Implementing the Landscape Triad conceptual framework: Timber production, wildlife, and reserve silviculture case studies

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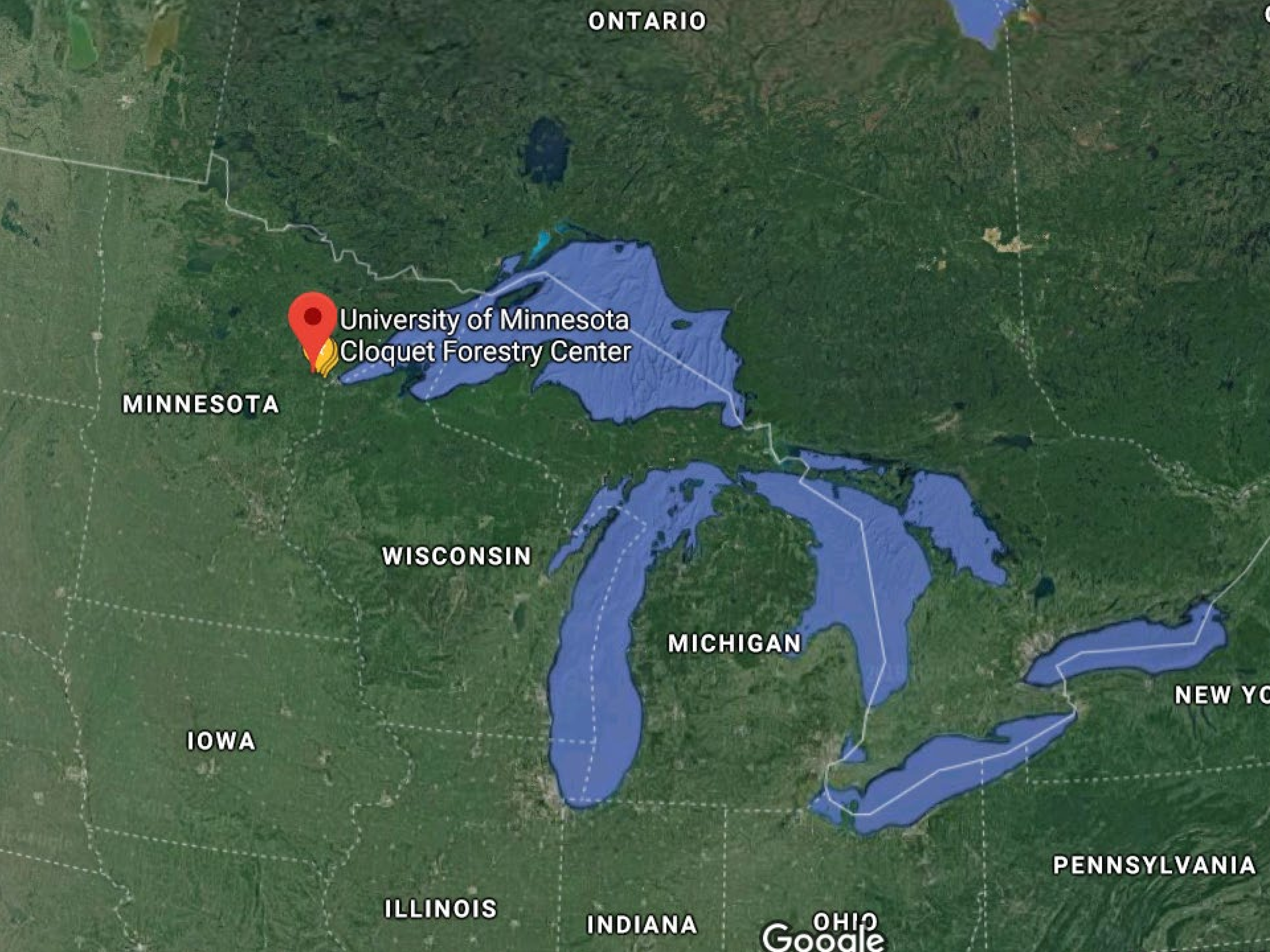
FOREST MANAGEMENT & RESEARCH

What do you want in/from/for forests?

How do we balance multiple objectives?


ONTARIO
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Cloquet Forestry Center
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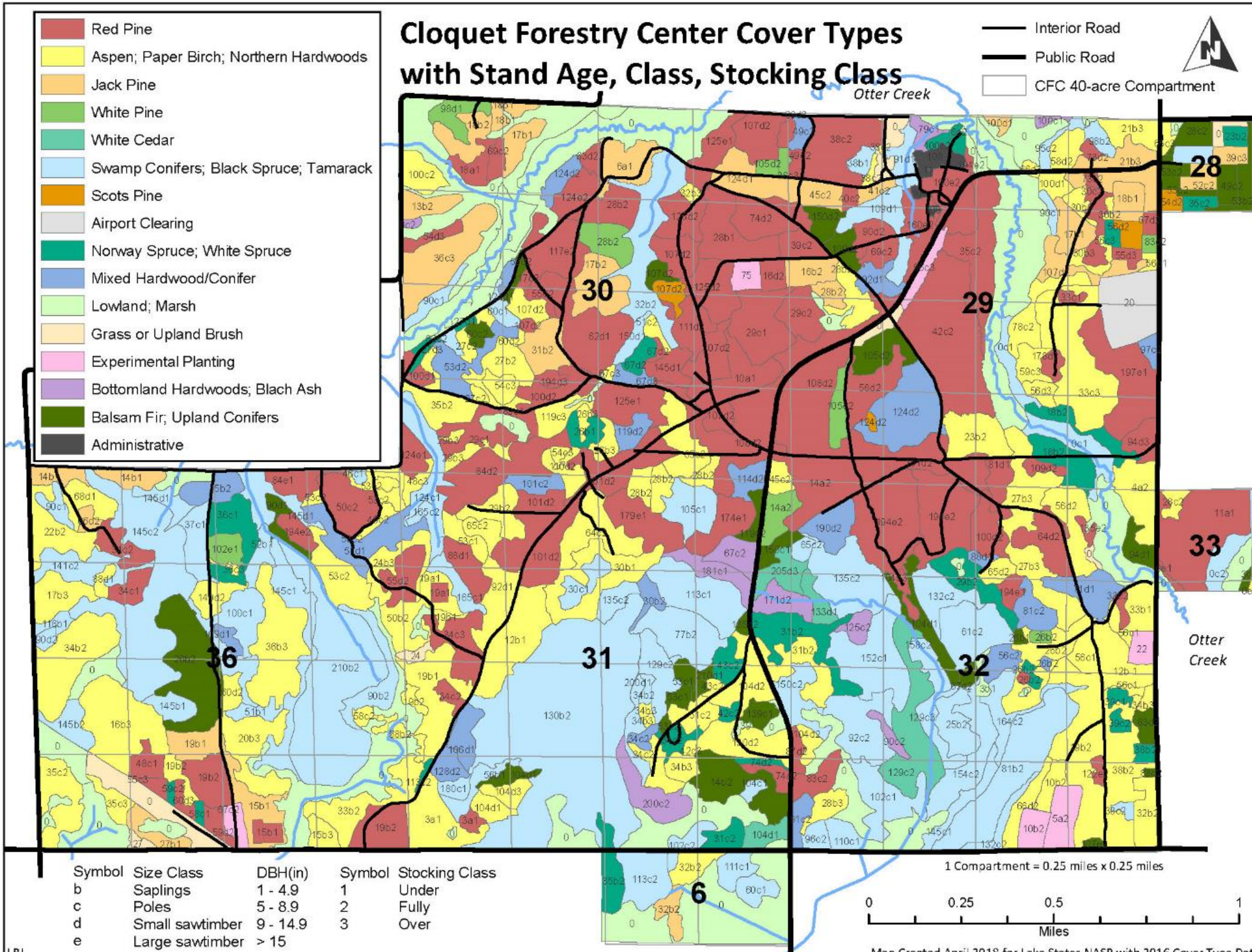
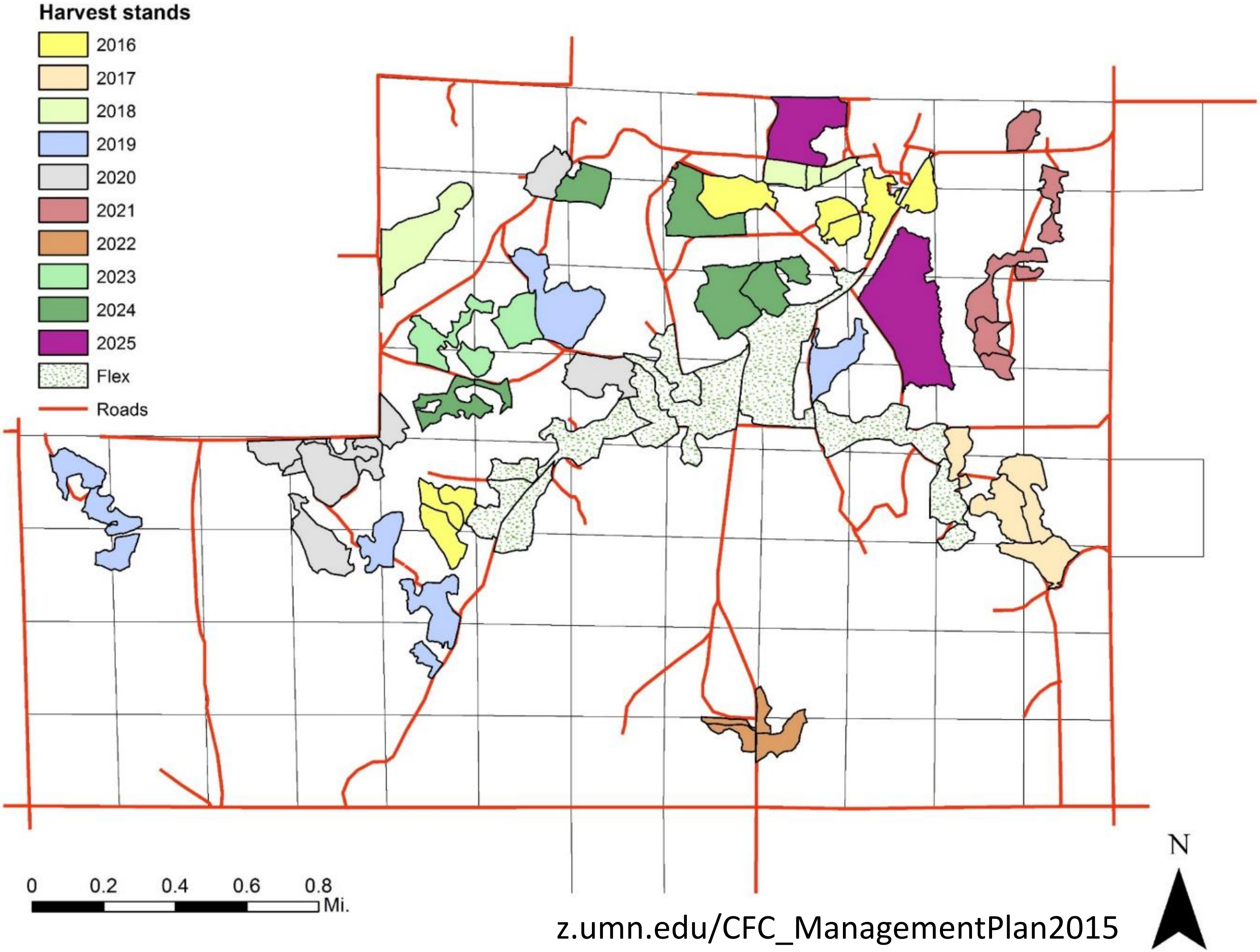
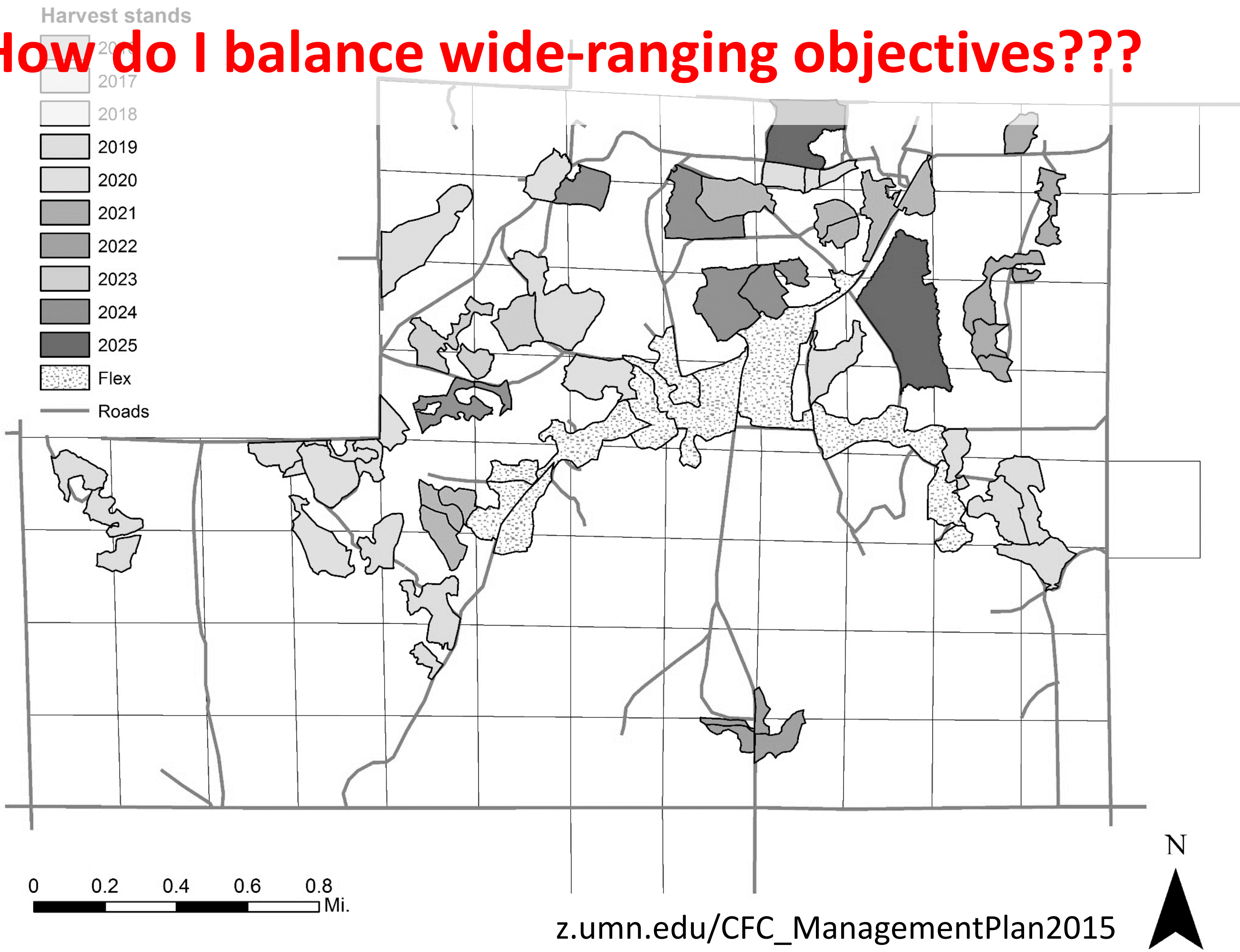

Cloquet Forestry Center Cover Types with Stand Age, Class, Stocking Class
Red Pine
Aspen; Paper Birch; Northern Hardwoods
Jack Pine
White Pine
White Cedar
Swamp Conifers; Black Spruce; Tamarack
Scots Pine
Airport Clearing
Norway Spruce; White Spruce
Mixed Hardwood/Conifer
Lowland; Marsh
Grass or Upland Brush
Experimental Planting
Bottomland Hardwoods; Blach Ash
Balsam Fir; Upland Conifers
Administrative
Interior Road
Public Road
CFC 40-acre Compartment
Otter Creek
28
29
30
31
32
33
36
6
Otter Creek
Symbol Size Class DBH(in)
b Saplings 1 - 4.9
c Poles 5 - 8.9
d Small sawtimber 9 - 14.9
e Large sawtimber > 15
Symbol Stocking Class
1 Under
2 Fully
3 Over
1 Compartment = 0.25 miles x 0.25 miles
0 0.25 0.5 1
Miles
LBJ
Map Created April 2018 for Lake States NASP with 2016 Cover Type Data

CFC Forest Management Plan (2016 – 2025)



z.umn.edu/CFC_ManagementPlan2015

How do I balance wide-ranging objectives???



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2 Principles of ecological forestry

ROBERT S. SEYMOUR AND MALCOLM L. HUNTER, JR.

Ecologically sound stewardship has long been a cornerstone of the forestry profession. But just what does 'ecologically sound' mean in practice? Historically, foresters were often taught that forest ecosystems could be engineered at will for human benefit. Ensuring ecological integrity meant not violating 'constraints' associated with soil, water quality, and wildlife (implicitly defined as well-known birds and mammals). Recently, the definition of ecological integrity has expanded; clearly, a primary focus is now on maintaining, and even restoring, native biological diversity. At the same time, a growing worldwide demand for forest products has encouraged foresters to expand traditional high-yield practices, amidst growing evidence that such systems often conflict with biodiversity.

While not discounting the difficulty of these conflicts, we believe there is a vision of ecological forestry that offers hope. To set the stage for the rest of this book, we define ecosystems, stands, and landscapes. Next, we review various incarnations of forestry, with emphasis on North American practice and the strong influence of the U.S. Forest Service. Hopefully, this will help readers to place the current discussion of ecological forestry into an historical, scientific, and professional context. Important principles of ecological forestry are defined and discussed, and related to traditional timber production forestry. Finally, a balanced forestry paradigm, which blends elements of traditional and ecological forestry, is described.

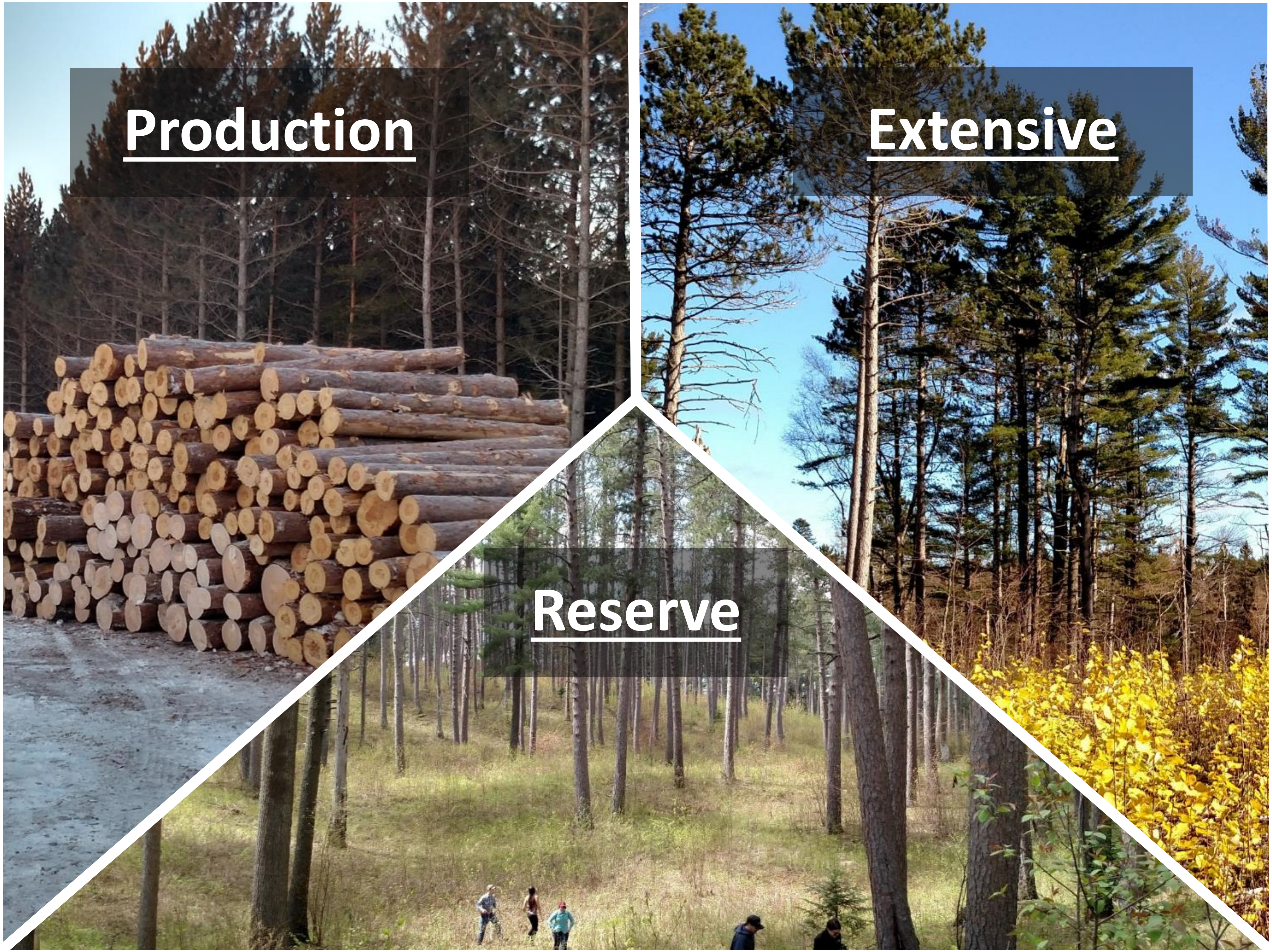
Ecosystems, stands, and landscapes

Asked to define *ecosystem*, a politician who was espousing the importance of protecting ecosystems hesitated for a long time then finally said, 'Well... they're kind of like an aquarium... they have plants and animals... and other stuff.' In fairness to the politician, ecosystems can be rather hard to define. Ecologists readily construct definitions such as 'a community of interacting species plus the physical environment that they

occupy', but, as we saw in Chapter 1, it is not always easy to move from a conceptual definition to defining ecosystems in the real world. Separating a lake and a forest is easy but where do you draw the boundary between a spruce forest ecosystem and a spruce swamp ecosystem? Is a spruce–fir forest that is 80% dominated by spruce (*Picea* spp.) a different type of ecosystem from one that is 80% dominated by fir (*Abies* spp.)?

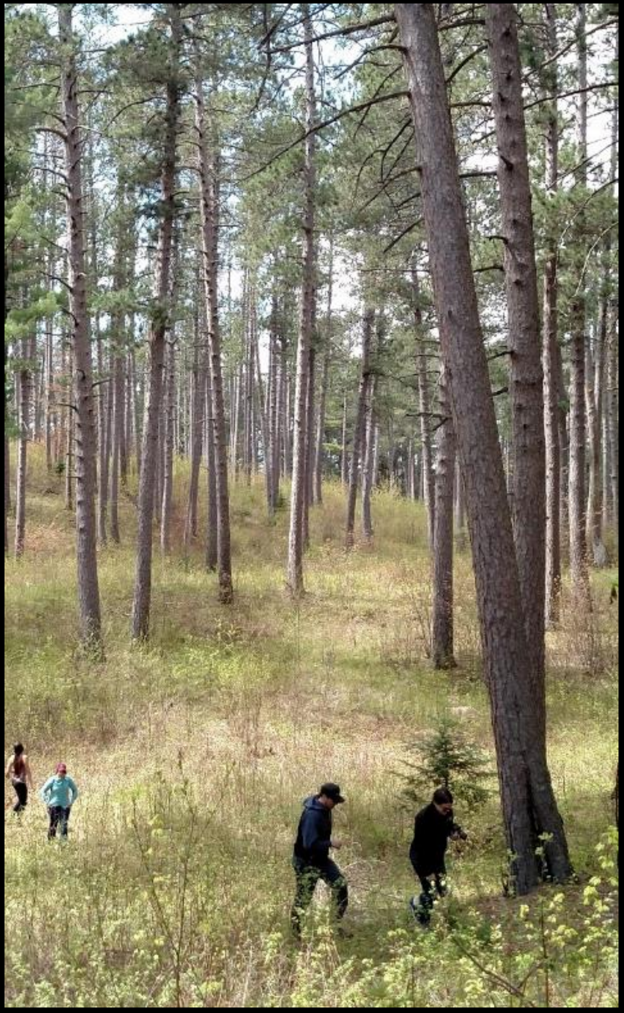
One of the things that makes defining ecosystems particularly difficult is the fact that they can occur at any spatial scale. The examples used above (a forest, a lake, a forested wetland) imply a spatial scale that is commonly used: patches of vegetation that one can easily see from a small plane – patches one would usually measure in hectares, rather than square kilometers or square meters. However, ecosystems can be much smaller or larger. Aquariums are indeed small, artificial ecosystems. One could even argue that all the invertebrates and microorganisms that occupy a single fallen acorn constitute a tiny ecosystem (Winston 1956). On the other hand, we could argue that because all the organisms on earth interact with one another and their physical environment (through global carbon and oxygen cycles for example) that the whole earth is one ecosystem (a concept close to the Gaia hypothesis of James Lovelock, 1979). In recent years there has been a growing tendency, especially among natural resource managers, to define ecosystems at quite large scales, as in the 'Greater Yellowstone Ecosystem' (Mattson and Reid 1991). This tendency can probably be traced to the increasing emphasis on *ecosystem management*, a key principle of which is thinking at larger spatial scales.

Because *ecosystem* is a scaleless term we will avoid using it in this book except where the emphasis is on the general concept of ecosystems and not on any particular scale. For patches of forest vegetation that are reasonably homogeneous in terms of species composition, age, and density, we will use the traditional forestry term, *stand*. Stands are usually defined at scales that make them roughly equivalent to *communities* (although in fact, community is really a scaleless term like ecosystems) and we will use this as a generic term for forests and non-forests. For the arrays of forest stands, grasslands, wetlands, and so on that form heterogeneous mosaics across the land we will use the term *landscape* (Forman 1995). In recent years landscape ecology has emerged as an important subdiscipline of ecology that focuses on the ecological patterns and processes that emerge at spatial scales where vegetation is seen as a heterogeneous mosaic (Figure 2.1). The distinction between forest stands and forest landscapes is the basis for


Production
Extensive
Reserve

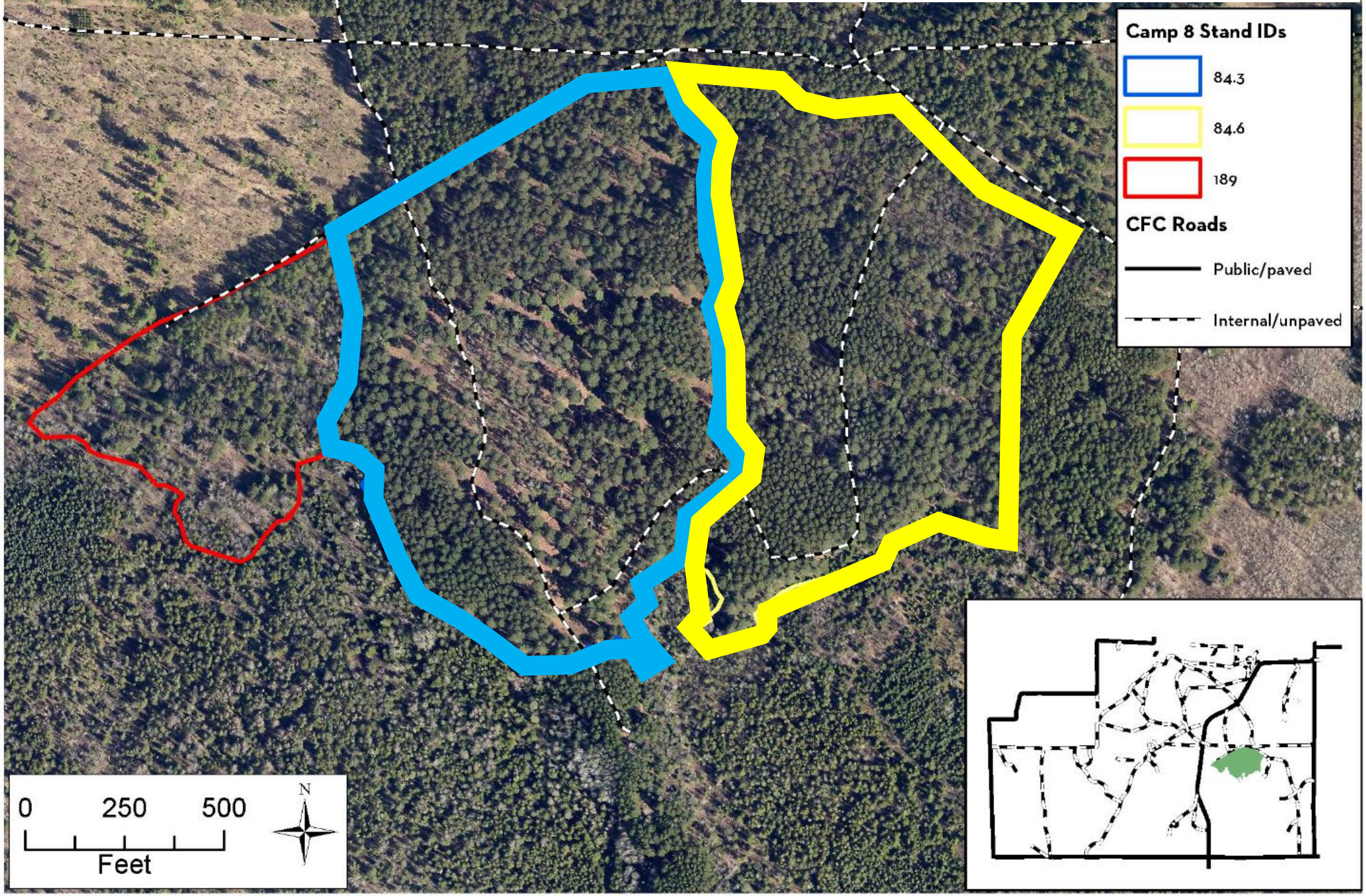
Gradient of management intensity

Production | Extensive | Reserve



Reserve Management

Camp 8 extent

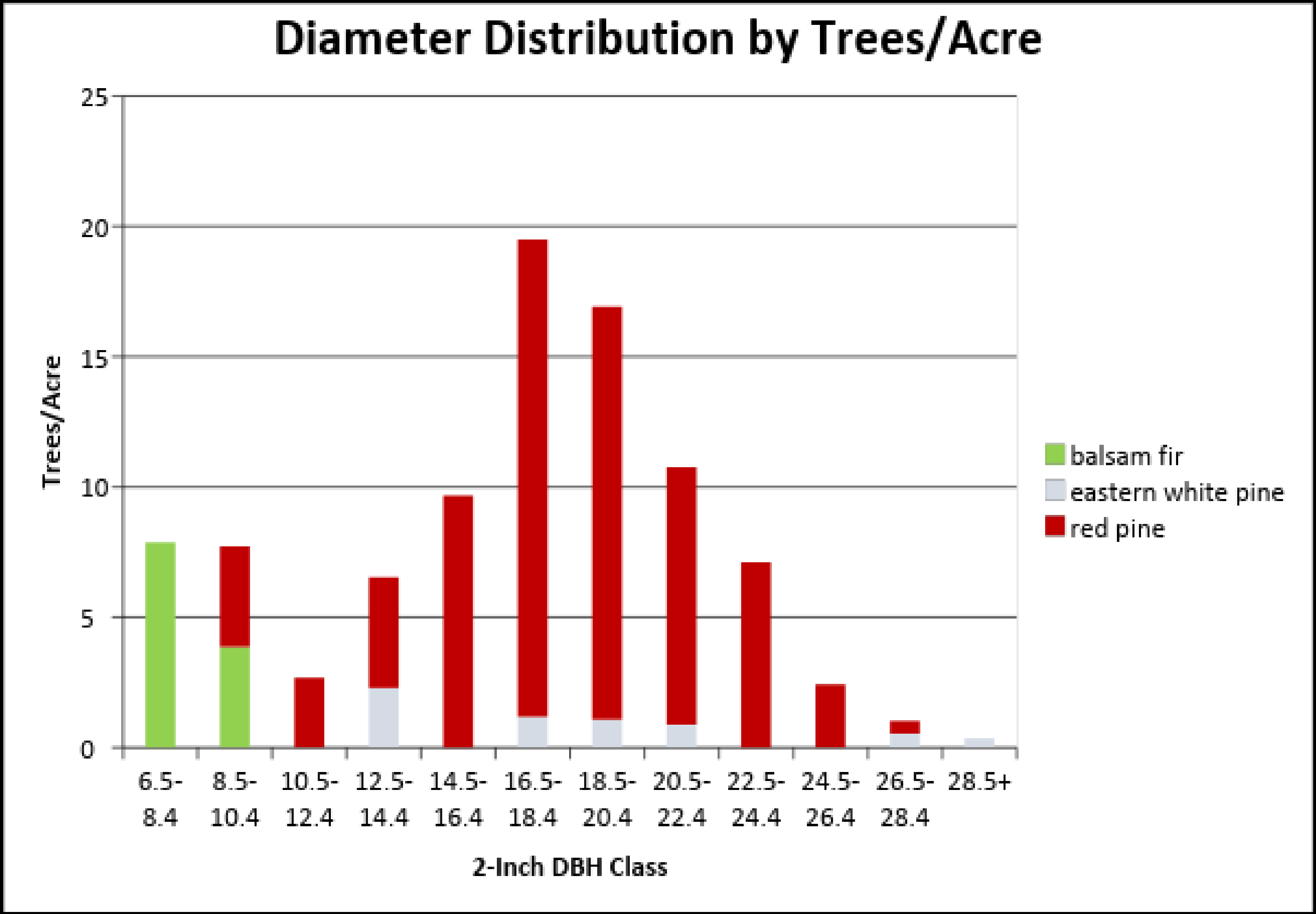


1927

Fires:
1824, 1842, 1855, 1864, 1871, 1874, 1894, 1905

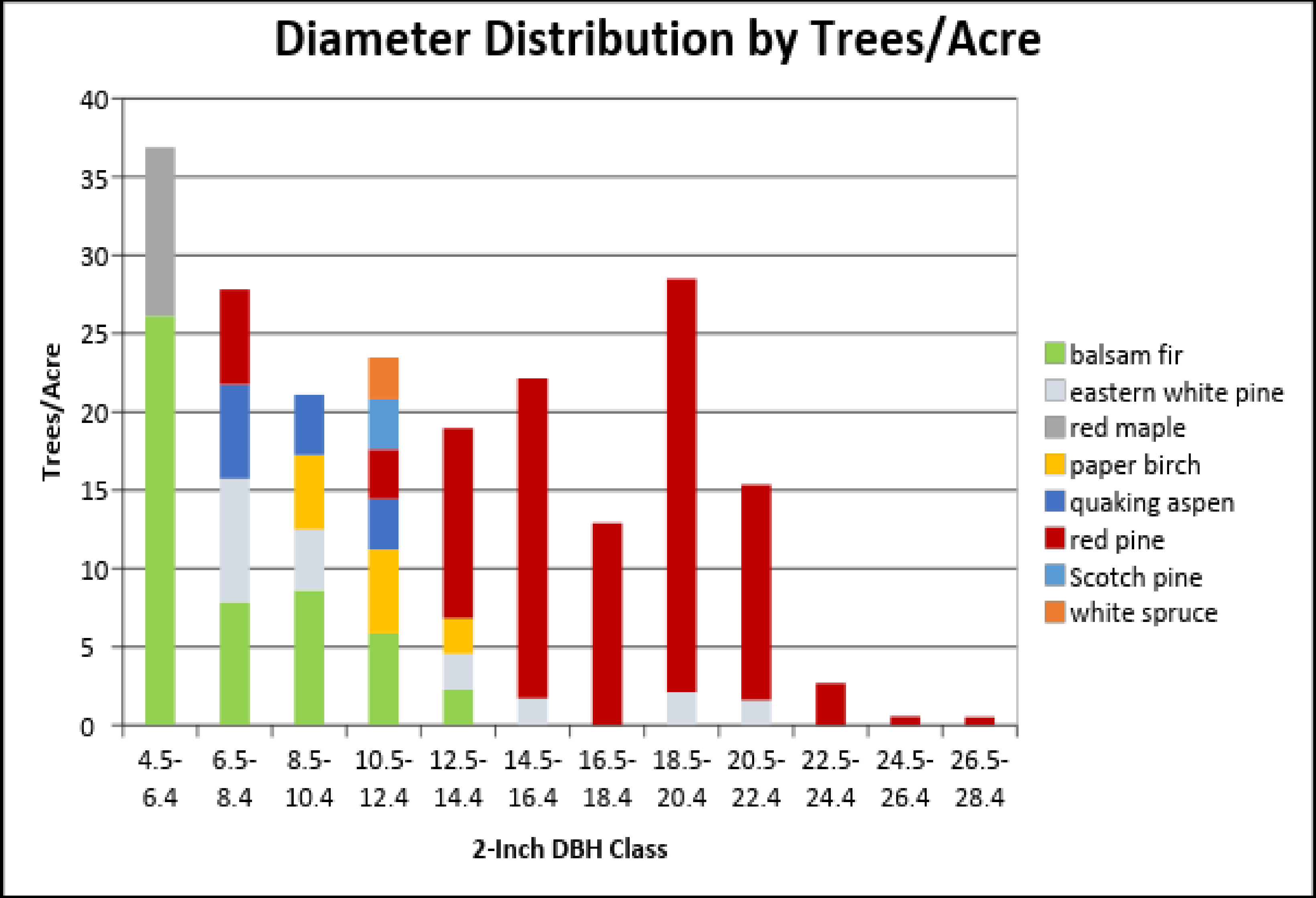
Structural Restoration treatments 1984 & 2009

2018 Structure, treated half:



Treated

2018 Structure, untreated half:

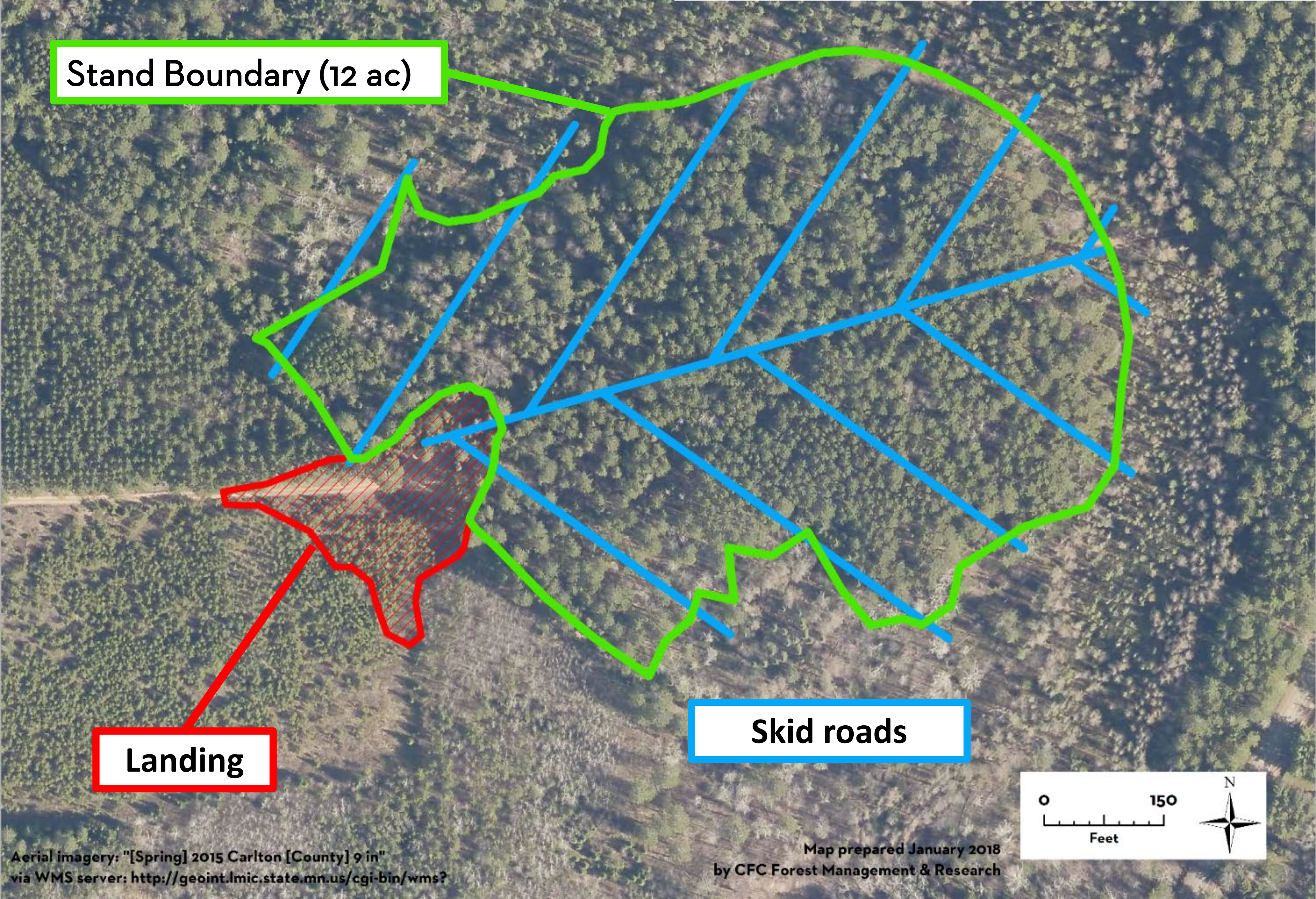


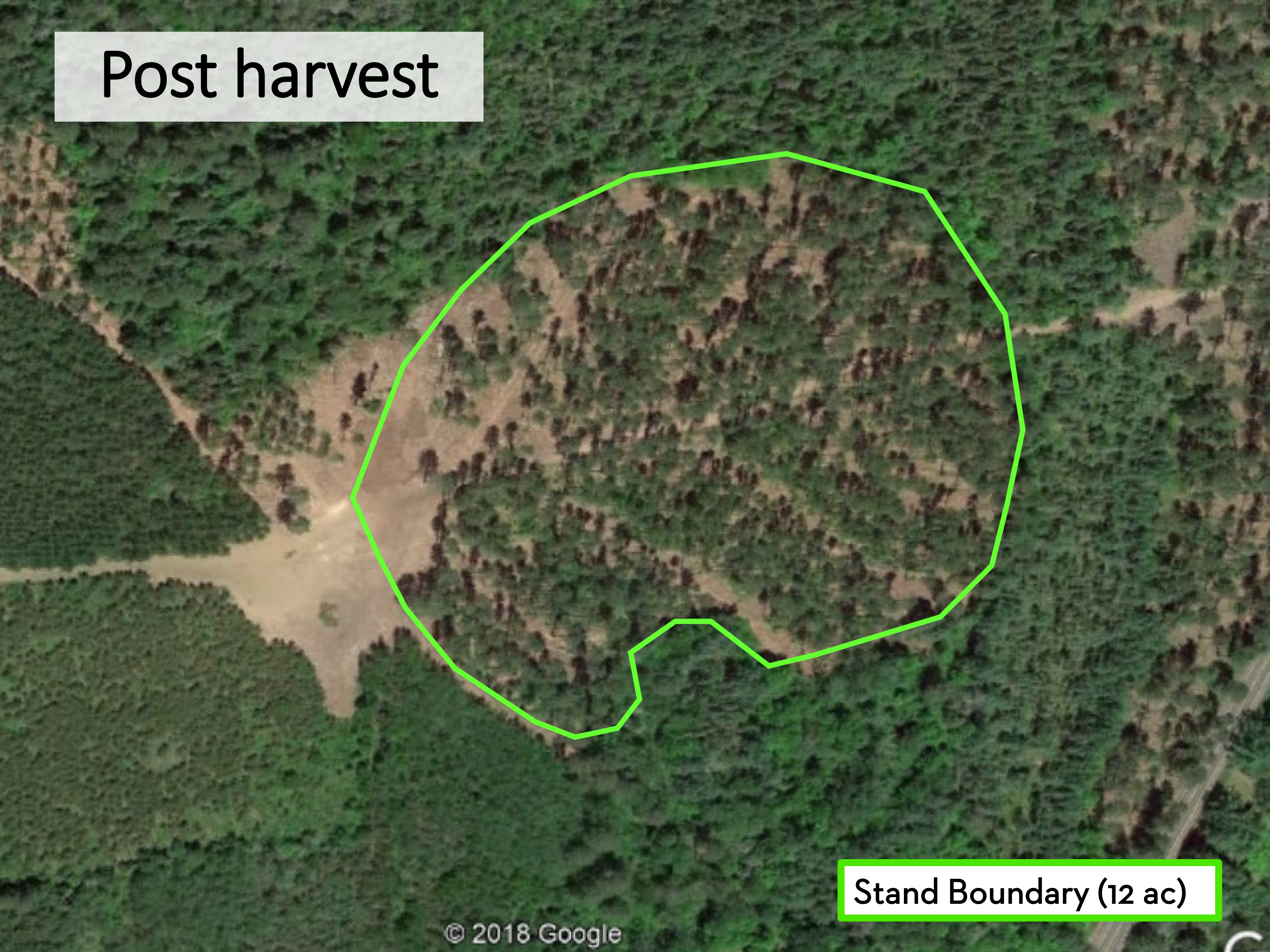

Untreated

Production: Red Pine Strip Seedtree

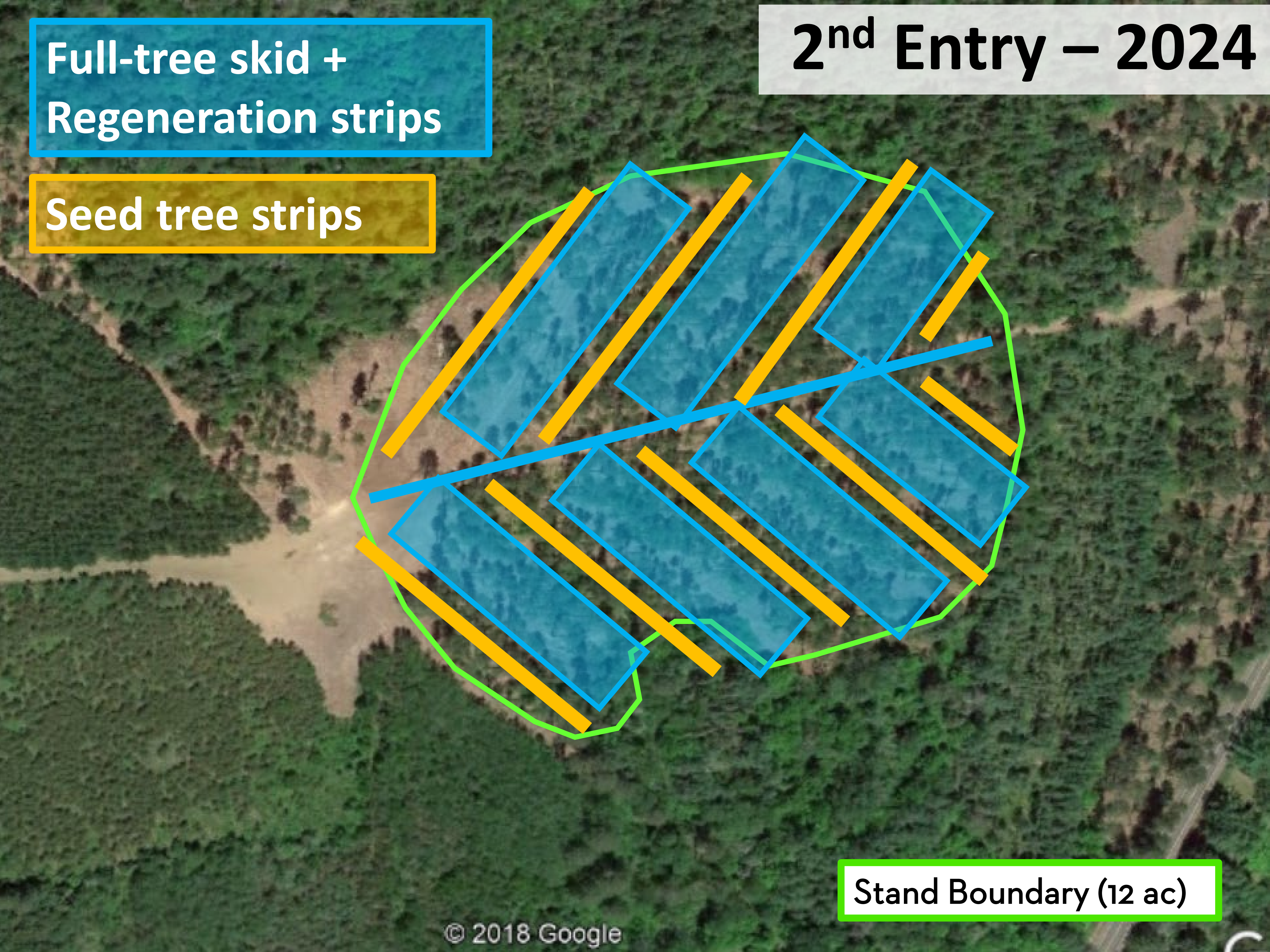

Pre-harvest

1st Entry – Dec 2016




Post harvest
Stand Boundary (12 ac)
© 2018 Google


Post harvest



Full-tree skid +
Regeneration strips
Seed tree strips
2nd Entry – 2024
Stand Boundary (12 ac)
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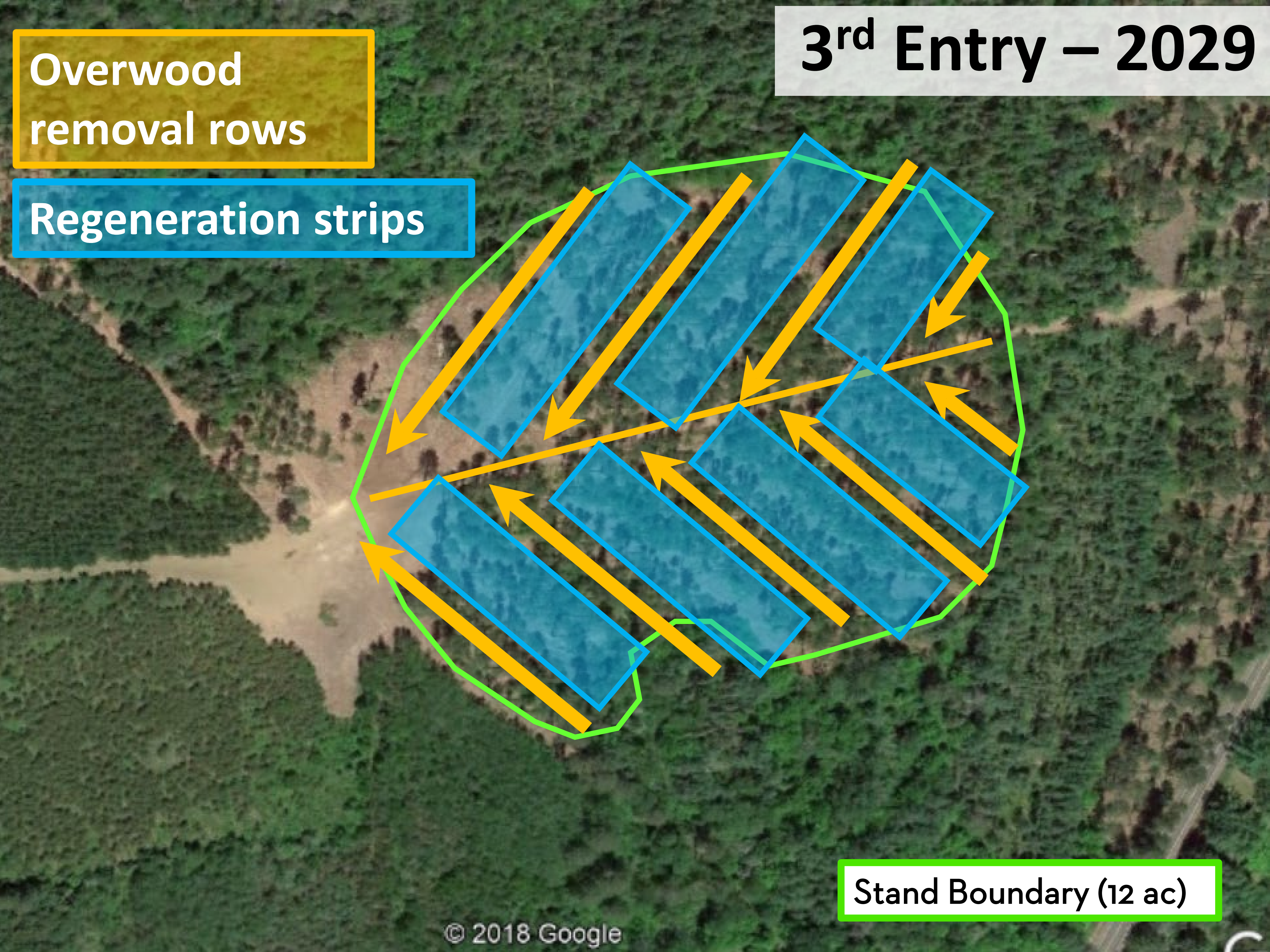
3rd Entry – 2029
Overwood removal rows
Regeneration strips
Stand Boundary (12 ac)
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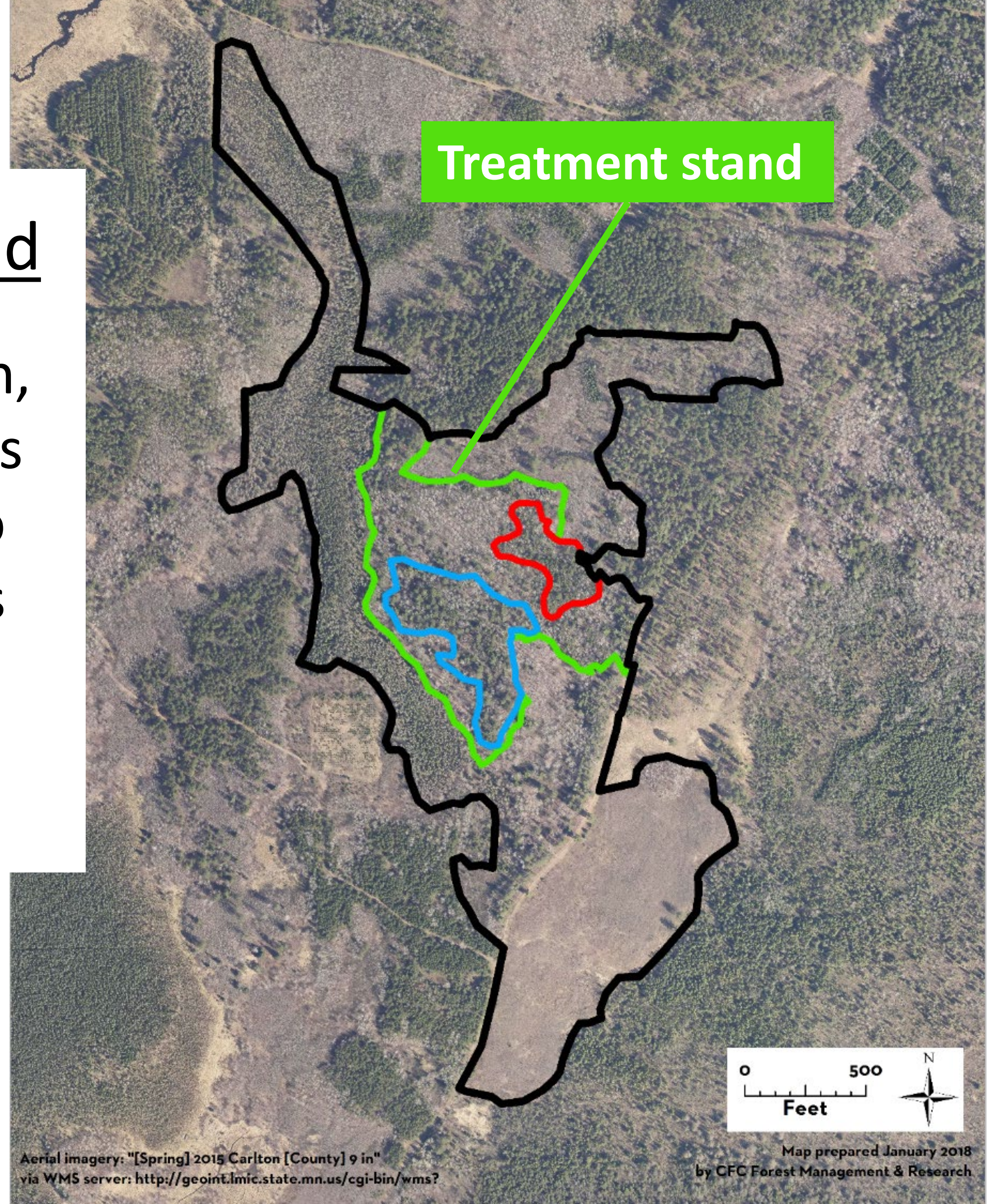
z.umn.edu/RedPineStripSeedtreeCFC

Extensive management:
Fisher Management Zone

2016 Treatment Stand

- Mixed-age aspen, birch, red maple, and conifers
- Surrounding areas also contained various ages and compositions
- Good spot for wildlife management area



Fisher Management Zone

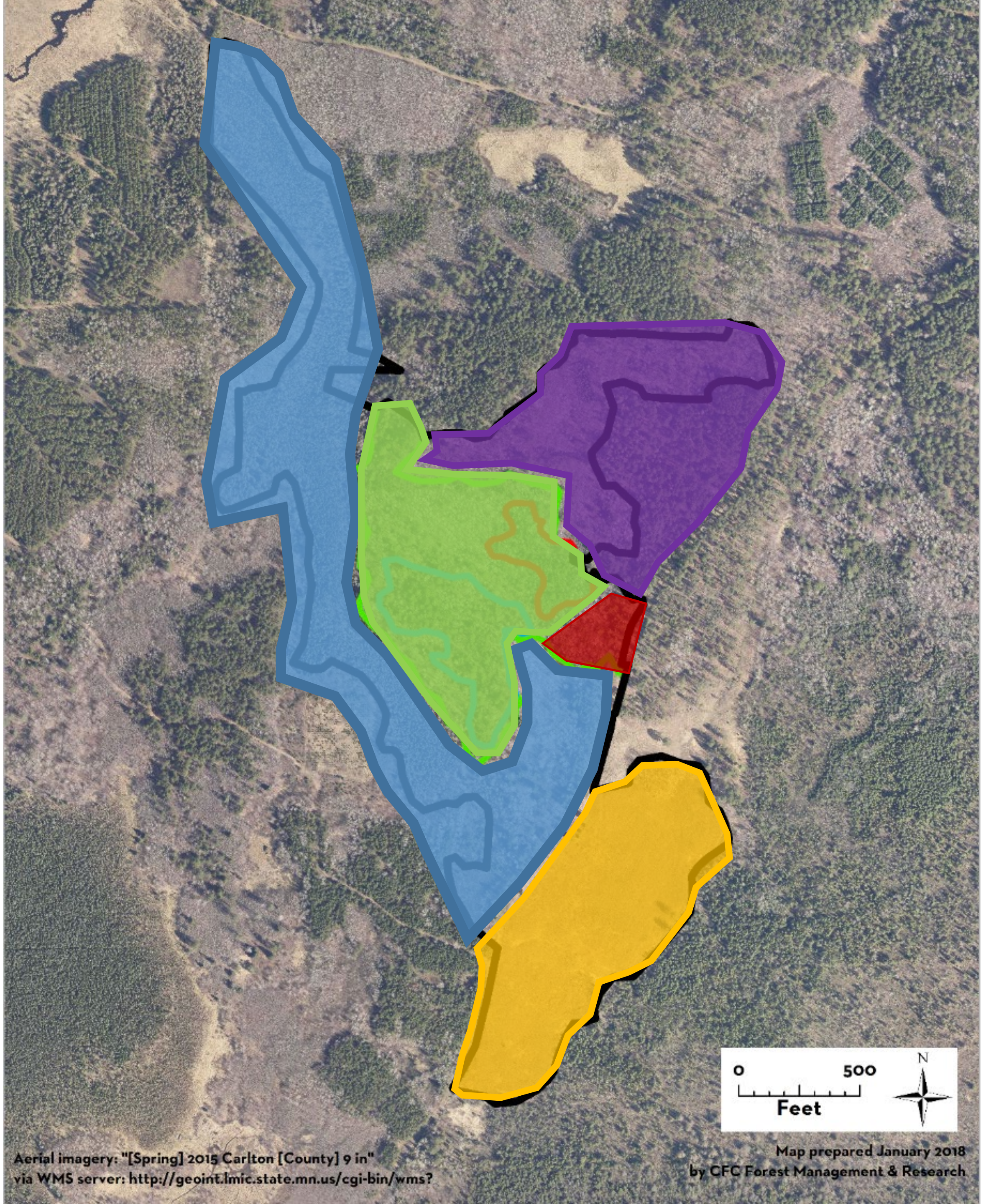
Reserve

1st Entry (2016)

2nd Entry (2031)

3rd Entry (2046)

Landing



Goals for every entry:

- Diversify structure and composition
- Retain & promote large diameter coarse woody debris
- Profitable timber sale

Lessons Learned:

- Don’t do the same thing everywhere
- Work with the stand’s features
- Think outside the stand
- Tradeoffs for every decision

Acknowledgements

Robert Seymour, Eli Sagor, John Erb, Lane Moser, Lane Johnson, Evan Larson

Questions?

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