



Why Ruffed Grouse?

- Forest dependent
- Thrive in healthy, diverse forests
- Non-migratory

Ruffed Grouse are a bellwether!



✕ – *Have identified grouse and woodcock as a species of concern*

RUFFED GROUSE



WOODCOCK



The Bigger—Picture



The problem is lack of structural and age diversity (disturbance).

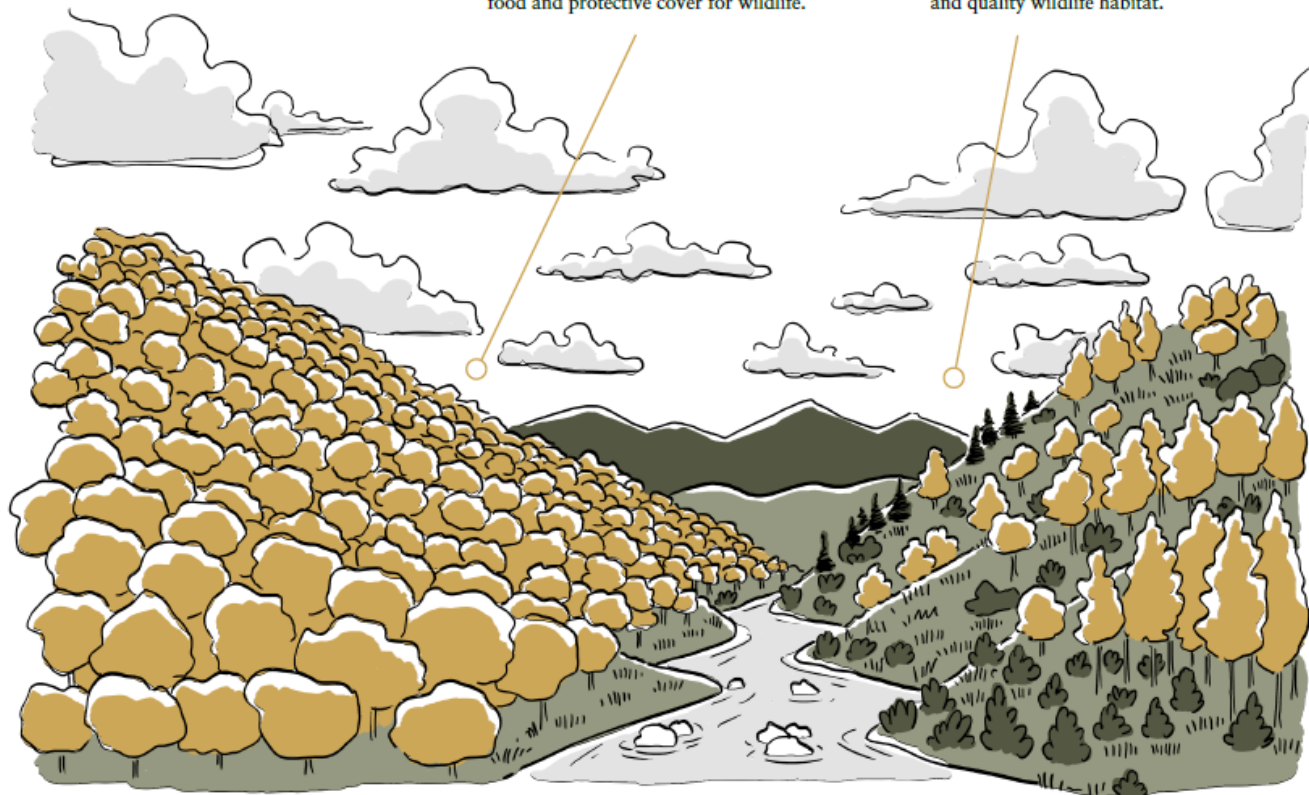
A healthy forest sequesters carbon, filters water, cleans the air, and provides wildlife habitat.

SINGLE-AGED FOREST

Susceptible to threats like disease, wildfire and invasive species, while lacking necessary food and protective cover for wildlife.

HEALTHY, DIVERSE FORESTS

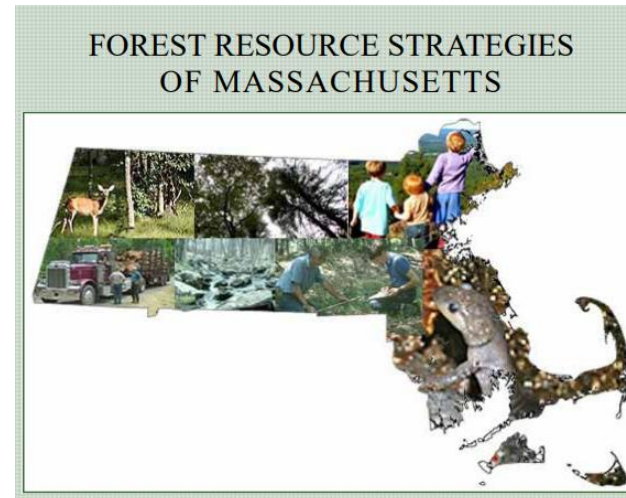
Resilient to threats, providing whole ecosystem benefits like clean air, clean water, and quality wildlife habitat.



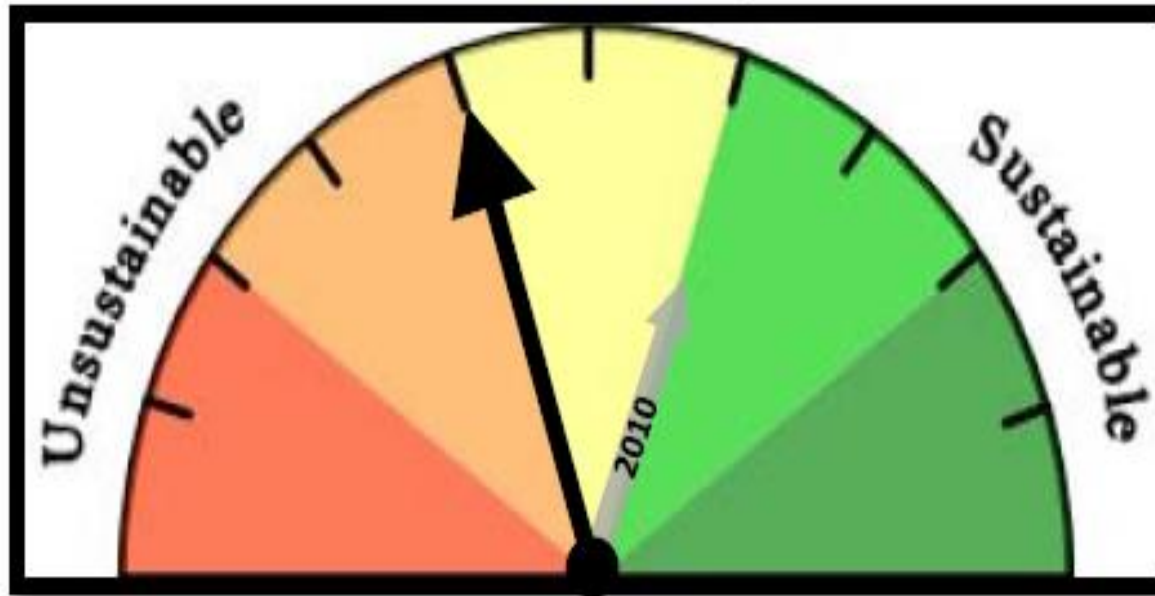


“State Wildlife Action Plans serve as the blueprints for conserving our nation's fish and wildlife and preventing endangered species.”
 -U.S. Fish & Wildlife Service

“Your state’s **Forest Action Plan** includes in-depth analysis of forest conditions and trends in your area. Collectively, the states’ Forest Action Plans make up a roadmap for forest management on a national scale.”
 -Association of State Foresters



Indicator 4. Status of forest/woodland communities and associated species of concern



Sustainability Meter

Grey arrow=2010 reading



□

Scale Up!



Fire and forest habitat diversification

1. Preparatory Treatment



2. Primary Driver



Photo ©Thomas Waldrop

Preparatory Treatment

Responses of hardwood advance regeneration to seasonal prescribed fires in oak-dominated shelterwood stands

Patrick H. Brose and David H. Van Lear

Abstract: Effects of seasonal prescribed fires of varying intensities on density, mortality, stem form, height, and height growth of hardwood advance regeneration using a shelterwood technique. Advance regeneration was assessed regeneration, following the routine burning, with spring and summer spp. L.) and hickory (*Carya* spp. maple (*Acer rubrum* L.), species height growth of hickory and oak the most benefit. This approach regenerating oak-dominated stands.

Résumé: Les effets du brûlage de forme de la tige, la hauteur et la croissance en hauteur de la régénération d'espèces feuillues d'été et d'automne. Chaque coupe hivernale ainsi qu'un été. Le brûlage. Le feu a été la coupe de printemps et d'été. Les espèces de hickory et de chêne ont eu le plus grand bénéfice. Cette approche de régénération d'espèces à dominance de chêne.

Introduction

Throughout the eastern hardwood forest of regenerating oak (*Quercus* spp. L.) stands is a major challenge for resource managers (1986; Pallardy et al. 1988; Hix and Loring 1992). Generally, oak seedlings in such stands following plentiful acorn crop and apical dominance in the dense shade, result in topped stems with little height growth (Loring et al. 1994). Without disturbance reducing shade, oak reproduction gradually die more shade-tolerant species, i.e., America

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SYMPOSIUM PROCEEDINGS
Knoxville, Tennessee
September 8–10, 1992

United States Department of Agriculture
Forest Service
Southeastern Forest Experiment Station
General Technical Report SE-84

Oak Regeneration Practical Report



REVIEW ARTICLE

silviculture

Development of Prescribed Fire as a Silvicultural Tool for the Upland Oak Forests of the Eastern United States

Patrick H. Brose

In the past 40 years, the perception of periodic fire in upland oak (*Quercus* spp.) forests in the eastern United States has changed dramatically. Once thought of as a wholly destructive force, periodic fire is now considered an important disturbance whose absence is a major contributing factor to oak regeneration problems. This change in attitude and the concurrent development of prescribed fire as an accepted oak regeneration tool are due to several research—management partnerships. Starting in the 1970s, cooperative research between the USDA Forest Service and various land management agencies examined fire effects in mature, upland oak forests. These efforts to regenerate oak but identified some key limitations leading to the failures. Subsequent research in the 1990s shifted to oak shelterwoods and ultimately identified hot spring fires as a treatment that would regenerate oak. Since then, other partnerships have expanded fire—oak research to include woodland restoration burning. This paper reviews the history of cooperative fire—oak research over the past 40 years and the key role partnerships have played in the development of current prescribed fire practices in upland oak forests.

Keywords: fire effects, hardwoods, *Quercus* spp., shelterwood, woodland restoration

Throughout the eastern United States, land managers increasingly recognize periodic fire as an important disturbance in upland oak (*Quercus* spp.) forests and are using prescribed fire to manage these ecosystems (Yasuy 2000, Dickinson 2006, Hutchinson 2009, Dey et al. 2012). These trends are evident in that the eastern national forests with significant areas of upland oak ecosystems have prescribed fire in their management plans and the number of burned acres in these forests has steadily risen over the past decade (National Interagency Fire Center 2013). Simi-

lar patterns of acceptance and use can also be found in land conservation organizations such as The Nature Conservancy, many state forestry and wildlife agencies, and some private land ownerships. This new acceptance and use of fire in upland oak forests of the eastern United States is in stark contrast to the long-standing view of fire in hardwoods.

In the late 1800s and early 1900s, fire was considered a scourge of forests throughout the eastern United States (Pyne 1982, DeCoster 1993). Fires were severe and widespread, causing damage to standing timber,

degradation of soil productivity, destruction of human property, and loss of human life. The negative impacts of forest fires coupled with other abuses wrought by natural resource exploitation led to the conservation movement that spawned the USDA Forest Service and other federal/state land management agencies. The Weeks Act in 1911 authorized the purchase of degraded lands in the eastern United States to protect watersheds, restore forests, and form national forests. Many eastern states followed suit by purchasing abandoned tax-delinquent lands, thereby forming a network of state forests and other public lands. The foresters hired by these fledgling agencies to manage these lands were tasked with resource conservation and protection; chief among these responsibilities was controlling forest fires. Success came relatively quickly. Through a comprehensive approach of fire control laws, prevention programs, early detection networks, and interagency cooperative suppression, the occurrence, severity, and size of wildfires in eastern hardwood forests decreased substantially within a few decades (Pyne 1982, Brose et al. 2001). For example, in Pennsylvania the number of fires and

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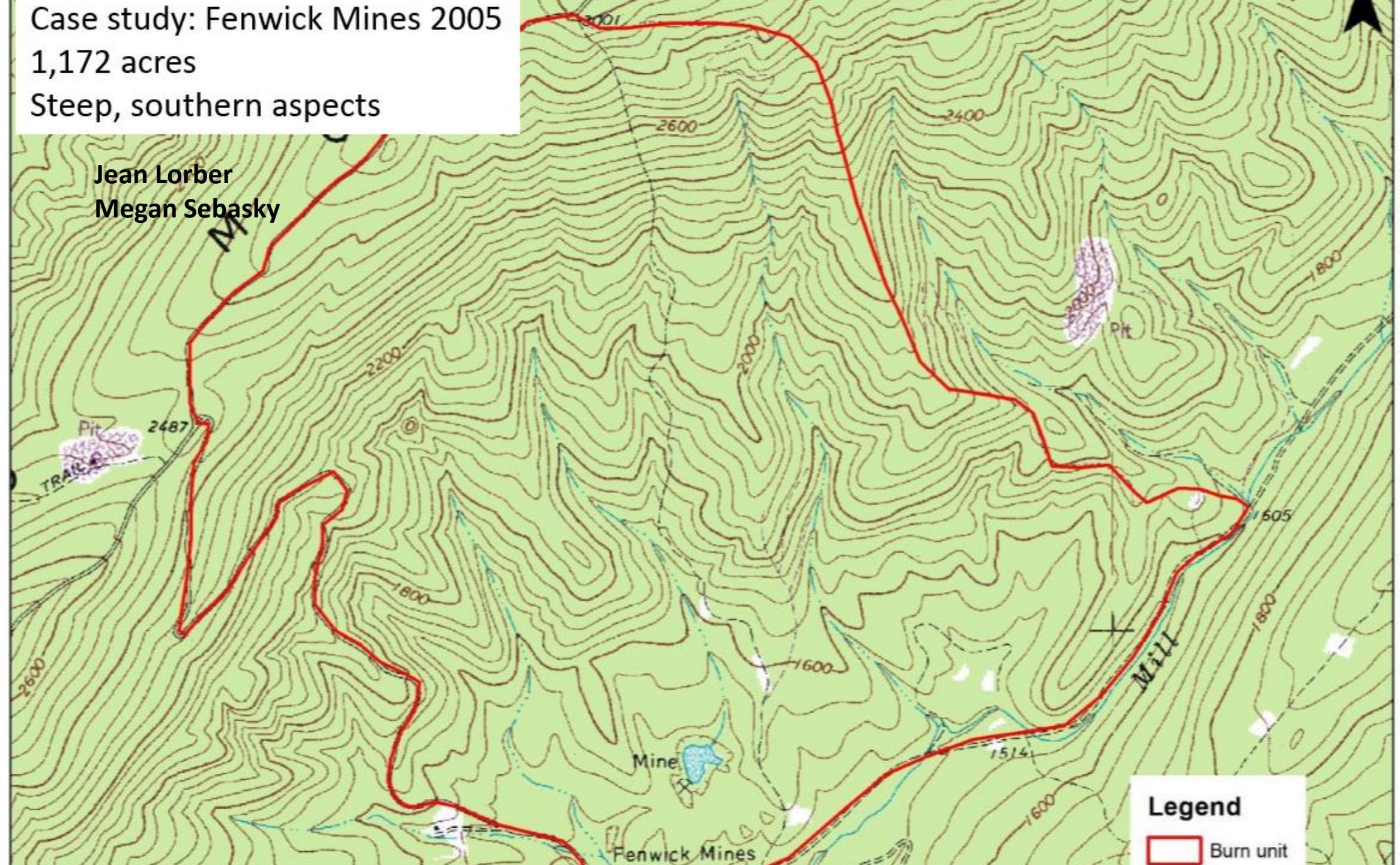
Acknowledgments: This paper was presented as part of the 2013 National Silviculture Workshop "Management-Research Partnerships" that was held jointly with the Society of American Foresters National Convention in North Charleston, South Carolina. I thank the organizers of the workshop for the opportunity to present this paper orally as well as publish it in a special issue of the *Journal of Forestry*. I also thank Todd Britton, Scott Siskind, Steve Whitson, and other anonymous reviewers for their many comments that helped with clarity and concision. Funding for the fire-oak literature synthesis was provided by the Joint Fire Science Program.

Primary Driver



Case study: Fenwick Mines 2005
1,172 acres
Steep, southern aspects

Jean Lorber
Megan Sebasky



1,172 acres
Steep, southern aspects

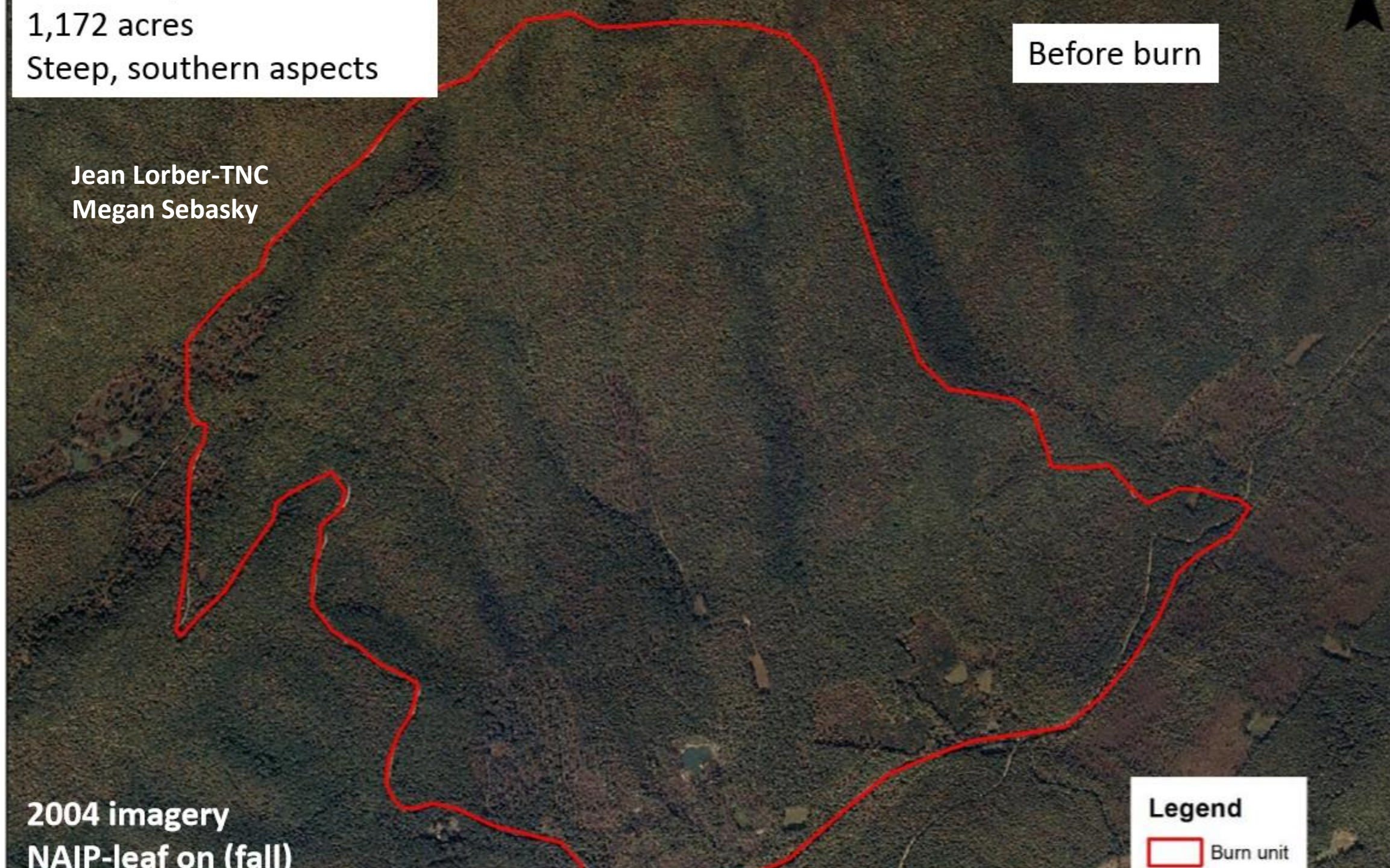
Before burn

Jean Lorber-TNC
Megan Sebasky

2004 imagery
NAIP-leaf on (fall)

Legend

 Burn unit



1,172 acres
Steep, southern aspects

After burn

Jean Lorber-TNC
Megan Sebasky

2005 imagery
NAIP leaf on (summer)

Legend

 Burn unit

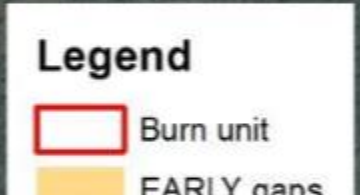
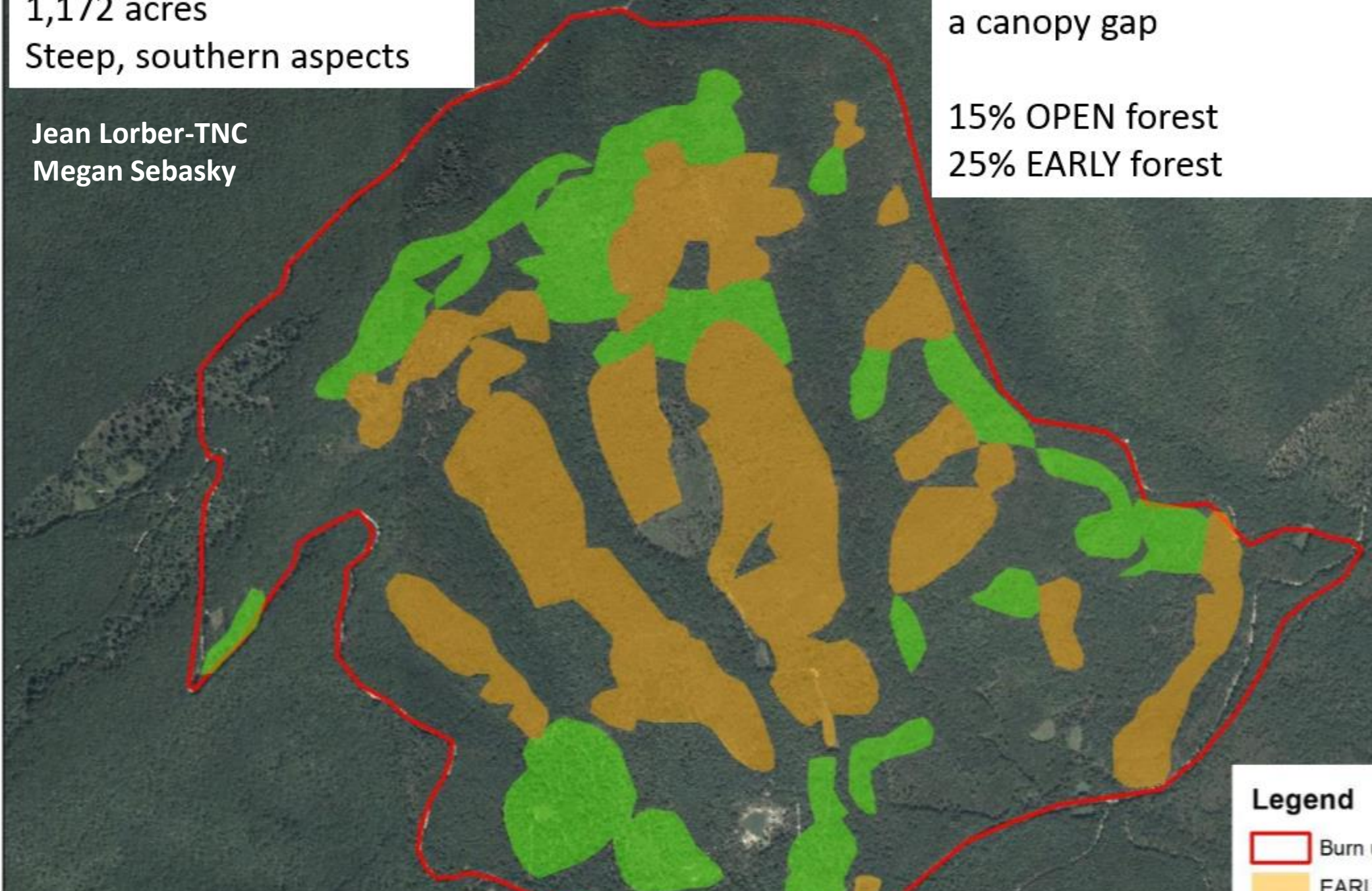


Case study: Fenwick Mines
1,172 acres
Steep, southern aspects

Jean Lorber-TNC
Megan Sebasky

40% of burn unit became part of
a canopy gap

15% OPEN forest
25% EARLY forest



The Need

Nantahala and Pisgah National Forests Plan Revision



Draft Plan recommendations for forest structure (1,040,000 acres total):

- Young forests, 60-90k acres
- Open woodlands, 360-480k acres

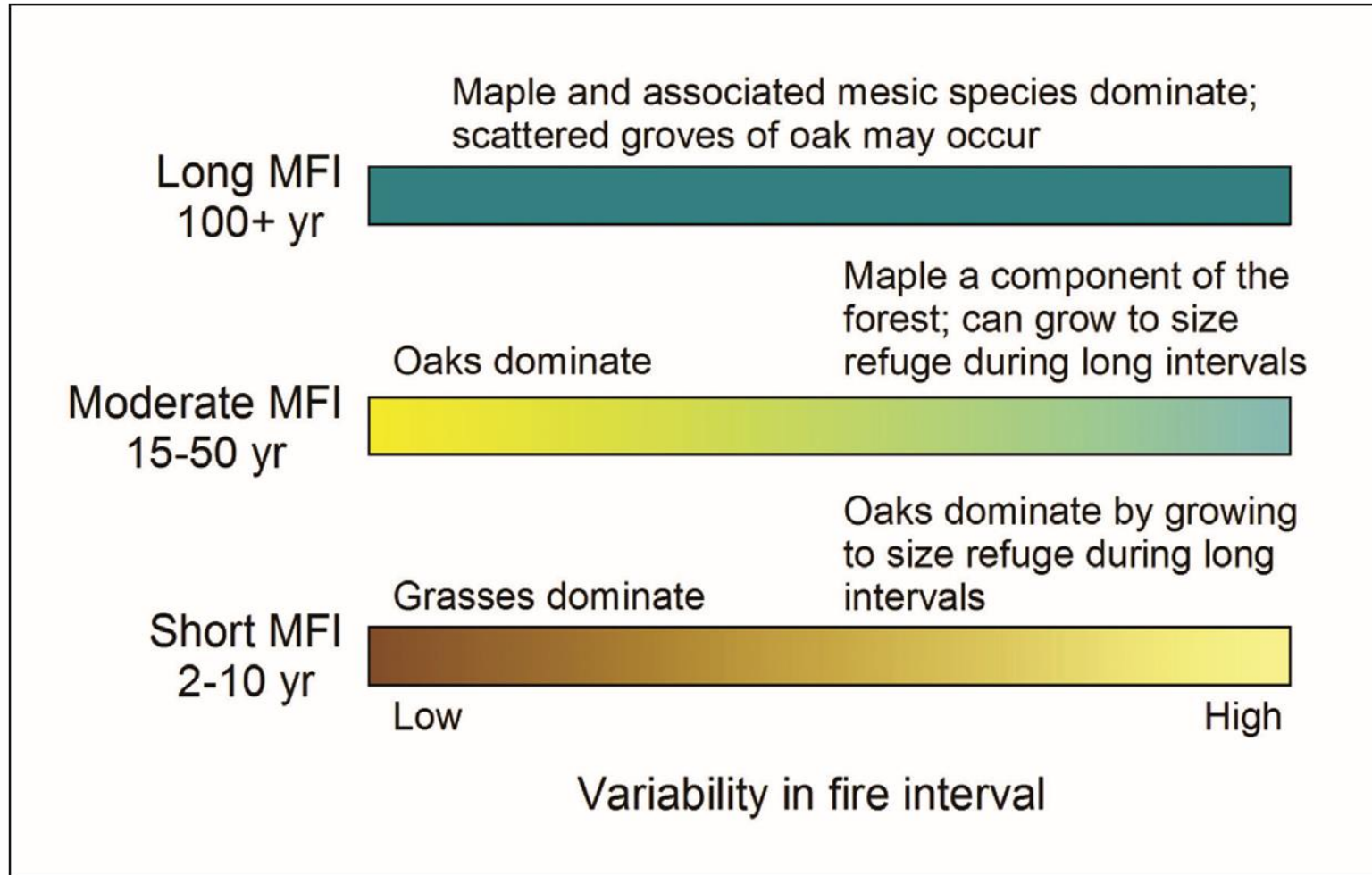
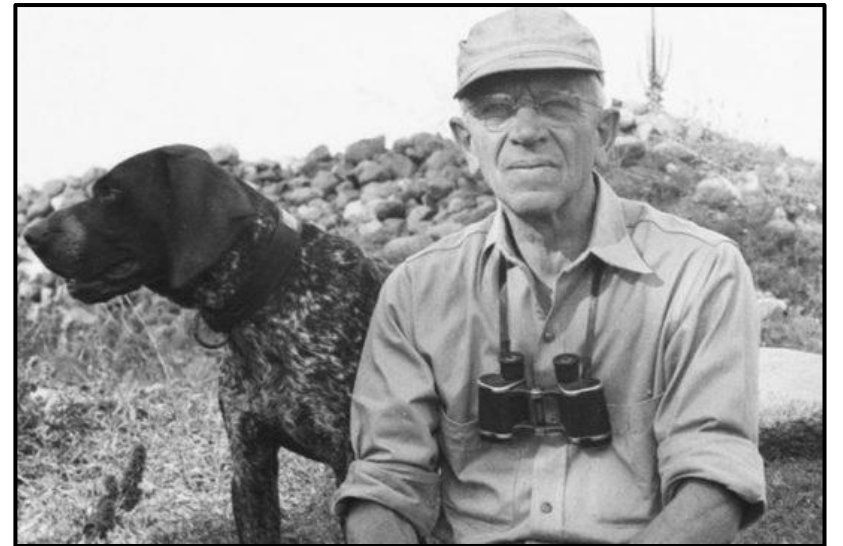
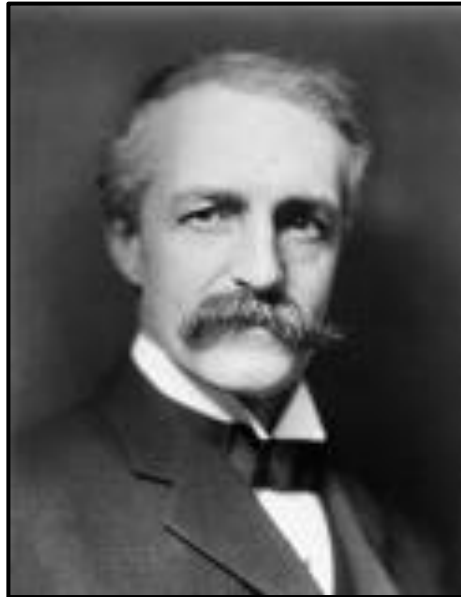


Figure 4—Relationship of mean fire interval (MFI) and its variability to oak.

Frelich et al.
General Technical Report PNW-GTR-914
September 2015



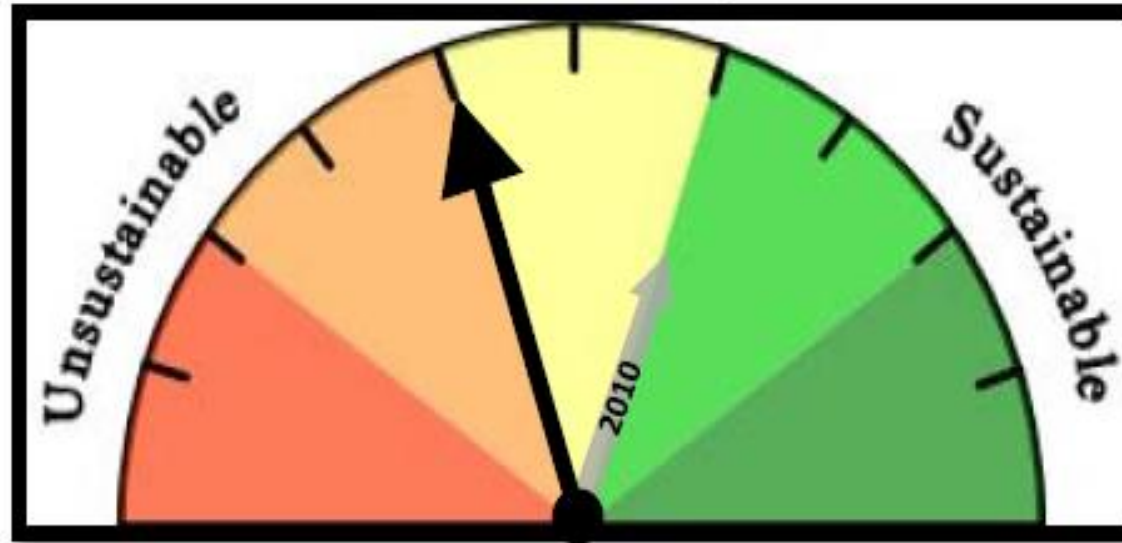
Building a fire program is hard work!



Far and away the best prize that life has to offer
is the chance to work hard at work worth doing.

(Theodore Roosevelt)

Indicator 4. Status of forest/woodland communities and associated species of concern



Sustainability Meter

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