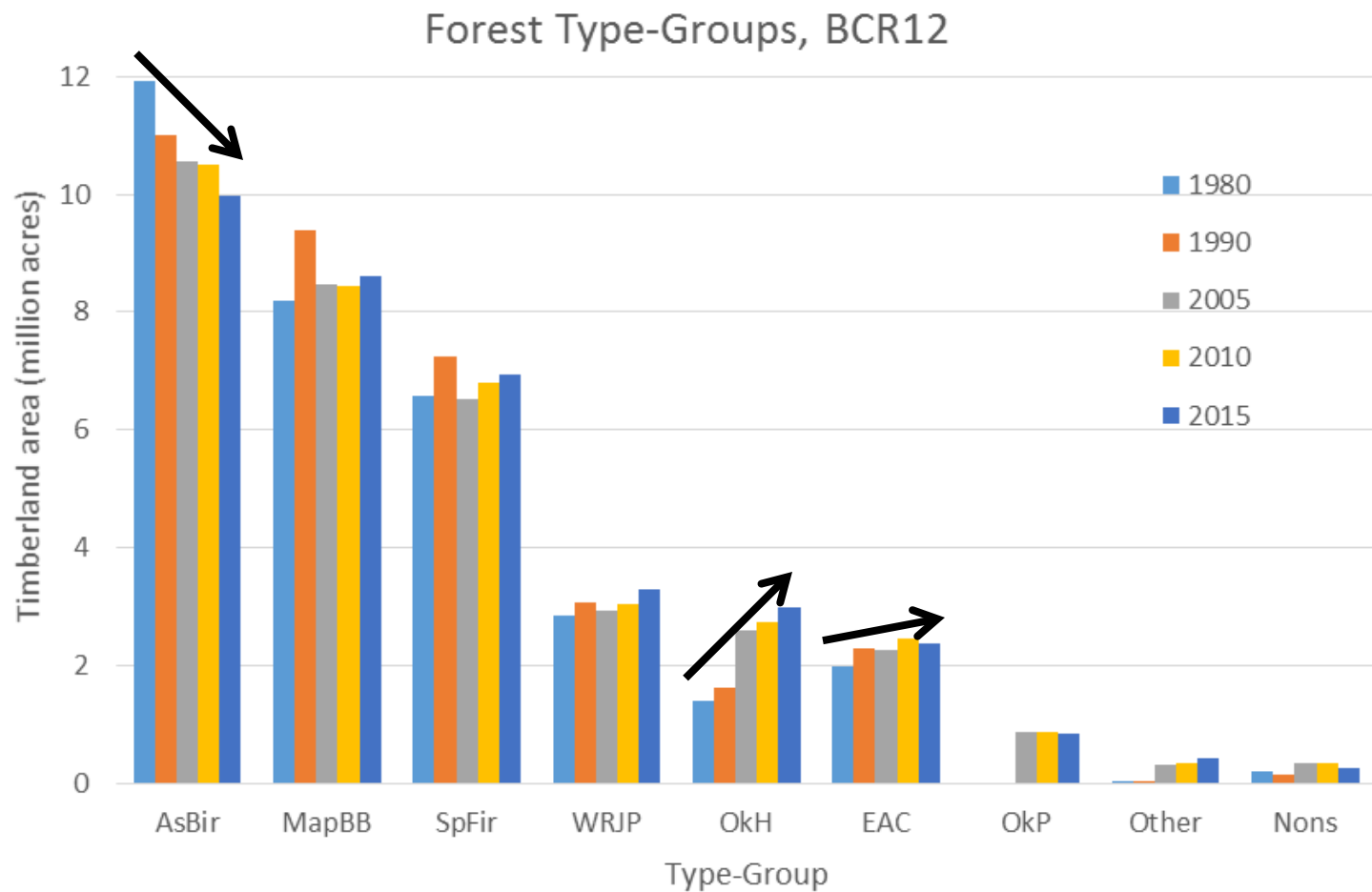
TRENDS: SIZE CLASS



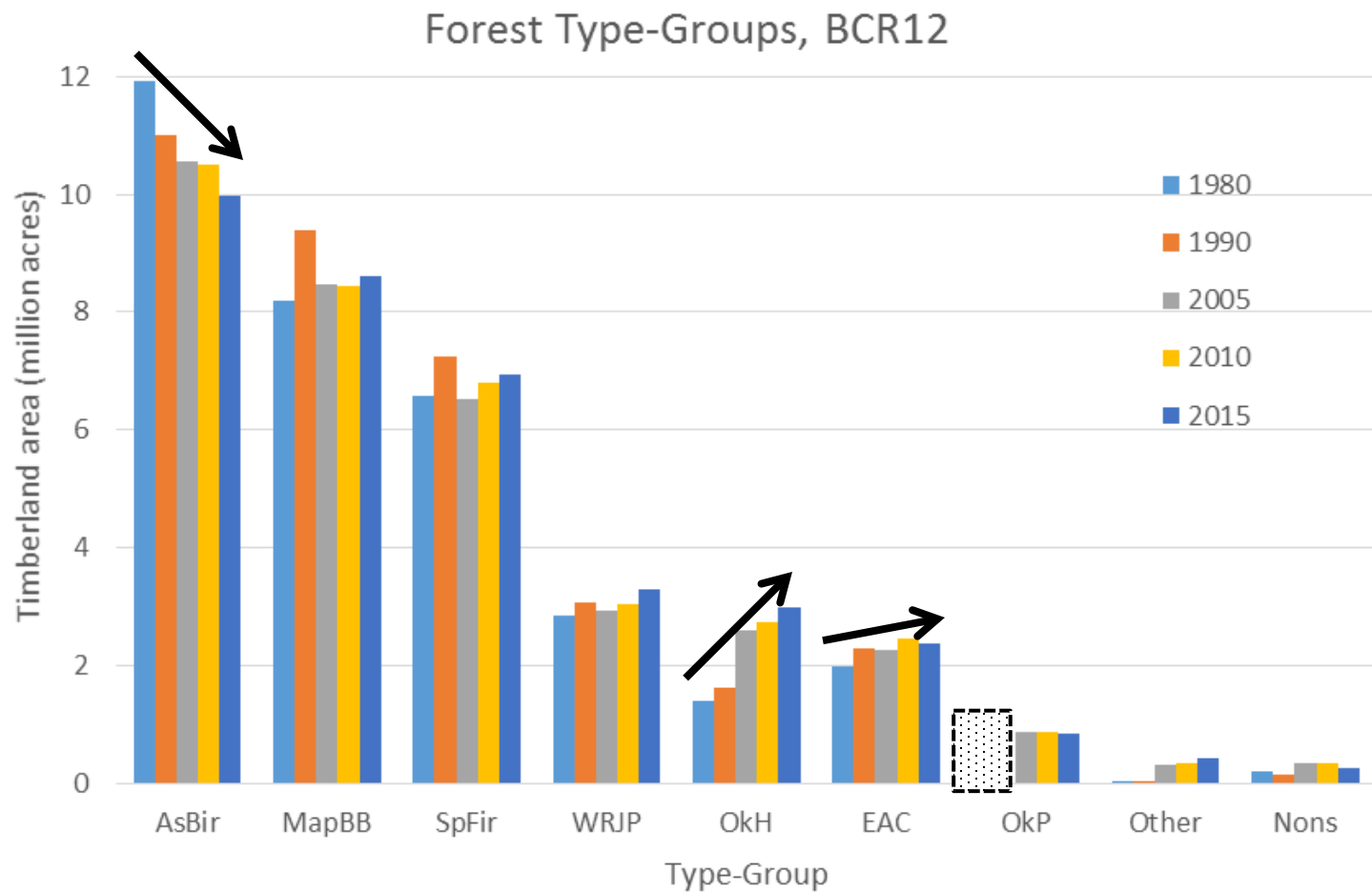
TRENDS: TYPE-GROUP



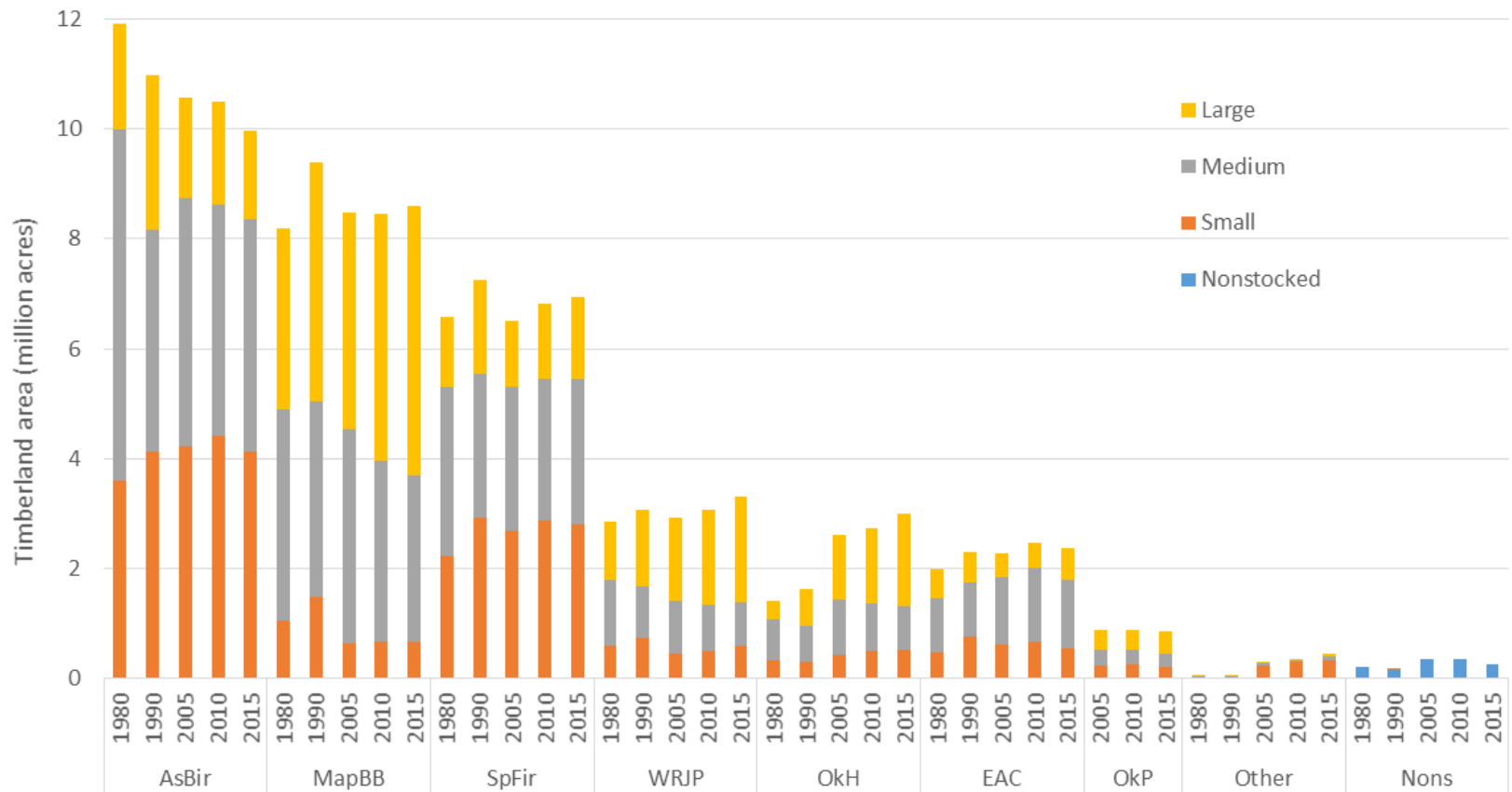
TRENDS: TYPE-GROUP



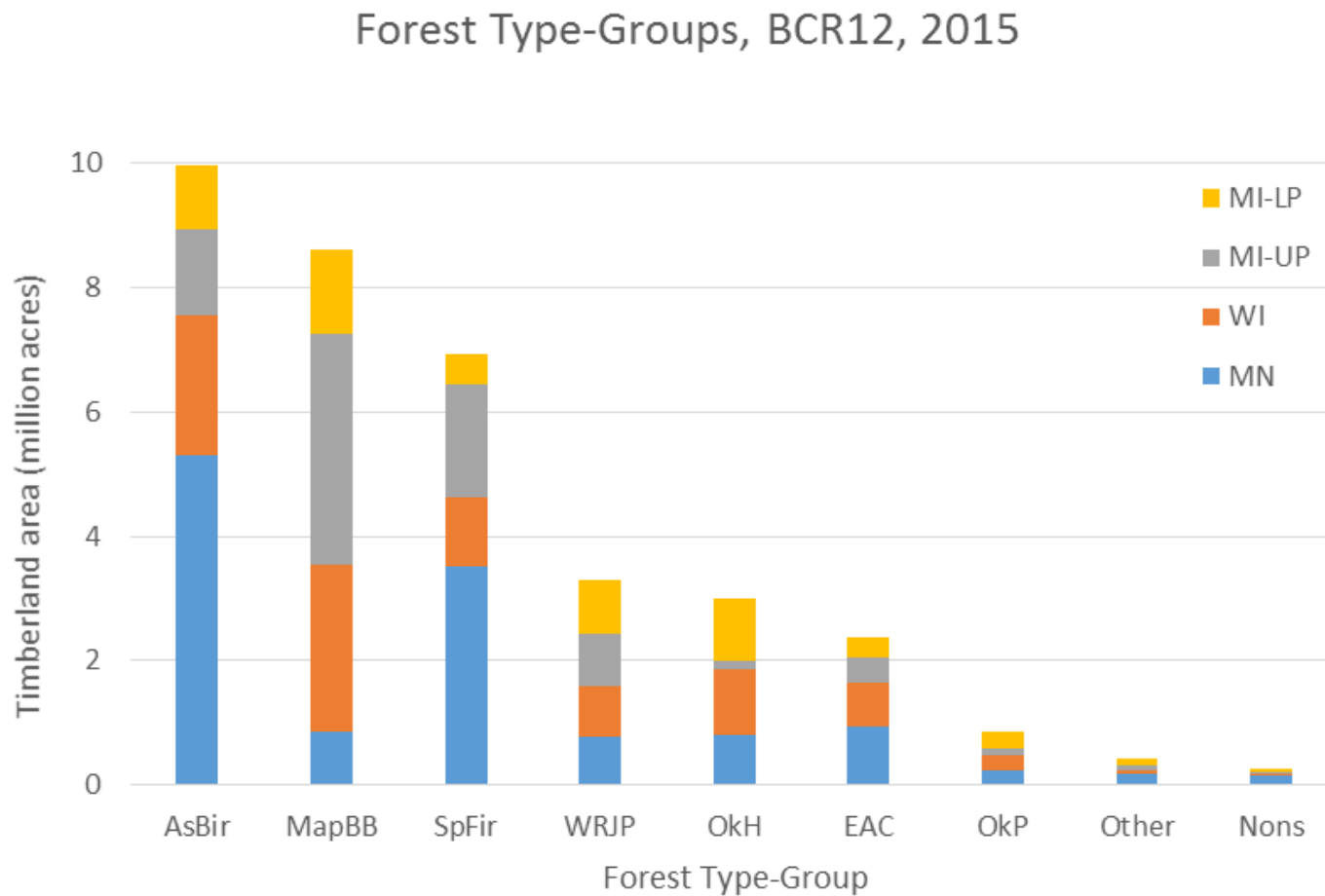
TRENDS: TYPE-GROUP



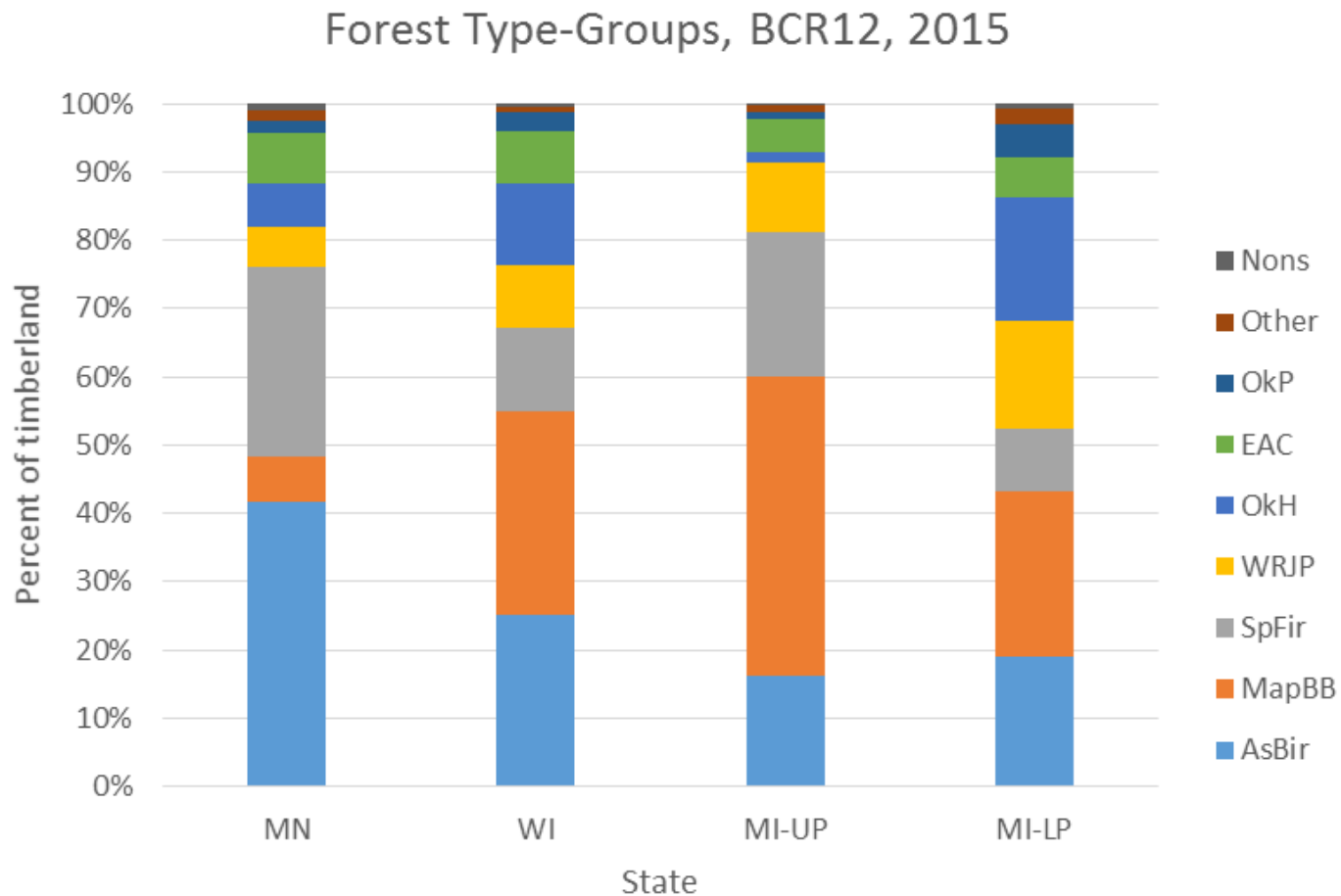
TRENDS: SIZE AND TYPE-GROUP



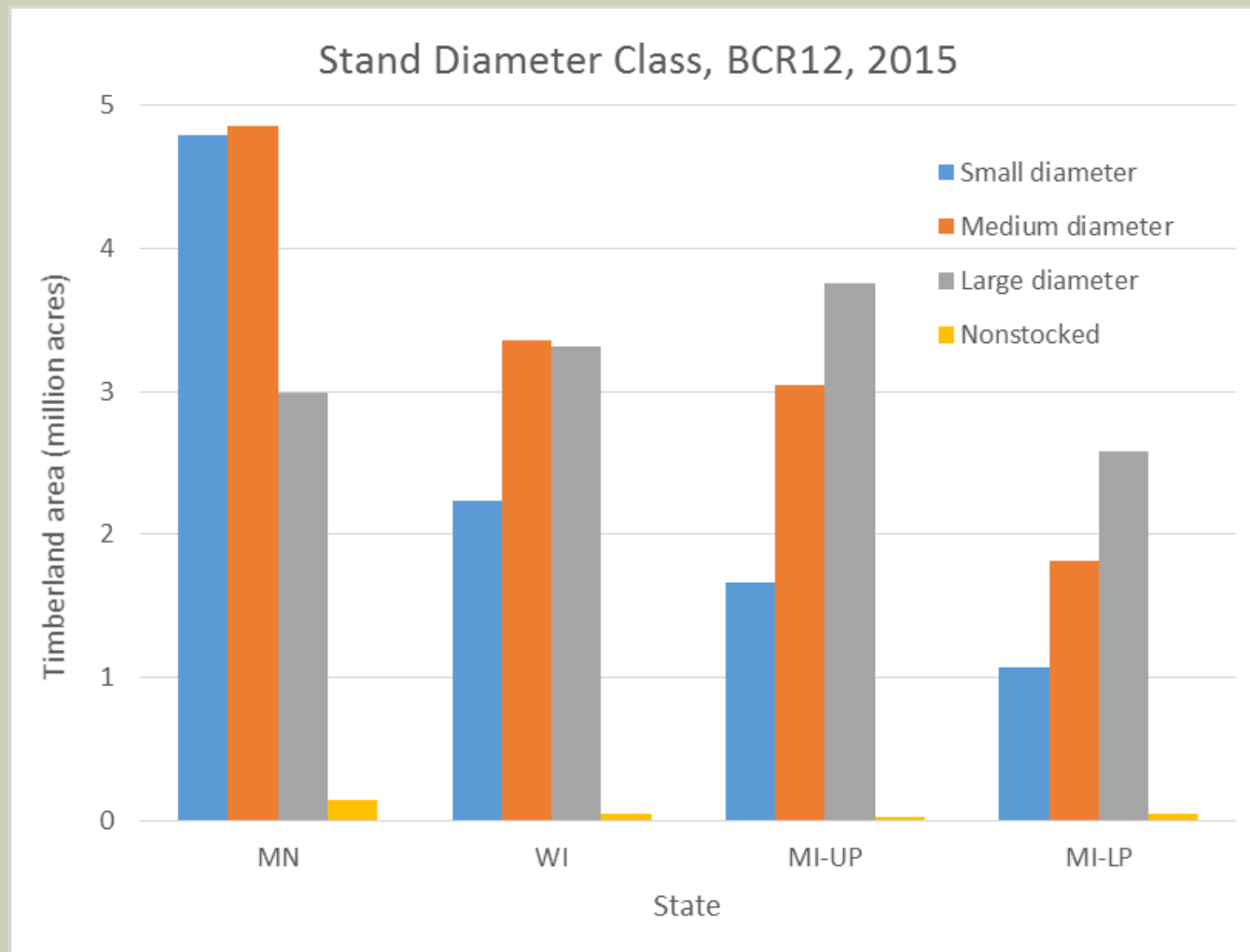
TYPE-GROUP



TYPE-GROUP

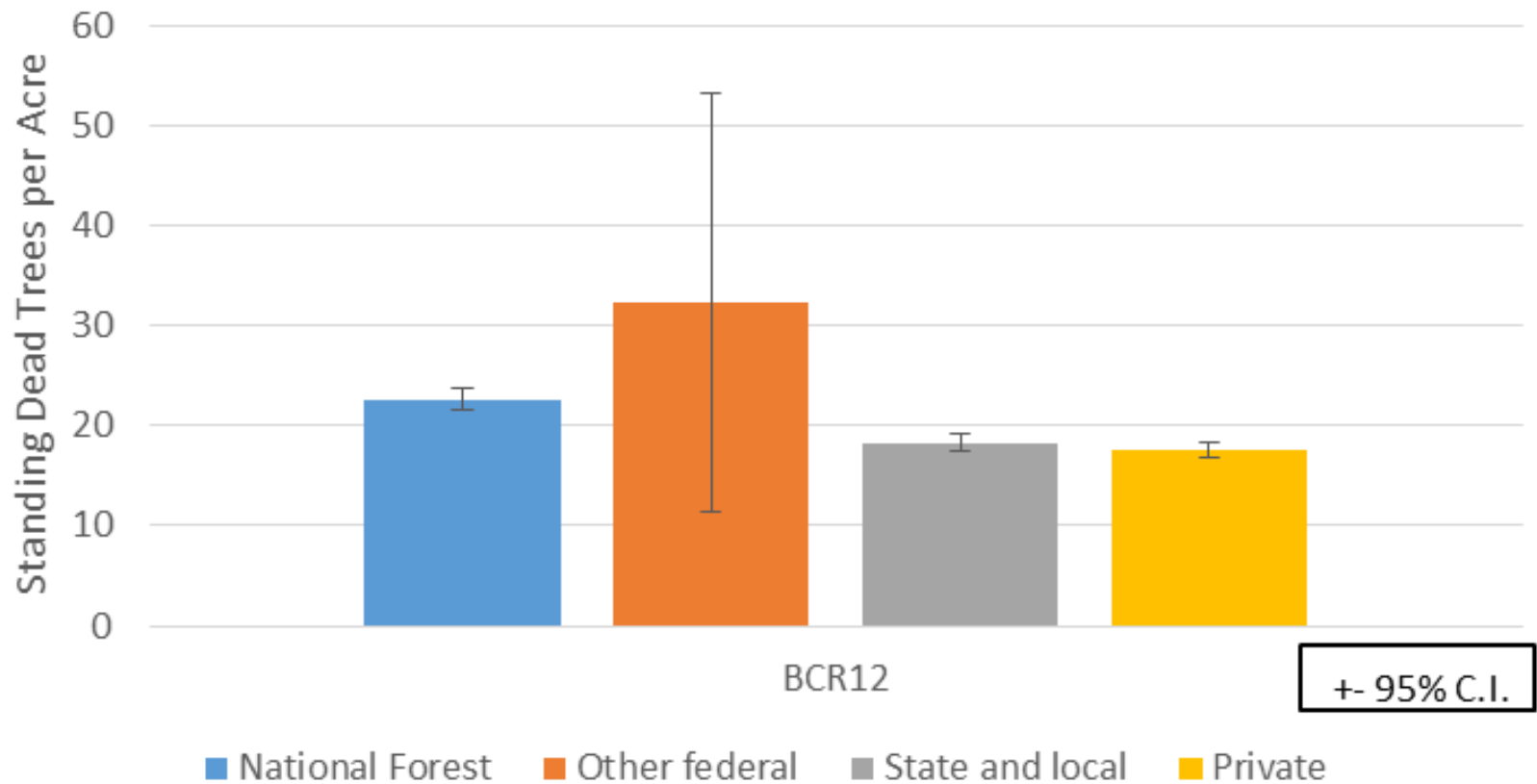


SIZE CLASS



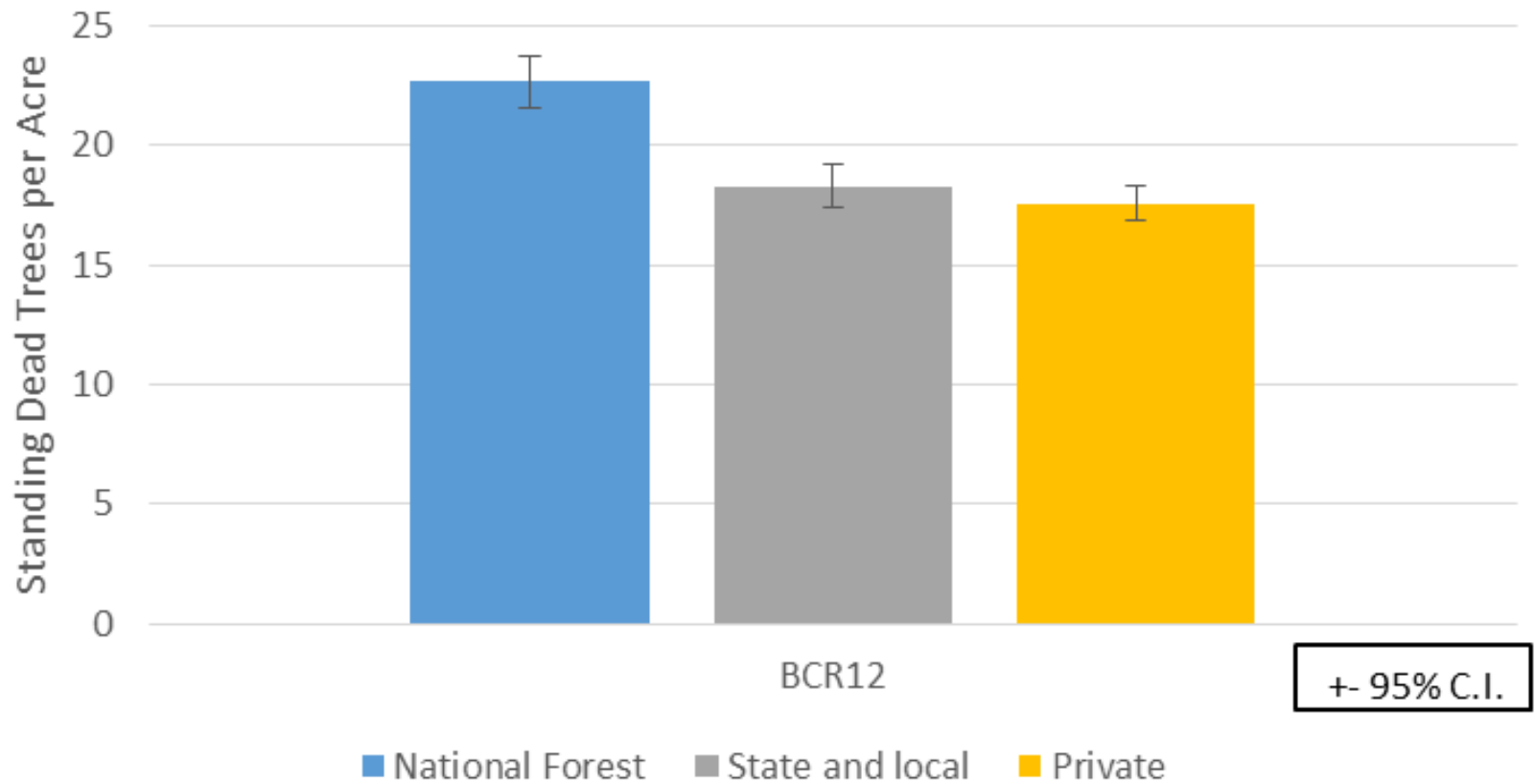
STANDING DEAD TREES

Dead TPA on timberland, BCR12, 2015



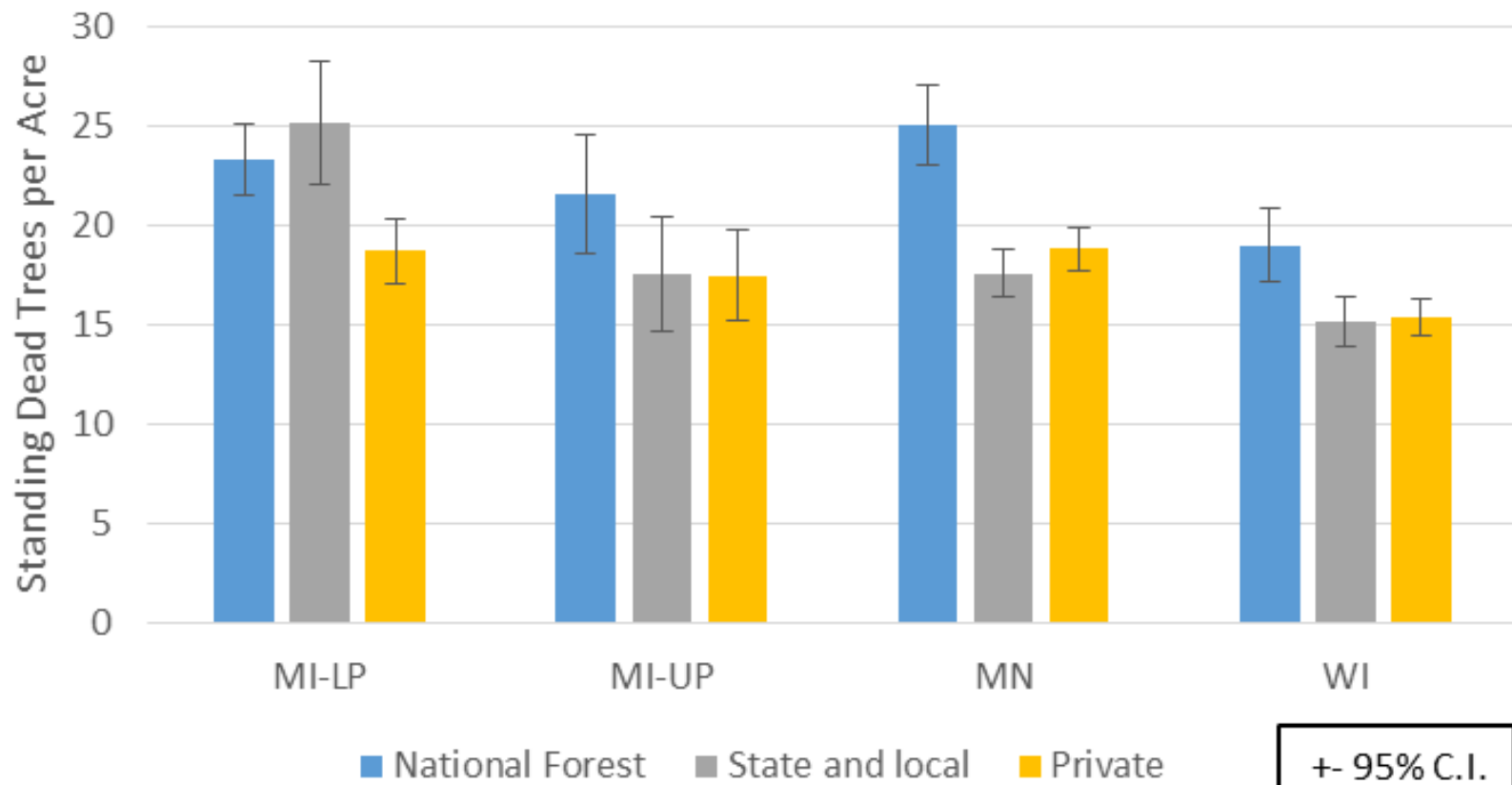
STANDING DEAD TREES

Dead TPA on timberland, BCR12, 2015



STANDING DEAD TREES

Dead TPA on timberland, BCR12, 2015





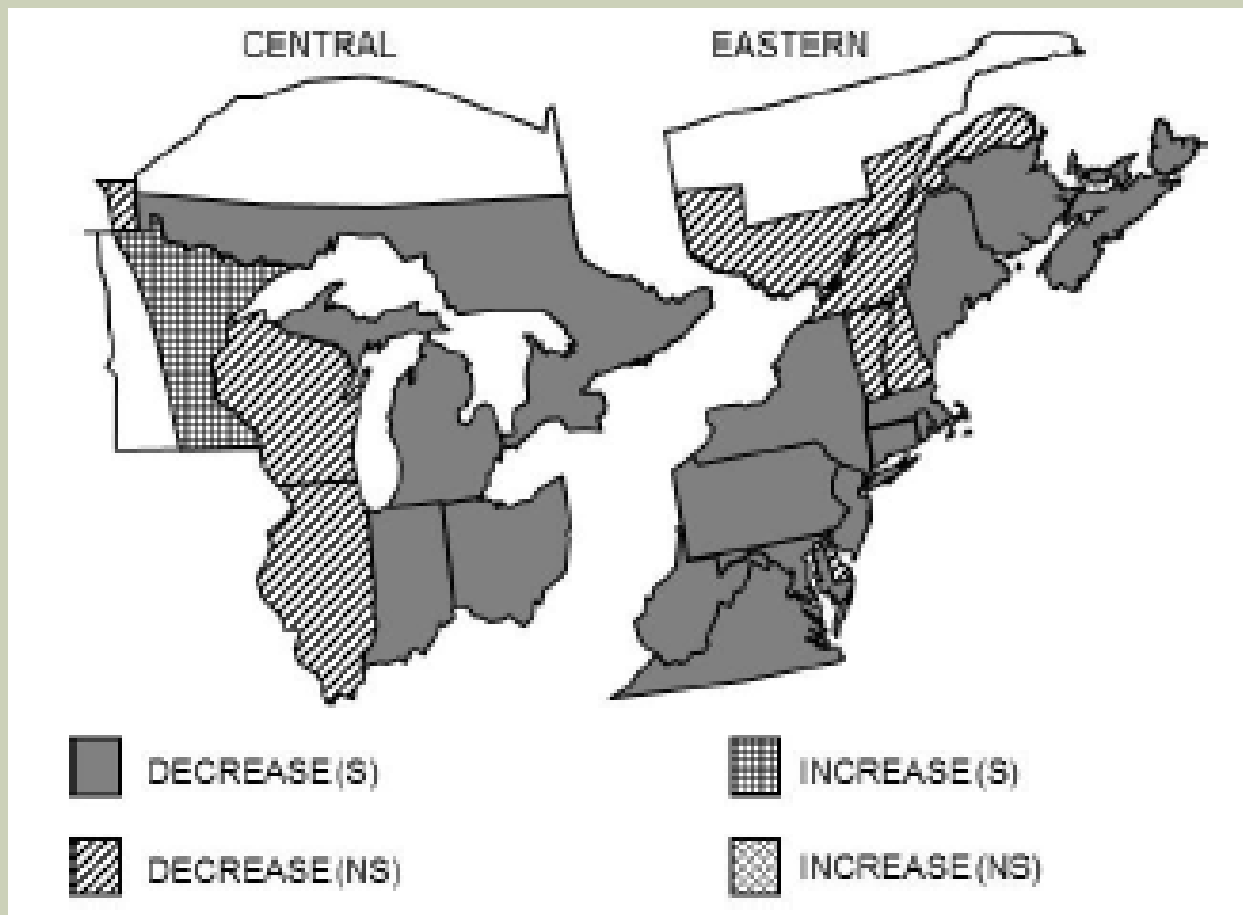
U.S. Fish & Wildlife Service

American Woodcock

Population Status, 2016

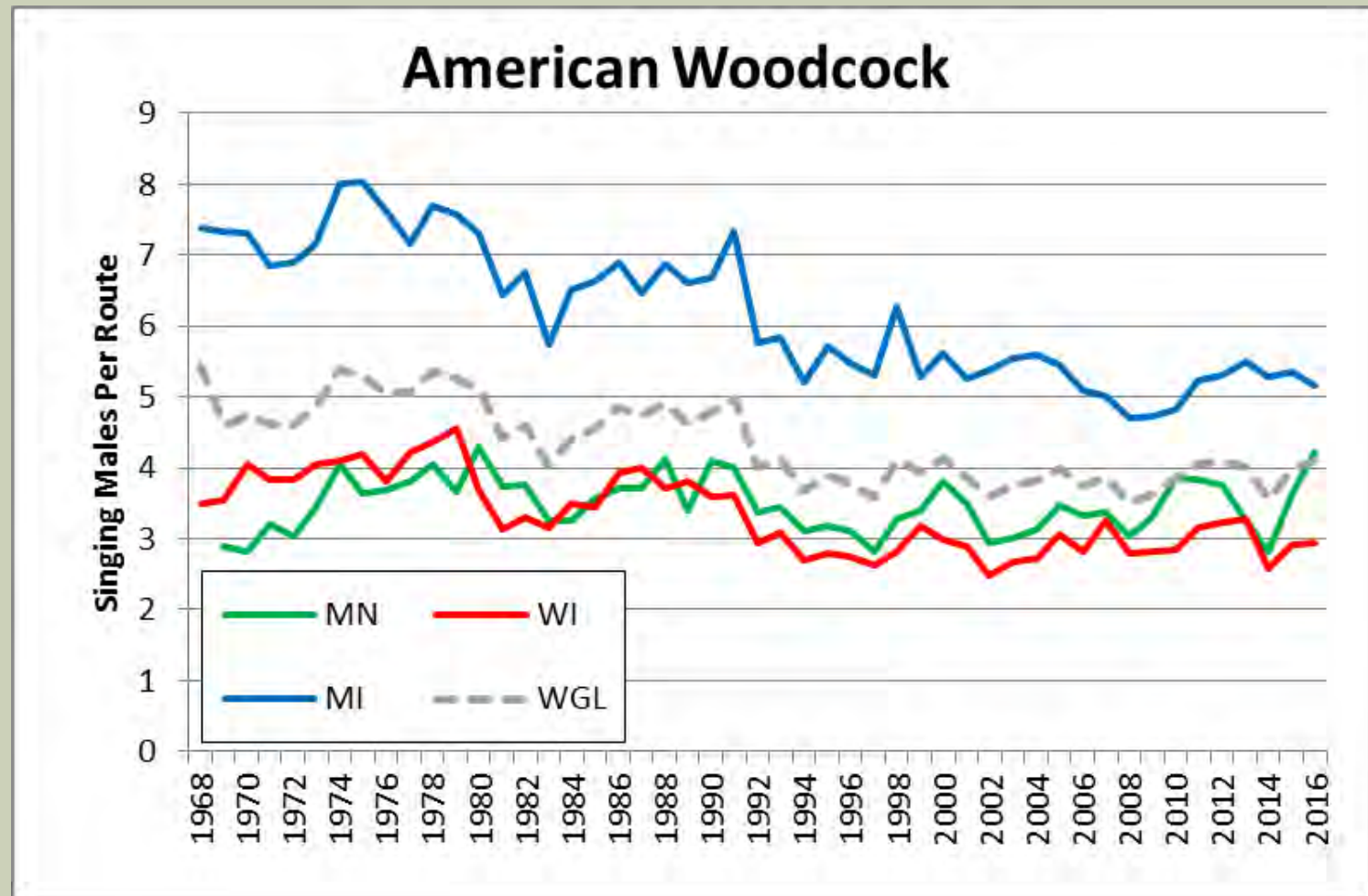


WOODCOCK TRENDS, 1968-2016



Seamans and
Rau (2016)

WESTERN GREAT LAKES



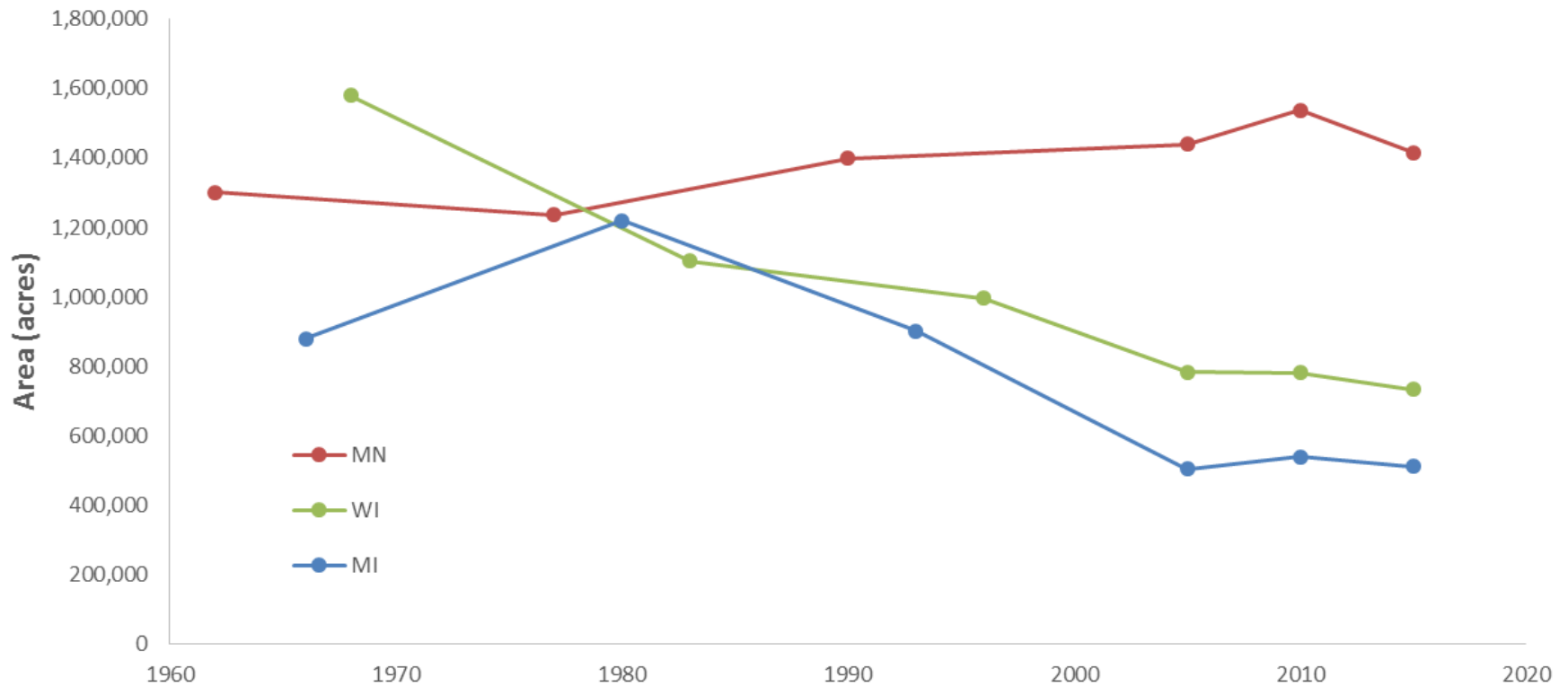
SUCCESSIONAL/STRUCTURAL STAGE



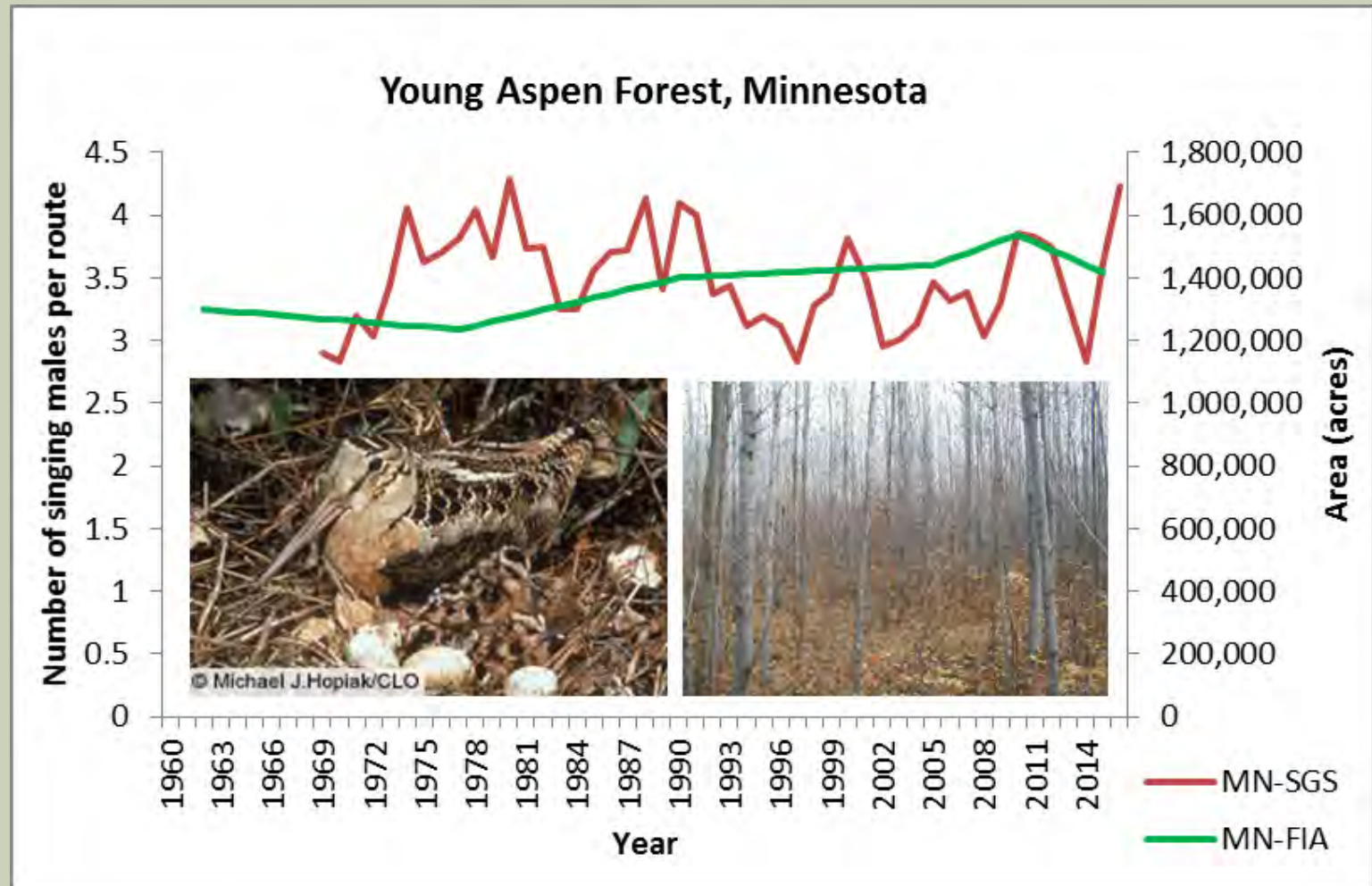
Mike Ostry, USDA FS Northern Research Station

YOUNG ASPEN TRENDS

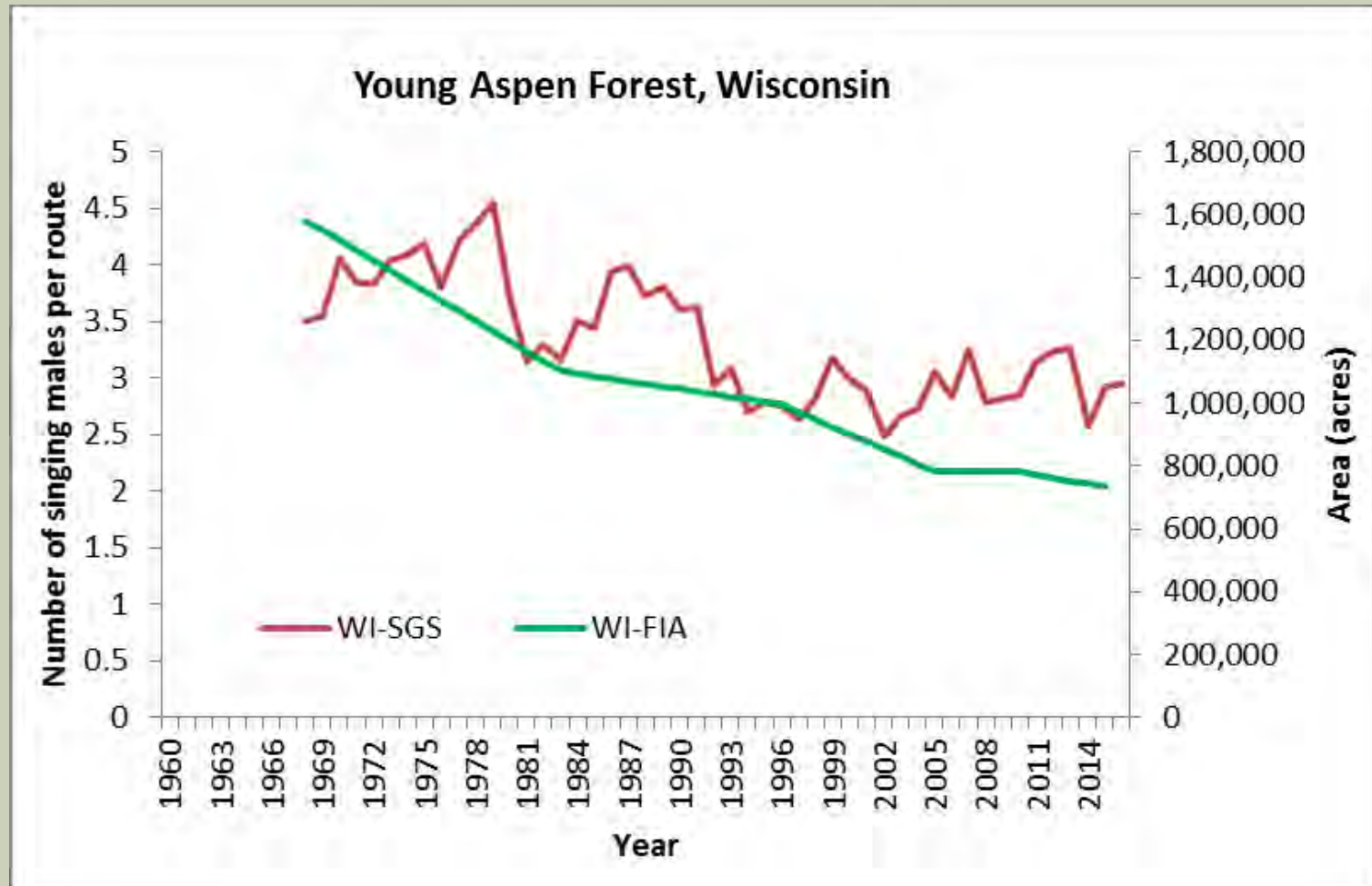
Young (0-20 years) Aspen Timberland in the Upper Great Lakes



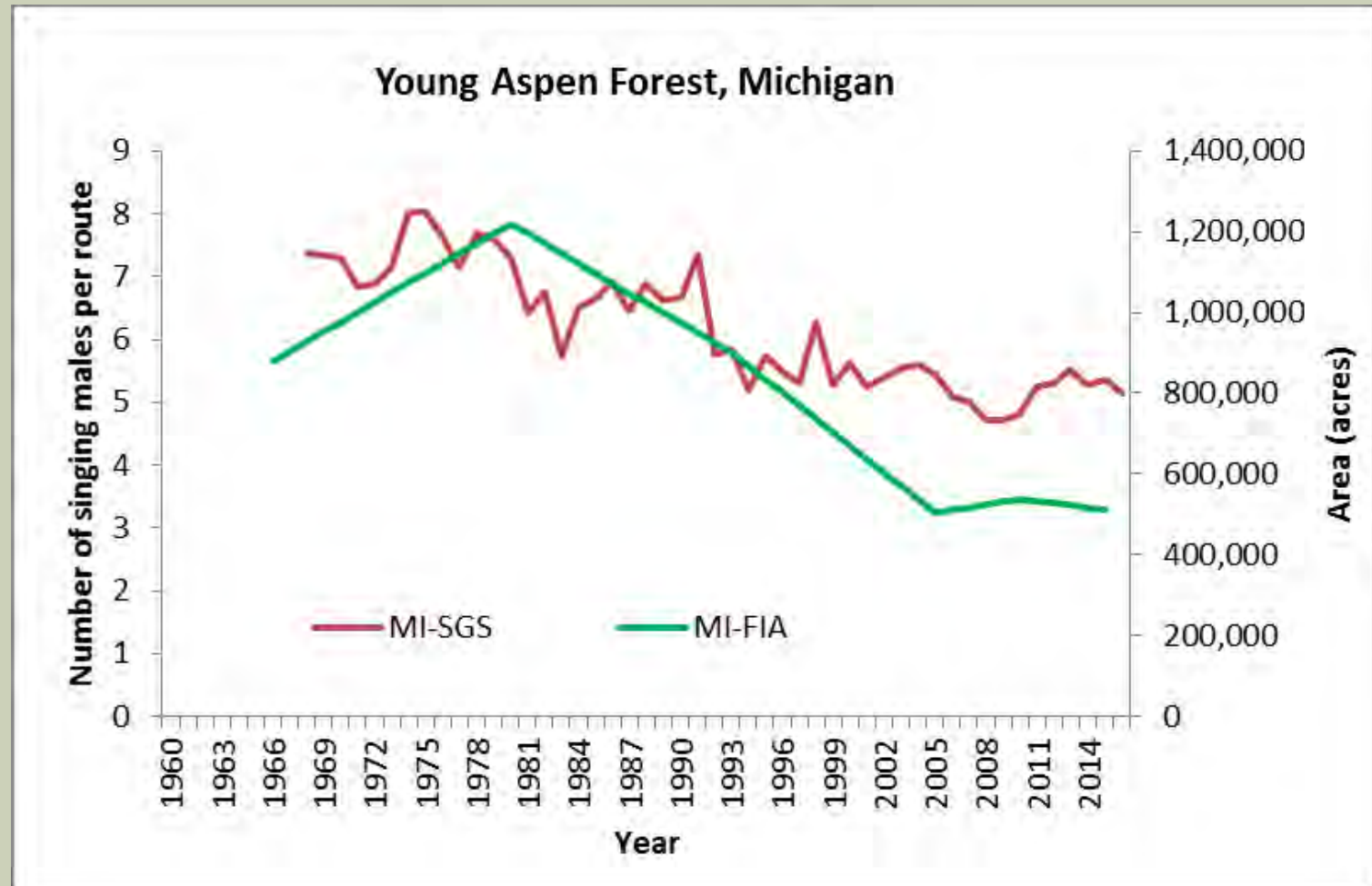
MINNESOTA SGS AND FIA TRENDS



WI SGS-FIA TRENDS



MI SGS-FIA TRENDS

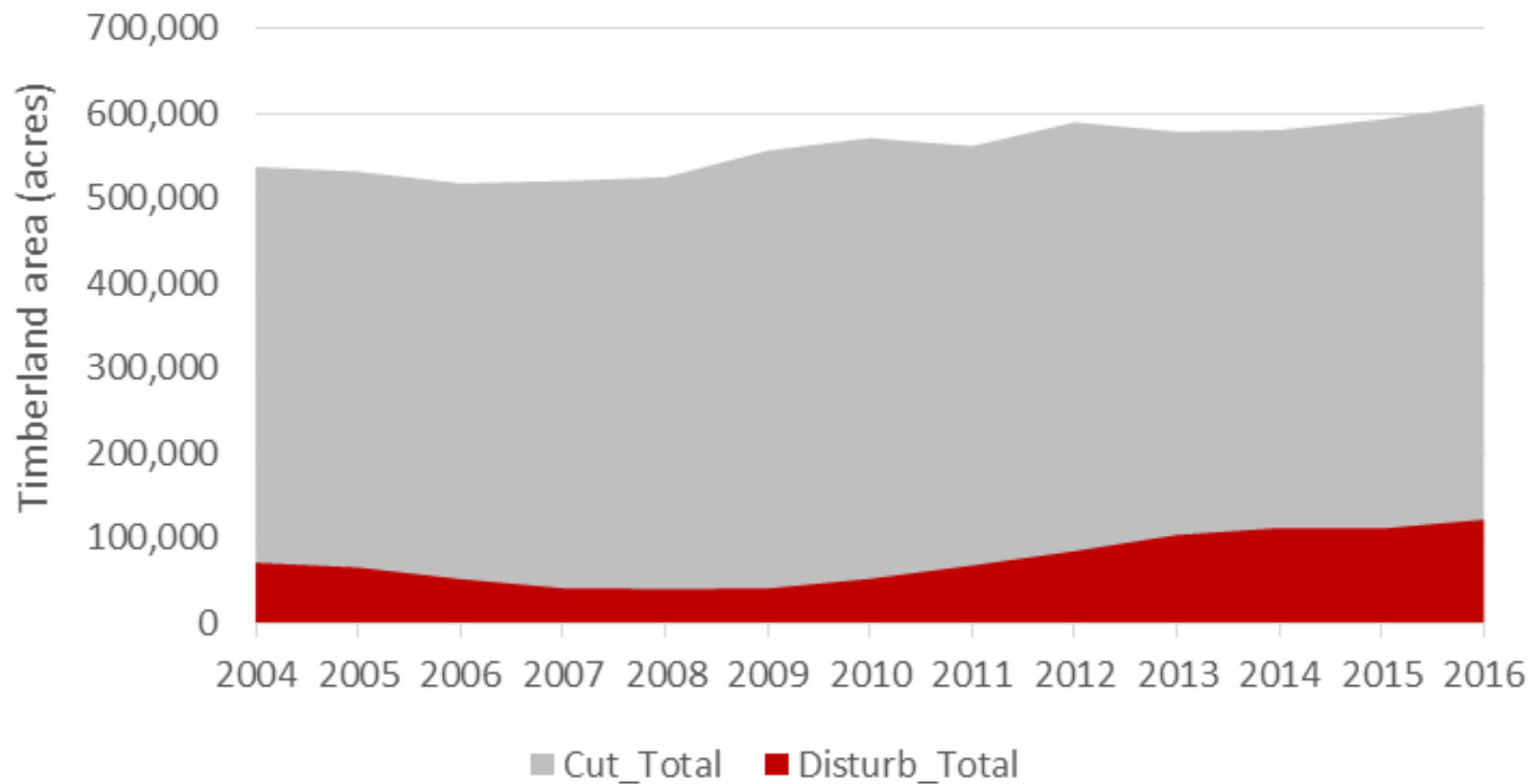


CANOPY DISTURBANCE



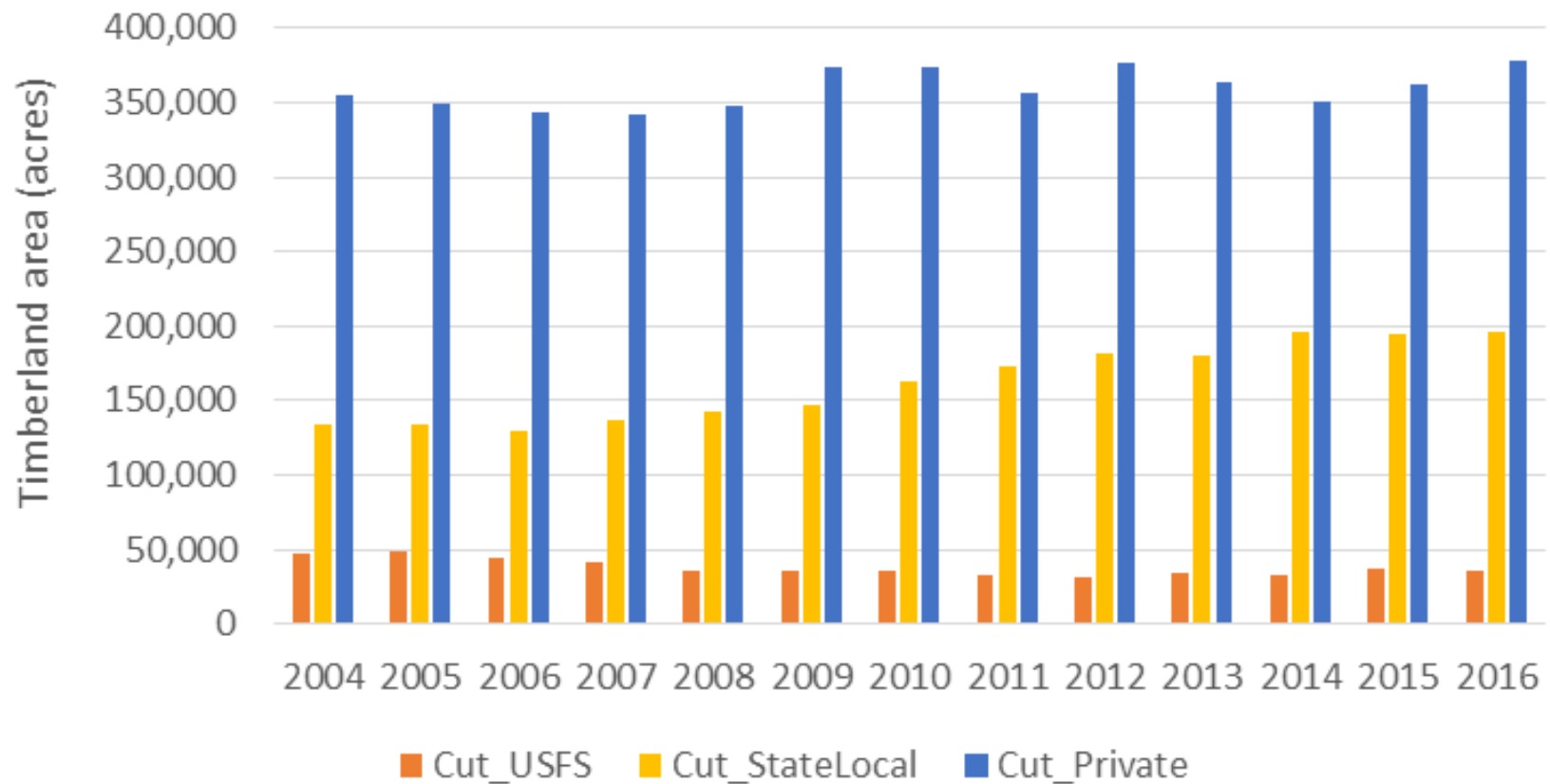
COVER CHANGE

Average Annual Cutting or Disturbance, BCR12



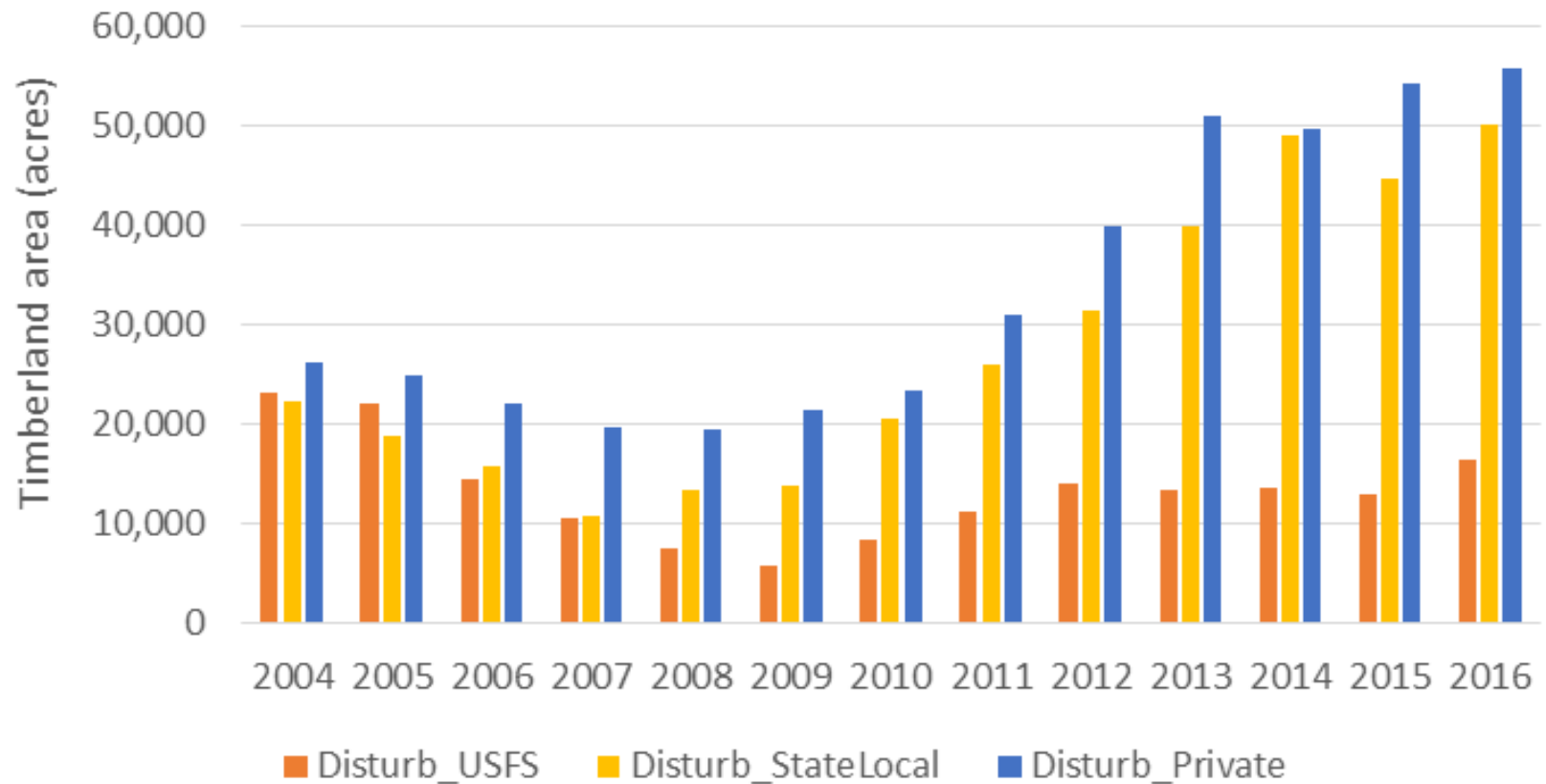
CUTTING

Average Annual Cutting, BCR12



DISTURBANCE

Average Annual Wind or Fire, BCR12



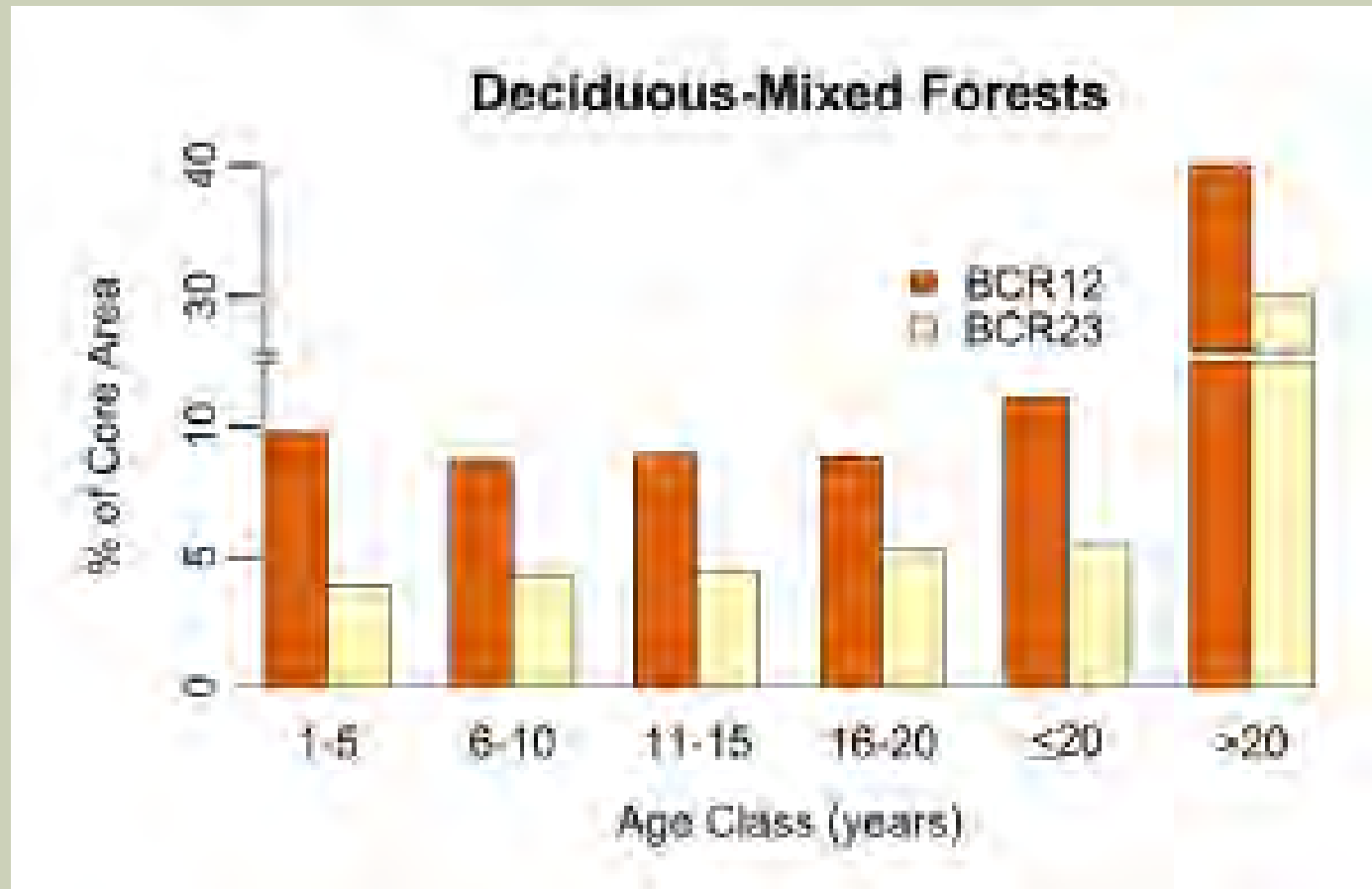
METRICS OF LANDSCAPE PATTERN



PATCH SIZE



CORE AREA



MN TREE SPECIES BA

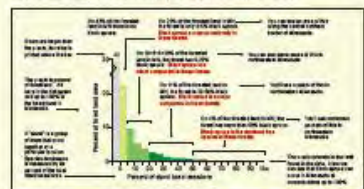
Modeled distributions of 10 tree species in Minnesota

Rachel Roman, Barry T. Wilson, Andrew J. Lister, Owen Cook, and Sierra Czar-Murdoch

Key Description

These maps depict the distributions of 10 tree species across Minnesota. The maps show where these trees do not occur (gray), occasionally occur (dark green), are a major component (medium green), or are the dominant species (light green) in the forest, as determined by the species' leaf morphology. Based on the degree of a species' leaf morphology, the maps show where these trees do not occur (gray), occasionally occur (dark green), are a major component (medium green), or are the dominant species (light green) in the forest, as determined by the species' leaf morphology. Based on the degree of a species' leaf morphology, the maps show where these trees do not occur (gray), occasionally occur (dark green), are a major component (medium green), or are the dominant species (light green) in the forest, as determined by the species' leaf morphology.

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These maps are based on species' leaf morphology, which is a key factor in determining their distribution. The maps show where these trees do not occur (gray), occasionally occur (dark green), are a major component (medium green), or are the dominant species (light green) in the forest, as determined by the species' leaf morphology.

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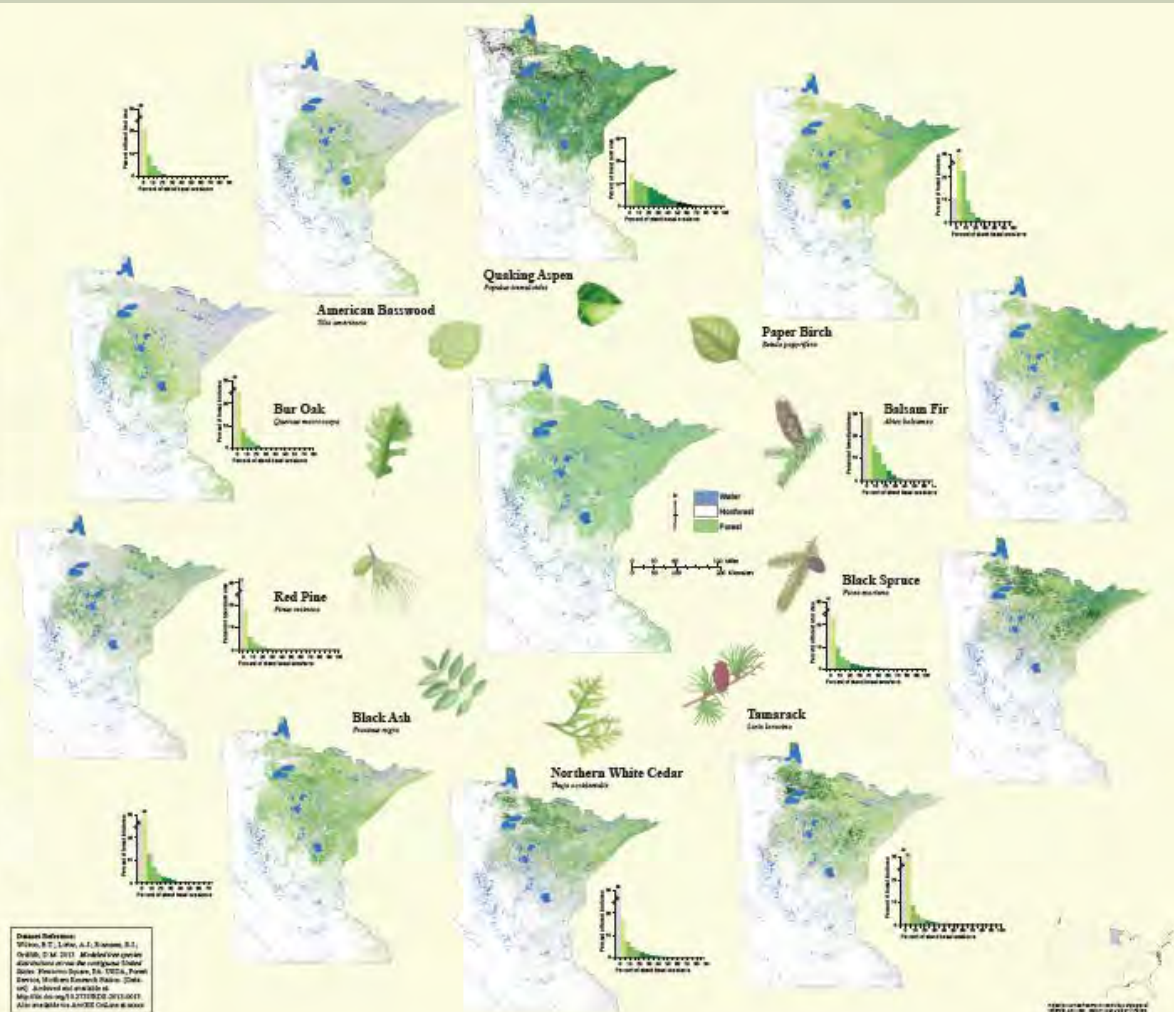
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For more information, visit:
Barry Wilson (barry@usda.gov)
Rachel Roman (rroman@usda.gov)
www.usda.gov

© Forest of Maps, 2016

Dataset Definition:
Wilson, B.T., Lister, A.J., Roman, R.J., Cook, O., & Czar-Murdoch, S. (2016). Modeled tree species distributions across the contiguous United States. *Forest Science*, 62(1), 1-10. DOI: 10.1093/forsci/fxw001. Archived and available at: <https://doi.org/10.1093/forsci/fxw001>. All rights reserved by US Forest Service.

SUMMARY

- **Timberland predominates, increasing in area**
- **Increasing early successional and late successional forest**
- **Decreasing mid-successional forest**
- **Size distributions differ among forest type-groups**
- **Standing dead TPA highest for USFS**
- **Harvest decreased on USFS**
- **Most ESF patches are small, edgy**

CHALLENGES AND OPPORTUNITIES

- This is a work in progress
- Changes differ among ownerships
- Analysis results are affected by scale:
 - Spatial
 - Temporal
 - Thematic
- Local trends may affect management decisions differently
- Future scenarios are needed to inform current decisions

FIA

<https://www.nrs.fs.fed.us/fia/>

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Forest Service

Northern Research Station

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The Northern Research Station FIA unit is responsible for creating and maintaining a comprehensive forest inventory for 24 States: Connecticut, Delaware, Illinois, Indiana, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Dakota, Ohio, Pennsylvania, Rhode Island, South Dakota, Vermont, West Virginia, and Wisconsin. The forests in these States cover about 174 million acres or about 30 percent of the land here.

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CONTACT

Mark Nelson

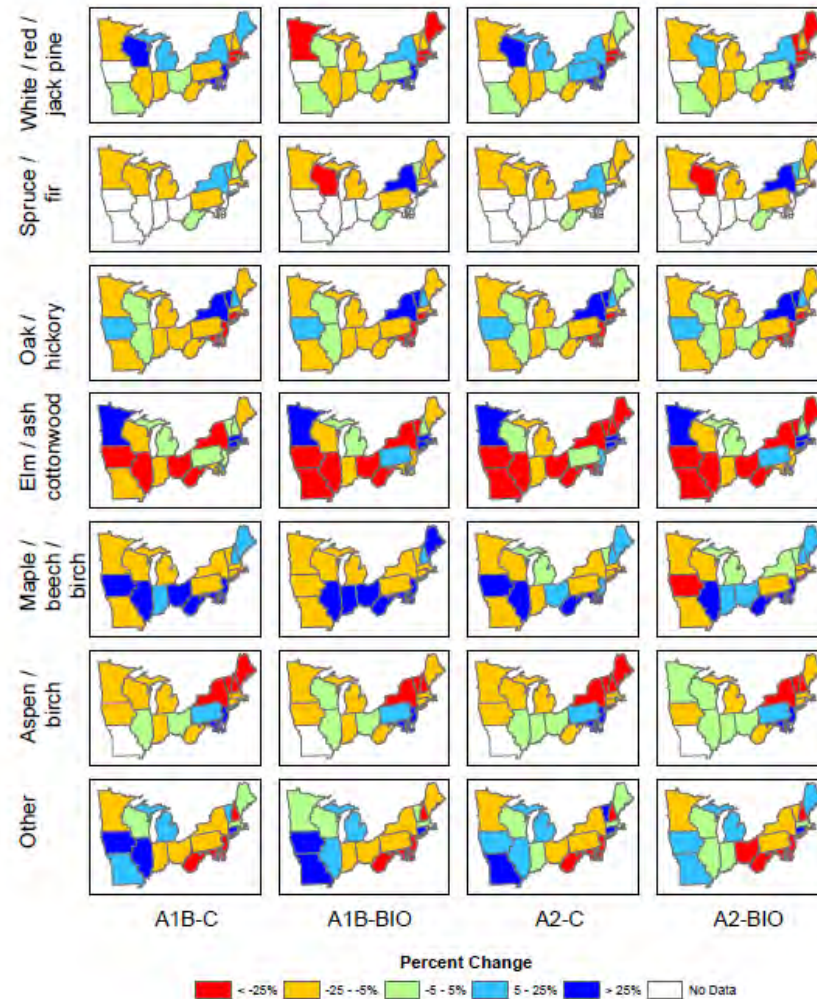
651-649-5104

<https://www.nrs.fs.fed.us/people/Nelson>

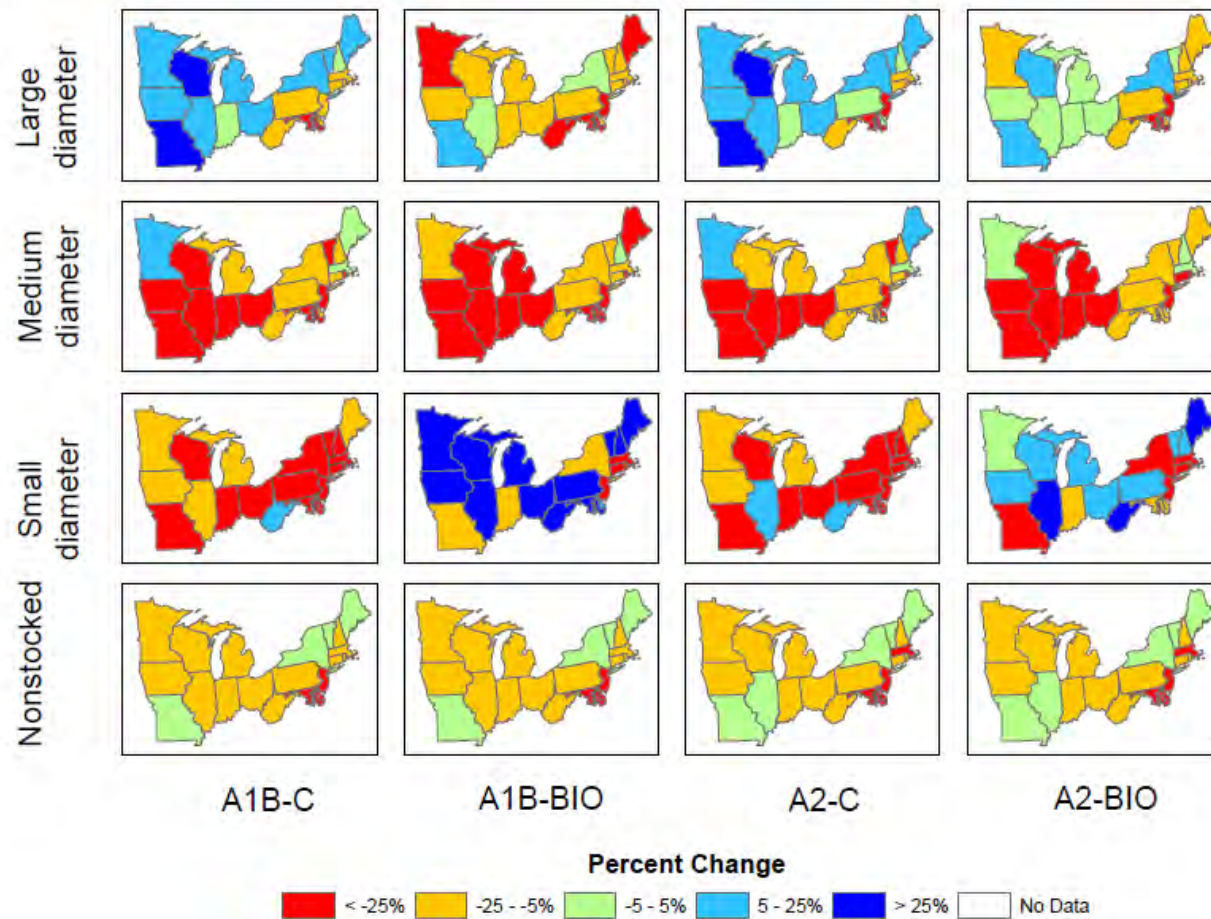
mdnelson@fs.fed.us



FUTURE TYPE-GROUP



FUTURE SIZE



FIA → FINE FILTER

Habitat Type

Habitat

