



Dendrology, Forest Ecology, and Data Analysis in the STEM-Centered Classroom



Mark Yeckley¹ and Margot Kaye²

¹RET, Glendale School District ²The Pennsylvania State University

Objective

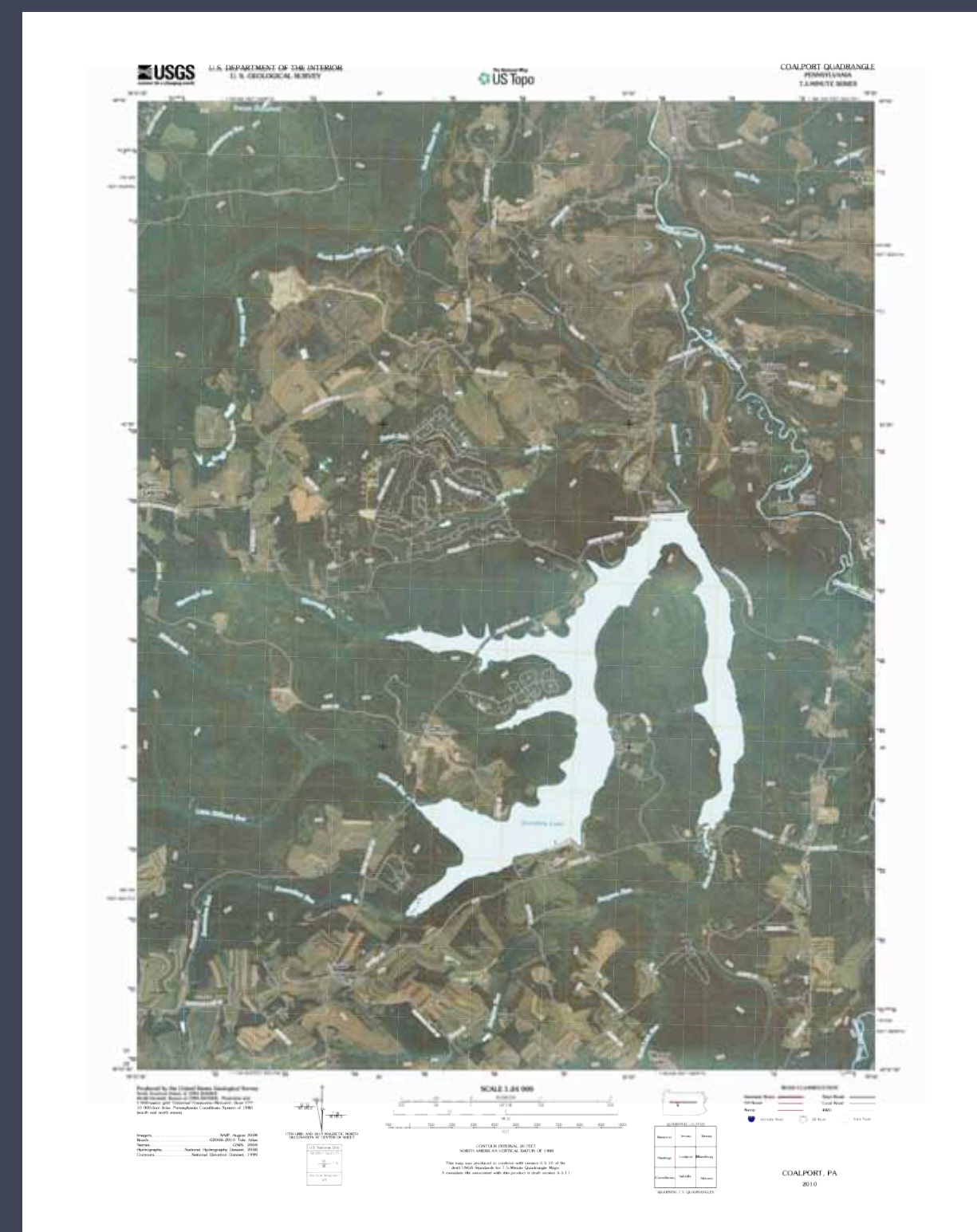
Allow middle school students of Glendale School District to participate in a 2-module curricular STEM (Science Technology Engineering Mathematics) program while also meeting Department of Education academic standards.

Introduction

The students of rural Pennsylvania have a unique opportunity to use Pennsylvania State Parks and public forests to enrich their education(s) in the areas of environmental science and ecology.

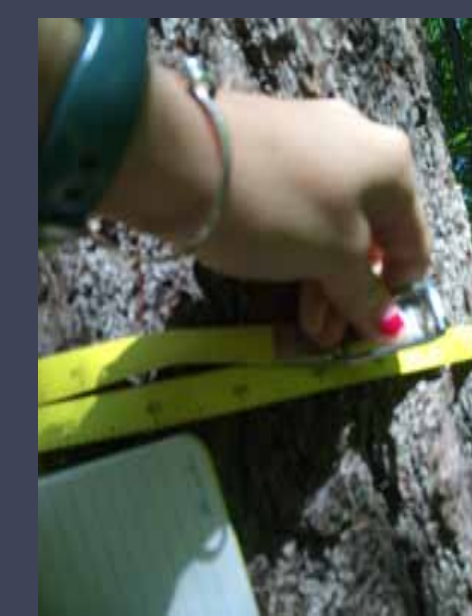
Prince Gallitzin State Park

The students of Glendale School District are located directly adjacent to the Prince Gallitzin State Park. Students will also have several experiences working with the DCNR park rangers from the Prince Gallitzin State Park allowing them to further develop their outdoor skills.



I. Field Module

- Will consist of hands-on fieldwork
- Students will develop the following skills;
 - Understory vegetation measurements
 - Tree identification
 - O – Horizon sampling
 - Course woody debris measurements



Tree Diameter At Breast Height



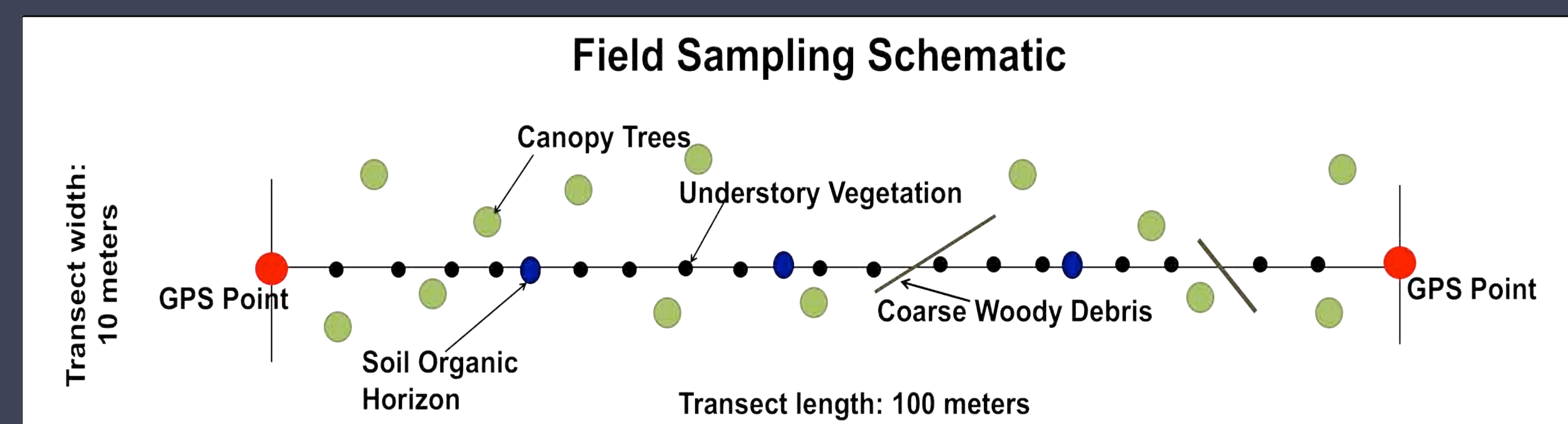
O-Horizon Sampling



Fuels Measurement



Tree Distance Off Transect



Standards Covered

4.1.7.A: Describe the relationships between biotic and abiotic components of an ecosystem. Compare and contrast different biomes and their characteristics.

4.1.7.C: Explain the flow of energy within an ecosystem. Explain the concept of trophic levels.

4.5.7.B: Describe the impact of pests in different geographic locations and techniques used to manage those pests.



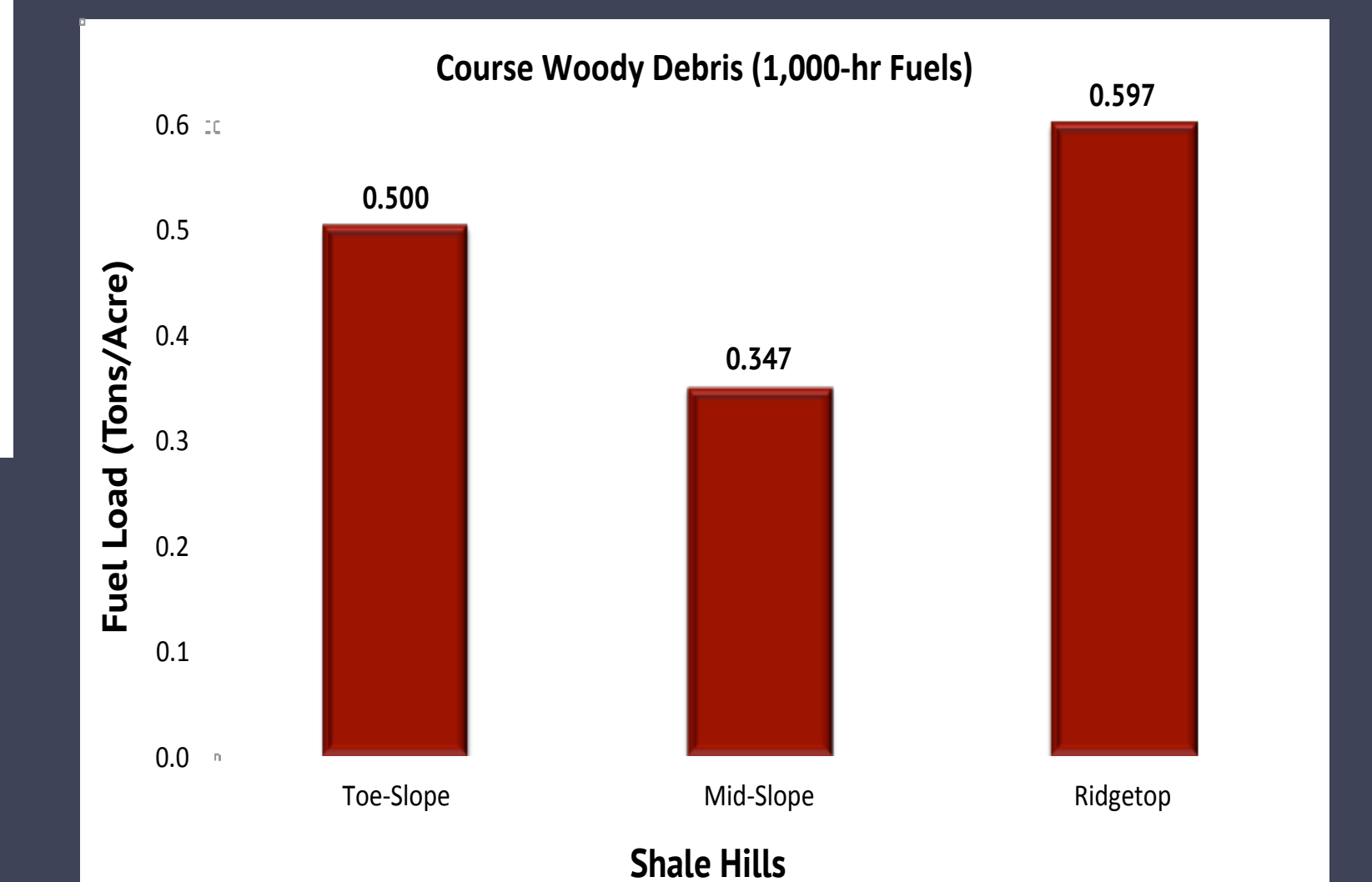
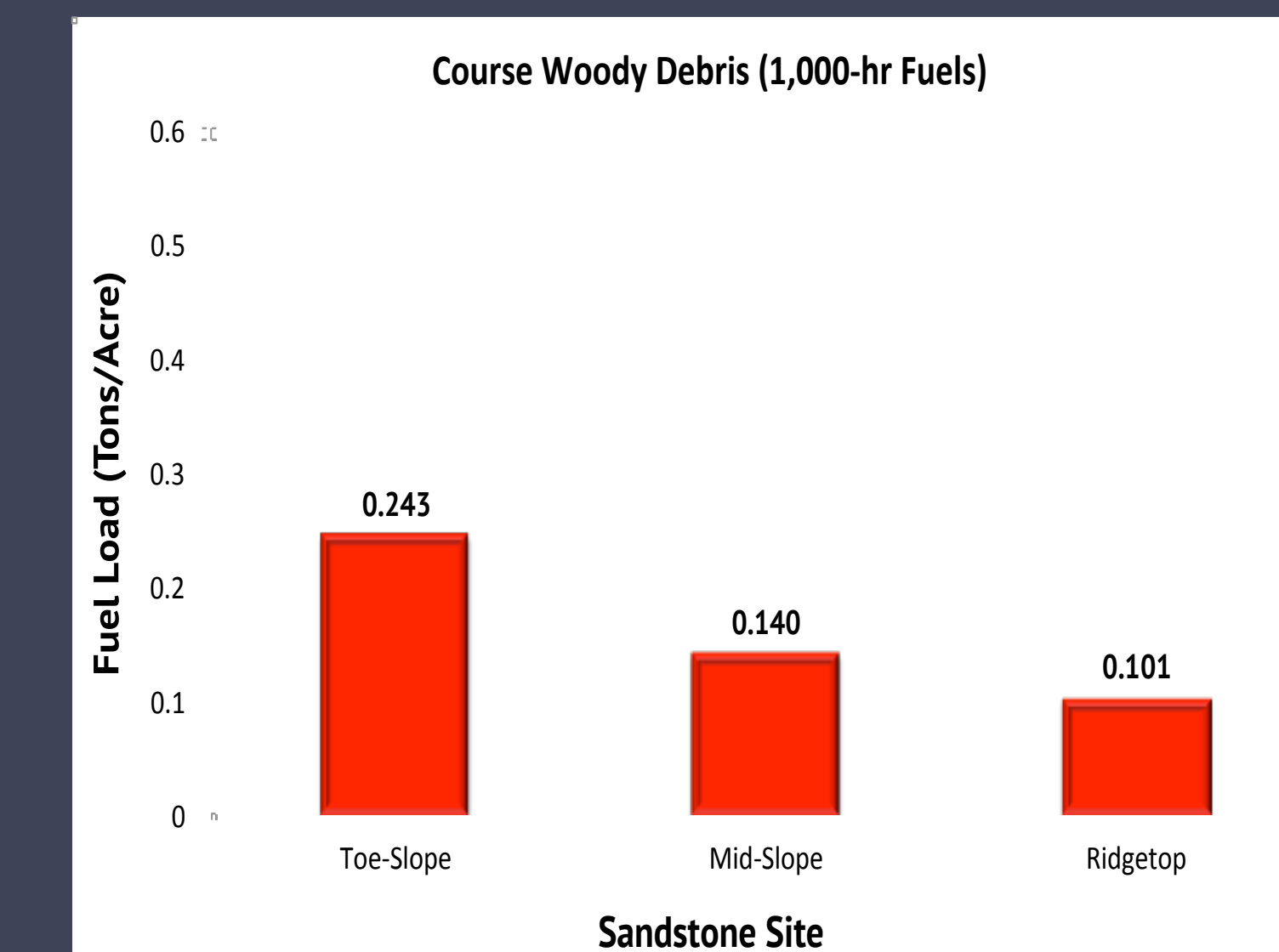
II. Analysis Module

- Will consist of data entry of field data
- Construction of graphs and data analysis
- Potential to create a long-term monitoring system

Raw Data

Site	Aspect	Topographic Position	Year	Transect	Segment	1hr	10hr	100hr	1000hr	Spp.	Azimuth	Dist. on Line (m)	Length (m)	Diameter (cm)	Decay Class
SASI SOUTH	MID-SLOPE	2014	2	0-25m	13	1	0	1		Bele	320	1.15	2.2	28	4
SASI SOUTH	MID-SLOPE	2014	2						1	Pine	280	18.3	7.8	8	3
SASI SOUTH	MID-SLOPE	2014	2						1	HARDWOOD	340	23.1	5.4	8.4	3
SASI SOUTH	MID-SLOPE	2014	2						1	HARDWOOD	342	24.25	2.4	18	4
SASI SOUTH	MID-SLOPE	2014	2	25-50m	15	1	1	1		HARDWOOD	332	32.8	2.5	9.5	3
SASI SOUTH	MID-SLOPE	2014	2						1	Pine	348	36.2	11.6	14.4	2
SASI SOUTH	MID-SLOPE	2014	2						1	HARDWOOD	20	47.8	5.8	14.2	4
SASI SOUTH	MID-SLOPE	2014	2	50-75m	10	2	0	1		HARDWOOD	270	58.4	5.1	12.1	3
SASI SOUTH	MID-SLOPE	2014	2						1	HARDWOOD	0	71	4.3	16	5
SASI SOUTH	MID-SLOPE	2014	2						1	HARDWOOD	456	72.45	5.4	6.3	3
SASI SOUTH	MID-SLOPE	2014	2	75-100m	29	4	0	0							

Analyzed Data



Standards Covered

3.4.7.C2: Explain how modeling, testing, evaluating, and modifying are used to transform ideas into practical solutions.

3.4.7.D3: Use data collected to analyze and interpret trends in order to identify positive or negative effects.

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