Longleaf Site Selection & Site Preparation

Ad Platt, The Longleaf Alliance

Overview of this presentation

Right site & soils?

Meets landowner's objective(s)?

Previous land use, history, and the starting point

Site Prep on Cutover

- **Chemical, Mechanical, or a combination?**

Site Prep on Old Field and Ag. Sites

- **Chemical, Mechanical or a combination?**

Is the Site Appropriate?

- **Avoid high pH soils (>7.0)**
  - Blackbelt/Prairie soils
  - Heavily limed soils (used in tomato production)
- **Test soil nutrients**
  - Excessive chicken litter applications may lead to toxic concentrations of some nutrients
- **Avoid the wettest soils**
  - Sites that have standing water for weeks at a time
  - Pelhams, Gradys, etc.

Prairie/Blackbelt Type Soils

Soils

- **Clays**
  - Longleaf is tolerant of very heavy soils
    - Reduced incidence of little-leaf disease
    - Gulf States / Westervelt plantings on clay soils
- **Loams**
  - Better the soil, the faster longleaf grows
- **Sands**
  - Longleaf is tolerant of well-drained soils
    - More volume as compared to other southern pine
  - Occasionally, some sands are too poor for longleaf
    - Some Lakeland sands in Florida

It is a Longleaf Site if:

- **In general, within or close to longleaf's natural range**
- **Longleaf will survive and grow well once established**

- **OK, it is a "longleaf site", BUT…**

  Does longleaf meet the landowner's objectives? Can I manage this long-term as a forest?

What are YOUR Management Objectives?

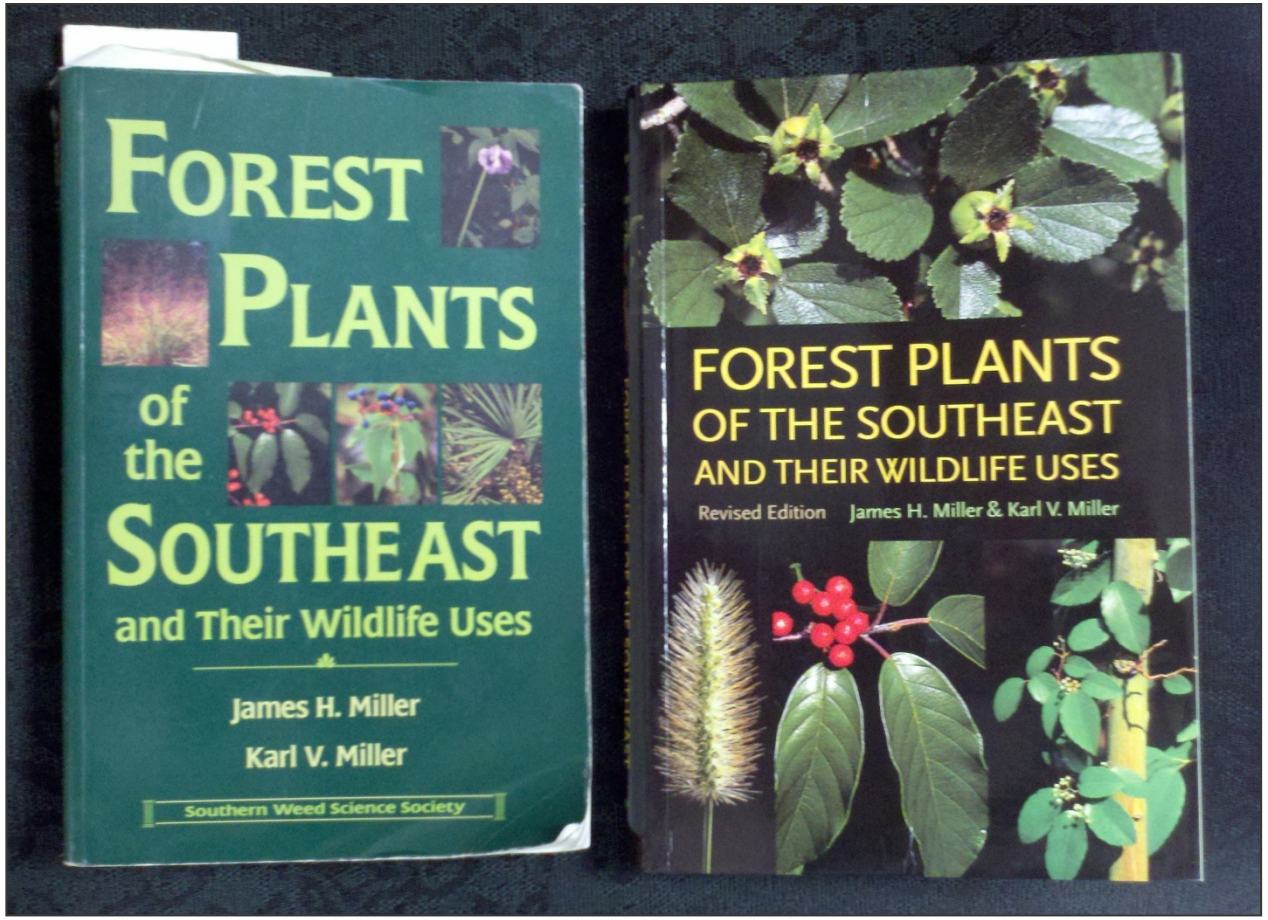
- **Good Survival & Growth**
- **Aesthetics**
- **Risk Reduction**
- **Restore Native Plants & Animals**
- **Recreation**
- **A profitable forest that I can also enjoy every day**

Values of the Longleaf Forest are many!

Perennial legumes used by wildlife

Habitat for Quail or Gopher Tortoises has to be within reach

Suggested Reading



In longleaf restoration…

- **Good site prep should:**
  - Assist with the successful establishment of longleaf pine
  - Control hardwood competition
  - Conserve keystone species
  - Allow Rx fire soon after planting
  - Maintain botanical diversity or allow it to quickly recover
  - Discourage weeds

- **Bad site prep may:**
  - Prevent the successful use of Rx fire
  - Encourage weeds such as dogfennel, climbing fern, rattlebox and blackberry that compete with longleaf and deteriorate wildlife habitat
  - Eliminate much of the botanical diversity that makes longleaf pine forest the beautiful places that we enjoy

From: Nathan Klaus, GADNR

Protect your fuels so you can burn

Grasses are necessary for fuel… and susceptible to imazapyr.

Find and control invasive species even before the site preparation

Site prep alone won't fix invasive problems – it takes more

Cogongrass = glyphosate and/or imazapyr

Climbing fern = glyphosate

With good previous fire history, Fire Only – at age 2

Dealing with the challenges of preparing to plant harvested sites

Can fuelwood harvest replace some mechanical site prep treatments?

Separating the biomass from the pulpwood and chipping on site

Frequently used site prep herbicides for longleaf

	Foliar only	Foliar only	Soil & foliar active	Soil & foliar active	Soil & foliar active	Soil & foliar active	Soil & foliar active
Target Species	Trichlopyr (Garlon, etc)	Glyphosate (Roundup, etc	Imazapyr (Arsenal, etc)	Hexazinone (Velpar)	Sulfometuron (Oust)	Aminopyralid (Milestone)	Chlopyralid (Transline)
Oaks							
Sweetgum							
Maple							
Hickory							
Cherry							
Wildling Pine							
Gallberry							
Yaupon							
Blackberry							
Grasses							
Broadleaves							
Legumes							

Avoid the nuclear solution – herbicides are powerful tools

All too frequently, we see overkill from cocktails like:
22 oz Arsenal AC
24 oz Forestry Garlon XRT
6 qts of glyphosate (41 % a.i.)
32 oz surfactant
15 – 20 gallons of water per acre

Sometimes also adding:
2 – 8 oz Oust XP
- **Lower rate on coarse, and higher rate on fine textured soils**

Avoid a "cookbook" recipe – be site specific for your tract!

Skidder with boomless sprayer – works well in most applications

Certain soil active herbicides are persistent

Table 2: Earliest recommended planting dates based on application dates of common Imazapyr rates @ 4# formulation.

Planting Date	Herbicide Site Prep Treatment Date**			
	May – June	July – August	September	October
	4# Herbicide product rates per acre*			
Loblolly Pine				
October	24 oz	20 oz	NO	NO
November	26 oz	22 oz	20 oz	18 oz (NO)***
Dec-Jan	28 oz	24 oz	22 oz	20 oz
Feb-Mar	32oz	28 oz	26 oz	24 oz
Longleaf and Slash Pine				
October	22 oz	18 oz	NO	NO
November	24 oz	20 oz	18 oz	16 oz (NO)***
Dec-Jan	26 oz	22 oz	20 oz	18 oz
Feb-Mar	30 oz	26 oz	24 oz	22 oz

**Imazapyr product formulations containing 4 lb acid equivalent imazapyr per gallon: trade names (manufacturer): Arsenal AC (BASF Specialty Products), Polaris AC Complete (NuFarm), and Imazapyr 4SL (Alligare LLC).*

***Do not plant within 60 days of a 24 oz/acre or greater (4 lbs ae/gallon) imazapyr herbicide application.*

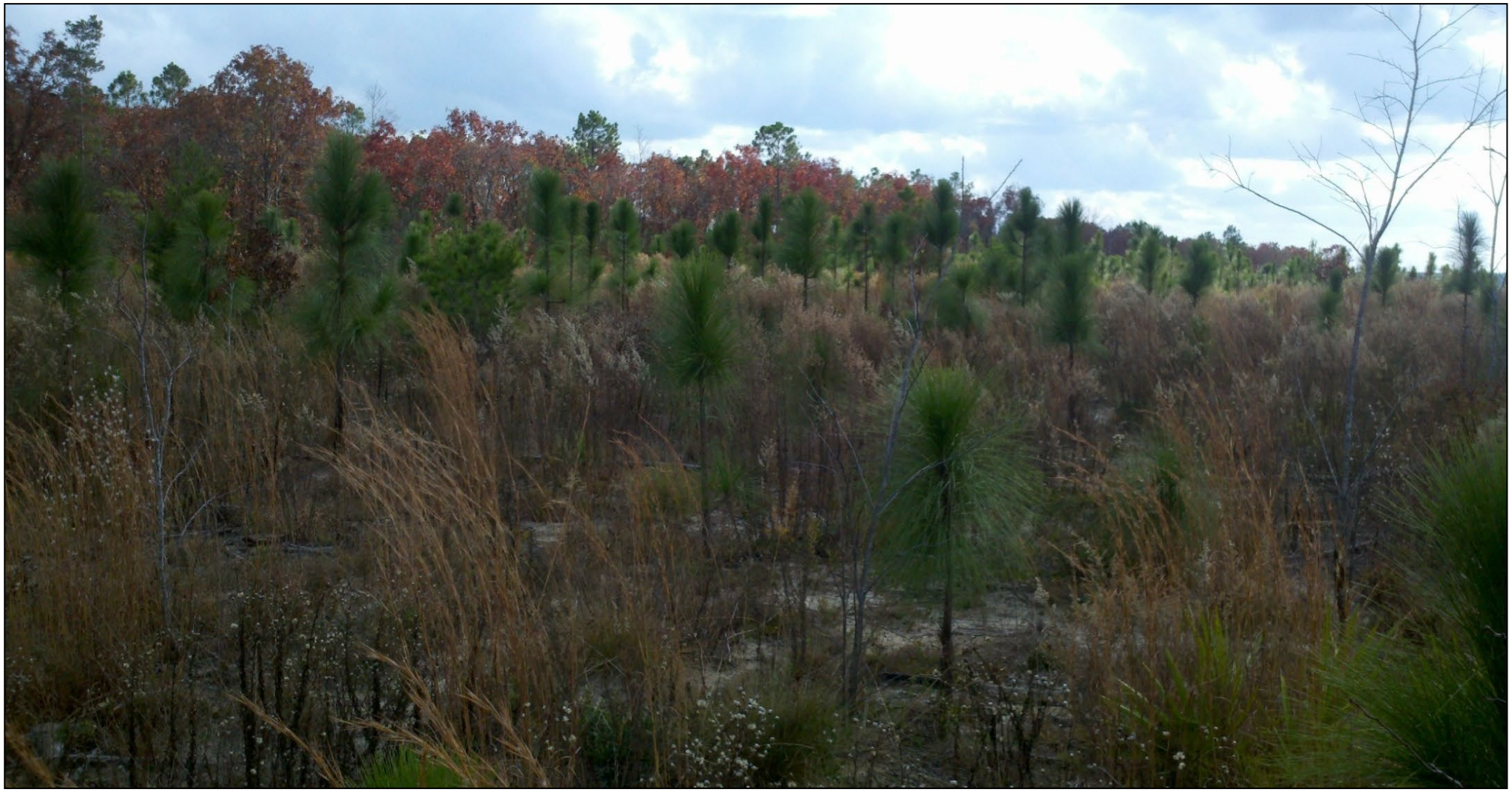
****Do not plant within 45 days of a 16 or 18 oz/ac imazapyr rate when rainfall amounts for the area are lower than normal, soil moisture is not adequate for planting, and competing vegetation is less than 1 foot tall.*

If the site has a sandy, loamy sand, or sandy loam surface soil texture, is moderately well, well to excessively well drained, and has an organic matter content < 2%, then the time interval between application and planting may be increased by one month (Tables 1 and 2). Another option is to reduce the herbicide product rate applied by 2 oz for 4 lb ae/gal imazapyr products and by 4 oz for 2 lb ae/gal product formulations.

Site preparation – avoid over preparation!

Consequences!

Your objectives drive the methods. Better growth with herbicides at age 3, but – where are the blueberries?



Sprayed (2 rates)in summer 2011. Burned in fall. Planted in winter.

The developing stand 11/15, 11/16, 4/17

Low Bush Blueberry & Huckleberries (*Gaylusacchia spp.*) are rhizomatous

Heavier soils with more sweetgum suggests imazapyr site prep

Respect the waiting period to plant

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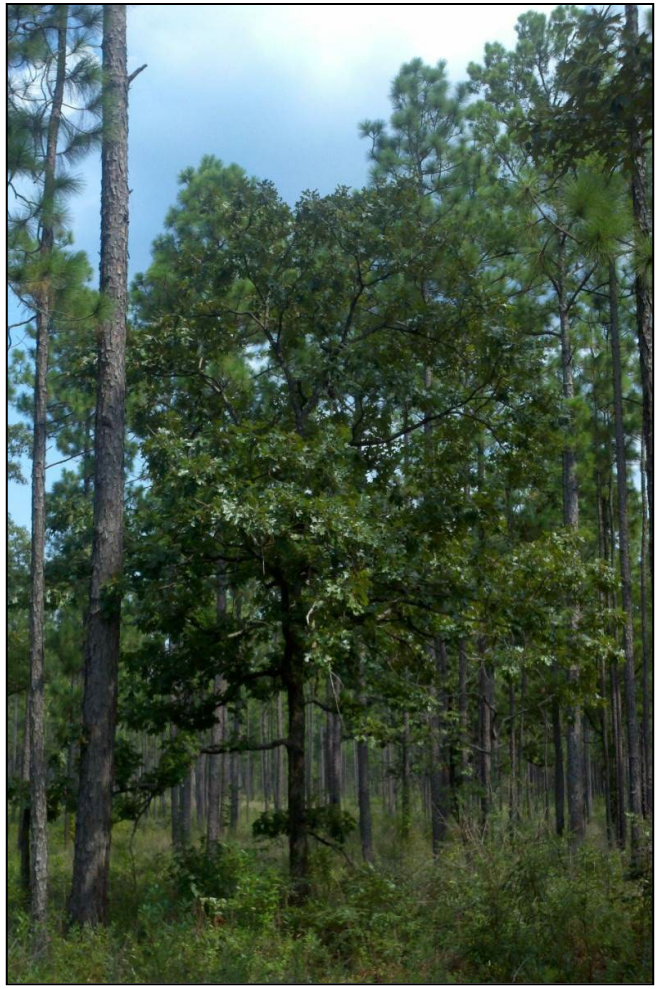
Thousands of offsite oaks = broadcast site prep. recommendation.

Scrub oaks are natural components of upland longleaf ecosystems



Post oak

Blackjack oaks

Also sand post, turkey, bluejack, sand live, etc

Each herbicide has certain strengths, as well as certain species resistant

Callicarpa americana is tolerant of hexazinone (Velpar)

Waxy leaf species usually targeted with Triclopyr (Garlon)

Waxy leaf species including:

- gallberry
- yaupon
- American holly
- wax myrtle
- titi

along with most woody brush, many broadleaves

Frequently used herbicide treatments compared in this study

GA DNR Site Prep Study @ Silver Lake:		Info from Nathan Klaus
Single Herbicide Treatments		
Herbicide	Rate	Common Brand names
Imazapyr 2 pound active ingredient	32 ounces/ac	CHOPPER, Rotary 2SL etc.
Imazapyr 2 pound active ingredient	48 ounces/ac	CHOPPER, Rotary 2SL etc.
Triclopyr 61.6% active	128 ounces/ac	Garlon 4
Metsulfuron Methyl 60% active	2 ounces/ac	Escort
ULW	3 Pounds/ac	ULW
Hexazinone 25% active	3.1 ml 5X5 grid	Velpar-L
ULW	6 Pounds/ac	ULW
Herbicide Tank Mixes		
Herbicide One	Rate	Herbicide Two
Imazapyr 2 pound active ingredient	32 ounces/ac	Metsulfuron Methyl 60% active
Imazapyr 2 pound active ingredient	40 ounces/ac	Triclopyr 61.6% active
Imazapyr 2 pound active ingredient	32 ounces/ac	Glyphosate 41% active
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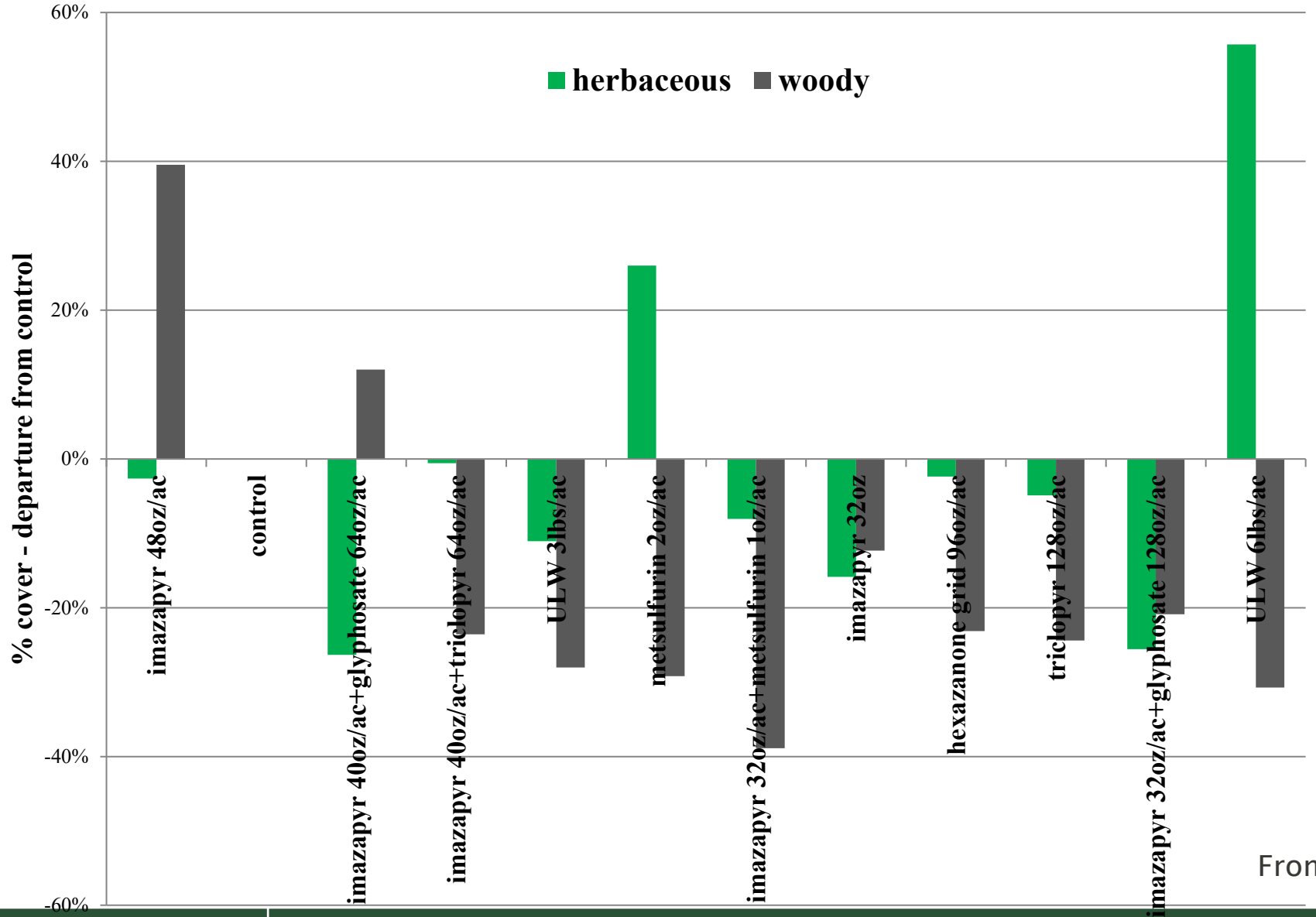
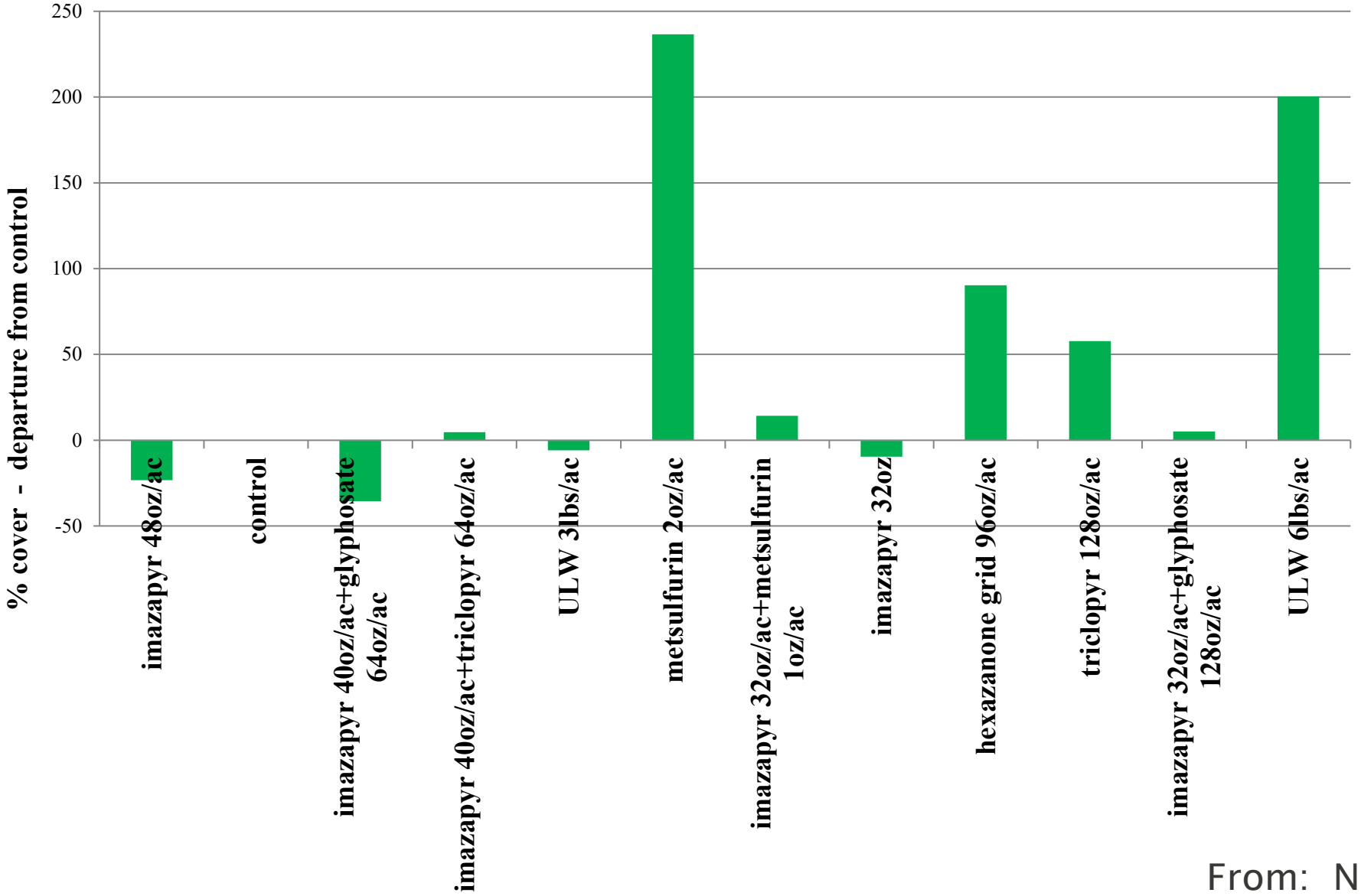
Check Plot		

Change in woody and herbaceous cover



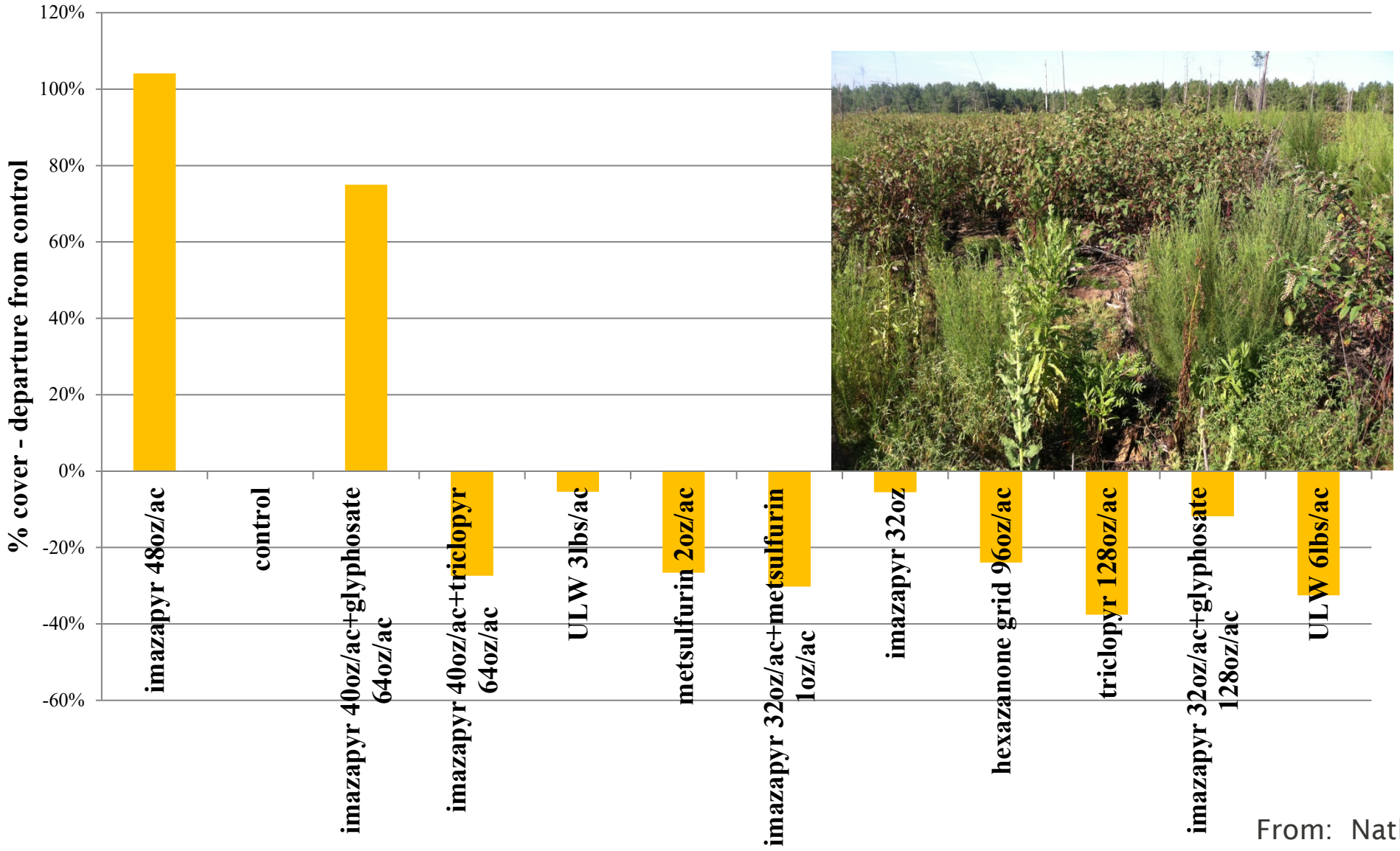
From: Nathan Klaus, GADNR

Change in grasses associated with longleaf pine



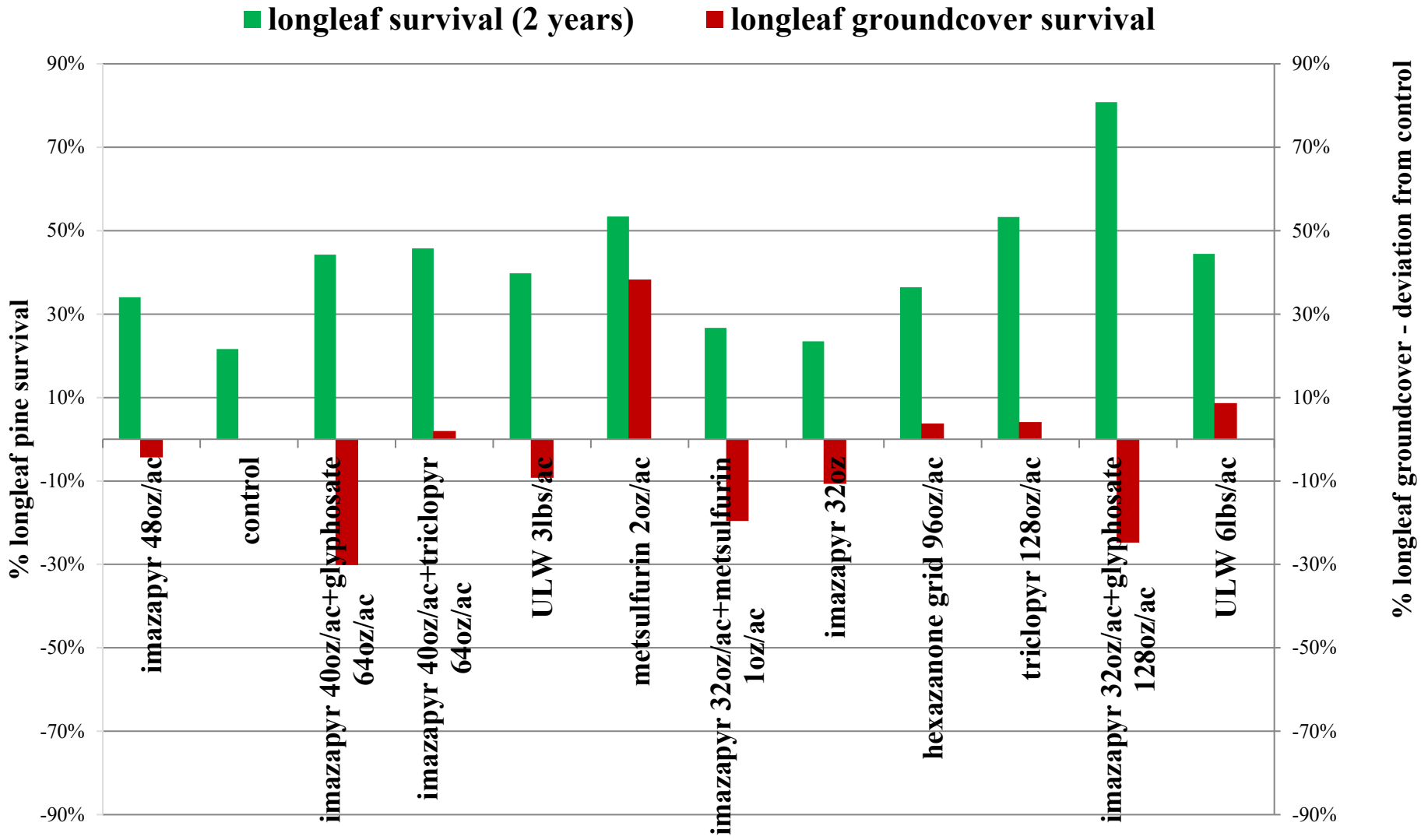
From: Nathan Klaus, GADNR

Change in weedy cover



From: Nathan Klaus, GADNR

Longleaf survival (2 years) and change in longleaf groundcover



From: Nathan Klaus, GADNR

One Alternative - Site Prep Mix

- **An alternative that favors understory retention**
  - **48 oz Garlon XRT/2oz Metsulfuron per acre in <u>at least</u> 12-15 gal/acre solution + surfactant**
    - **Not tested in southern rough**
    - **Hold off SP burn**
  - **Applied to 7 sites totaling almost 3,000 acres with good effects**

From: Nathan Klaus, GADNR

Expected, but did not find lower survival in restoration treatments

- Plum Creek 73% seedling survival at 17 months (preferred mix, planted 12/2014)
  - Catchmark tract (48 oz imazapyr) 70% survival (planted 11/2014)
- Flint River Plantation 93% seedling survival @ 19 months (preferred mix, planted 11/2014)
- Fall Line Sandhills WMA – 20 month seedling survival 45% (preferred mix, planted 11/2014
- Brown tract (imazapyr+escort) 88% survival (planted 1/2015)
- Hughes tract 85% seedling survival during severe drought (preferred mix planted 11/2015)

From: Nathan Klaus, GADNR

Choices could restore a site, or reduce it

Garlon/Escort – 19 mos.

Rates matter also!

- Years of testing go into herbicide registration and labels to determine the lowest effective use rate for control each target species.
- Not following labeled rates can cause problems.
  - Applying more than the labeled rate can cause crop damage
  - Applying less can cause poor weed control and may lead to herbicide resistance

Too rapid of a “burndown” can prevent systemic herbicides from getting deep into the target.

Mixes can offer multiple modes of action from the different chemistries used.

Seasonality

Table2. Optimum Timing for Ground-applied Forestry Herbicides in the South

Herbaceous Weed Control	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Oust			best									
Oust + Velpar L			best									
Oust + RoundUp					best							
Poast or Fusilade												
Spotgun												
Velpar L			best									
Injection												
Tordon 101 R/RTU				questioned								
2,4-D amine												
Garlon 3A				questioned								
RoundUp or Accord												
Directed Sprays	Apply at first full leaf											
Weedone 2,4-DP					best							
Garlon 4 & 3A					best							
RoundUp or Accord						best						
Arsenal						best						
Streamline or Basal												
Garlon 4 + Disesel		best		questionable							questionable	

Dates are approximate for the upper coastal plains. Spring dates will shift to the right going from the coastal plains to the mountains. Likewise, fall dates will shift to the left going from the coastal plains to the mountains because of earlier frost.[2]

J.H. Miller & L.M. Bishop, USFS 1989

Optimum Timing Varies

- Seasonally – when most effective
- Time of day – systemic herbicides work best when applied in late morning, midday and afternoon in cool climates. Plant growth slows down at dusk. Heavy dew can cause herbicides to run off; wait for dew to evaporate.
- Read and understand the label, it is the law. If off-label application occurs, time, money, and potentially the pine seedlings themselves could be lost.
- Other adverse weather factors: avoid application in high temperature, high humidity, rain (or imminent), inversion layers, excess wind, and freezing temperatures.

Pause between cutovers and ag situations:

Questions so far?

Ag Fields, Old Fields, and Pastures

Site Preparation – Ag Fields & Pastures

- Know the history of recent practices
- Full micronutrient soil test
- Scalping, sometimes Subsoiling
- Herbicide application
  - Broadcast
  - Banded application

Improved pasture grasses, especially Bermudagrass, Bahia

Control of aggressive pasture grasses is often a two-year job

Bermudagrass = high rates imazapyr
(48 to 60 oz. Chopper Gen II)
Follow up next year!

Bahiagrass = Escort (1.25 oz) or
high rates of glyphosate

Fescue = high rates of glyphosate

Consider including Escort for blackberry on
pasture sites.

Effective control depends on stage of grass and timing!

Address *Rubus* species during site preparation with Escort (metsulfuron).

Agricultural Fields

Always begin with a full micronutrient soil test

Expect a range of both grasses and broadleaves

Early pioneers of disturbed sites

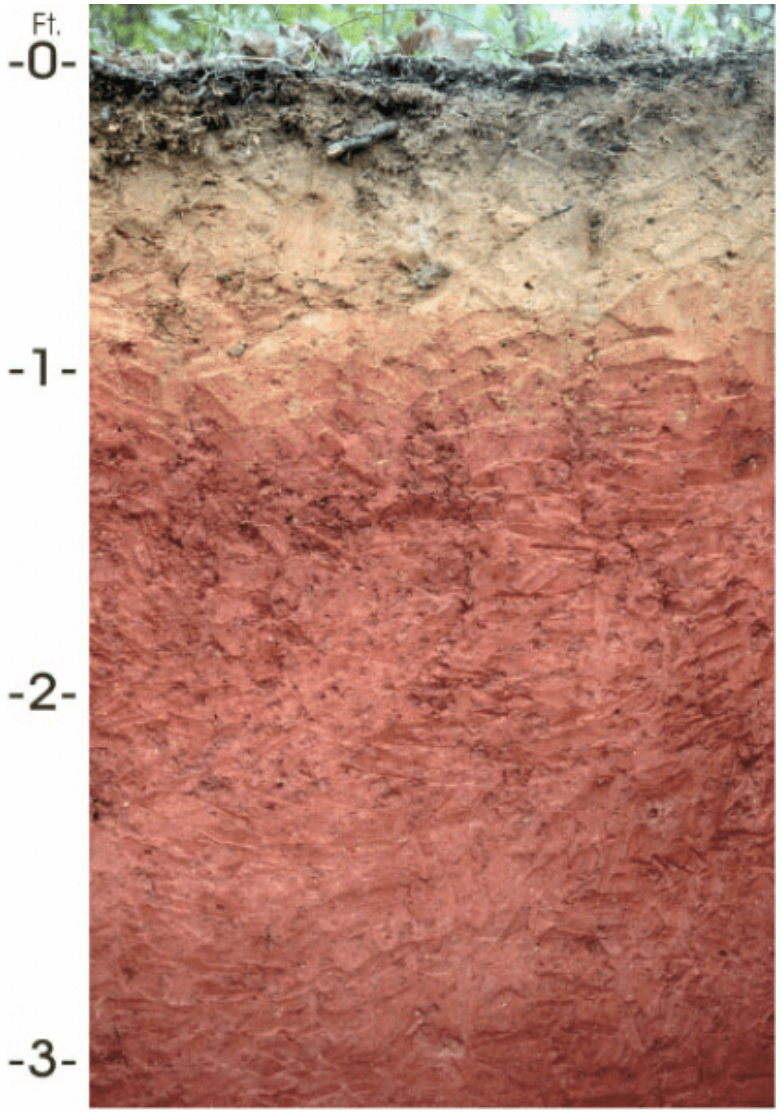
Aggressive weedy growth capitalizing on excess nutrients and altered competition

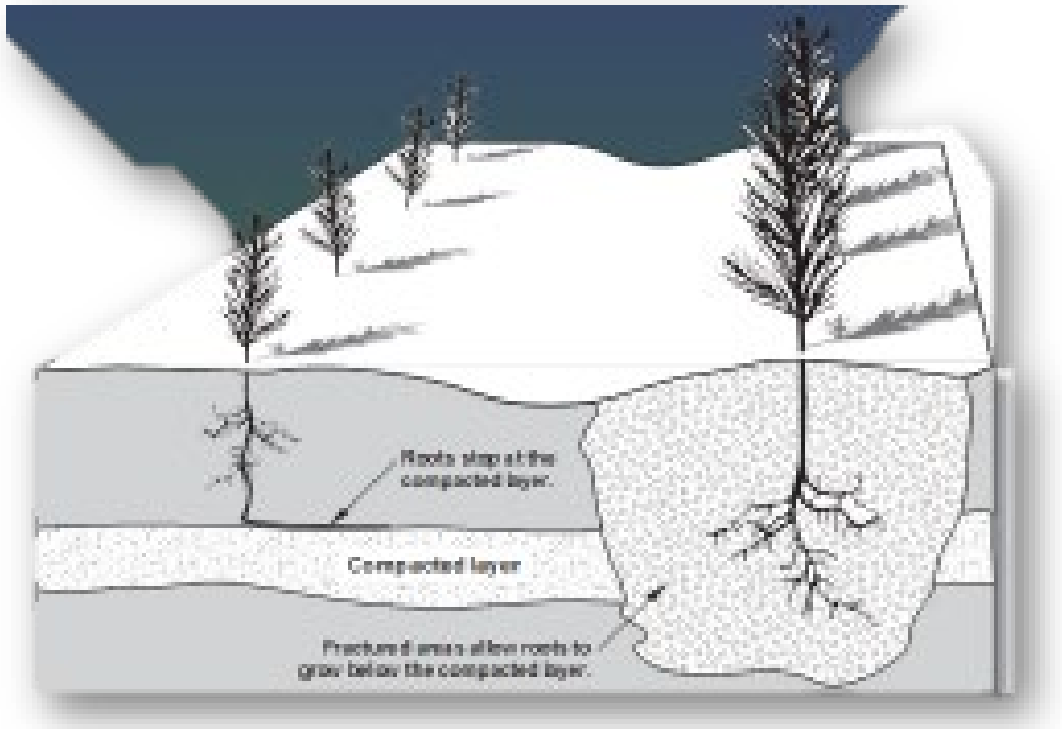
Elevated nutrients often result in poor form and greater disease issues, as seen in many CRP plantings. Increase planting density to allow for greater mortality, heavier thinning later, while still having enough desirable trees to carry into sawtimber/poles.

Watch out for seed-in from adjacent loblolly (or sand or slash) plantations, especially on small tracts surrounded by neighboring plantations. These seeds germinate in the spring, and may not be noticed in summer site inspection.

→Generally a combination approach, often with pre- and post emergent activity, for grasses and broadleaves, plus wild pine if not able to burn.

Subsoiling can help ameliorate compacted soils





Subsoiling (Ripping)

Ripping with a straight shank. Clods and fracture will settle over a few months.

Use the right tool for the job

Whitfield Scalper

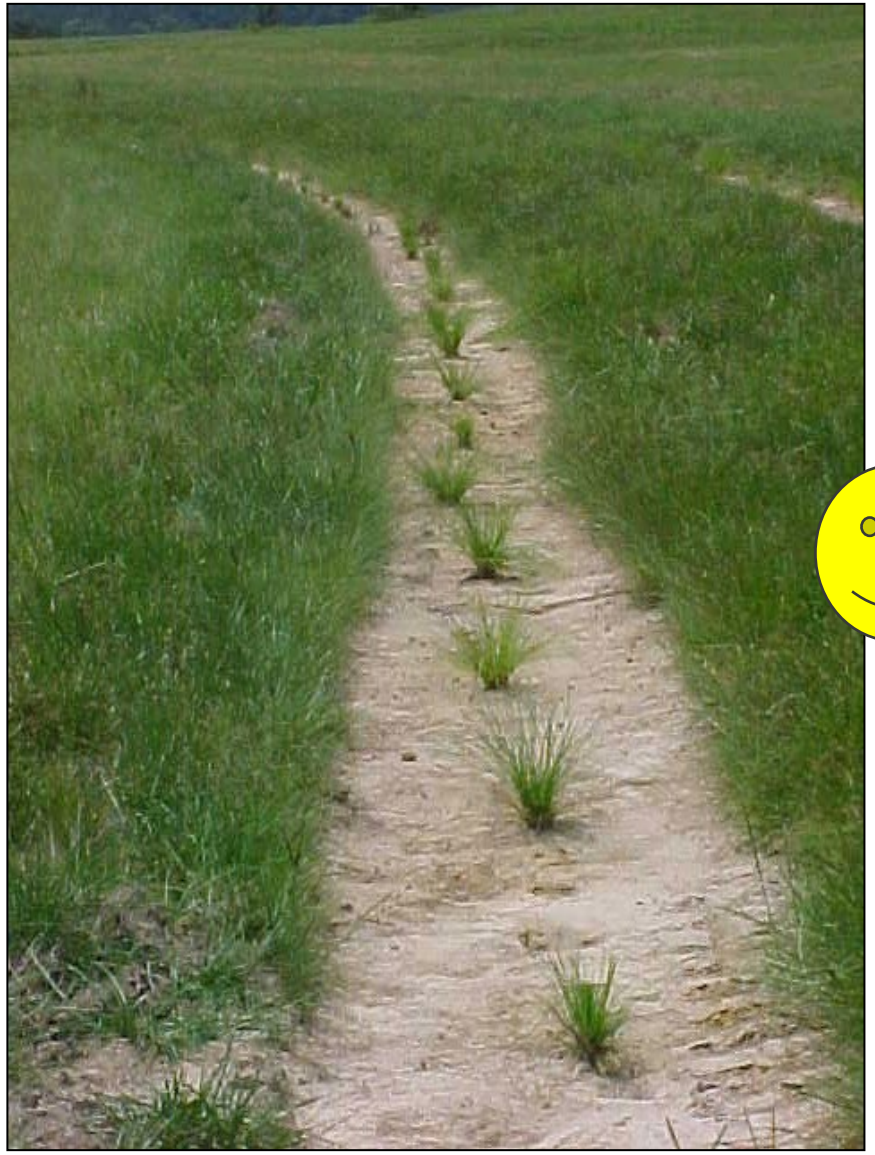
Scalp too deep; too messy

On Ag sites – especially pastures, or following legume crops

Scalped Rows

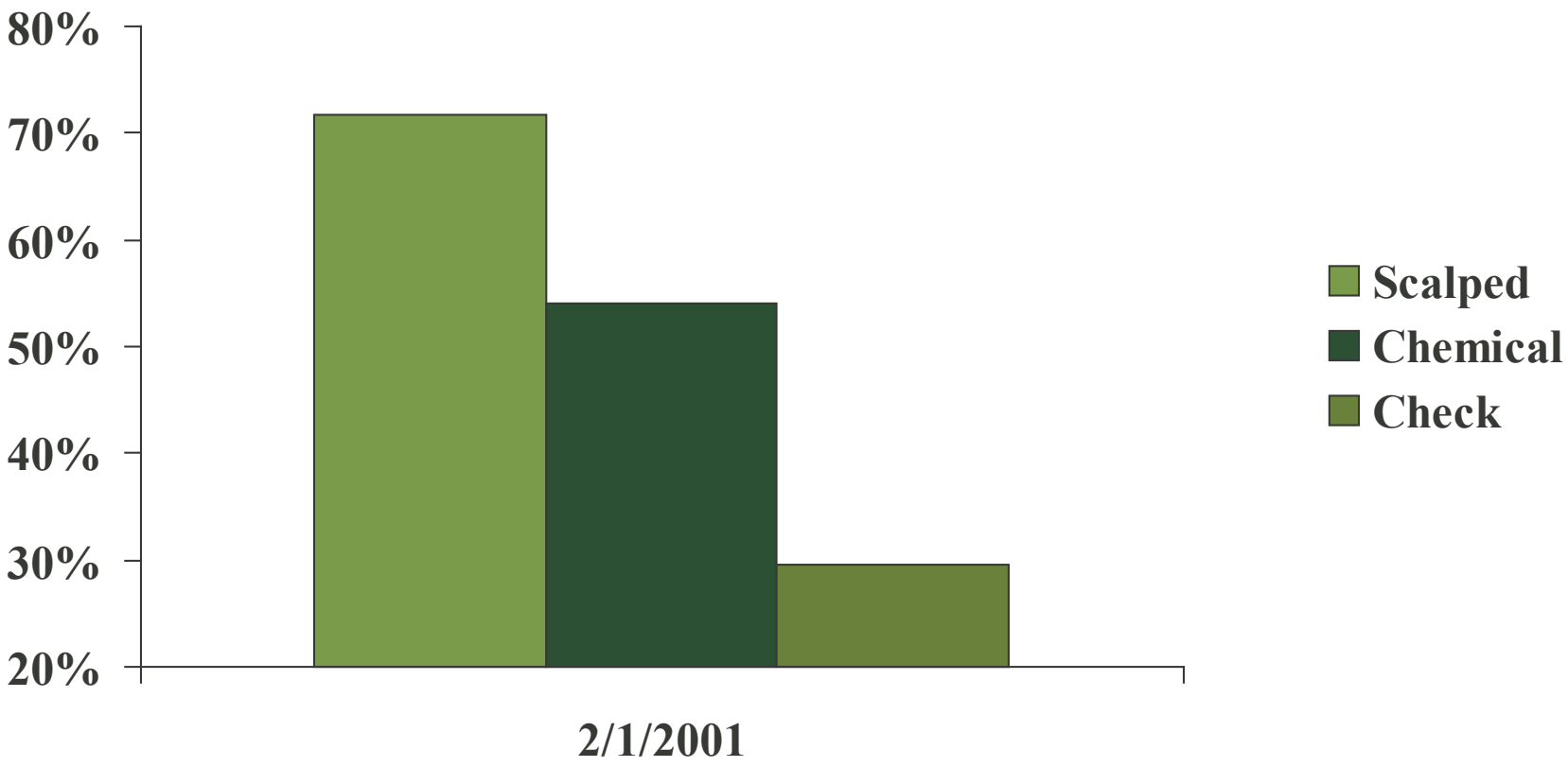
- **Position terminal bud approx. 2” above soil surface**
- **Leave plug exposed 1-1 1/2” above soil surface**
- **Do not plant in rip; plant on the elevated shoulder**

Success on a challenging pasture site



On contour, no erosion, stays open 18 months. Easy to follow and release, if you had to.

% Starting Height Growth at Age 2 (by Site Prep)



Spring- 4 Months Post Planting – plug too low

Terminal Bud Exposed

Terminal Bud Covered

Depth Study #5 Installed July 2002

Cutover Site

- **Assessed Survival 11/13/02**
- **Overall Survival 91%**
- **Terminal bud 5 cm above soil surface 88% survival**
- **On cutover sites, tell tree planters that you "want to see the plug."**

Adjust - when planting areas where water may stand

Wet Sites

- Use 6” Plug
- 3-4” of Plug Exposed

Questions?