

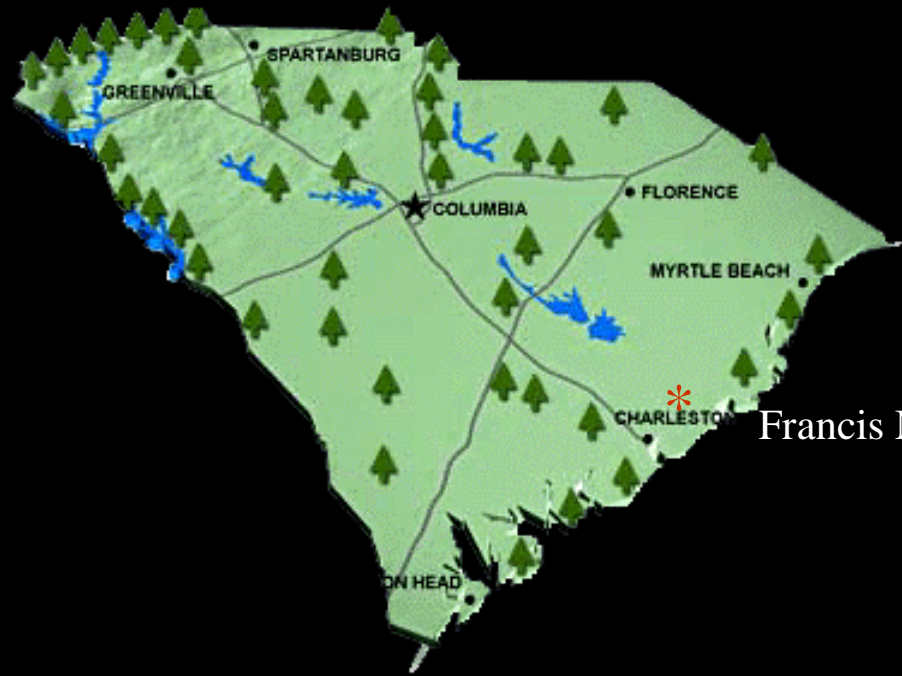
Effects of fire regime on the understory community of coastal plain pine forests

Kenneth W. Outcalt Research Fire Ecologist

Dormant-Season Prescription fires to Reduce Hazardous Fuel Loads on the South Carolina Coastal Plain

Kenneth W. Outcalt
USDA Forest Service
Southern Research Station
Athens, GA, USA 30602





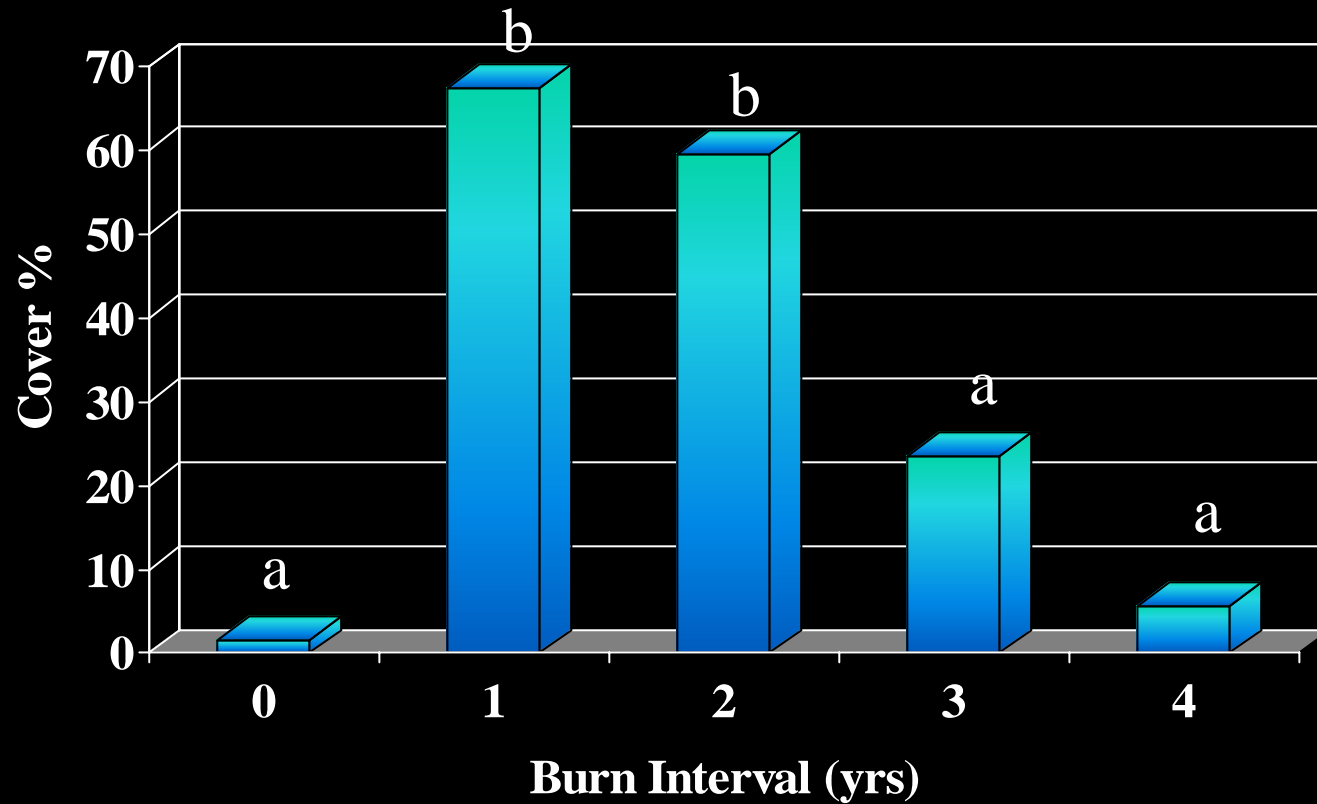
Francis Marion National Forest

Methods

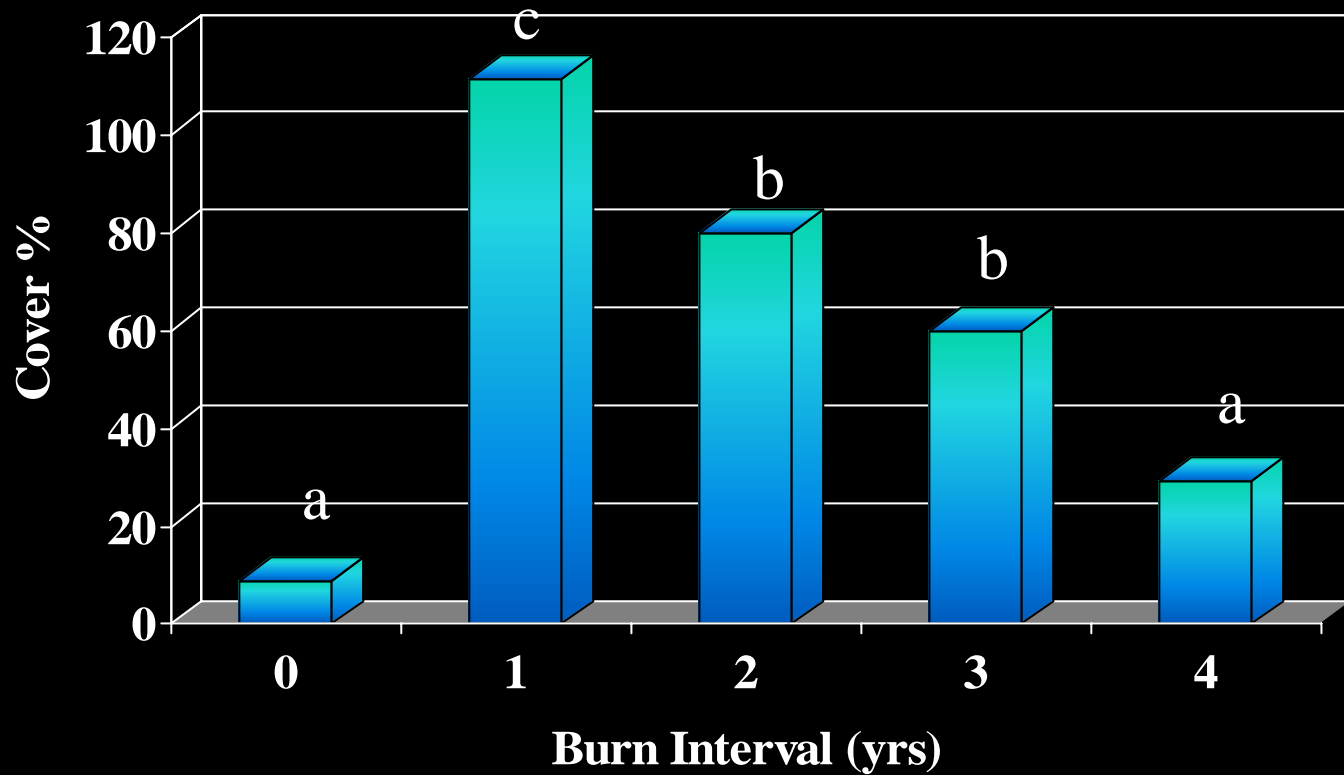
1. 40 acre study site on Francis Marion National Forest
2. Fire return intervals of every 1-, 2-, 3-, or 4-years (along with an unburned check treatment),
3. Five treatments replicated 4 times, each replicate 2-acres
4. Scheduled treatments have been applied every year since 1958



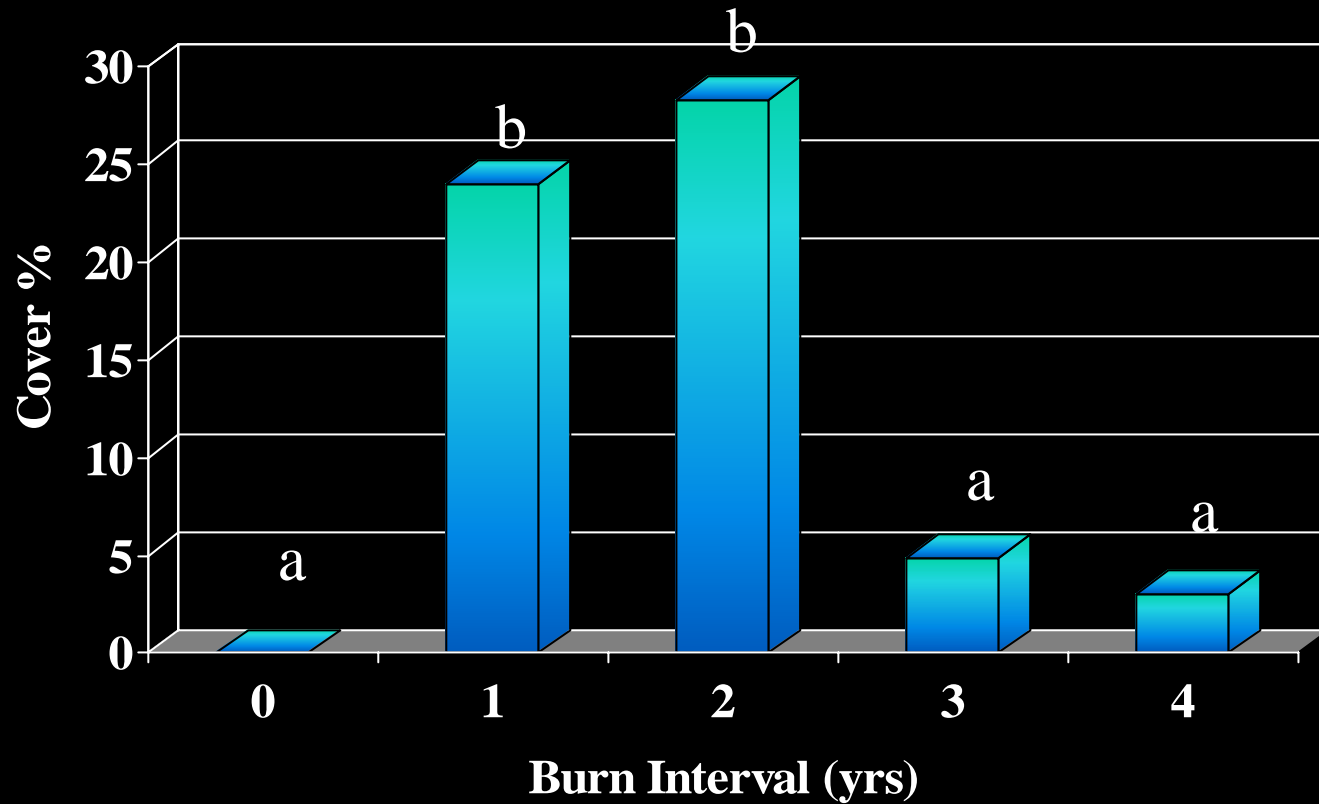
Effects of Burning Frequency on Forb Cover



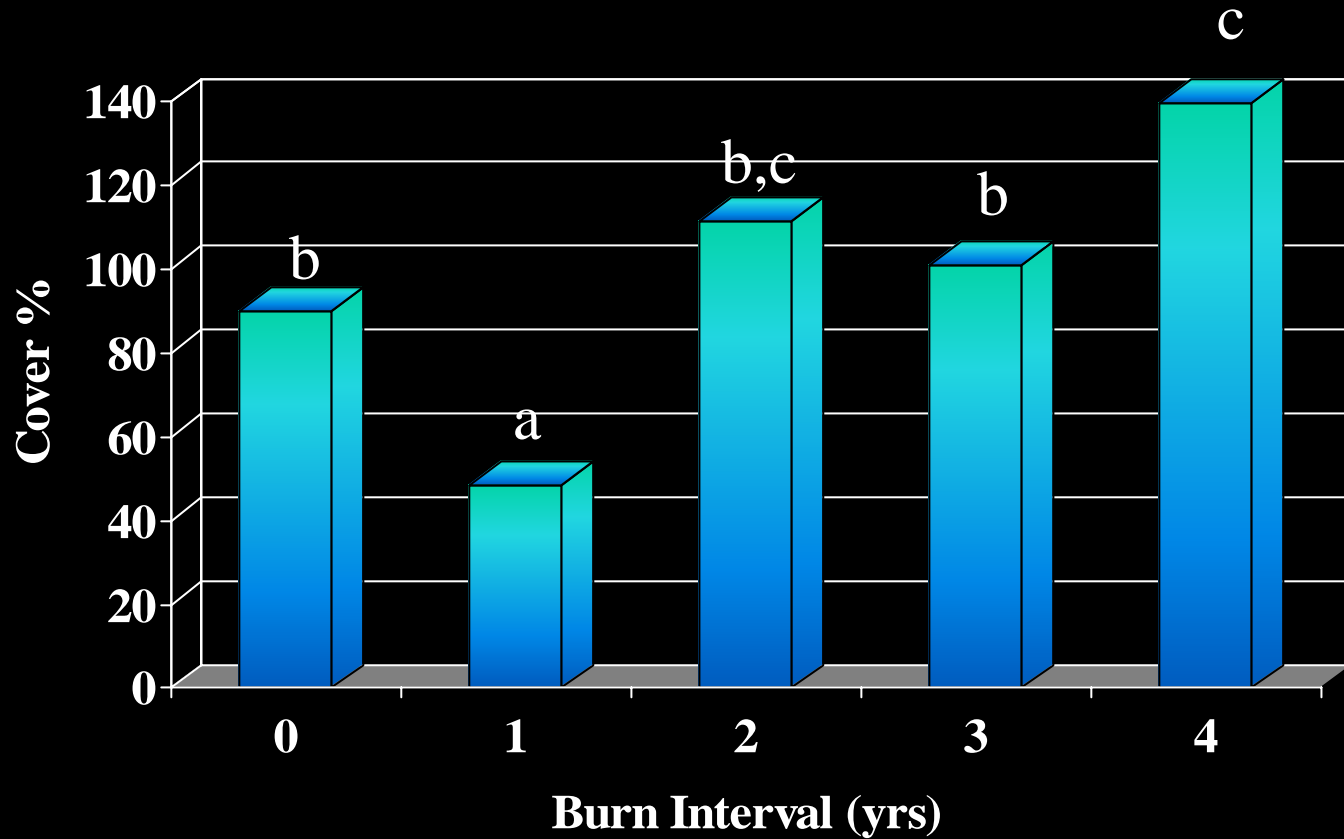
Effects of Burning Frequency on Grass Cover



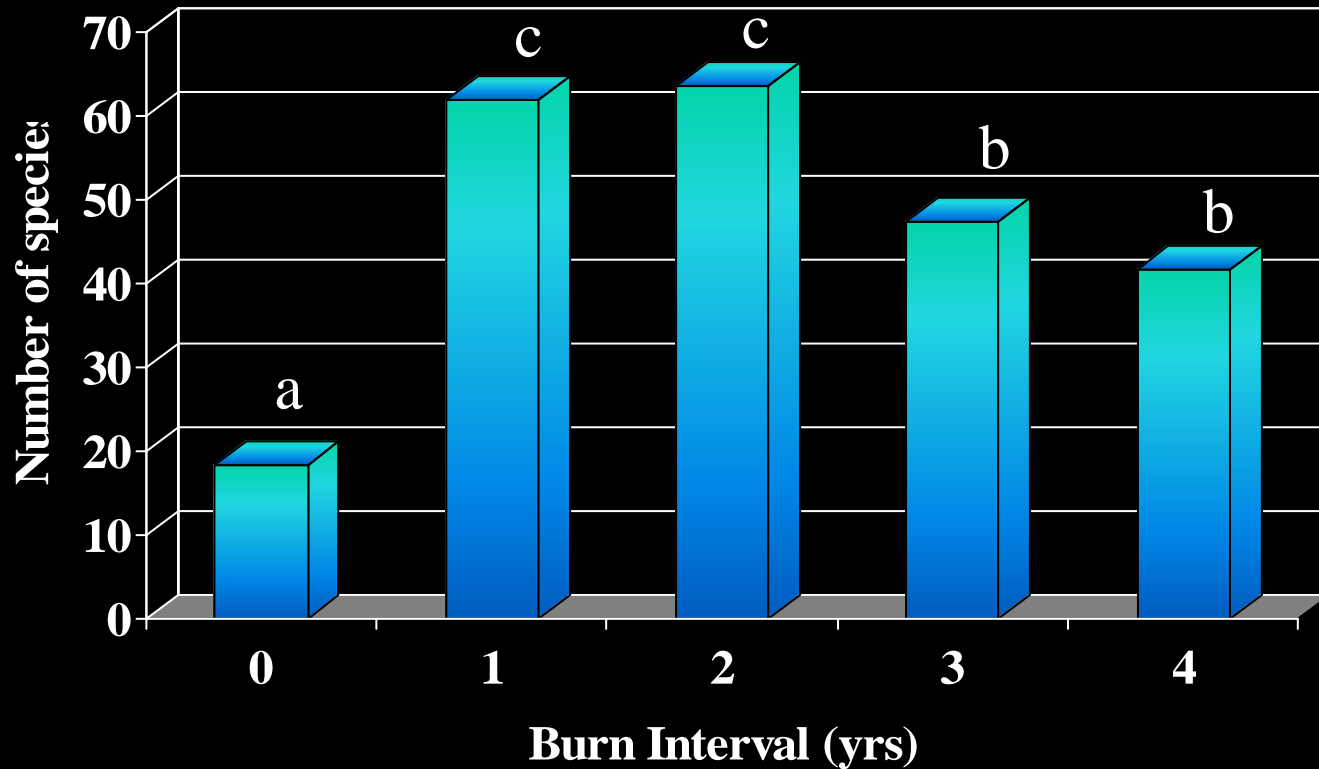
Effects of Burning Frequency on Legume Cover



Effects of Burning Frequency on Shrub Cover



Effects of Burning Frequency on Species Richness





Unburned



4 Year Fire Cycle



3 Year Fire Cycle



3 Year Fire Cycle Post Burn



2 Year Fire Cycle



2 Year Fire Cycle Post Burn



1 Year Fire Cycle



1 Year Post Burn

No Burn



4 Year Burn



3 Year Burn



Biennial
Burn



Annual
Burn





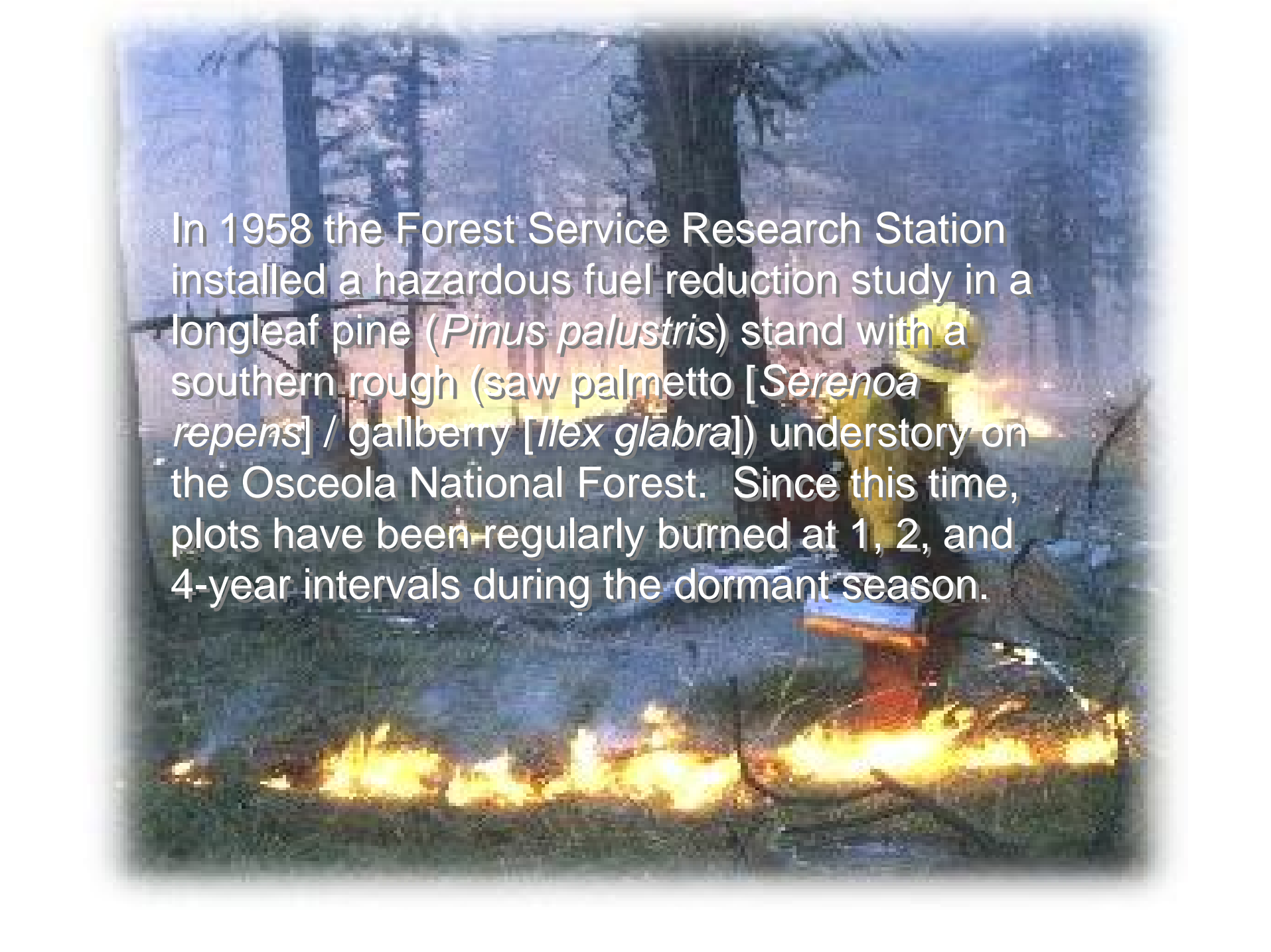


Conclusions

1. Cover of herbaceous species (forbs grasses and legumes) is increased by more frequent burning.
2. Cover of woody understory species is decreased by annual burning.
3. Species richness is increased by more frequent burning.

Long-term Dormant-Season Burning
Interval Study in the
Palmetto/Gallberry Fuel Complex



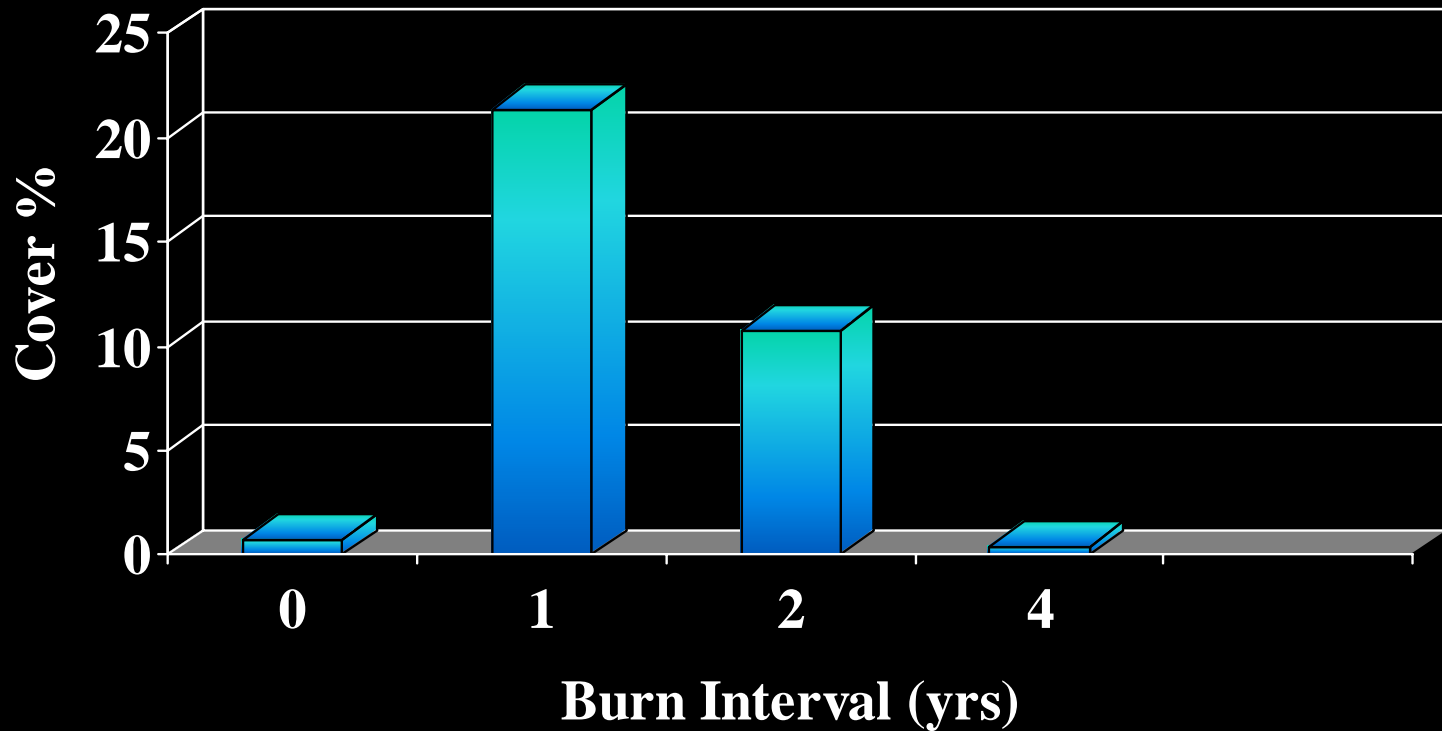


In 1958 the Forest Service Research Station installed a hazardous fuel reduction study in a longleaf pine (*Pinus palustris*) stand with a southern rough (saw palmetto [*Serenoa repens*] / gallberry [*Ilex glabra*]) understory on the Osceola National Forest. Since this time, plots have been regularly burned at 1, 2, and 4-year intervals during the dormant season.



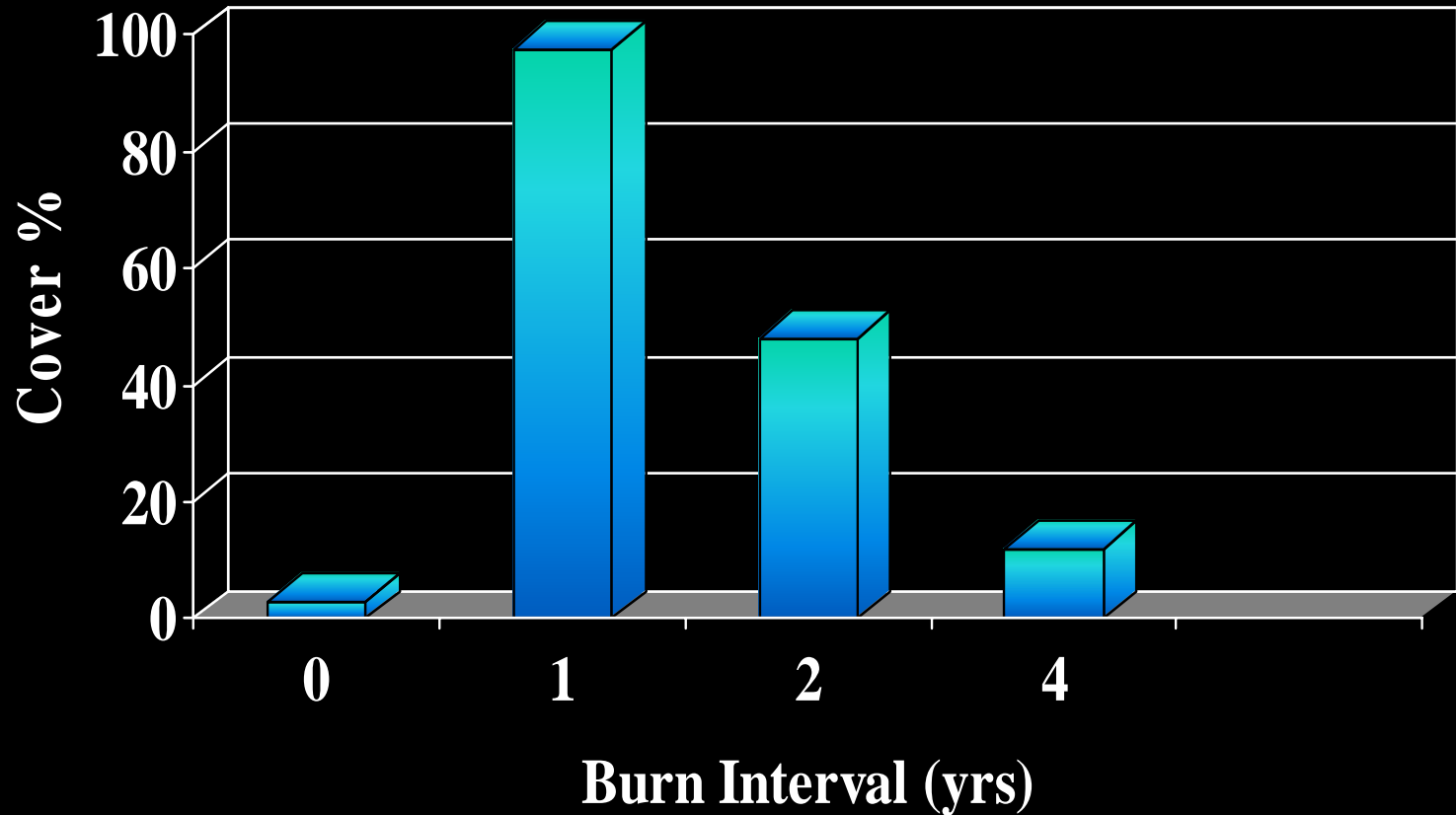
Study Location

Effects of Burning Frequency on Forb Cover



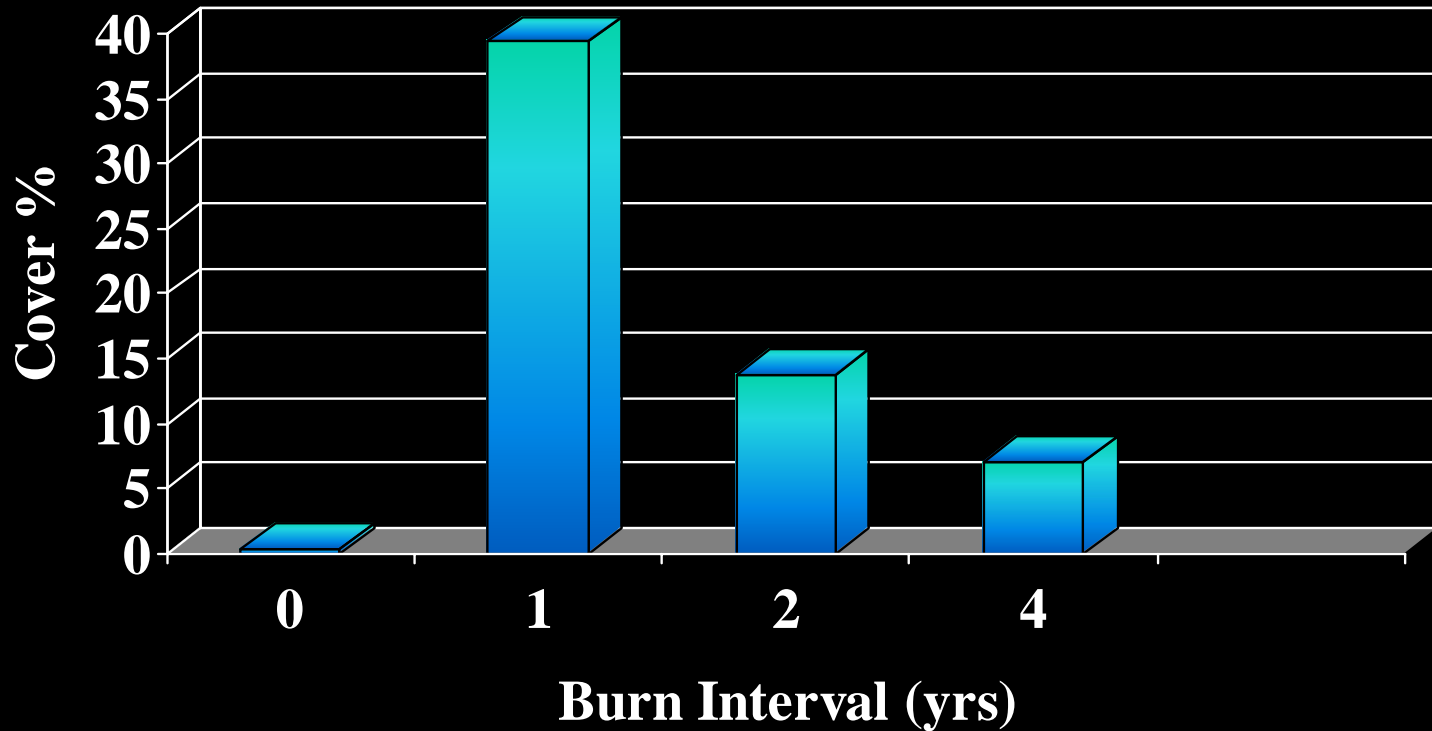
Forb cover was highest on the frequently burned plots, but was very low on unburned and plots burned every 4 years.

Effects of Burning Frequency on Grasses



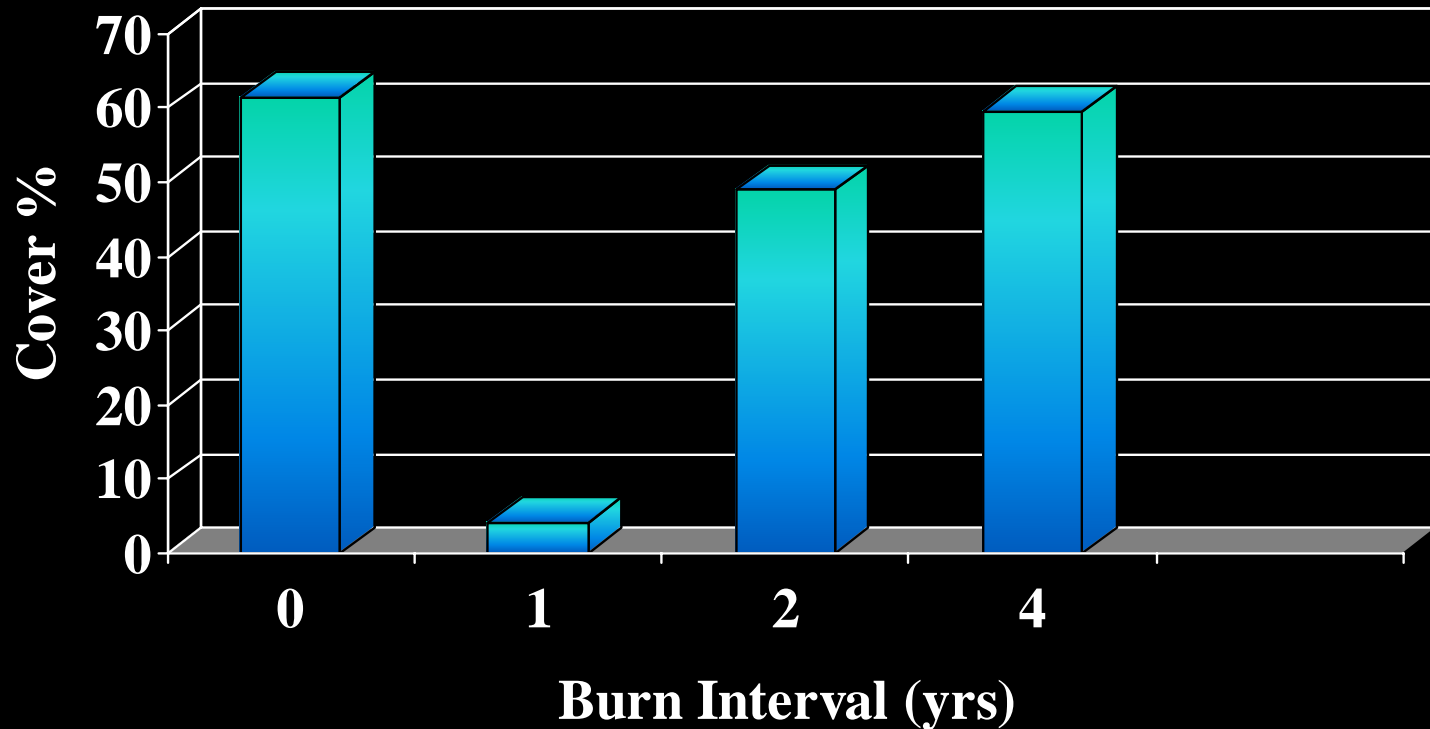
Grass covered nearly all of the annual burned plots, about half of the biennial plots, but was a minor component on control and 4 year burned plots.

Effects of Burning Frequency on Legumes



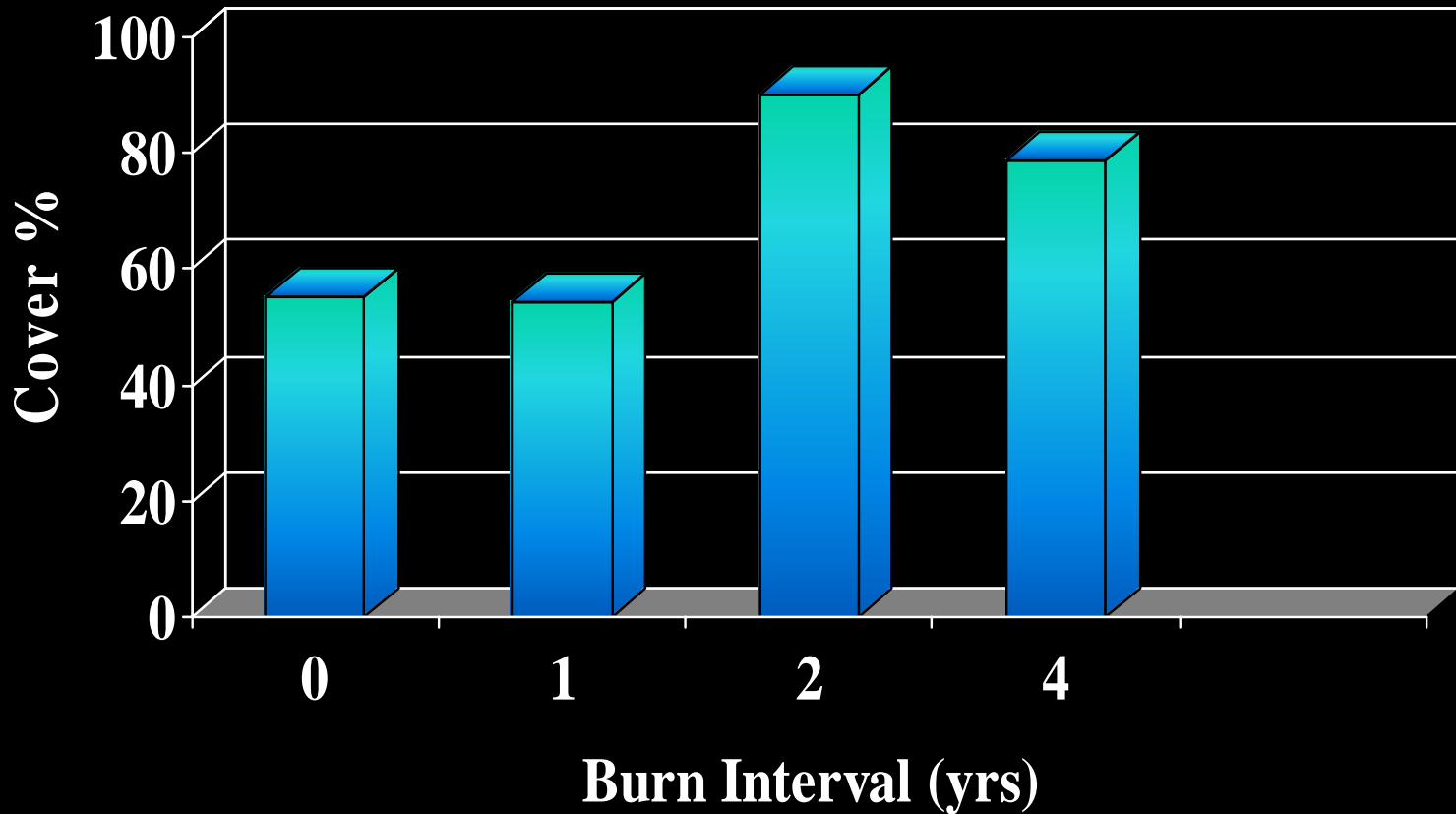
Annual burning favored the growth of legumes.

Effects of Burning Frequency on Palmetto



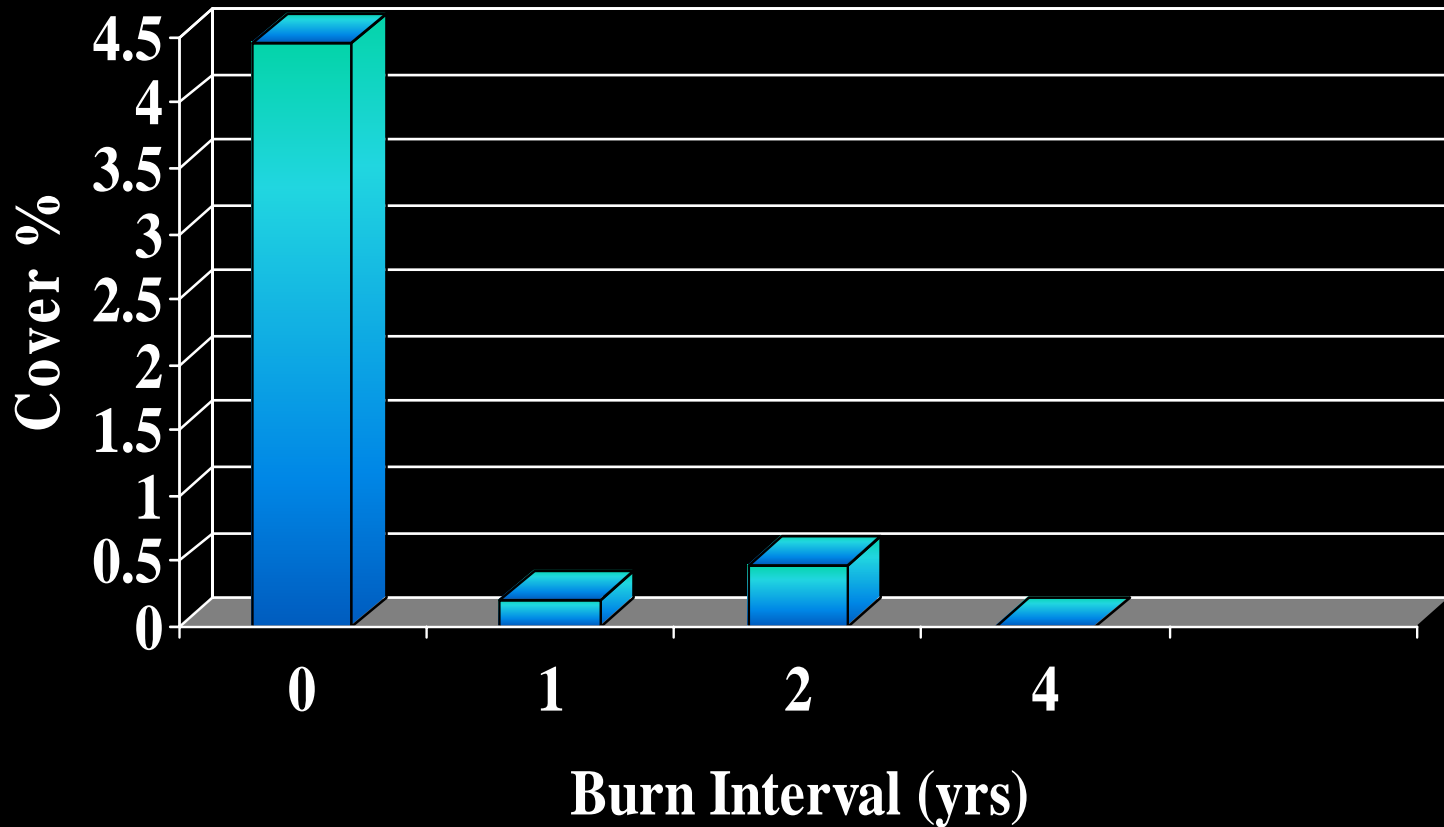
Burning every 4 years had no effect on saw palmetto, while biennial burning decreased it slightly. Annual dormant season burns reduced palmetto to a minor species.

Effects of Burning Frequency on Shrubs



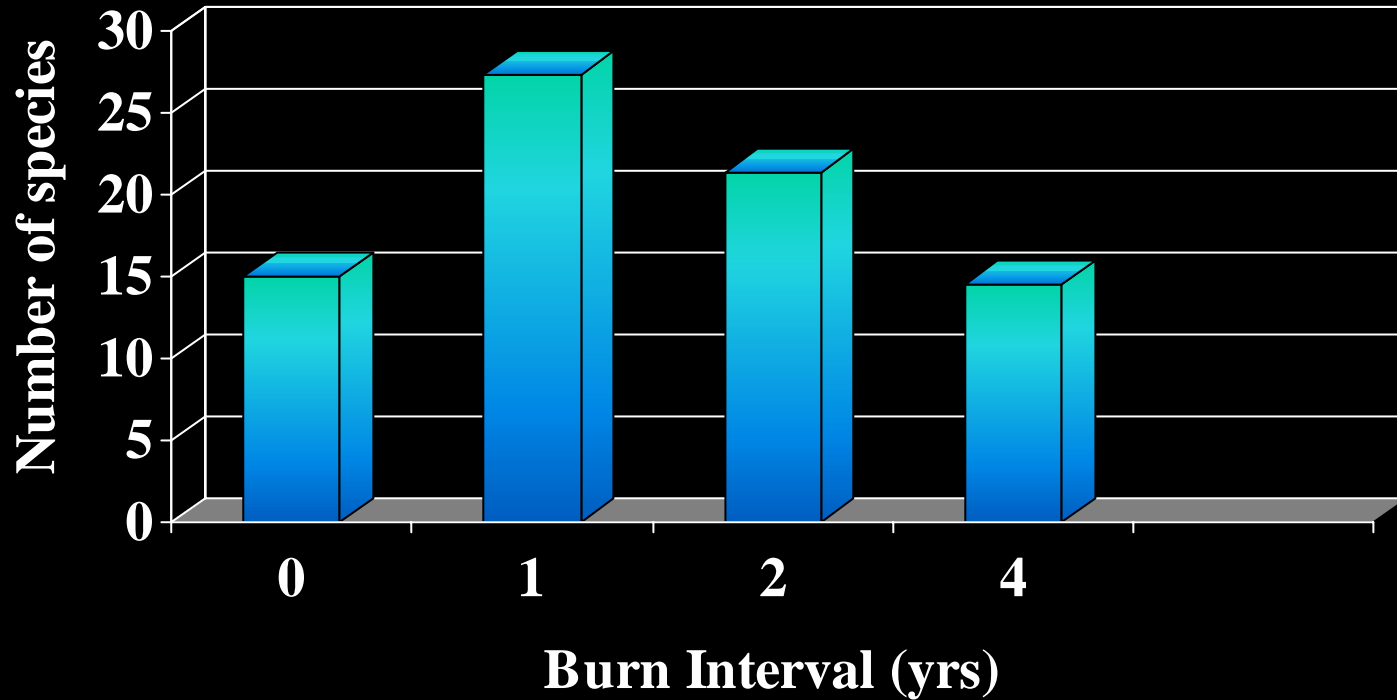
Woody shrub cover was high on 4 and 2 year burn interval plots and while lower on control and annual burned plots, it still covered over 50 percent of the area.

Effects of Burning Frequency on Vines



Vines were a minor component of the vegetation but had highest cover on control plots.

Effects of Burning Frequency on Richness



Annually burned plots had the highest understory species richness.

Control (No Burn)



Top-Left—Control Plot 1970

Bottom-Right—Control Plot 2002



Four Year Burn Cycle



Top-Left—Burn
Mid-Right-Post Burn (same day)

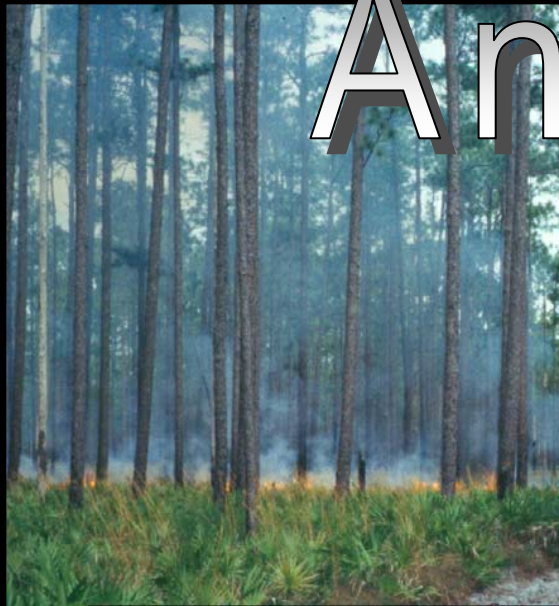
Bottom-Right—Three years,
Four months after burn

Biennial Burn



Top-Left—Burn
Mid-Right—Post Burn
(same day)
Bottom-Left—One year,
Four months after burn

Annual Burn



Top-Left—Burn
Mid-Right—Post
Burn (same day)
Bottom-Left—Four
months after Burn



Conclusions

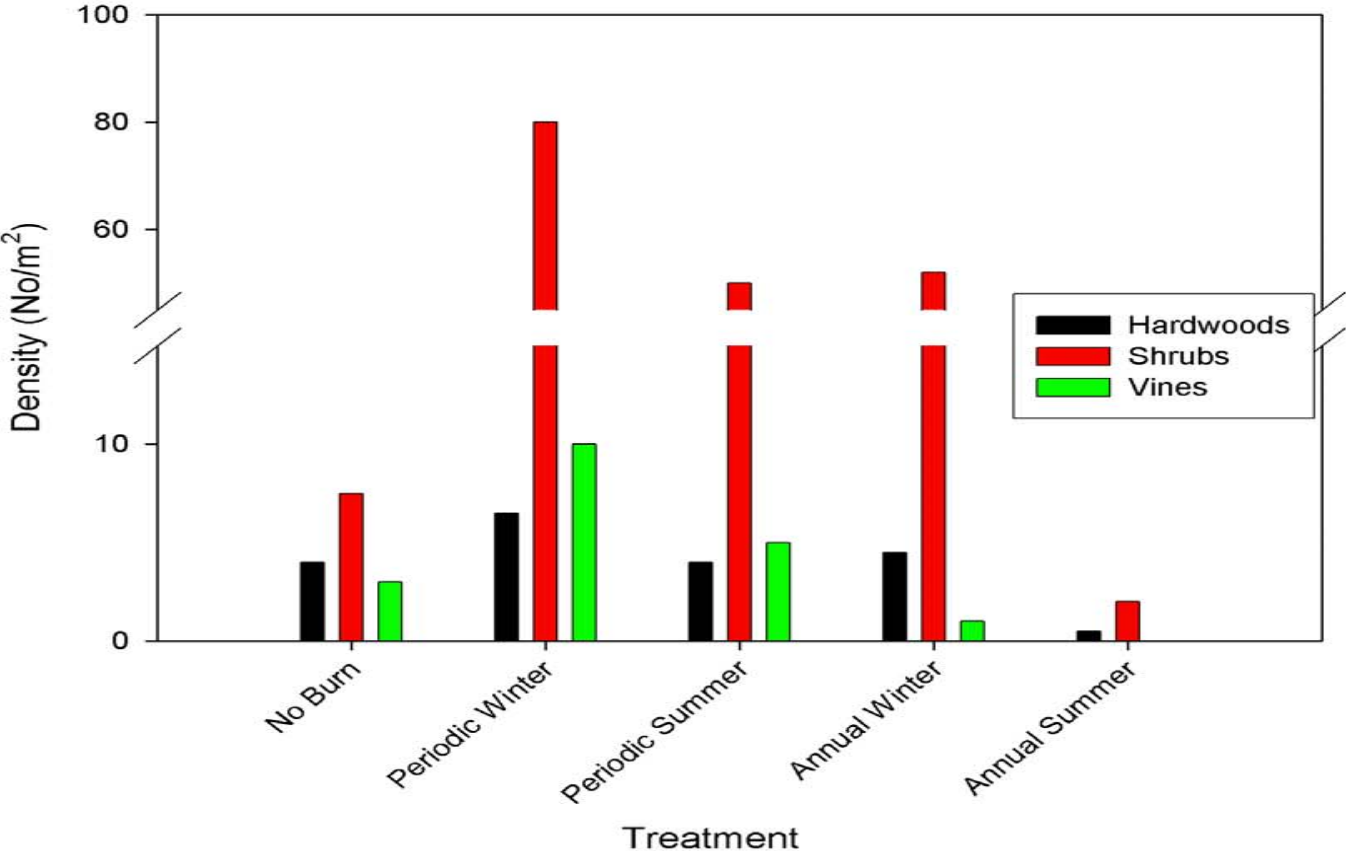
1. Understory composition was most different on annually burned plots.
2. Plots burned every 4 years were dominated by saw palmetto and woody shrubs.
3. The biennially burned plots were intermediate with more grasses and forbs and reduced palmetto cover.

Santee Fire Plots

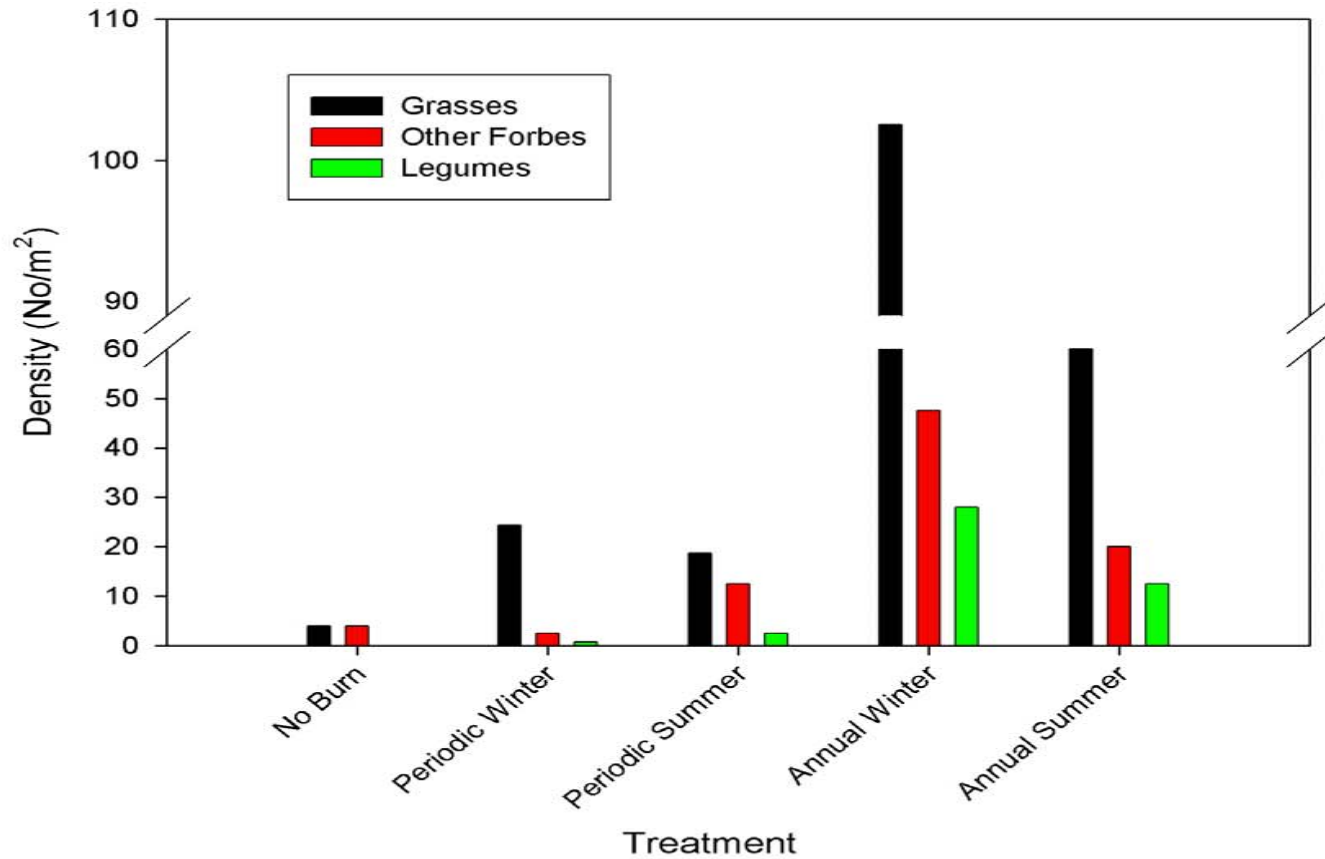
Installed in 1946

Lower Coastal Plain South Carolina

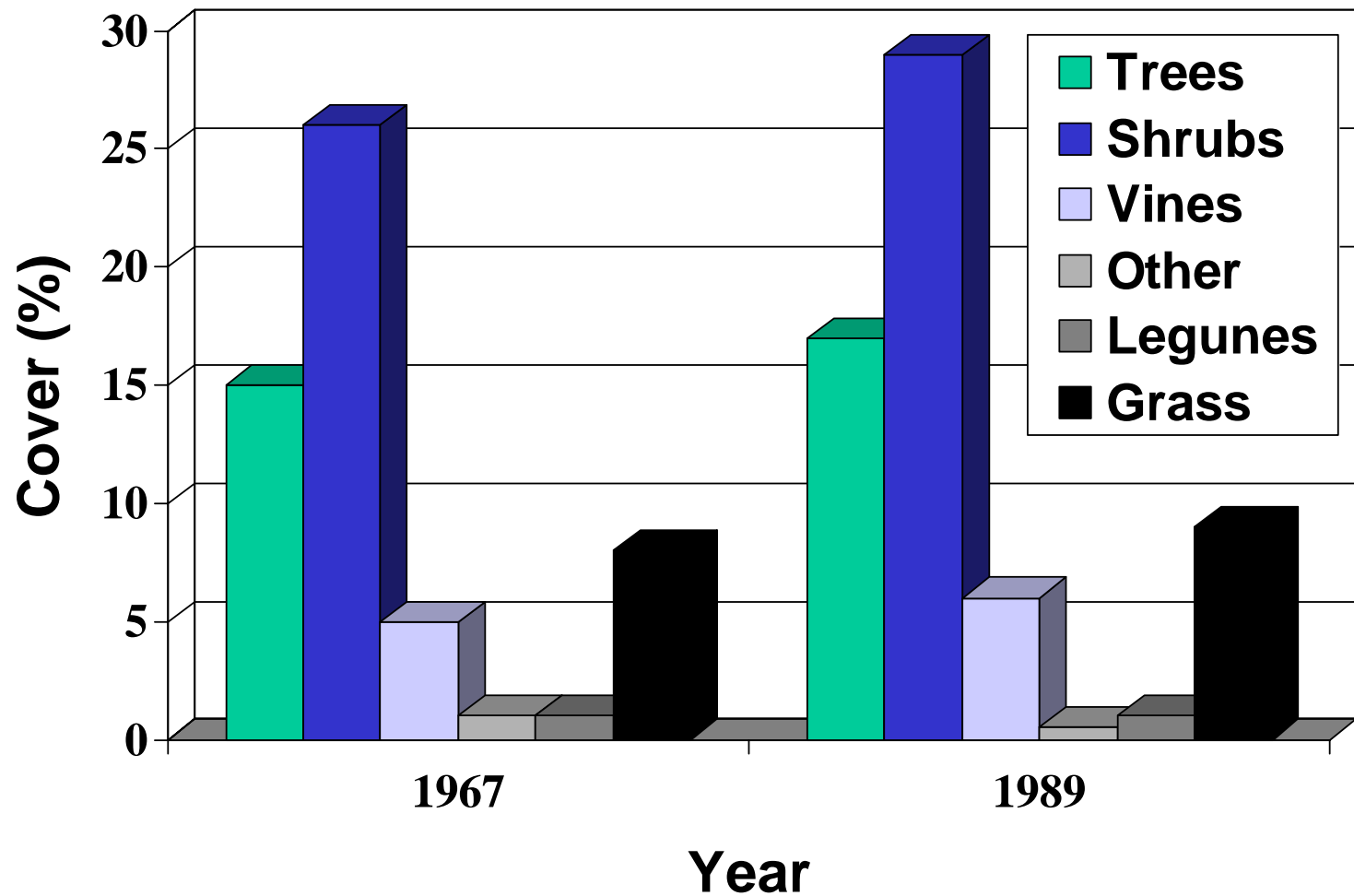
Effect of burn treatment on density of woody understory



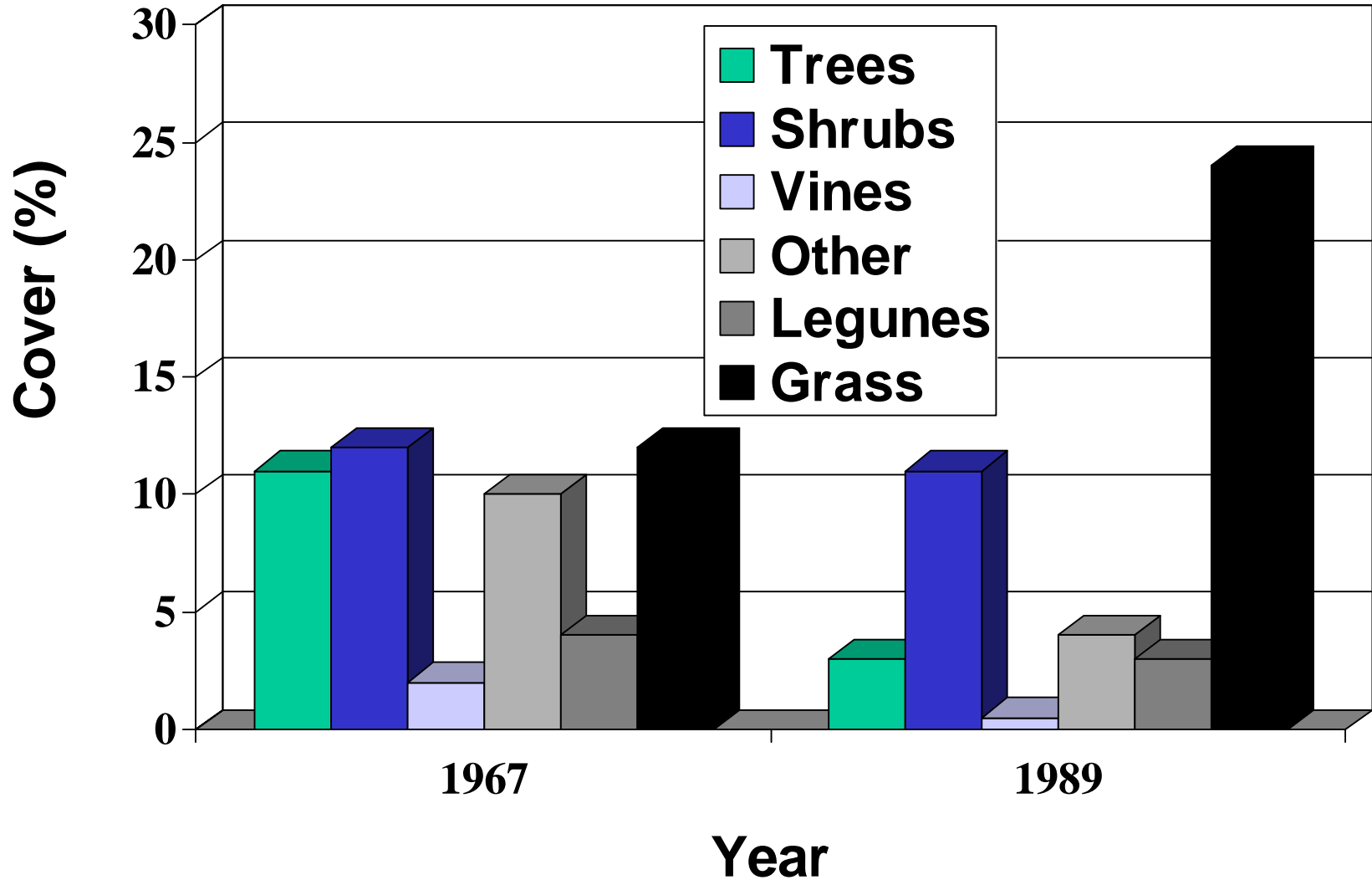
Effect of burn treatment on herbaceous understory density



Understory Cover with Periodic Summer Burns

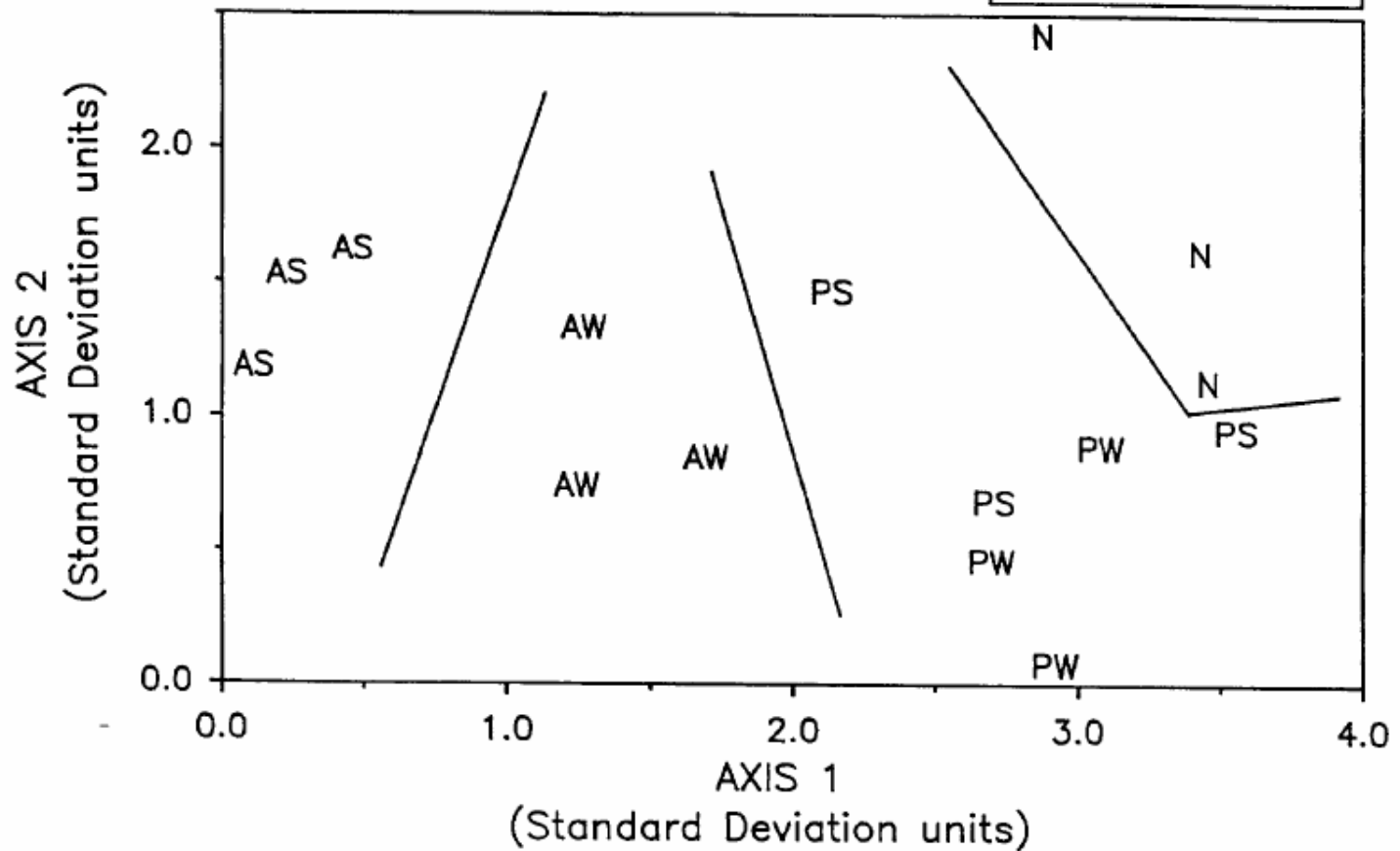


Understory Cover with Annual Winter Burns



DETRENDED
CORRESPONDENCE ANALYSIS

AS=ANNUAL SUMMER
AW=ANNUAL WINTER
PW=PERIODIC WINTER
PS=PERIODIC SUMMER
N=NO BURN



Overall Conclusions

- Periodic growing and periodic dormant the same
- Annual or biennial needed to effect compositional changes
- Annual or biennial growing season more effective than dormant at reducing woody species numbers but cover is not changed.

Summary

- It's a fire regime not a single fire
- Growing season fire is not inherently good and dormant season fire inherently bad
- Fire frequency has more impact than fire season
- Select fire regime based on desired outcomes
- Use adaptive management and adjust fire regime as needed
- Recognize importance of initial conditions
- Be patient
- Variation is good

