

High School Science Teachers and Forestry Education: How Are They Connected?

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**Forest Resources
& Environmental
Conservation**

at Virginia Tech

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Natural Resources

Outline

- Background/Objectives
- Methods
- Results
 - Who responded?
 - What are their connections to forestry?
 - Attitudes toward forestry education and forest management
 - Frequency that forestry concepts are taught and predictors
 - Frequency of field trips to forests and predictors
- Conclusion

Background

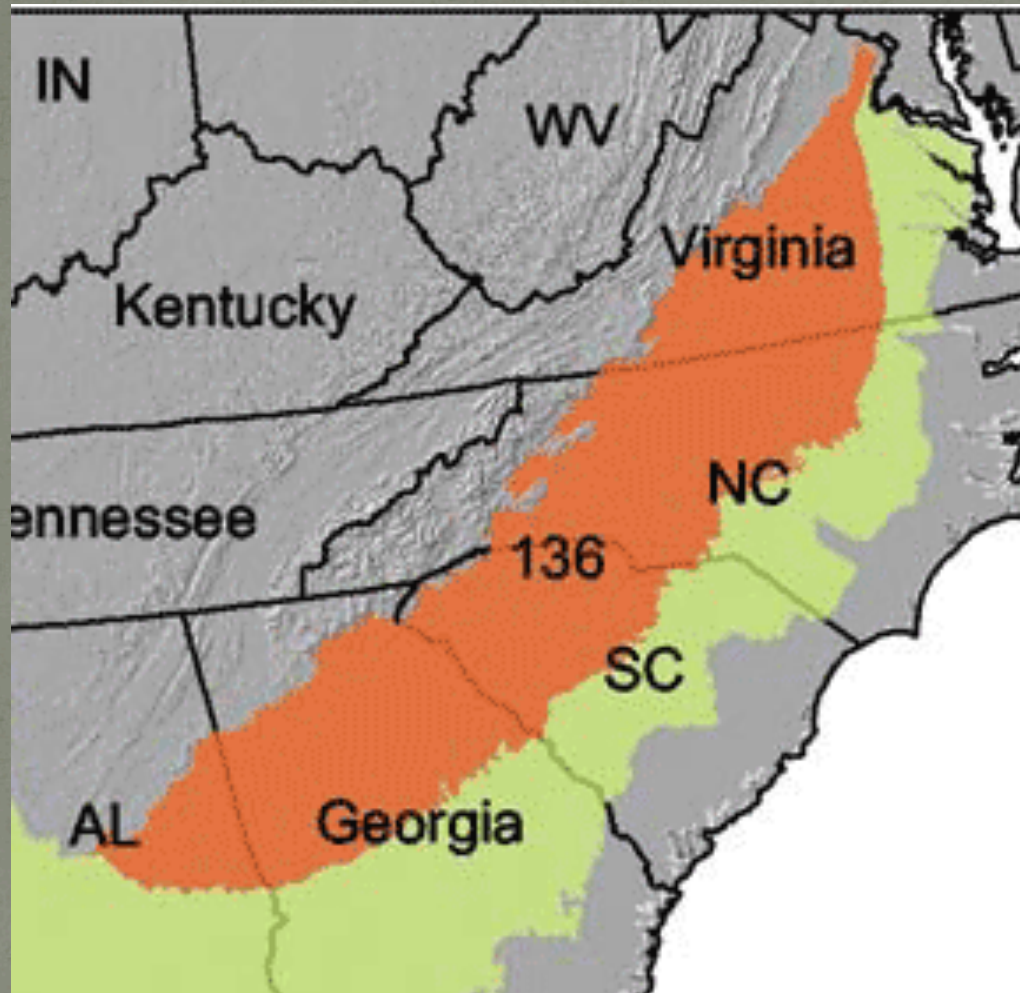
- Increasing need for:
 - Natural resource managers
 - Public involvement
 - Education about natural resources
- What is being taught?
 - Evidence of students having misconceptions
 - Decline in enrollment



Objectives

- To determine the extent to which high school science teachers in the Southern Piedmont region are teaching forestry concepts in the classroom.
- To determine variables that predict the frequency that teachers present forestry concepts in the classroom.
- To determine the frequency that teachers take field trips to forests for educational purposes.
- To determine teaching variables that predict whether or not teachers take field trips to forests for educational purposes.

Participants



From: http://www.mo15.nrcs.usda.gov/technical/MLRAs/mlra_136.html

Participants


School Districts Included in Stratified Random Sample

Legend


 Southern Piedmont Region

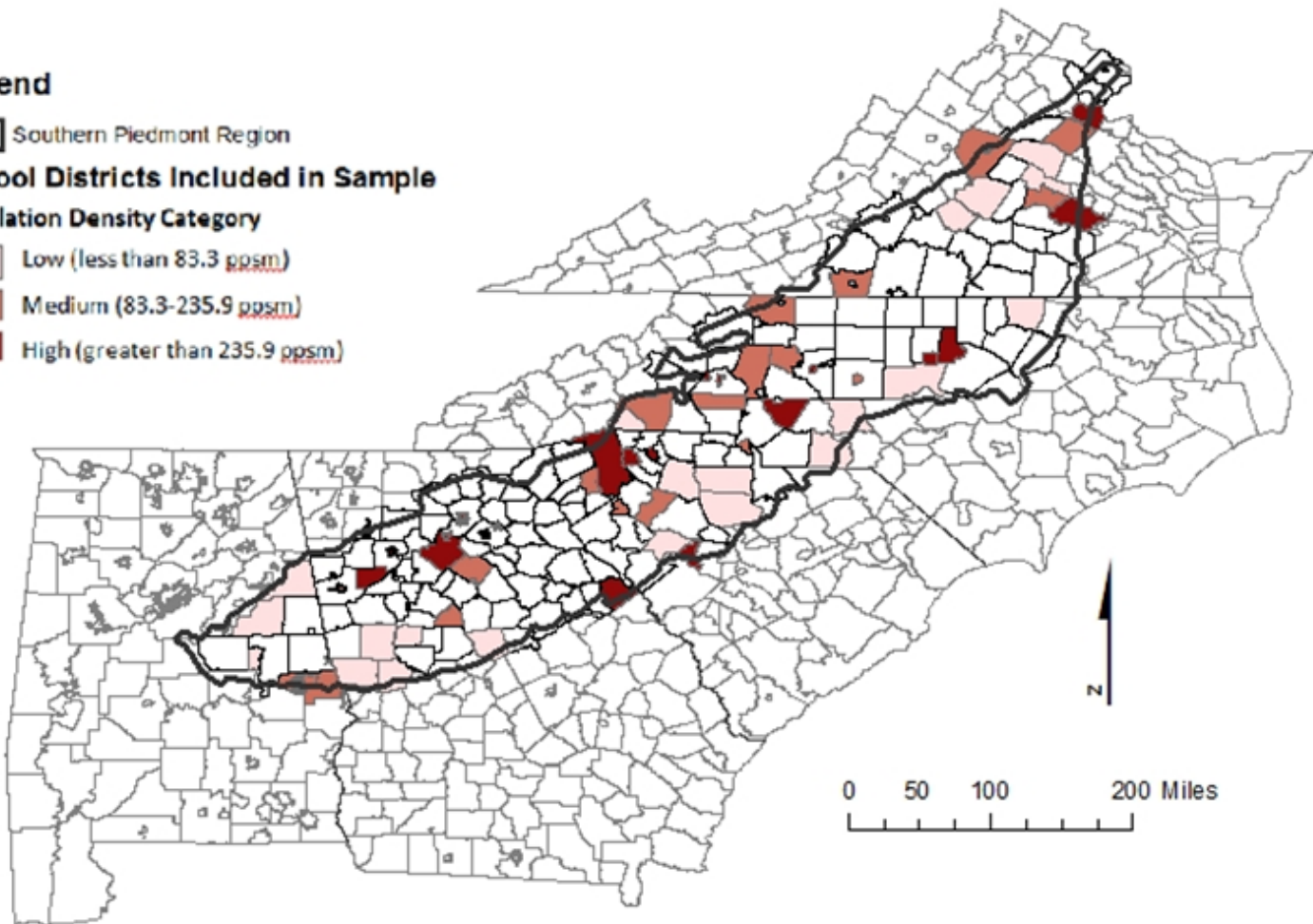
School Districts Included in Sample

Population Density Category

 Low (less than 83.3 *ppsm*)


 Medium (83.3-235.9 *ppsm*)


 High (greater than 235.9 *ppsm*)



Instrument/Response Rate


- Web-based survey with e-mail invitation and reminders
- Response rate: 34%
 - 1095 surveys sent
 - 71 not delivered
 - 324 completed



Completed 

Please select the response that represents the extent to which you agree or disagree with each of the following statements.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My values influence my students' values.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My values influence my students' career choices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My teachings influence my students' values.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My teachings influence my students' career choices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



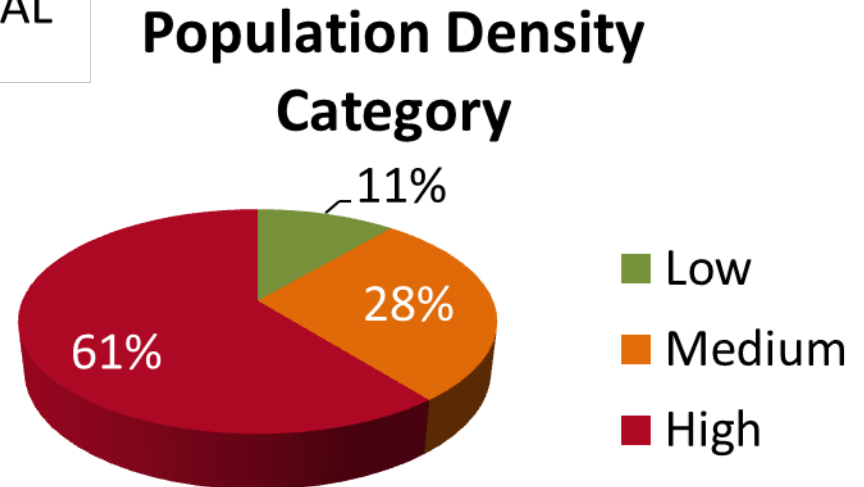
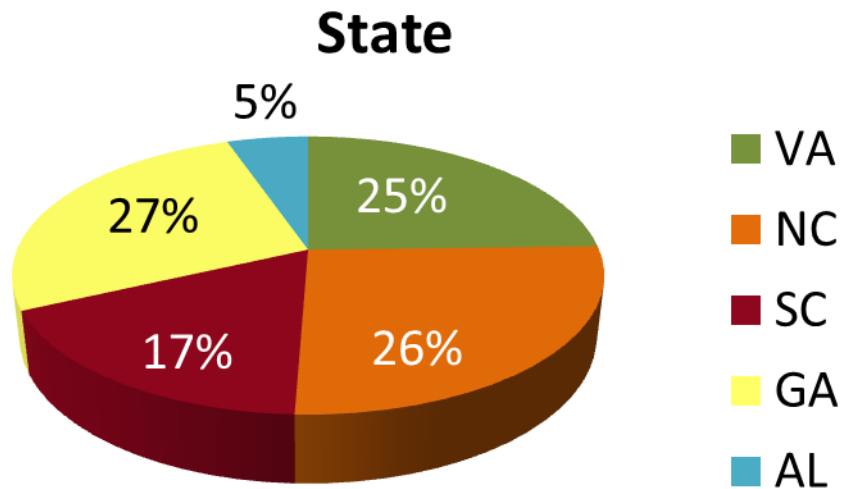
Forestry is a large part of the economy in my area.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Forestry concepts should be taught in schools.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would like to receive more training in forestry.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Time constraints limit me from teaching forestry concepts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Money constraints limit me from teaching forestry concepts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Curriculum standards limit me from teaching forestry concepts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel confident to teach forestry concepts.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<< Last Pause Next >>

Please contact Shannon Fowler at teacherforestrysurvey@vt.edu if you experience any difficulty with this survey.

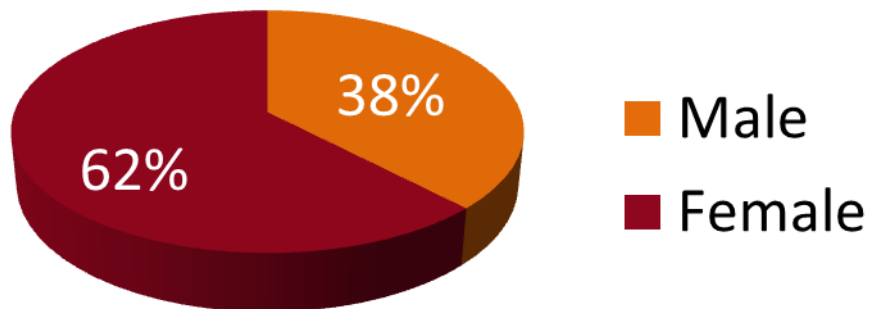
Powered by Agari SurveyPro Survey Software

Who Responded?

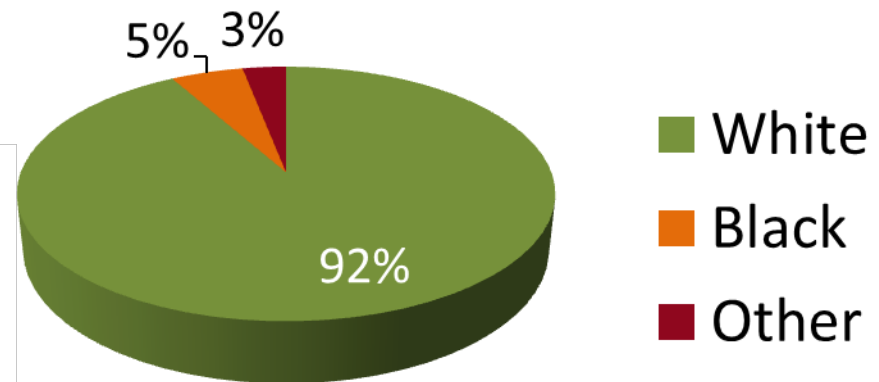


Who Responded?

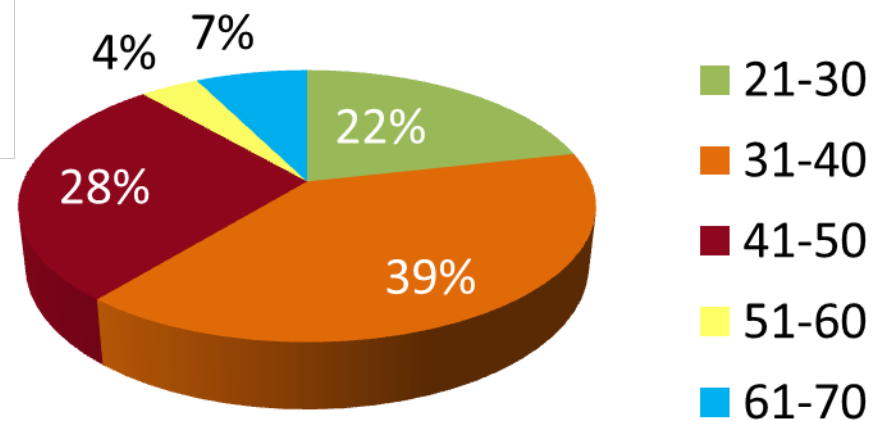
Sex



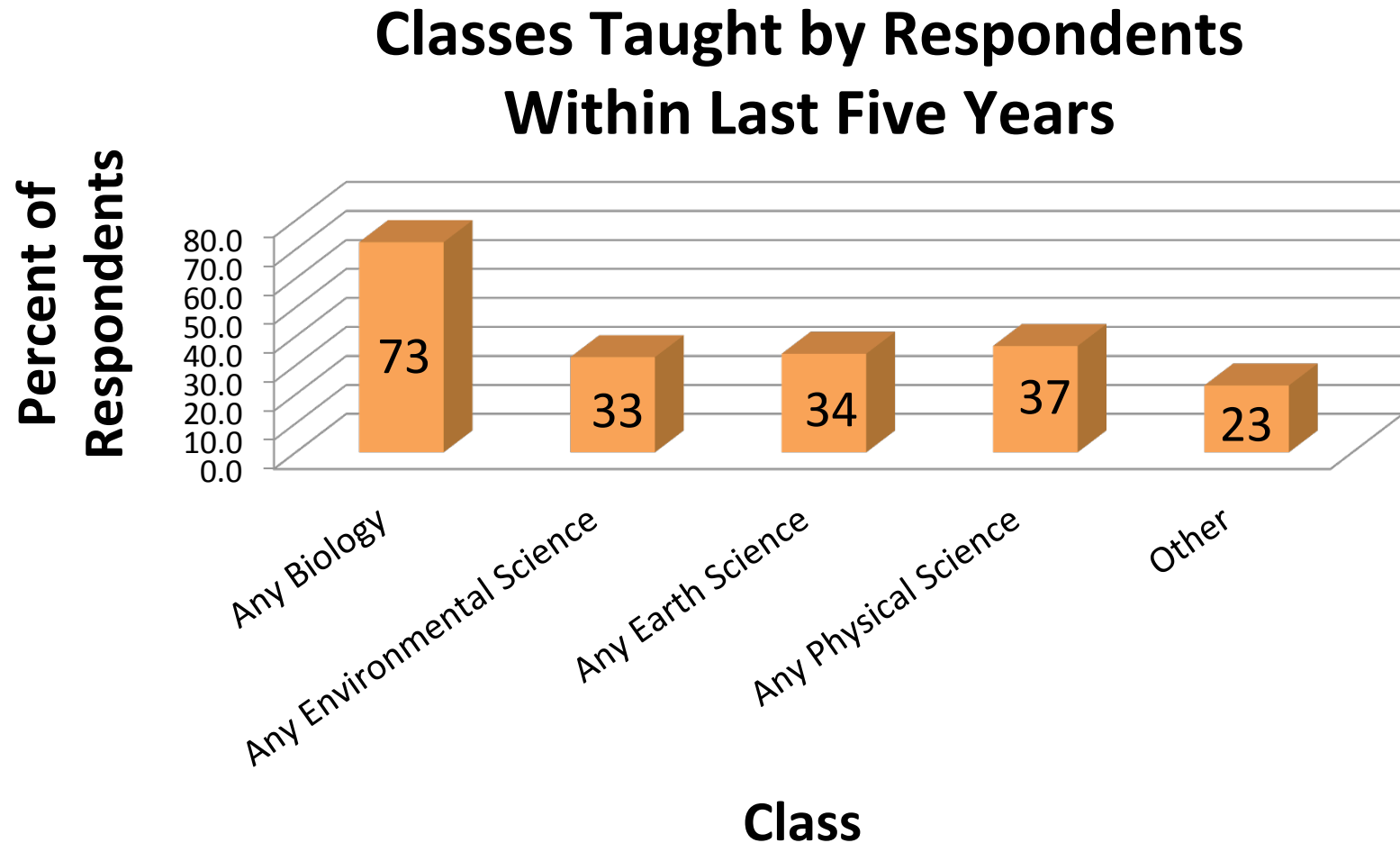
Race



Age

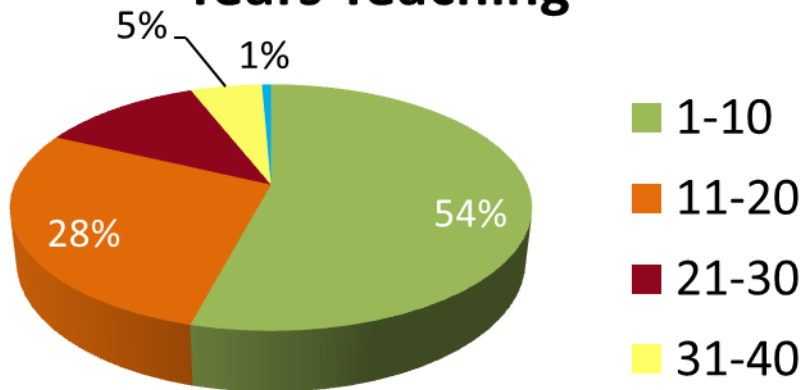


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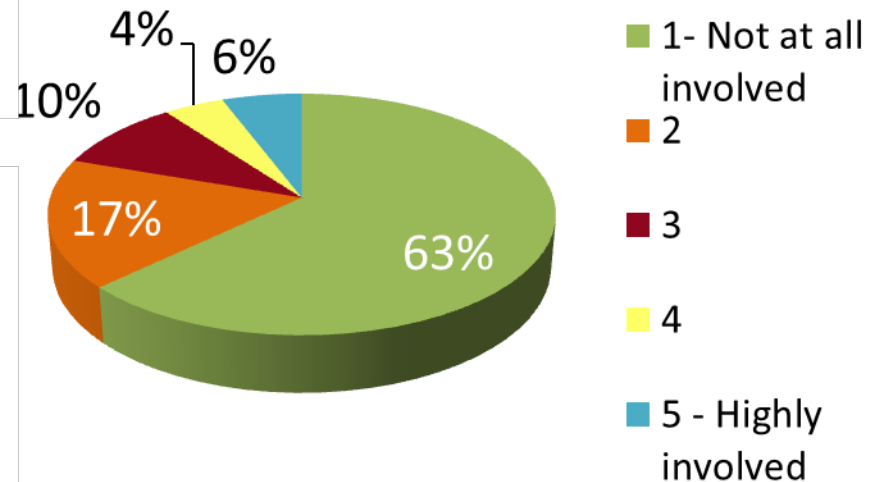


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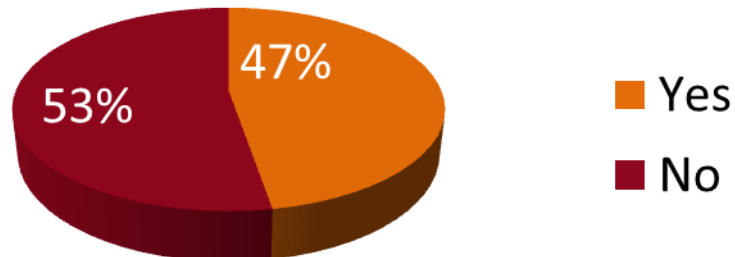
Years Teaching



Involvement in School Natural Resources Organizations

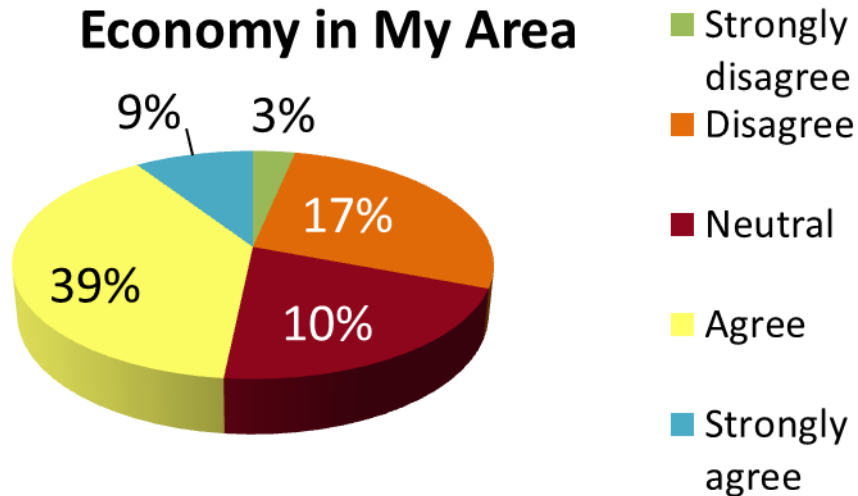


Environmental Education Program Training

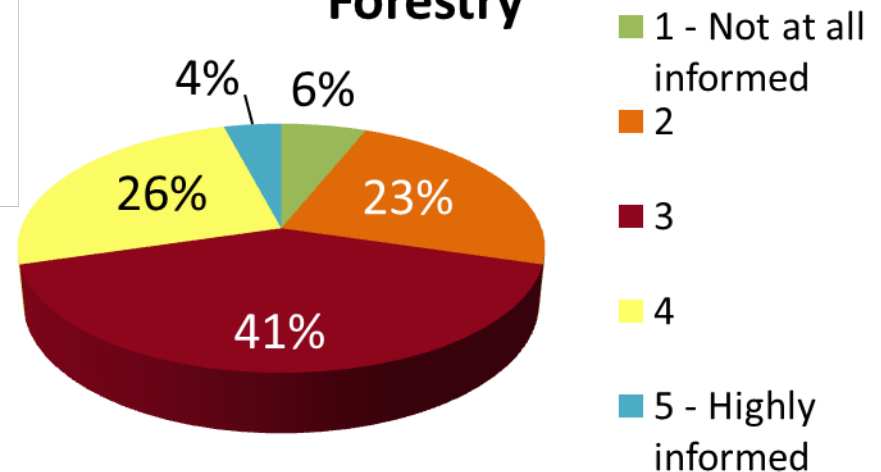


What are Their Connections to Forestry?

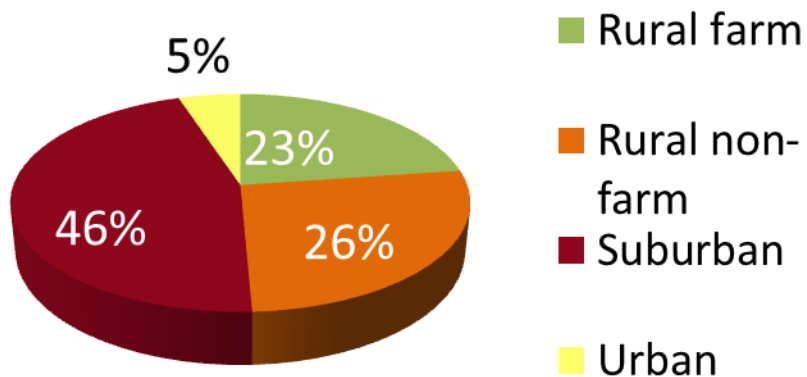
Forestry is a Large Part of the Economy in My Area



Extent of Feeling Informed of Forestry



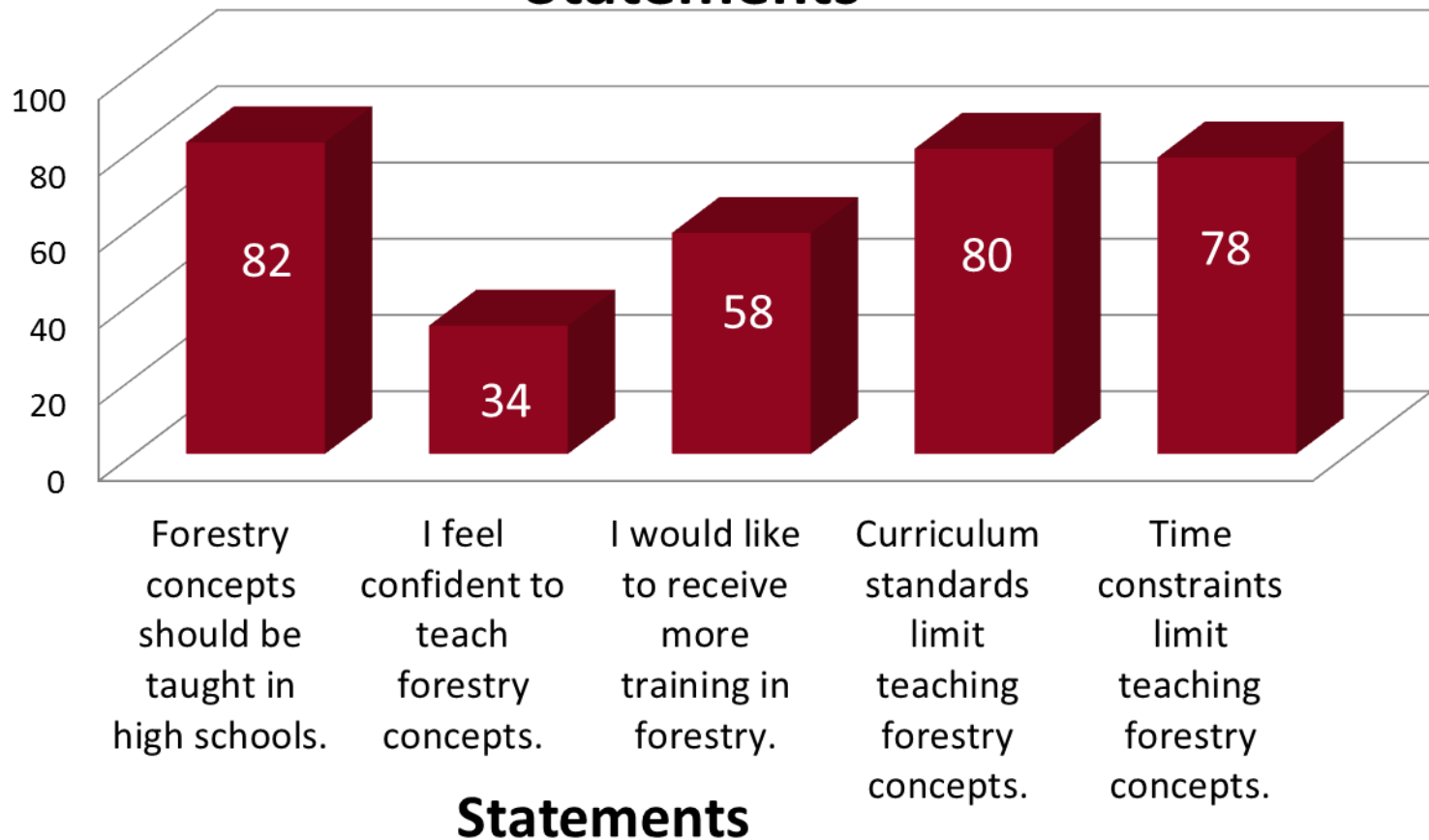
Childhood Location



Attitudes toward Forestry Education

Agreement with Forestry Education Statements

Percent of Respondents that agree/strongly agree



Impacts of Forest Management

Most beneficial to:

- Wildlife habitat
- Forest health
- Air quality
- Water quality
- Biodiversity



Least beneficial to:

- Property value
- Climate change prevention
- Carbon storage
- Human well-being
- Outdoor recreation

Forest Management Goals

Most important for teachers:

Water quality

Air quality

Biodiversity

Wildlife habitat

Endangered species

Most important for managers as perceived by teachers:

Timber

Fire prevention

Wildlife habitat

Water quality

Air quality

Familiarity with Management Practices

Practices not recognized by a large portion of respondents:

Growing non-timber forest products (29.3%)

Slash burning (25.2%)

Planting on streamside zones (25.2%)

Reforestation with tree clones (23.7%)

Habitat improvement cuts (16.9%)

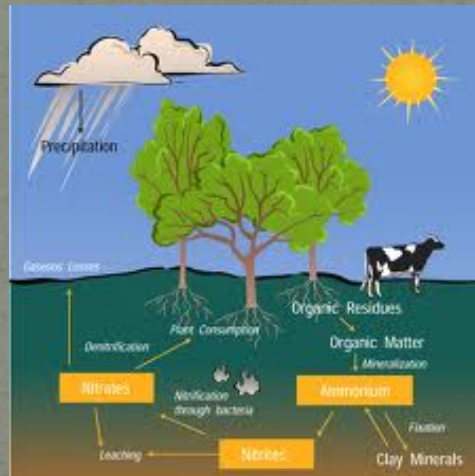
Pine plantations (16.3%)



What Are They Teaching?

Most Frequently Taught:

Air quality
Wildlife habitat
Biodiversity
Nutrient cycling
Climate Change



Least Frequently Taught:

Tree measurement
Wood products
Forestry career opportunities
Non-timber forest products
Timber harvesting

How Often Are They Teaching It?

- **Concepts related to products, uses, and management of forests**
 - Mean = 1.55*
- **Concepts related to ecosystem services**
 - Mean = 2.38*
- **Concepts related to biological and physical characteristics of trees**
 - Mean = 1.68*

*Scale: 1 = never, 2 = sometimes, 3 = often

All means significantly different ($p < 0.000$)

Regression Model Predicting Frequency of Teaching Ecosystem Services Concepts

Parameter	Beta	Sig.
Importance of wildlife management goals	.337	.000
Teaching Biology	.309	.000
Teaching Environmental Science	.264	.000
Importance of products and uses management goals	-.169	.004
Environmental education training	.130	.010
Forestry large part of economy	.129	.012
Importance of ecosystem services management goals	.121	.026
Impacts of management beneficial to forests	.111	.028
Number of forest management practices recognized	.102	.043
Teaching Physical Science	-.090	.067
Confident to teach forestry concepts	.096	.079
R² = .565		

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$R^2 = .565$

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Parameter	Beta	Sig.
Importance of products and uses management goals	.282	.000
Teaching Environmental Science	.211	.000
Teaching Agriculture Science	.236	.000
Informed of forestry	.188	.002
Impacts of management beneficial to humans	.132	.016
Number of management practices recognized	.136	.017
Curriculum standards limit teaching	-.118	.038
Spent majority of childhood in rural farm location	.092	.095
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Parameter	Beta	Sig.
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Confident to teach forestry concepts	.204	.001
Teaching Agriculture Science	.212	.007
Involvement in school natural resources activities	.182	.009
Age	.137	.025
Teaching Horticulture	.133	.077
Number of management practices recognized	.128	.139
R² = .328		

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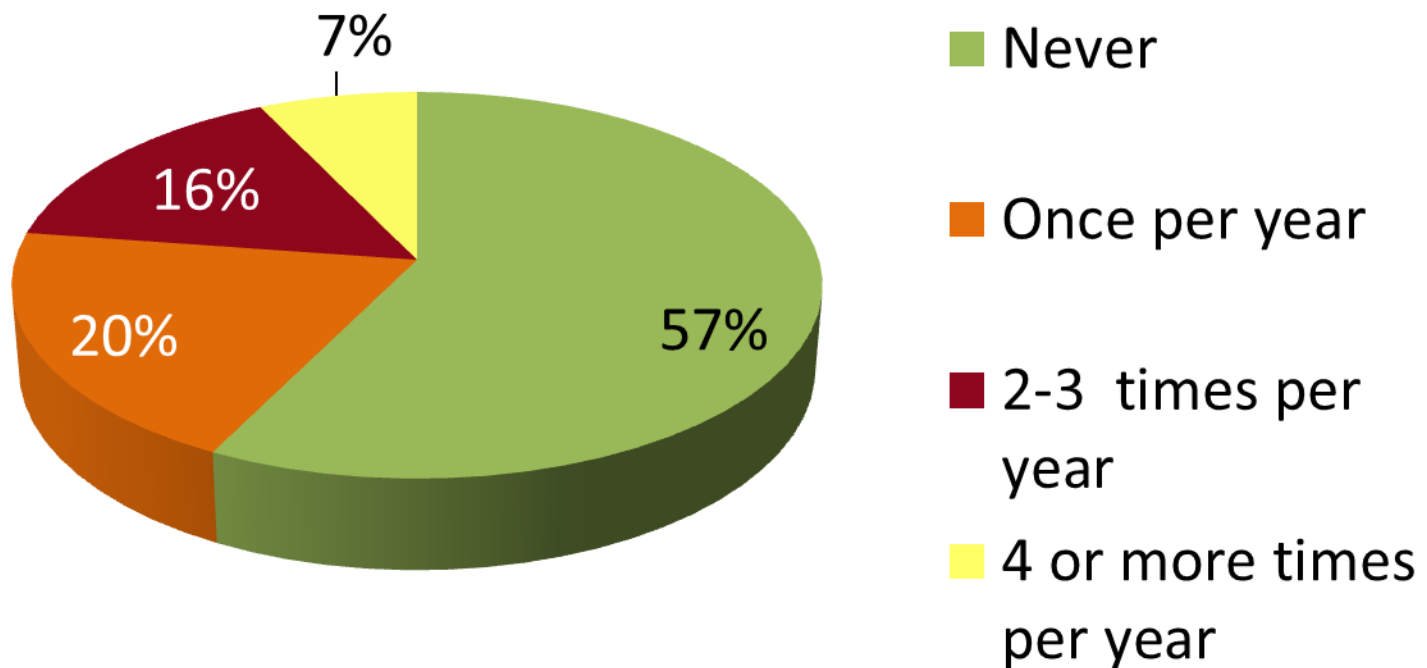
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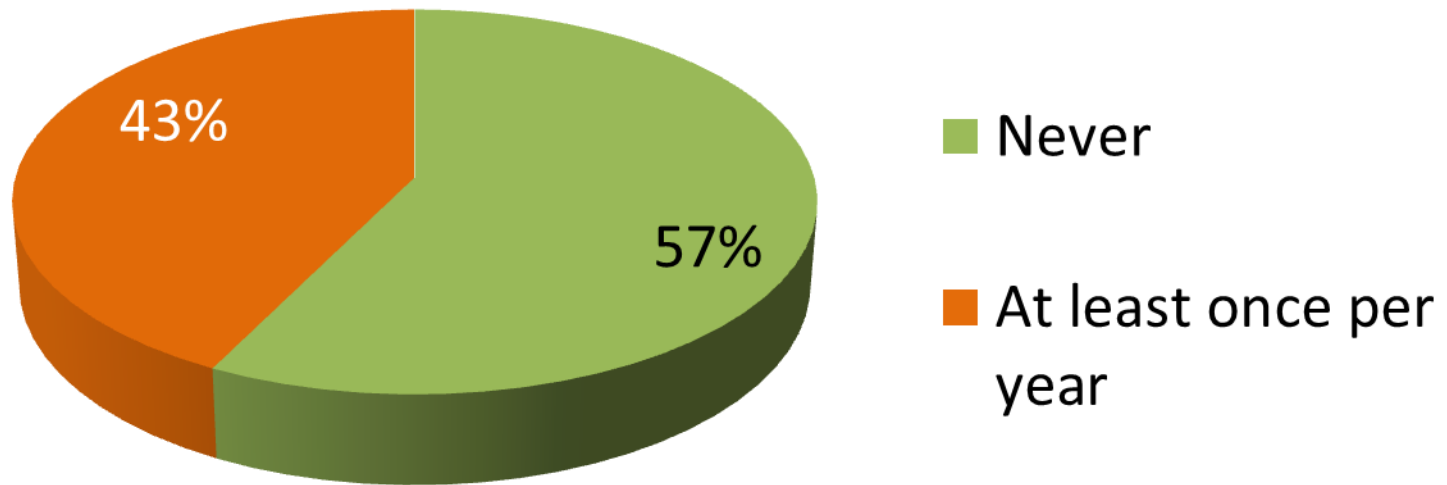
How often do they take field trips to forests?

Frequency of Field Trips to Forests



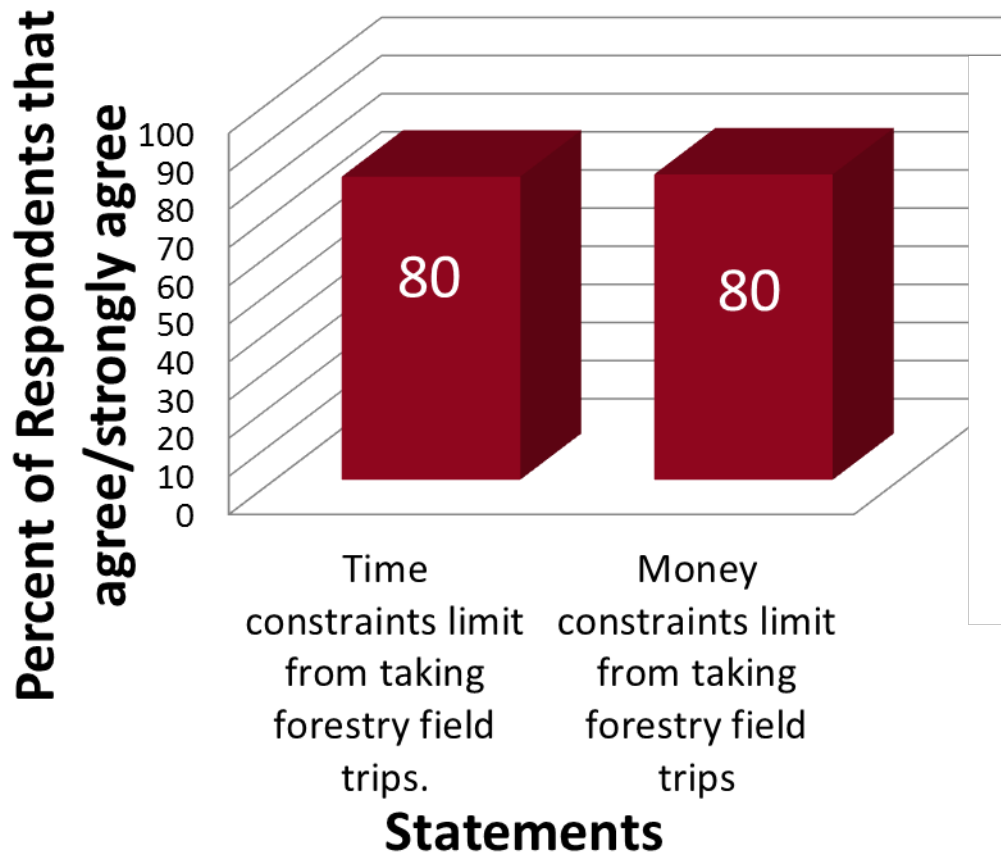
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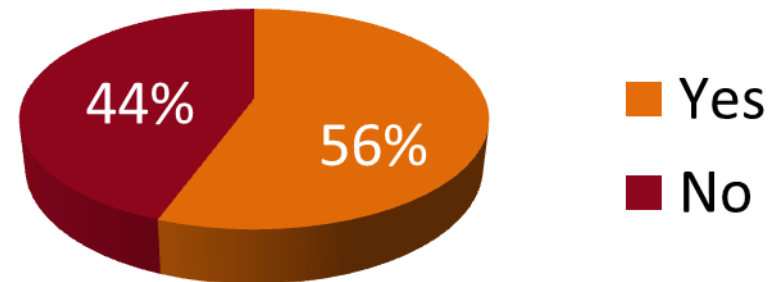


What are the Constraints?

Agreement with Field Trip Constraint Statements



Forest Within Walking Distance of School



Logistic Regression Model

Predicting Whether Teachers Take Field Trips to Forests

Variables in Model	Odds Ratio	Sig.
Forest within walking distance	11.413	.000
Confident to teach forestry concepts	2.218	.000
Involvement in school natural resources activities	1.551	.004
Nagelkerke R Square = .477		

Conclusions

- Objectives 1 and 2: To determine the extent to which high school science teachers in the Southern Piedmont region are teaching forestry concepts and the variables that predict teaching frequency.

Conclusions

- High school science teachers in the Southern Piedmont region are teaching forestry concepts related to ecosystem services most frequently, followed by those related to characteristics of trees and finally those related to products, uses, and management of forests.
- A variety of variables work together to predict the frequency that each of these concept groups are taught most notably including knowledge and attitudes related to forestry.

Conclusions

- Objectives 3 and 4: To determine the frequency that high school science teachers in the Southern Piedmont region take field trips to forests for educational purposes and the teaching variables that predict whether or not they take field trips to forests.

Conclusions

- Over half (57%) of high school science teachers in the Southern Piedmont region never take field trips to forests. Just over a third (36%) do so one to three times per year and only a very small percentage (7%) take field trips to forests four or more times per year.
- Whether or not teachers take field trips to forests is extremely influenced by whether or not there is a forest within walking distance of their school. Other predictors include knowledge of forest management practices, involvement in school natural resources organizations, and level of confidence to teach forestry concepts.

Thank you!

Questions?

