

# Burning Longleaf

*The Pine that Fire Built*

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*Longleaf 101 Academy*





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Burning Longleaf

# Arguably, the Most Fire-Adapted Tree in North America

- Highly resistant to fire in the grass stage
- Resprouts after fire
- “Rockets” quickly to height above most flame lengths
- Thick insulating bark
- Needles are primary carrier of fire
- Seeds need mineral soil to germinate



# Remember that longleaf is fire resilient, not fire-proof



Mortality will occur, no matter how carefully fire is applied.  
What is your acceptable loss?





10 March 2017

28 Jan. 2017



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Burning Longleaf

# Cypress Fire- Angelina National Forest



The  
Long

ng Longleaf

# Benefits and Objectives of Fire in Longleaf

- Brownspot Control
- Hardwood Control
- Pine Control
- Maximize sunlight
- Encourage & Sustain Groundcover Plant Community
- Create Conditions for Future Fires
- Wildlife Habitat
- Aesthetics
- Regeneration
- Risk Reduction
- Promote tree form



# Burning Young Longleaf

- First, decide why you should burn
  - Let your objective determine when
- Know and understand your fuels
- Avoid periods of active height growth (exposed candling)
- Avoid backing and intense ring fires; use grid ignition and strip-head fires instead



# Young Longleaf

- Plan to burn as soon as enough fine fuel are present to carry the fire
- Vigorous grass stage seedlings
- At least 0.4" RCD



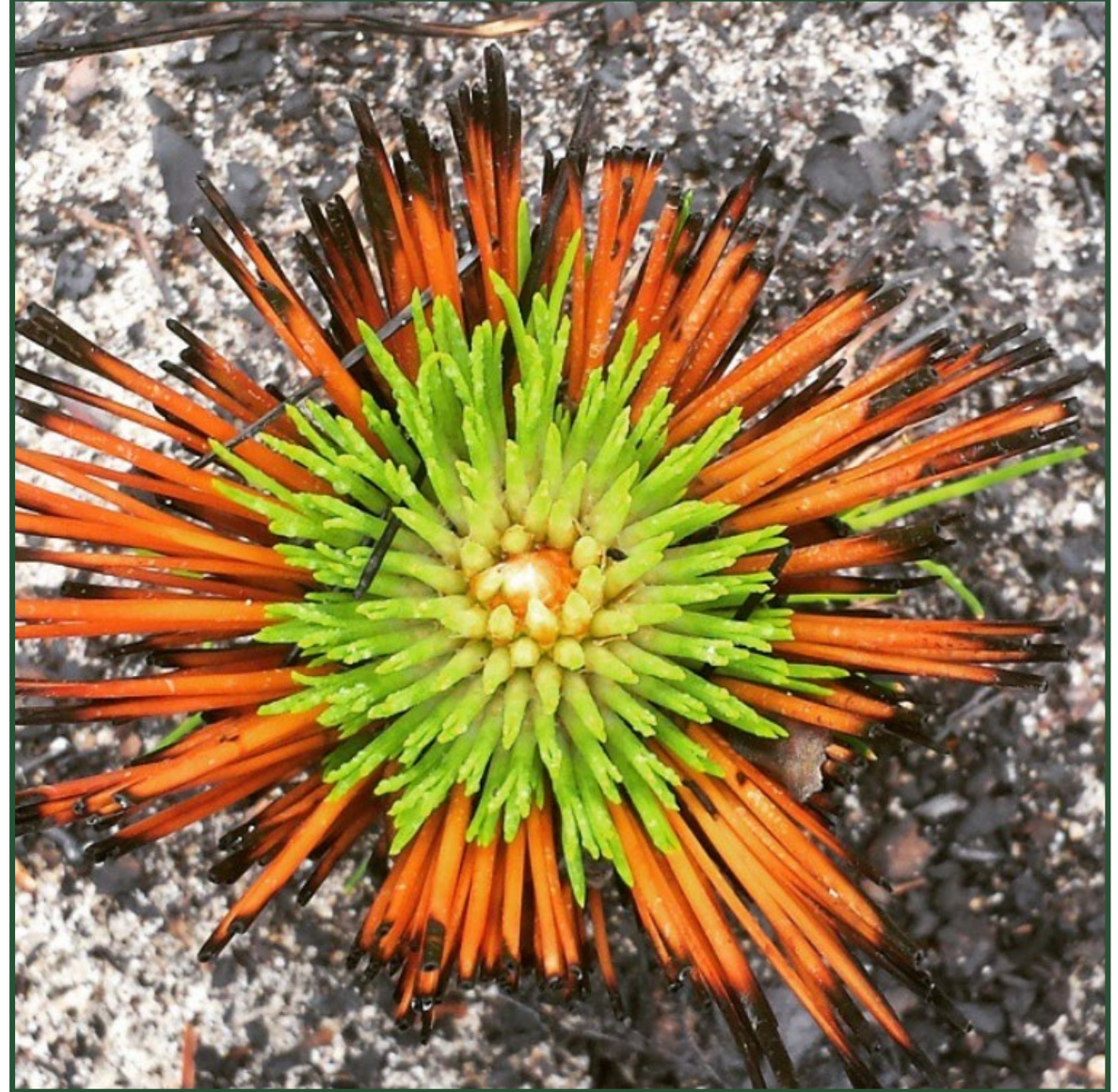
# 1 Year Old—Winter Burn



# Resilience at the grass stage



Resprout at six-months post-burn





# Longleaf vs. Loblolly



- Studied post-fire survival on study plots at the Solon Dixon Center, Andalusia, AL
- Planted Longleaf with seeded-in Loblolly
- Survival measured by height classes
  - **Grass Stage (longleaf)**
  - **<1" (loblolly)**
  - **1-3"**
  - **3-6 "**
  - **+6"**



## What We Learned—

- **Longleaf out-survives Loblolly in all height classes**
- Even at the vulnerable 1-3”
- But loblolly survival was far worse at same height (1-3”)
- Grass stage longleaf, 3-6” and +6” did extremely well
- **At 6 feet tall**, both trees have comparable survival rates—  
window has closed on loblolly control!



# 1-3' tall young longleaf—Winter Burn



Photo: R. Thompson



# 1-3' tall young longleaf—Winter Burn



Photo: R. Thompson



# Longleaf vs. Loblolly Early Fire Studies from The Longleaf Alliance

## The Takeaways—

- Advantage for burning longleaf early in grass stage where loblolly is going to be an issue. Longleaf can take some heat where loblolly will perish— **Exploit their differences.**
- Loblolly survival dramatically increases at **6 feet---** window closing to control with fire— **Burn Early.**
- Loblolly has many characteristics of a weed—repeated fires needed to kill and suppress germinants— **Burn Frequently!**



# No burn (or not soon enough)?



# Second Burn



# General Guidance on Burning Young Longleaf Pine

## Avoid Burning

- Trees have been in the ground < 1 year
- RCD < 0.4"
- Poor vigor
- Exposed candles



# General Guidance on Burning Young Longleaf Pine

## Avoiding Exposed Candles



# General Guidance on Burning Young Longleaf Pine

## Use Caution

- Air temp > 80°F, RH < 25%, or winds < 5 mph
- Reduced seedling vigor
- Seedlings out of grass-stage to 5' (< 2" RCD)
- Backing fire as primary ignition technique
- Headfires where flame height=seedling height
- Heavy fuel loads
  - Heavy slash and logging debris
  - Pasture grasses, invasives, dense native grasses



# General Guidance on Burning Young Longleaf Pine

Head Fires

vs.

Backing Fires



@scbobwhites



ALPFC



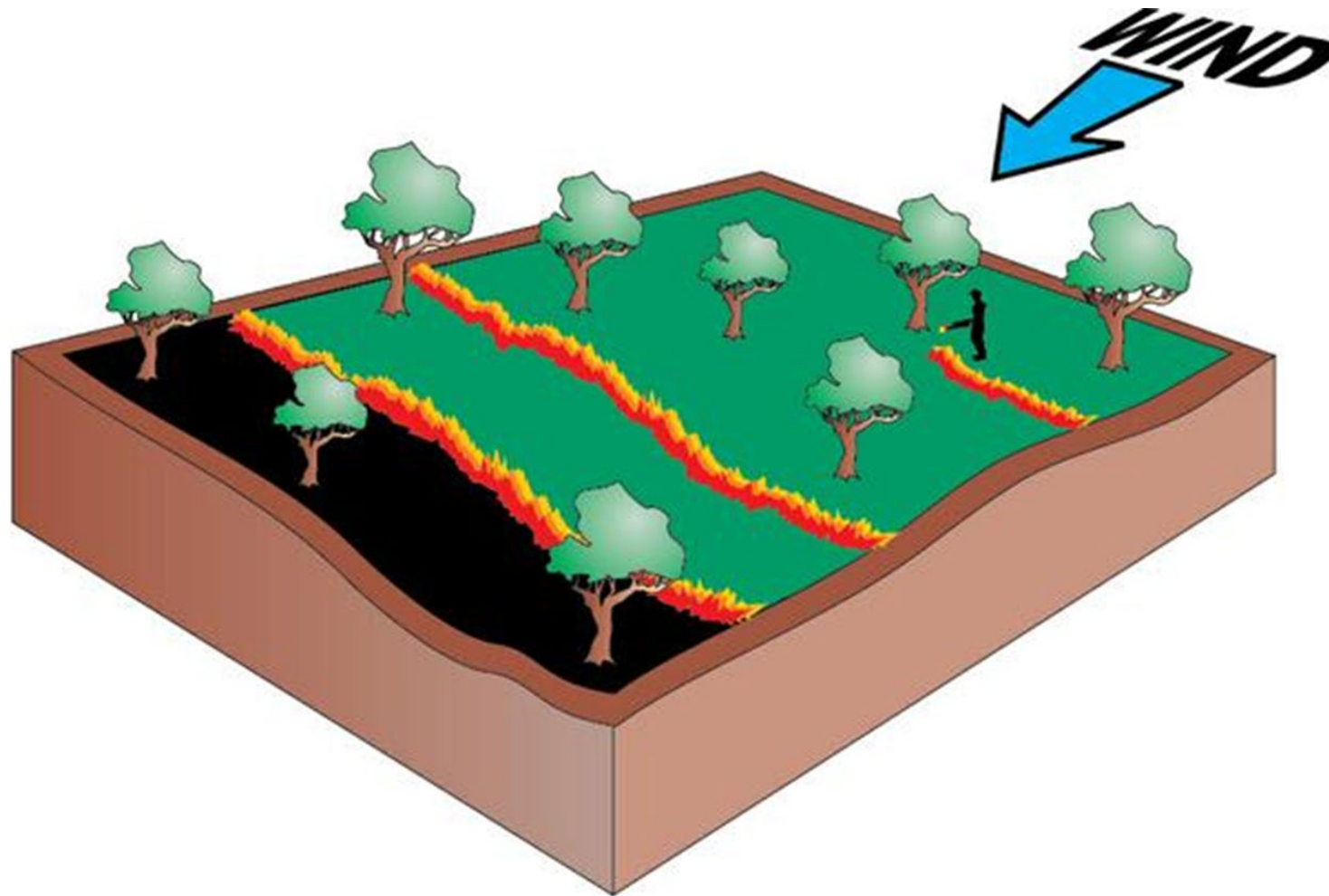
# General Guidance on Burning Young Longleaf Pine

## Good Conditions

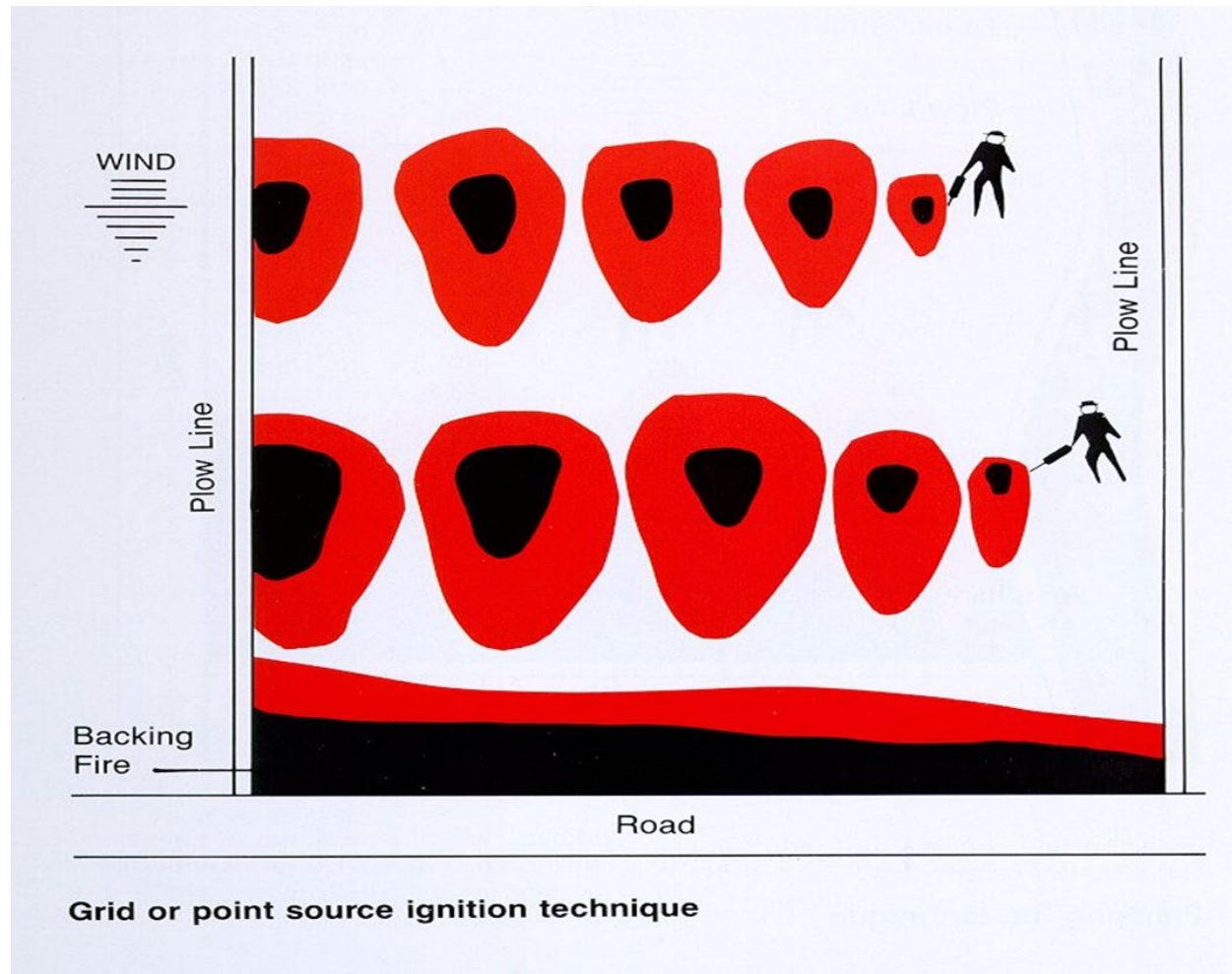
- Seedlings in grass-stage or 5'+
- Air temperature 40s and 50s
- Reliable wind forecasted
- Fuels are in moderation
- Strip-head fire and point-source ignition are used as primary techniques



# Strip-head Fire Ignition



# Point-source Ignition



# 8 year old, ag field longleaf—Winter Burn



# Plantation Longleaf—winter burn in high humidity



Photo: J. Hatcher



# Fire plots at the Escambia Experimental Forest (USFS)

**Mix of dormant & growing season burns**

*(Photo taken in March)*



all photos by Becky Estes

**A**



**B**

**Mix of dormant & growing season burns**

*(Photo taken in July)*

**Primarily dormant season burns**

*(Photo taken in March)*



**C**



**D**

**Primarily dormant season burns**

*(Photo taken in July)*



# “Pyrodiversity Begets Biodiversity”



*Painting by Philip Juras*



# ADVANCES IN UNDERSTANDING DUFF FIRES IN LONGLEAF PINE FORESTS



**Kevin Hiers, Morgan Varner,  
Jesse Kreye, and Joe O'Brien**



**Restoration of Fire to  
Long-Unburned  
Longleaf Pine Forests**



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Burning Longleaf

# Longleaf Forests Without Fire

Decline in  
herbaceous  
biodiversity

Increase in litter  
accumulation &  
cultivation of duff

Increase in fire  
severity

Change of  
composition toward  
fire-inhibitive species



# Approaching prescribed fires more deliberately in duffy areas



# Consequences can be grim...



And delayed.

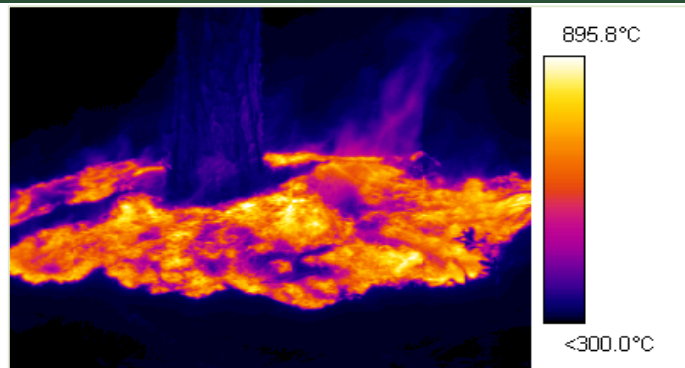


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# A Look at Smoldering Fire

5 Minutes  
Post-Ignition

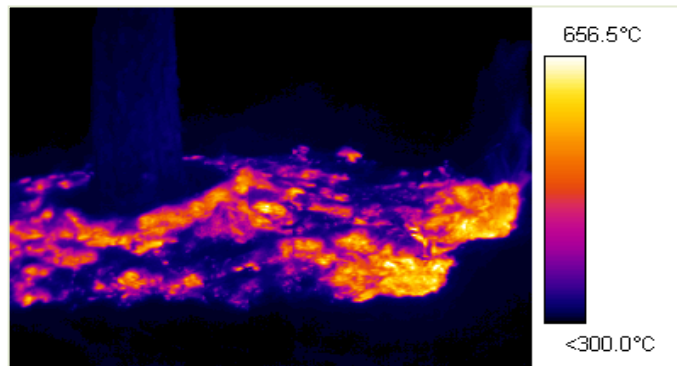


895 C= 1643 F

300 C= 572 F



8 Minutes  
Post Ignition

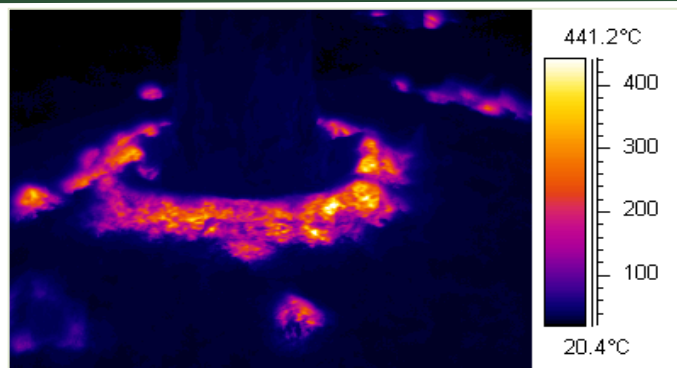


656 C= 1212 F

300 C= 572 F



110 Minutes  
Post-Ignition



441 C= 825 F

20 C= 68 F



Slide by Kevin Hiers



# What we've learned

## Pine Mortality:

- Impacts from duff consumption may be delayed over 2+ yrs.
- Mortality may be extensive (>70%).
- Destruction of roots caused cascade of insults leading to tree death with <30% consumption

## Safe Burning Conditions:

- Are identifiable.
- More conservative than thought.
- Varies seasonally and inter-annually.



Slide from Kevin Hiers



# ...through trial and error

- Burn when the duff layer is moist to the touch and only the litter layer is dry.
- Cumulative rainfall is key!
- Use fast moving, close strip headfires
- Minimize crown scorch
- Don't try to remove several decades of fuel accumulation in one or two fires – be patient



# Litter and duff monitoring



# Other Considerations



- Mop up smoldering duff when feasible
  - Don't try to rake duff back from tree boles
  - Removing woody fuels doesn't help much
  - Be prepared for some mortality
- It will take several careful fires to reach a point where normal fire regimes can be re-introduced and understory and fuel conditions return to "normal"



# If you burn.....

- Become a Certified Burner!
- Burn (volunteer) with more experienced individuals
- Use quality gear
- Learn about weather and forecasting tools
- Develop a written burn plan and prescription
- Clearly state objective(s) and owner's intent
- Team up with others – don't go it alone



# .....or if you contract

- Seek out one with experience burning longleaf, of all age classes
- Talk over your objectives; make sure they are heard
- Right burn day vs. “everyday is a burn day”
- Gain training and experience in order to make informed decisions—Certified Burner, Longleaf Academies, field days, PBAs or PFCs





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The Longleaf Tree: A Natural History

# References

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