Perceptions of Biomass Harvesting Guidelines Among Stakeholders in the Southeast

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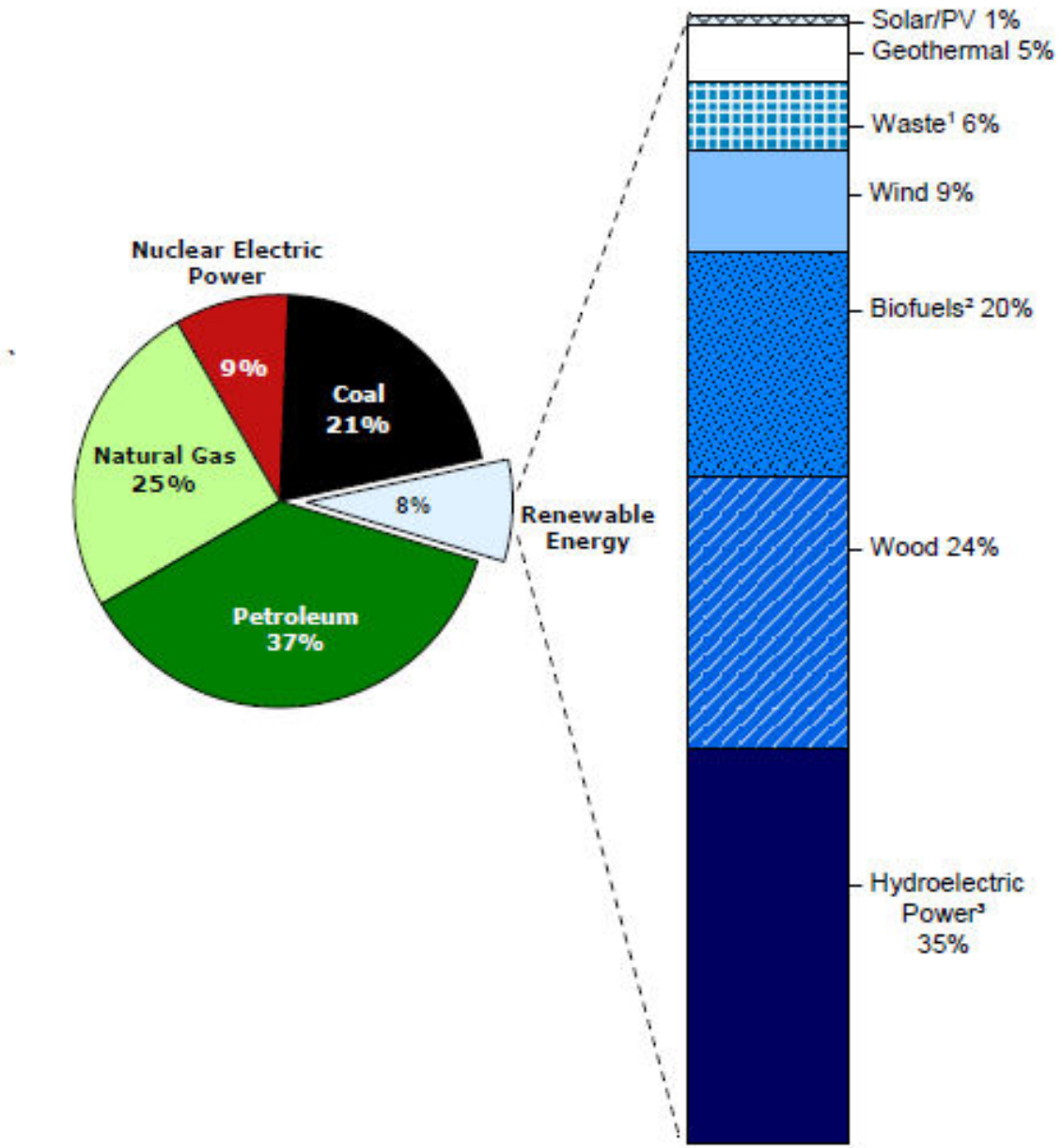
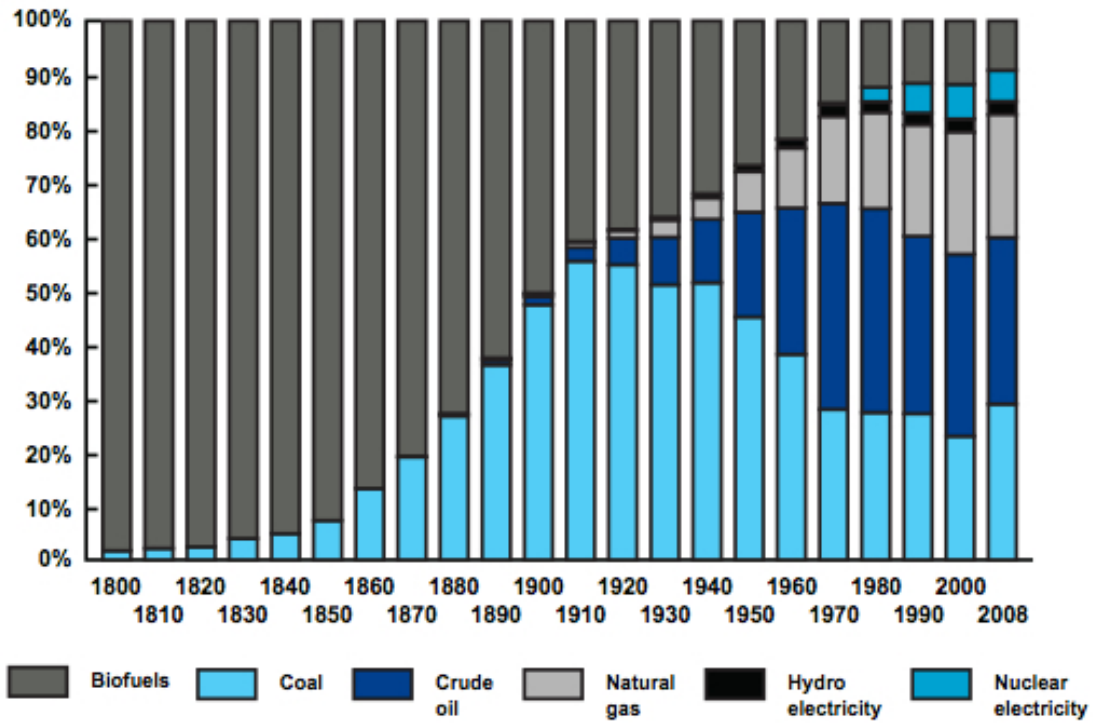
Some Renewable Energy Policy

- Energy Independence and Security Act of 2007
- North Carolina adopts Renewable Energy and Energy Efficiency Portfolio Standard (REPS)

Renewable Energy as Share of Total Primary Energy Consumption, 2009



Share of Fuels in Energy Mix, 1800–2008



Source: *Energy Transitions: History, Requirements, Prospects*, Vaclav Smil, 2010.
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What is Woody Biomass?

- A low-value product that consists of residues from a logging operation such as limbs, tops, snags, and any small diameter material that is used for energy production.

Woody biomass harvest- Harnett County

Guidelines

- Best Management Practices (BMPs)
- Forest Practice Guidelines (FPGs)

Snags and downed coarse woody debris are important to forest ecosystems and critical to wildlife habitat.

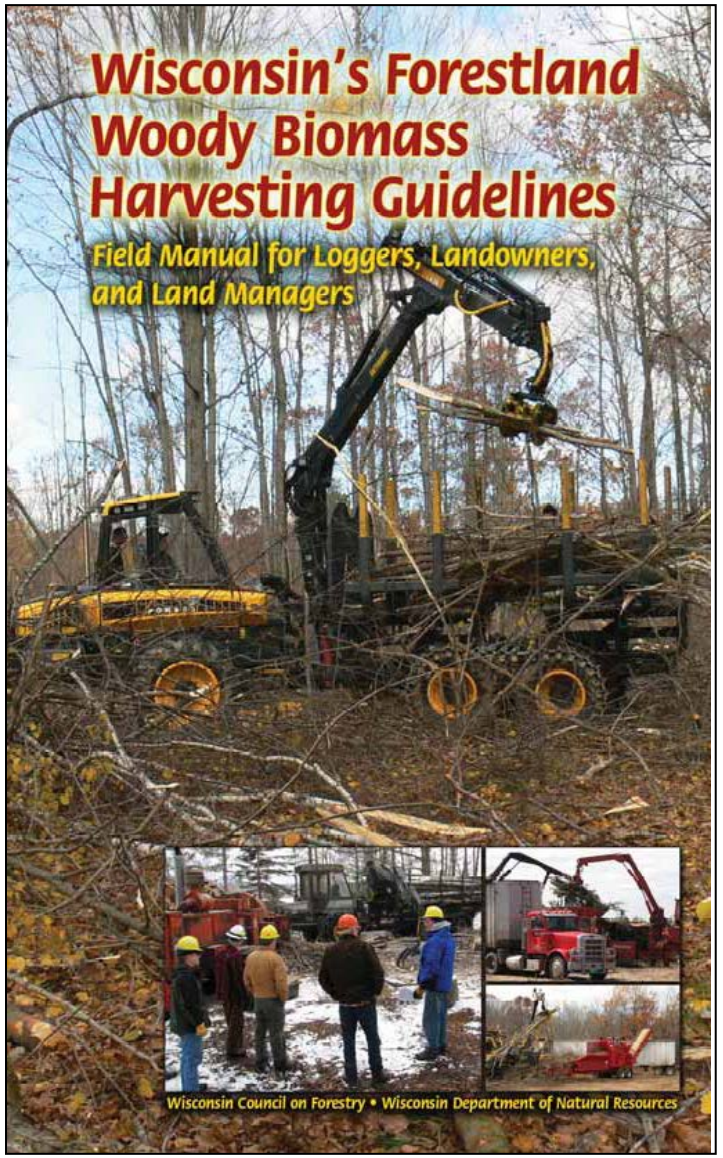
(Harmon et al. 1986)

There is a consensus among experts that the “absence of downed woody debris would be detrimental to biodiversity and ecological processes.”

(Hess and Zimmerman 2001, page 6)

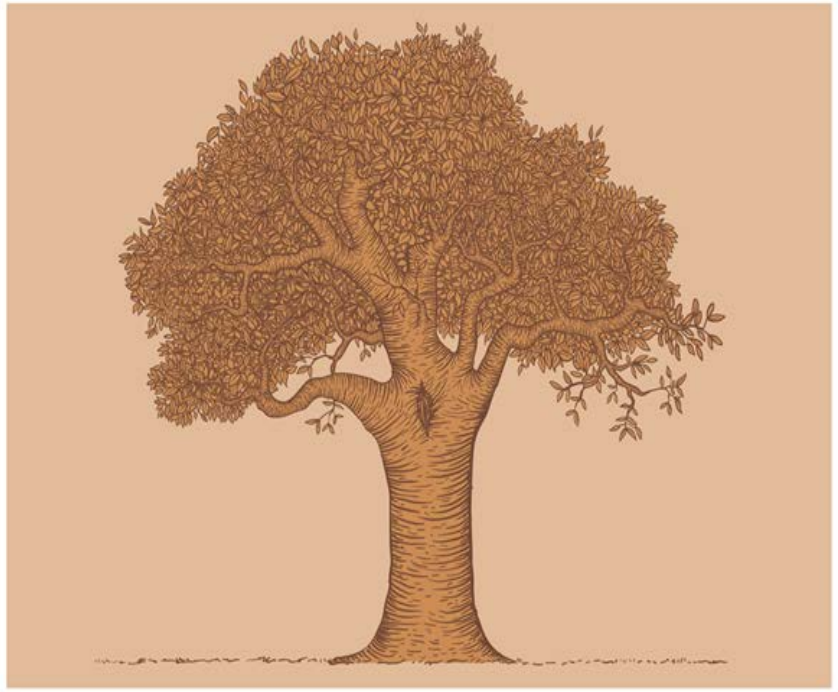
Biomass harvesting guidelines (BHGs)

- Maine, Maryland, Michigan, Minnesota, Missouri, Pennsylvania, Wisconsin, and growing.
- Generally recommend leaving 15-30 percent of coarse woody debris on a site after harvest.
- Minnesota: 33 percent of the residual tops and limbs following a harvest must be retained.
- Wisconsin:. retaining and scattering the tops and limbs from 10 percent of trees harvested on the site.



Part 1: A Qualitative Assessment of Forest Manager, Logger and Landowner Perspectives on BHGs

Objective



The primary objective of this study is to understand the perceptions of:

- forest managers
- loggers
- forest landowners

regarding the economic and operational feasibility of biomass harvesting guidelines and their willingness to adopt such standards.

Methods

- Qualitative Approach
- Snowball sampling method
- 3 separate interview guides
- Conducted 60

  semi-structured interviews:
  - (20) Forest managers
  - (20) Professional loggers
  - (20) Forest landowners

- Thematic Analysis

Forest Managers

- 90% male
- Average age of 50 years old
- All had 4-year college degree or higher.

- Consulting Foresters: 45%
- Private Industry: 40%
- Government Agencies: 15%

Society of American Foresters

ACF™ SINCE 1948

NCDENR

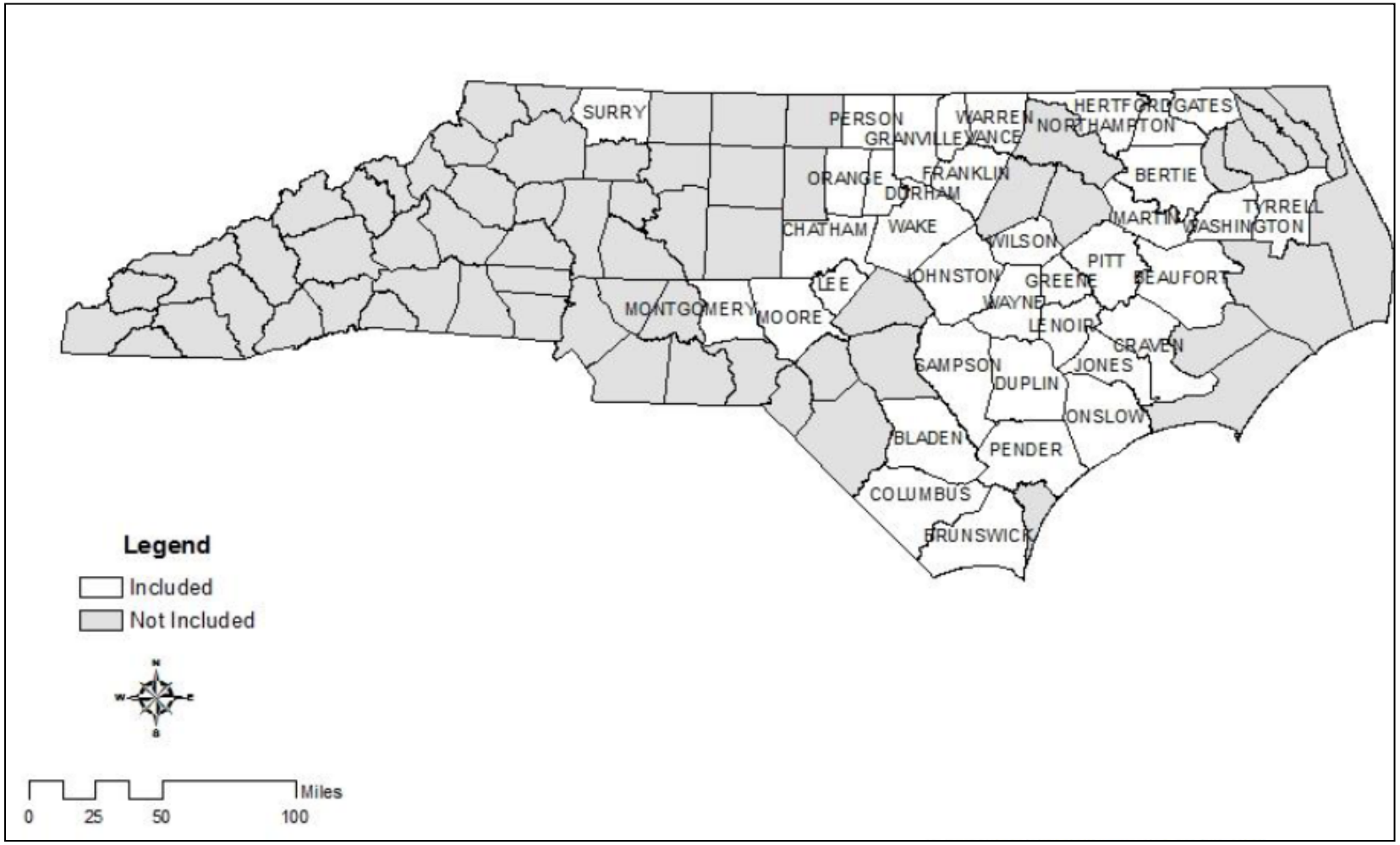
Weyerhaeuser

Loggers

- All male
- Average age of 50
- 65 % were currently harvesting woody biomass
- Received an average of $21/ ton for woody biomass material

NCAPL
N.C. Association of Professional Loggers

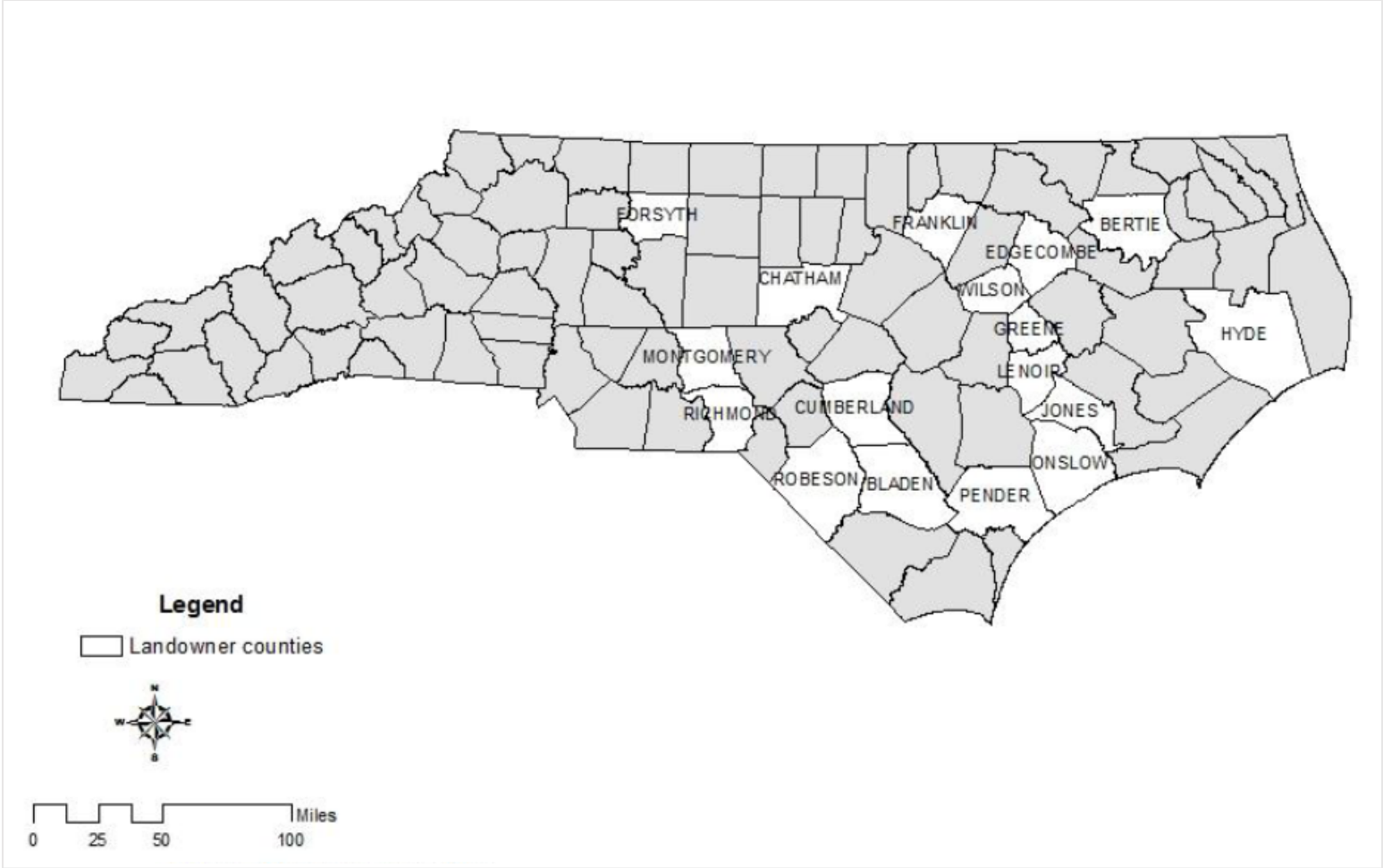
Counties in which logger respondents primarily work



Forest Landowners

- 90% male
- Average age of 63
- Owned an average of 1286 acres of NC forestland
- 19 of 20 landowners currently had a management plan.

Counties in which landowner participants own forestland



Forest Managers, Loggers, Landowners: Opposition to Biomass Harvesting Guidelines

- Best Management Practices (BMPs) are successful and sufficient.
- Woody biomass harvesting is only an additional component to conventional harvesting with little or no modification to operations.
- Lack of scientific research supporting claim that harvesting woody biomass leads to adverse environmental effects.

Successful and Sufficient BMPs

According to a NC Department of Forest Resources 2003 study, implementation rate of BMPs in North Carolina was 82%.

Biomass Harvesting Component: Little or No Modification to Harvesting Operations

“Biomass harvesting is no different than regular clearcut harvesting. You‘re going to have the same machinery running on the ground, you will have to observe the same buffer zones and forest practice guidelines—there is no difference, same type of equipment doing the same thing.”

-Connor, logger

Harnett County, Biomass Harvest

Lack of Scientific Research

“There is no document in the literature that I‘ve seen that says that nutrients are diminished by biomass harvesting”

-Felix, forest manager

Biomass harvesting research,
Middlebury College VT

Forest Managers and Loggers: BHGs Reflect Public Distrust of Forest Industry

Harvest, Apex, NC

Forest Managers:
BHGs Reflect Public's Fear of a Desolate Site

Timber harvest, Sampson County, North Carolina

Forest Managers and Loggers:
BHGs are a threat to the viability of biomass harvesting

“If I got to leave 15 to 30 percent, I‘m going to retire.”

Blake, logger

Forest Manager and Loggers: BHGs may prove difficult since accurate estimation of debris is not possible

"I think it would be very difficult to estimate the amount [of biomass]—that's because you're looking at stuff that's pushed half into the ground, so how can you know what's there?"

Patrick, forest manager

Forest Landowners

- A clear definition of *woody biomass* is needed.
- Landowner interest in woody biomass as an additional forest product.
- Increased government support of the woody biomass market is needed.
- Private property rights should provide landowners freedom in forest management.

Private Property Rights

“As far as the state creating regulations telling the landowner what he or she can and cannot do with a harvest on their property, it’s [expletive] communism.”

Henry, landowner

Benefits of Biomass Harvesting Guidelines

- Increased business for consulting foresters.
- Increase in proactive forest management.
- Soil stabilization and erosion control.
- Increase in wildlife habitat.

Respondent Recommendations for BHGs

“One law won‘t fit across the whole state.”

-Jason, logger

“I am not sure you can regulate good forestry.”

-Duke, landowner

Conclusions

The forestry community is reluctant to accept BHGs due to:

- Perceived economic and social impact of increased regulation.
- Perceptions that BMPs and BHGs are identical and biomass harvesting doesn’t change harvest operations
- Perceptions that science does not suggests impacts from woody debris removal.
- Perceptions that biomass retention is too difficult to measure or operationalize

Recommendations

- Specify local relevance of woody biomass harvesting guidelines.
- Define the term *woody biomass* clearly in appropriate policy.
- Develop guidelines based on sound science and research and adapt responses accordingly.
- Develop standard protocols for measuring the amount of biomass initially and the amount to be left on site.

Part 2: A Quantitative Assessment of Forest Manager, Logger and Landowner Perspectives on BHGs

The University of Georgia

Biomass Harvesting Guidelines Survey

A Survey of Foresters, Loggers, Forest Landowners, and Environmental Organizations

Choice models & Conjoint Analysis

- CMs: assumes the choices people make equate to underlying preferences to measure the value of environmental goods

- CA:
  - a form of choice modeling used to determine which attributes presented to a “consumer” are most important in determining choice or purchasing behavior

  - poses questions to consumers in a way that reflects how people make choices between products by asking the consumer to compare and then choose the most appealing product rather than by rating or ranking

CBC Survey

- An online survey using SSI Web (Sawtooth Software version 8.2.0); Jan-Feb. 2013
- Respondents chose between scenarios with varying levels of key attributes; 12 choice tasks, with three options per task and an “I would not choose either of these” option

Table 1. Attributes and Levels for Conjoint Analysis

• Percentage of coarse woody debris remaining after harvest	10%; 20%; 30%
• Distribution of coarse woody debris after harvest	Spread out; Piles in rows; Scattered piles
• Stumpage price received for woody biomass material	$0/ton; $3/ton; $6/ton
• Wildlife habitat quality after harvest	Low; Medium; High

Sampling

- Publically available databases; Contacted state and national forest professional and environmental non-profit organizations, as well as university extension programs
- Created list of registered **foresters** and **loggers**, **environmental non-profit organizations** with an interest in woody biomass, and **forest landowners** in NC, SC, GA, and VA
- Two sub-lists of participants: 1) individuals for whom we had email addresses and 2) Three organizations preferred not share internal information, but agreed to send our emails directly to their members or staff on our behalf

Reminders/Distribution/Bias

- Reminders were sent to individuals and organization contacts every week for four weeks or until survey completion
- Notifications contained a web link to questionnaire
- Used continuum of resistance model to evaluate potential for non-response bias (early/intermediate/late respondents)

Analysis

- Used XLSTAT version 2010.5.02
- Hierarchical Bayesian (HB) estimation for **utility scores** then rescaled using a zero-centered differences method to standardize all attribute utility scores and facilitate comparisons
- Analyzed two-way interactions among attributes to determine if **a single attribute, or combination of attributes**, had an effect on choice

Analysis Cont’d

- **Importance scores** measure the percent importance of the four attributes in the respondent’s choice that was made
- One-way ANOVA to determine whether zero-centered utility scores for the total usable **population’s preferences for the four attributes differed**
- ANOVAs to test for **differences among stakeholder groups** (excluded NGOs)
- Fisher’s least significant difference (LSD) post-hoc tests

Policy Simulation

- Sawtooth's online simulator software to explore five hypothetical policy profiles
- Uses utility scores to calculate respondents' preferences for policy profiles. Results are interpreted as percent share of preferences

Policy Scenarios

(1) "BHG Wildlife" ($6/ton; high quality wildlife habitat; 30% CWD remaining, spread out distribution)

(2) "Reduced Costs" ($6/ton; low quality wildlife habitat; 10% left, piled distribution)

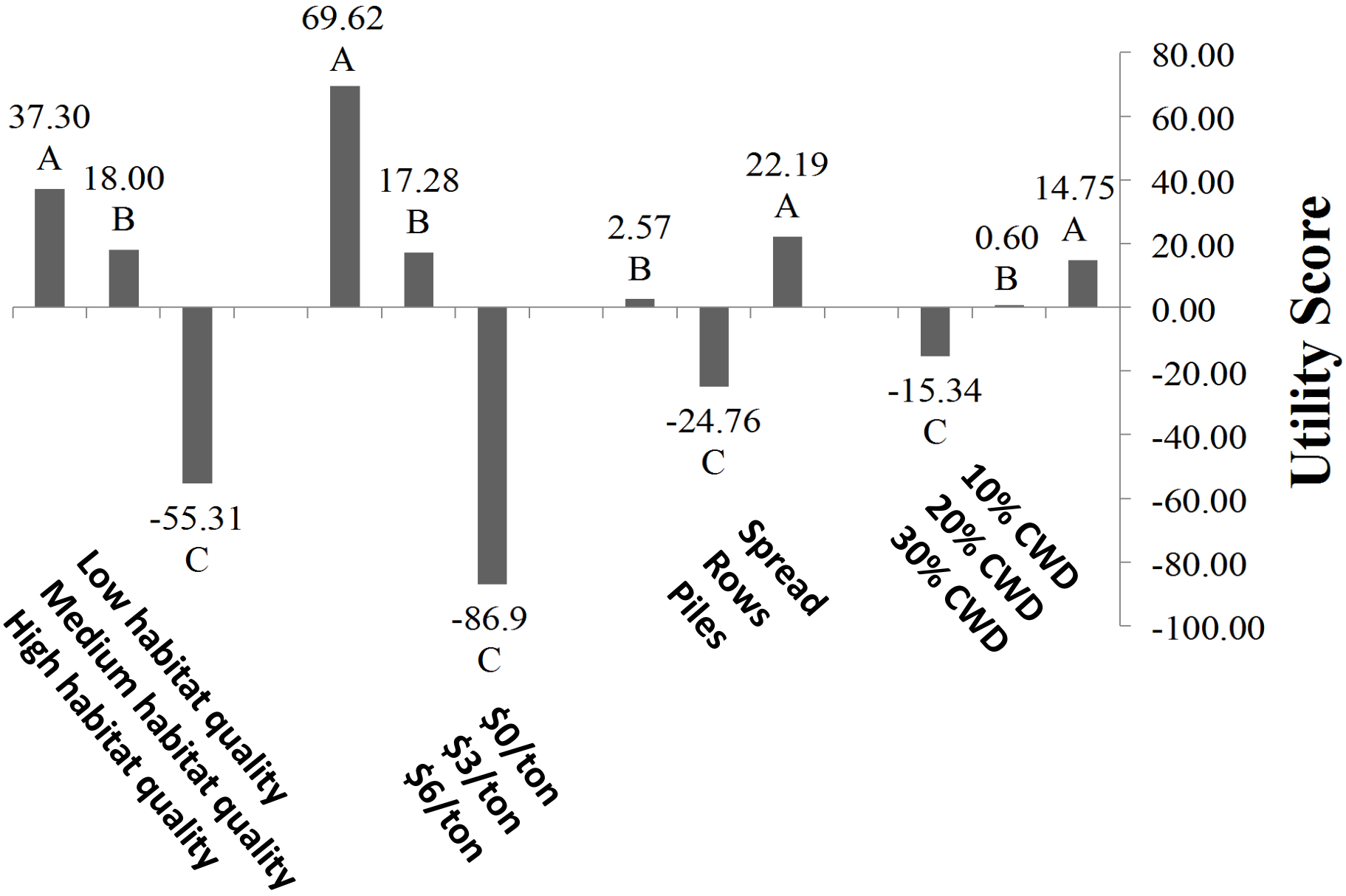
(3) “Theoretical Wildlife” ($6/ton; high quality wildlife habitat; 30% CWD remaining, piled distribution)

(4) “Balanced 1” ($6/ton; medium quality wildlife habitat; 20% CWD remaining, piled distribution)

(5) “Balanced 2” ($6/ton; medium quality wildlife habitat; 20% CWD remaining, rows distribution).

Sample

- North Carolina (*n* = 186), Georgia (*n* = 159), Virginia (*n* = 49) and South Carolina (*n* = 31)
- Foresters (*n* = 247), loggers (*n* = 92), landowners (*n* = 81), and those affiliated with environmental non-profit organizations (*n* = 21).
- 95% male
- Average age of 51
- Half had a bachelor's degree (*n* = 236, 33%) or graduate degree (*n* = 97, 14%)
- Average reported annual income of $75,000-99,999 USD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A
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-80.00
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Utility Score
Low habitat quality
Medium habitat quality
High habitat quality
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Spread
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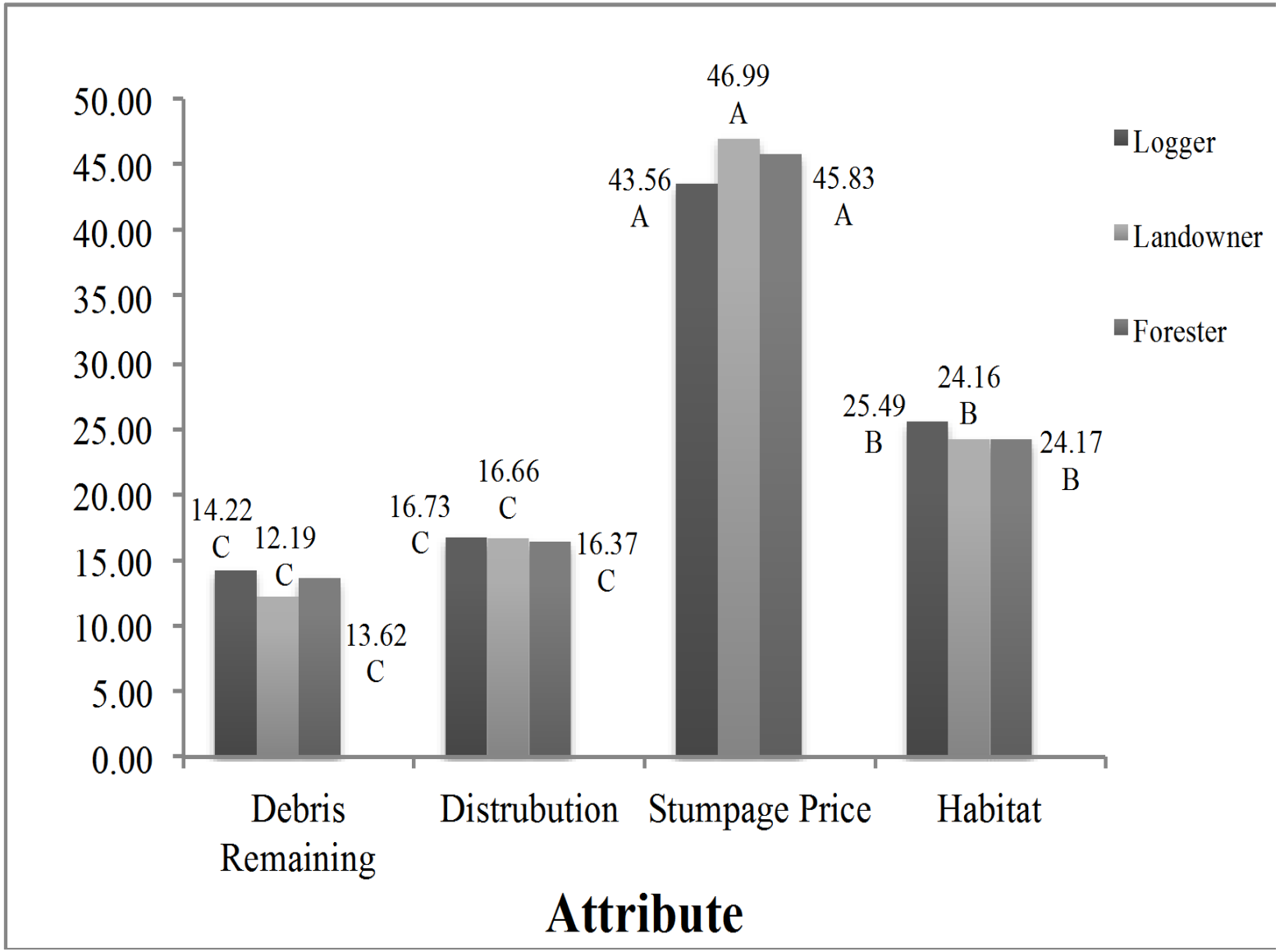
10% CWD
20% CWD
30% CWD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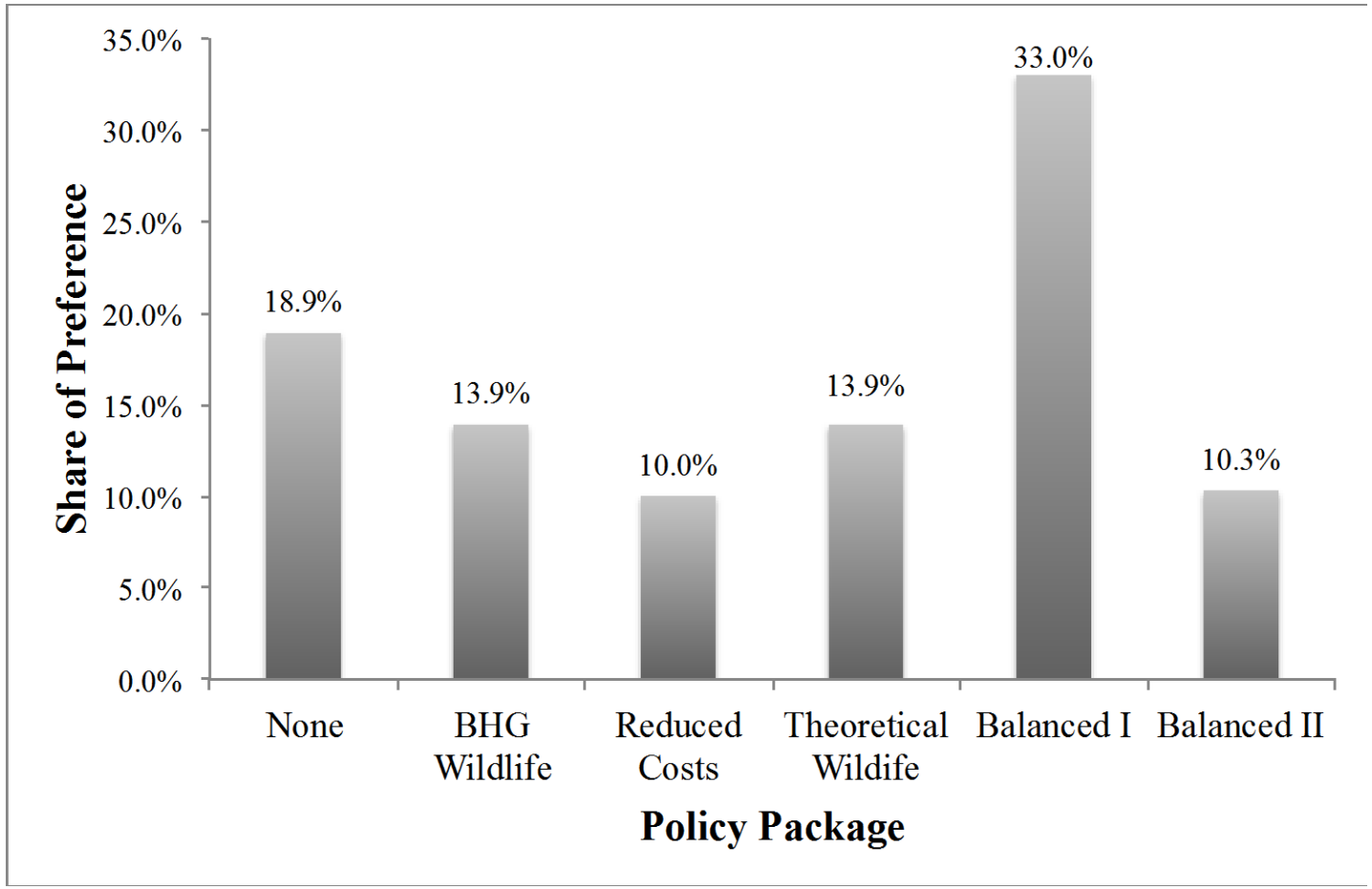
43.56 A
46.99 A
45.83 A
25.49 B
24.16 B
24.17 B
Logger
Landowner
Forester
Debris Remaining
Distrubution
Stumpage Price
Habitat
Attribute

Extra Information

- All three groups responded that BHGs would increase costs for loggers (62%).
- Landowners (65%) and loggers (65%) were more likely than the foresters (53%) to agree that harvesting woody biomass would benefit them financially.
- Collectively, 58% of foresters, loggers, and landowners agreed they would benefit financially compared to only 15% who disagreed.
- These groups also preferred high wildlife habitat quality. However, foresters, loggers, and landowners were more likely to disagree (56%) than agree (13%) that harvesting woody biomass would damage wildlife habitat.

Policy simulation



Conclusions

1. Loggers, landowners, and foresters have almost identical views on BHGs

2. Stumpage price is much more important to stakeholders than any criteria for BHGs

3. Impacts on wildlife habitat quality are more important to stakeholders than operational issues, but stakeholders do not believe harvesting biomass would damage wildlife habitat

4. Unless BHGs improve revenue and wildlife habitat simultaneously stakeholders would rather not have them

Recommendations

Develop BHGs with minimal percentage of CWD retained to achieve ecological objectives, and use piles rather than rows if evenly spread CWD is not ecologically acceptable

Articulate how proposed BHGs:
1. Will improve stumpage prices
2. Will improve wildlife habitat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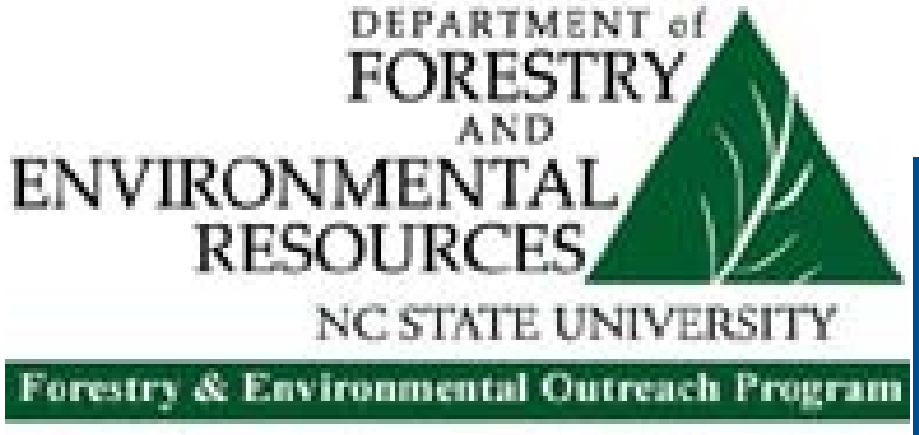
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