Balancing Objectives & Outcomes for Wildlife Habitat & Forest Management

Bronson Strickland, Ph.D.
St. John Family Professor of Wildlife Management

MISSISSIPPI STATE UNIVERSITY
EXTENSION SERVICE
FOREST AND WILDLIFE RESEARCH CENTER
MSU DEER LAB

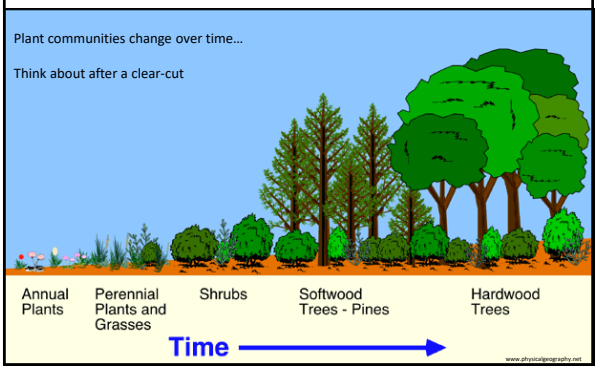
MSUDeerLab
unit of Mississippi State University

Outline

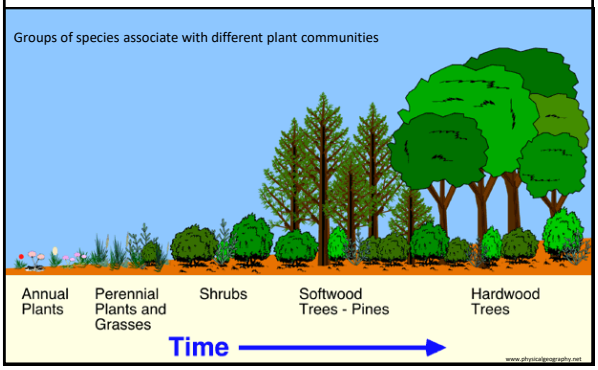
- Ecology – Plant succession
- Tools for manipulating succession
- Wildlife Response to plant succession
- Economics of habitat management

Ecology
Plant Succession

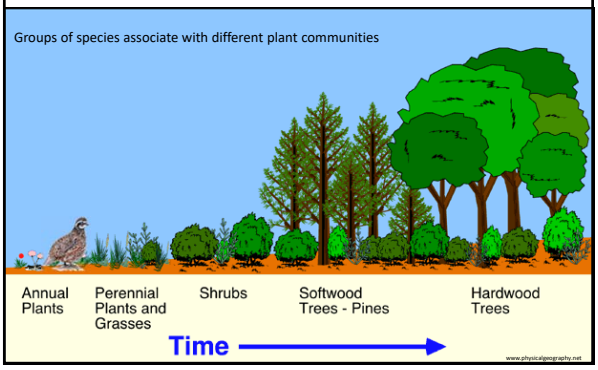
The only thing constant is change…
Plant Succession



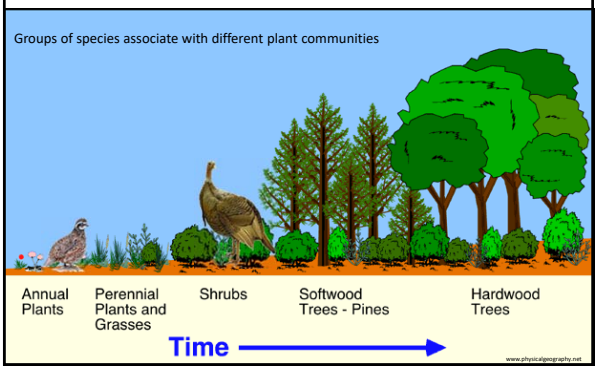
Plant Succession



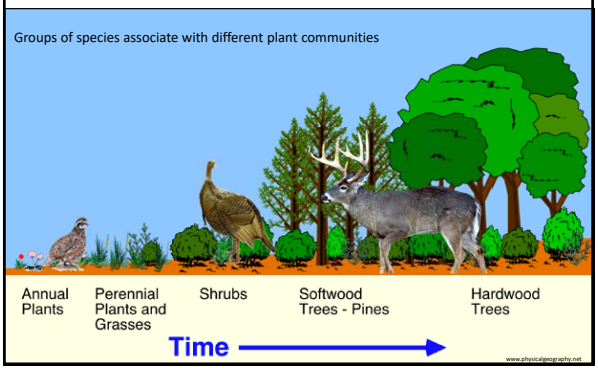
Plant Succession



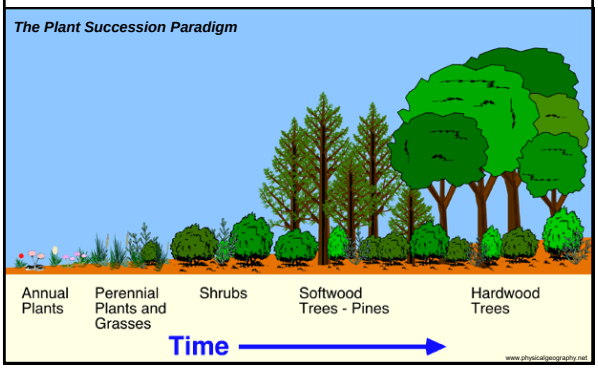
Plant Succession



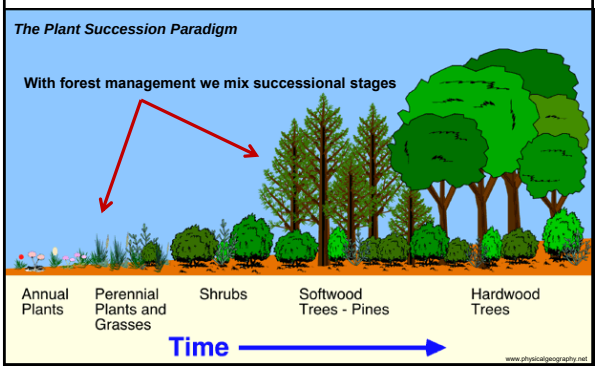
Plant Succession



The only thing constant is change…



The only thing constant is change…

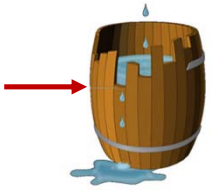


Limiting Factors

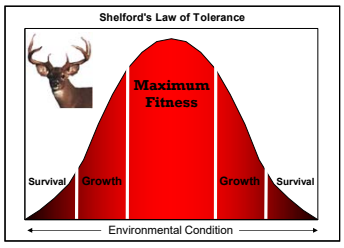
Liebig's Law of the Minimum

States growth is dictated not by total resources available, but by the scarcest resource (limiting factor).

The law has also been applied to biological populations and ecosystem models for factors such as sunlight or mineral nutrients.

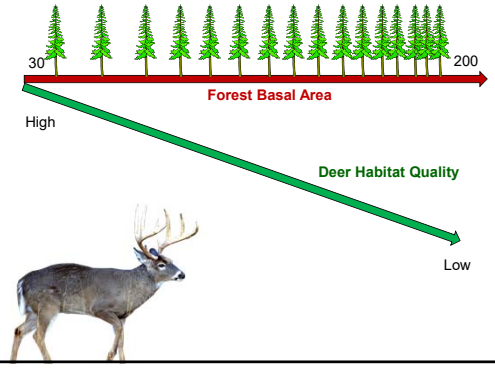


Tolerance to Environment

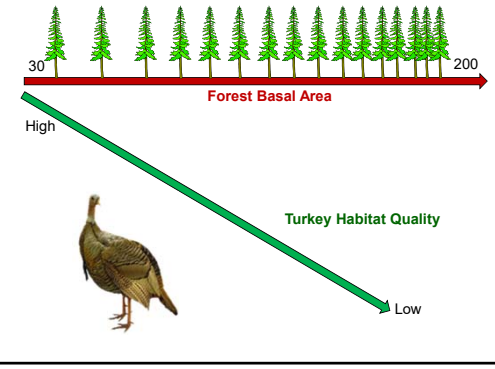


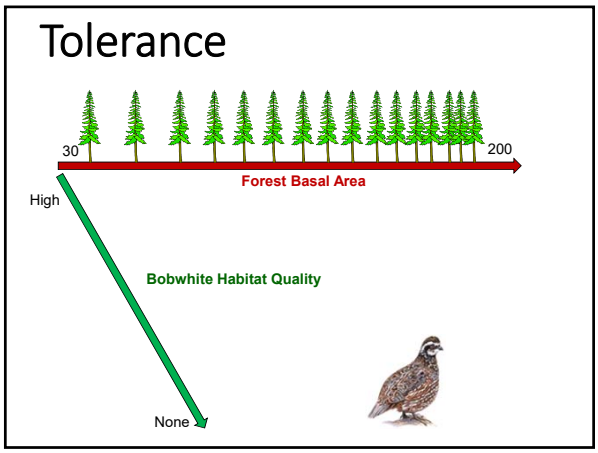
"…the presence and success of an organism depend upon the extent to which a complex of conditions is satisfied (e.g. the climatic, topographic, and biological requirements of plants and animals)."

Tolerance

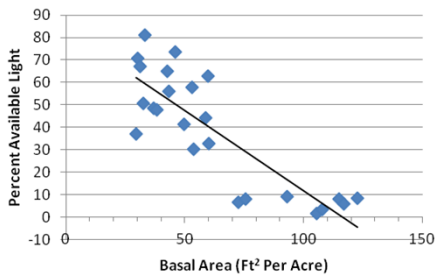


Tolerance



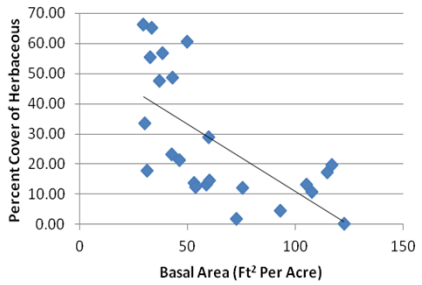

Tolerance
30
200
Forest Basal Area
High
Bobwhite Habitat Quality
None

As Canopy Coverage ↑ Sunlight ↓



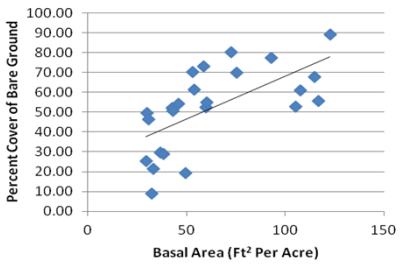
Credit – Cody Rainer, MDWFP

As Canopy Coverage ↑ Herbaceous Plants ↓



Credit – Cody Rainer, MDWFP

As Canopy Coverage ↑ Bare Ground ↑

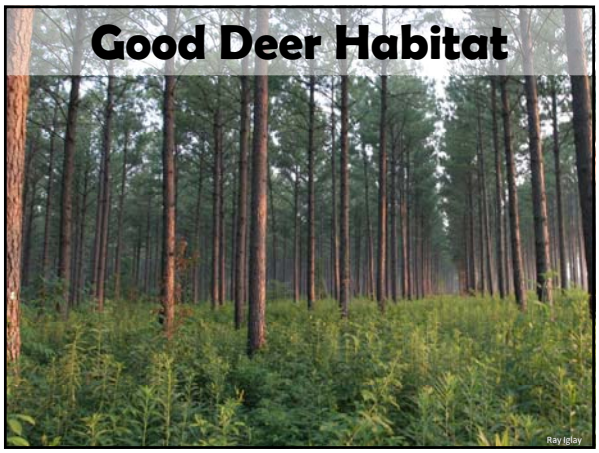


Credit – Cody Rainer, MDWFP

Good Pine Tree Habitat
Poor Deer Habitat

What can a Deer eat?

Good Deer Habitat



Tools for Management

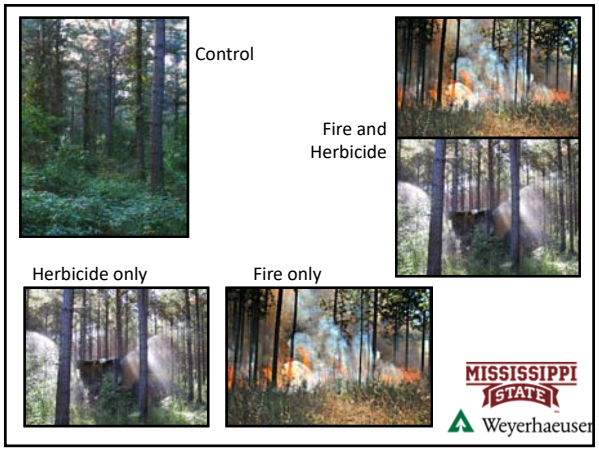
Aldo Leopold	Today
Cow	Chainsaw
Plow	Feller/Buncher/Skidder
Axe	Herbicide
Fire	Helicopter
	Disc
	Fire

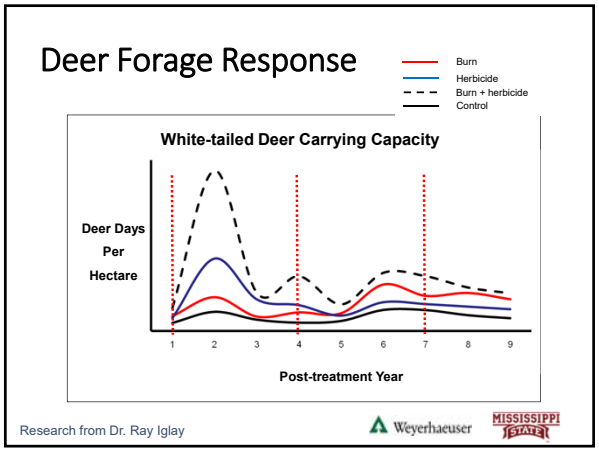

Prescribed Fire
January – March Application
Melissa Moore

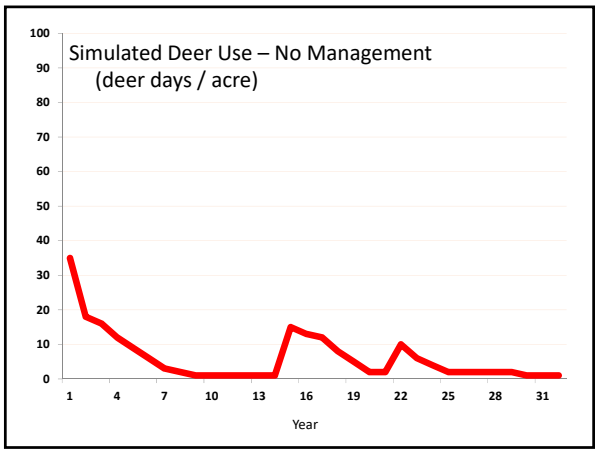

1st growing season

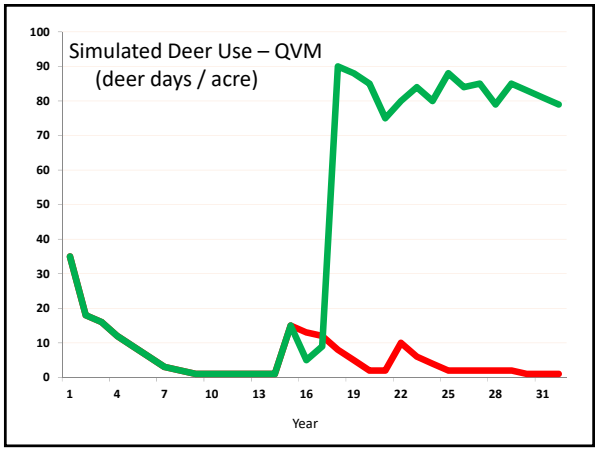

2nd growing season


4th growing season

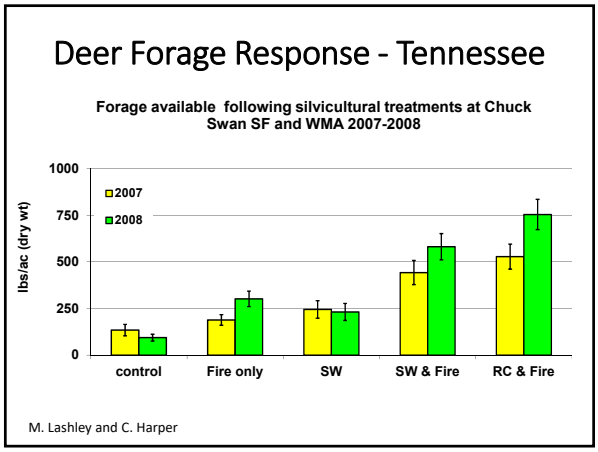

Control
Fire and Herbicide
Herbicide only
Fire only
MISSISSIPPI STATE
Weyerhaeuser


Deer Forage Response
Burn
Herbicide
Burn + herbicide
Control
White-tailed Deer Carrying Capacity
Deer Days Per Hectare
1
2
3
4
5
6
7
8
9
Post-treatment Year
Research from Dr. Ray Iglay
Weyerhaeuser
MISSISSIPPI STATE



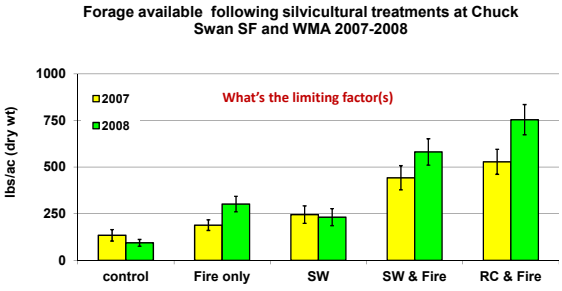


Deer Forage Response - Tennessee



M. Lashley and C. Harper

Deer Forage Response - Tennessee



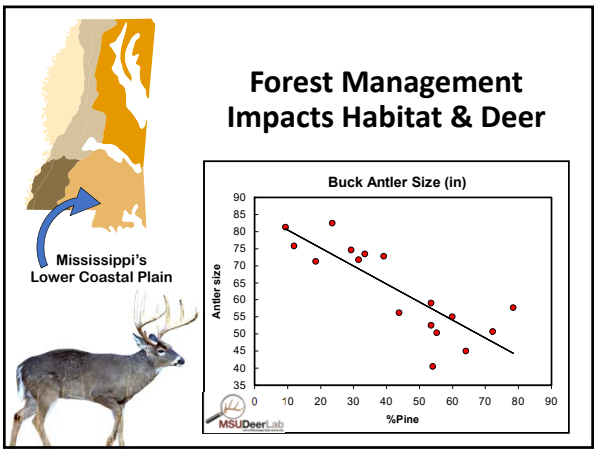
M. Lashley and C. Harper

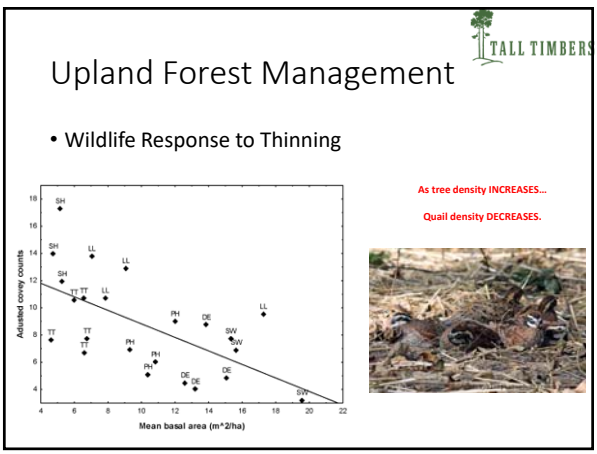
Wildlife Response to Habitat

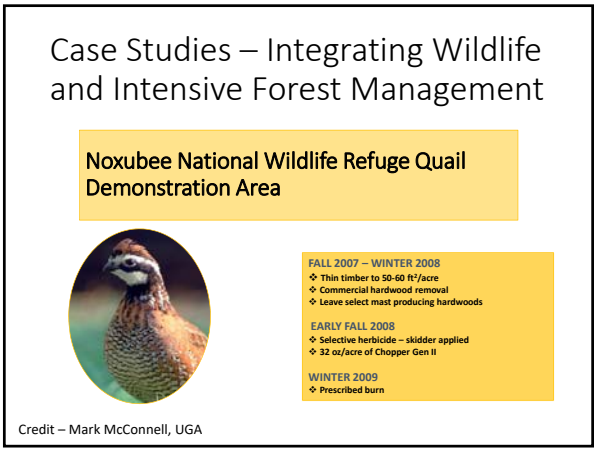
Deer Forage Requirements

Question:

1. How much does an adult deer eat each day?
   About 3 pounds (6 including water weight)
2. In a typical pine forest how much deer forage is produced per acre?
   a) In an unmanaged pine plantation? About 100 pounds
   b) In a managed pine plantation? About 400-800 pounds

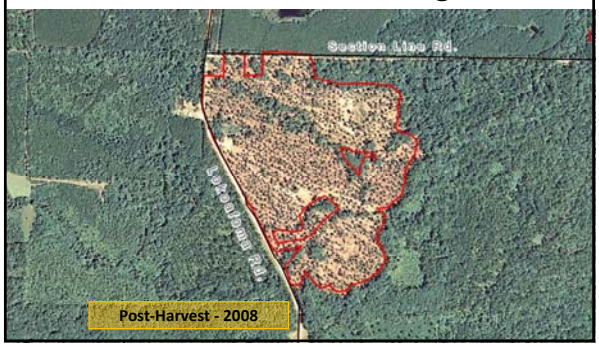

Forest Management
Impacts Habitat & Deer
Mississippi's
Lower Coastal Plain
Buck Antler Size (in)
Antler size
%Pine
MSUDeerLab


Upland Forest Management
TALL TIMBERS
• Wildlife Response to Thinning
Adusted covey counts
Mean basal area (m^2/ha)
As tree density INCREASES…
Quail density DECREASES.


Case Studies – Integrating Wildlife and Intensive Forest Management
Noxubee National Wildlife Refuge Quail Demonstration Area
FALL 2007 – WINTER 2008
Thin timber to 50-60 ft²/acre
Commercial hardwood removal
Leave select mast producing hardwoods
EARLY FALL 2008
Selective herbicide – skidder applied
32 oz/acre of Chopper Gen II
WINTER 2009
Prescribed burn
Credit – Mark McConnell, UGA

Case Studies – Integrating Wildlife and Intensive Forest Management

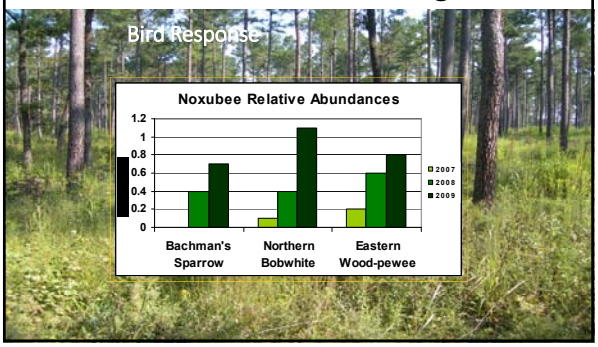
Case Studies – Integrating Wildlife and Intensive Forest Management



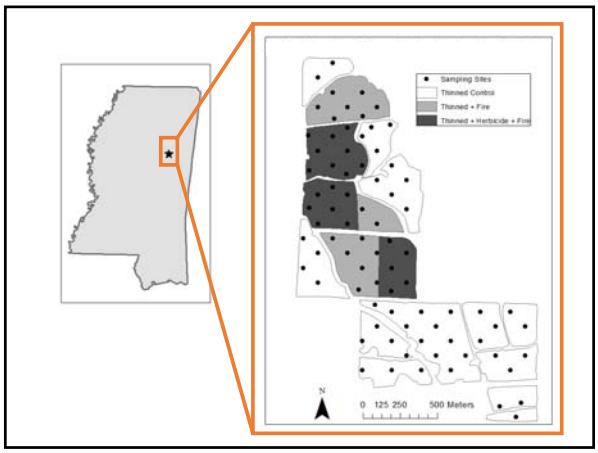
Case Studies – Integrating Wildlife and Intensive Forest Management

Case Studies – Integrating Wildlife and Intensive Forest Management

Case Studies – Integrating Wildlife and Intensive Forest Management



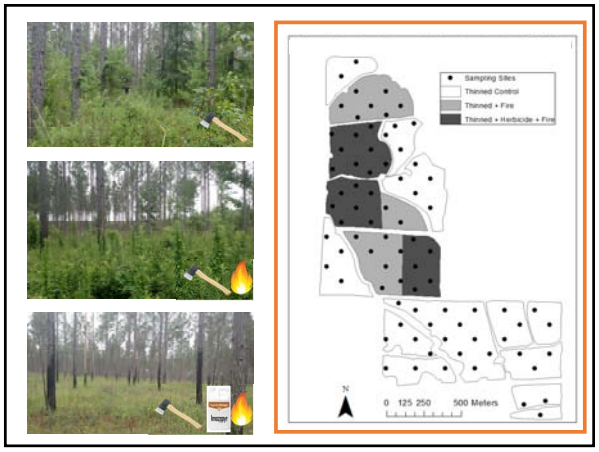
Wildlife Habitat Preference Using Trail Cameras

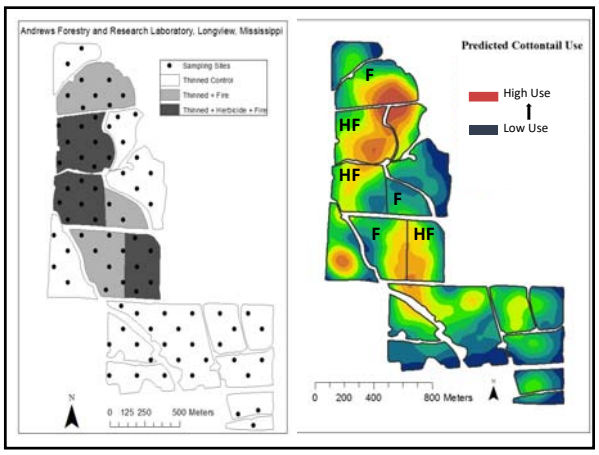

Sampling Sites
Thinned Control
Thinned + Fire
Thinned + Herbicide + Fire
N
0 125 250 500 Meters

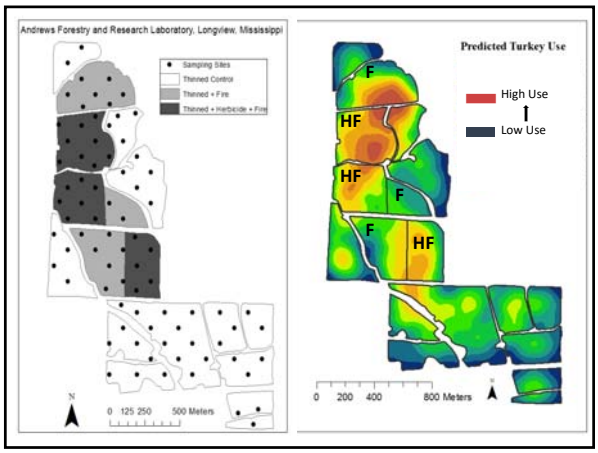

80+ Basal Area

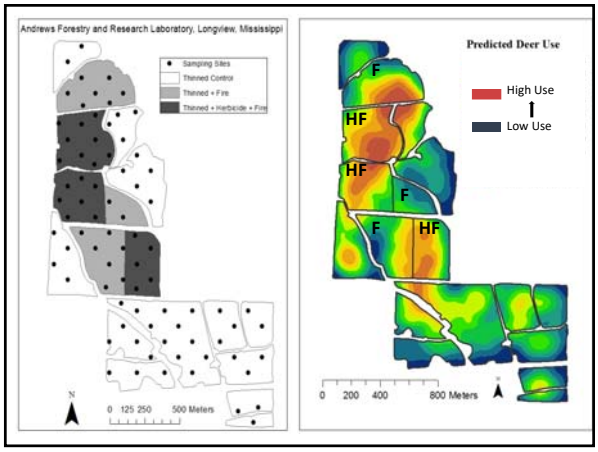

60 Basal Area

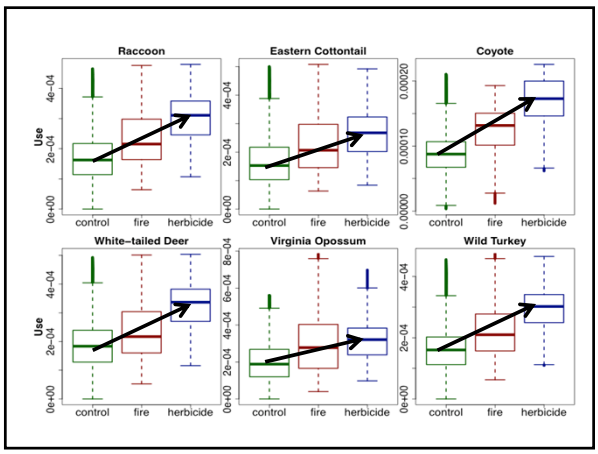

40 Basal Area


Sampling Sites
Thinned Control
Thinned + Fire
Thinned + Herbicide + Fire
N
0 125 250 500 Meters


Andrews Forestry and Research Laboratory, Longview, Mississippi
Sampling Sites
Thinned Control
Thinned + Fire
Thinned + Herbicide + Fire
N
0 125 250 500 Meters
Predicted Cottontail Use
High Use
Low Use
F
HF
HF
F
F
HF
0 200 400 800 Meters
N


Andrews Forestry and Research Laboratory, Longview, Mississippi
Sampling Sites
Thinned Control
Thinned + Fire
Thinned + Herbicide + Fire
N
0 125 250 500 Meters
Predicted Turkey Use
High Use
Low Use
F
HF
HF
F
F
HF
0 200 400 800 Meters


Andrews Forestry and Research Laboratory, Longview, Mississippi
Sampling Sites
Thinned Control
Thinned + Fire
Thinned + Herbicide + Fire
N
0 125 250 500 Meters
Predicted Deer Use
High Use
Low Use
F
HF
HF
F
F
HF
0 200 400 800 Meters


Raccoon
Eastern Cottontail
Coyote
White–tailed Deer
Virginia Opossum
Wild Turkey
Use
control
fire
herbicide

Economics

The Journal of Wildlife Management 81(8):1363–1371; 2017; DOI: 10.1002/jwmg.21330

Research Article

Economic Tradeoffs of Managing for Timber Production or Wildlife Habitat

PHILLIP BROCK DAVIS, *Department of Forestry, Mississippi State University, Box 9680, Mississippi State, MS 39762, USA*
IAN A. MUNN, *Department of Forestry, Mississippi State University, Box 9680, Mississippi State, MS 39762, USA*
JAMES E. HENDERSON, *Department of Forestry, Mississippi State University, Box 9680, Mississippi State, MS 39762, USA*
BRONSON K. STRICKLAND, *Department of Wildlife, Fisheries, and Aquaculture, Mississippi State University, Box 9680, Mississippi State, MS 39762, USA*

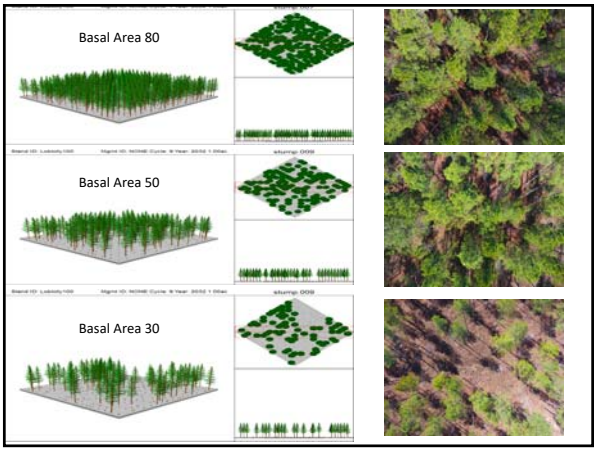
ABSTRACT Little quantitative information is available to nonindustrial-private forest (NIPF) owners regarding economic tradeoffs between managing pine plantations for timber production or wildlife habitat. We modeled loblolly (*Pinus taeda*) pine plantations to quantify economic tradeoffs for competing management scenarios using densities aimed at wildlife habitat or timber production in the Lower Coastal Plain and Coastal Flatwoods regions of Mississippi, USA. Scenarios contained a range of site indices, planting densities, thinning densities and frequencies, and rotation lengths for timber maximization and white-tailed deer (*Odocoileus virginianus*) or northern bobwhite (*Colinus virginianus*) habitat production. Land expectation values (LEVs) were highest for timber scenarios, followed by joint deer and timber, joint quail and timber, deer, and quail management scenarios. Comparison to the regional hunting lease rate revealed that compensatory lease rates from the study could be realized, making wildlife management as valuable as timber management. The results of this study could help landowners be more informed about economic tradeoffs when making management decisions on their property. © 2017 The Wildlife Society.

KEY WORDS *Colinus virginianus*, economic tradeoffs, Forest Vegetation Simulator (FVS), loblolly pine, northern bobwhite, *Odocoileus virginianus*, *Pinus taeda*, white-tailed deer.

Timber vs Wildlife Habitat

How much $$$ are you giving up?

- Basal Area (trees per acre)
- Site Index Base Age 50 (site productivity)
- Pine value (10-year avg. 2004-2013)
- Habitat mgmt. costs (herbicide, fire)



Results

Timber vs Wildlife Habitat

How much $$$ are you giving up?

	Site Index 80		Site Index 90		Site Index 100	
	Timber	Deer	Timber	Deer	Timber	Deer
Value	$2,448	$1,575	$3,205	$1,984	$3,805	$2,289
Difference		$912		$1,220		$1,515
Lease Rate		$27/ac		$37/ac		$45/ac

*Based on 2004-2013 timber values
** 3% Discount rate
***Cost of fire can be less

Results

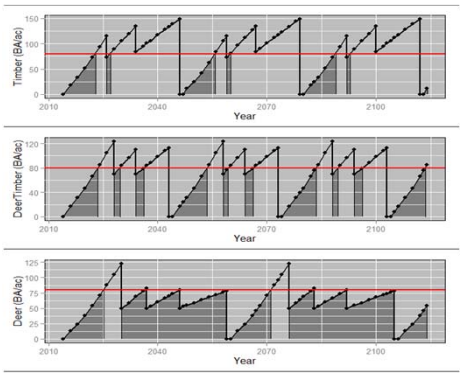
Timber vs Wildlife Habitat

How much $$$ are you giving up?

	Site Index 80		Site Index 90		Site Index 100	
	Timber	Quail	Timber	Quail	Timber	Quail
Value	$2,488	$1,202	$3,205	$1,545	$3,805	$1,731
Difference		$1,286		$1,657		$2,074
Lease Rate		$39/ac		$50/ac		$62/ac

*Based on 2004-2013 timber values
** 3% Discount rate
***Cost of fire can be less

Years of Deer Habitat

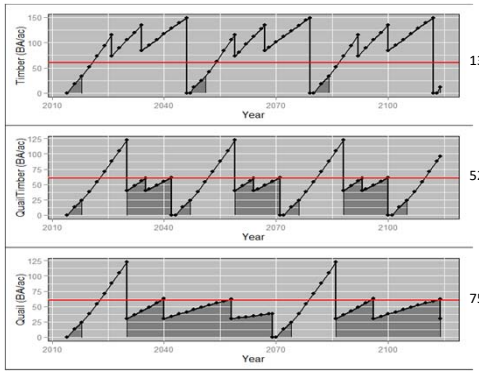


31 years

48 years

88 years

Years of Bobwhite Habitat



13 years

52 years

75 years

How should I manage my forest?

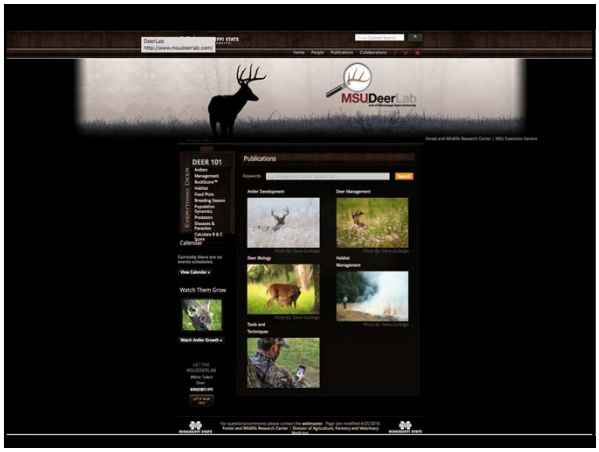
It depends on what you want!

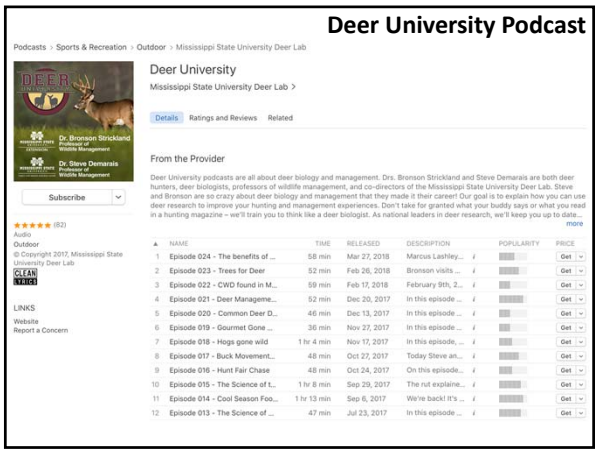
What happened to quail?

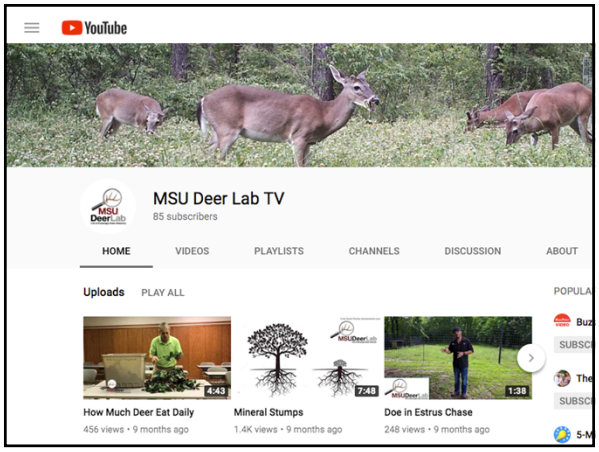
Deer by highways? Why?

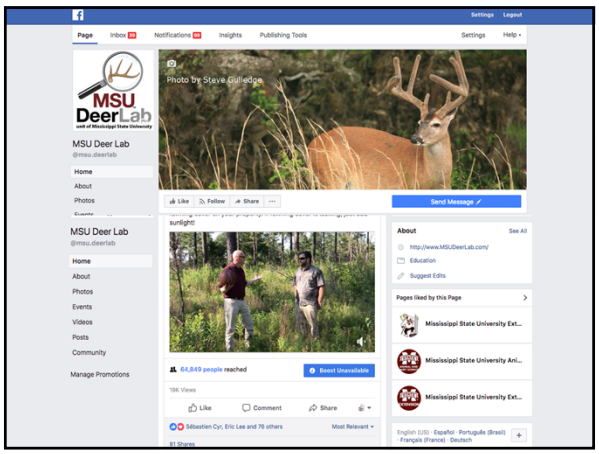
There's no food in the forest!

www.msudeerlab.com




Deer University Podcast
Podcasts › Sports & Recreation › Outdoor › Mississippi State University Deer Lab
Deer University
Mississippi State University Deer Lab >
Details
Ratings and Reviews
Related
From the Provider
Subscribe
LINKS
Website
Report a Concern


YouTube
MSU Deer Lab TV
85 subscribers
HOME
VIDEOS
PLAYLISTS
CHANNELS
DISCUSSION
ABOUT
Uploads
PLAY ALL
How Much Deer Eat Daily
456 views • 9 months ago
Mineral Stumps
1.4K views • 9 months ago
Doe in Estrus Chase
248 views • 9 months ago


MSU DeerLab
MSU Deer Lab
Photo by Steve Gulledge
Send Message
Boost Unavailable


Questions?