

Silvopastures involve intentional integration of trees with forage livestock production systems and are managed to optimize the interrelationships among system components

Introduction: Outreach is critical for moving applied research beyond the university, but extension experience and training often is missing in graduate student educational programs. At the same time, high school teachers and students typically have only limited access to cutting-edge research. **The Graduate Extension Scholars program addressed these areas of need by directly connecting graduate students at Virginia Tech with teachers and 4-H agents across Virginia.** In this case, the lead author (Pent) worked with the agriculture teacher at Randolph Henry High School (Charlotte County, VA) and a county 4-H agent to develop and pilot an educational module on silvopasture.

Objective
Introduce students to the concept of silvopasture and teach the necessary steps for implementation

Methods
Develop appropriate training activities for the high school students to use on their school farm

Output
Publish an inquiry-based silvopasture curriculum for use by teachers across the state

Activity 1: Site visit with professionals



Student learning objectives

- Recognize silvopasture as an intensive land management practice
- Consult and collaborate with resource professionals

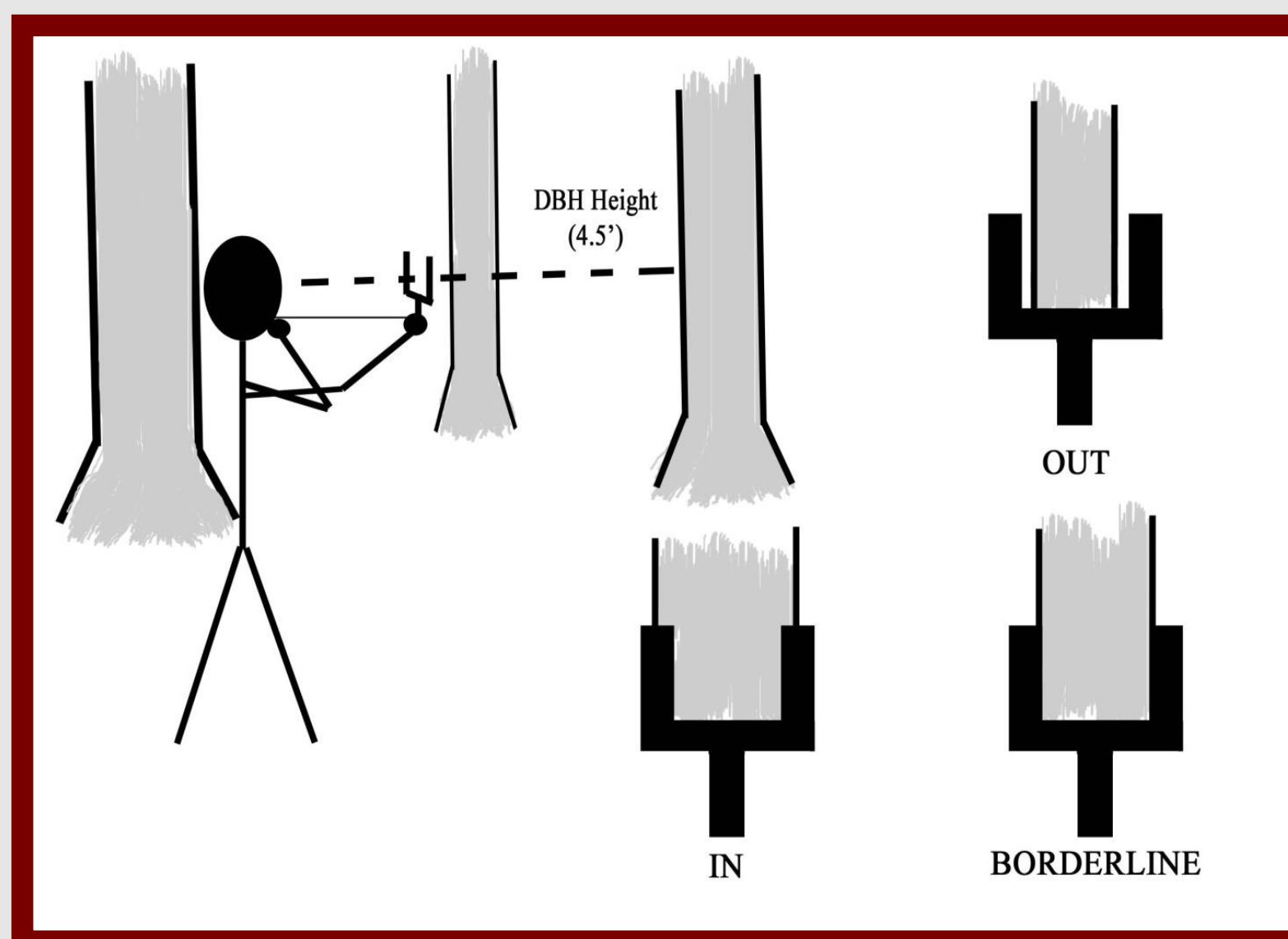
Activity



Following the scholar's presentation on benefits of silvopastures, students visited the site with resource professionals.

Students and specialists discussed options for stand thinning, litter and stump control, forage species and establishment and managing grazing after establishment.

Activity 2: Basal area and thinning calculations



Student learning objectives

- Assess basal area with a cruising angle
- Distinguish trees with good market potential
- Visualize appropriate density for a managed silvopasture

Activity

After an area forester demonstrated use of a cruising angle to determine tree basal area, students calculated the existing basal area of the loblolly pine stand.

Under guidance of the forester, the students determined which trees to keep and which to cut based on principles of timber stand improvement.

Aiming for 40-60 ft² of basal area per acre, the students evaluated and marked the trees, reducing basal area from 133 to 53 ft² per acre.



Activity 3: Soil sampling and comparison



Student learning objectives

- Understand how to amend soils to achieve target pH and nutrient requirements for different species
- Sample and prepare soil samples for analysis

Activity

The scholar demonstrated appropriate soil sampling techniques. Sample areas were divided into distinct management units based on information from USDA's Web Soil Survey and field observations.

Students sampled soils in the pine stand and a nearby pasture. Using a pH indicator kit, the students discovered that the pH was 6.5 in the limed pasture and 3 under the pine trees. This observation led to a discussion of how to manage for multiple species with different nutrient and pH needs in the same management units.



Outcomes:

Graduate student

- Improved confidence communicating science to diverse audiences
- Developed understanding of how to plan and manage outreach projects
- Broadened publication and presentation venues
- Altered outreach perspective towards systems thinking
- Exposed to new teaching techniques
- Informed of public viewpoints on dissertation research

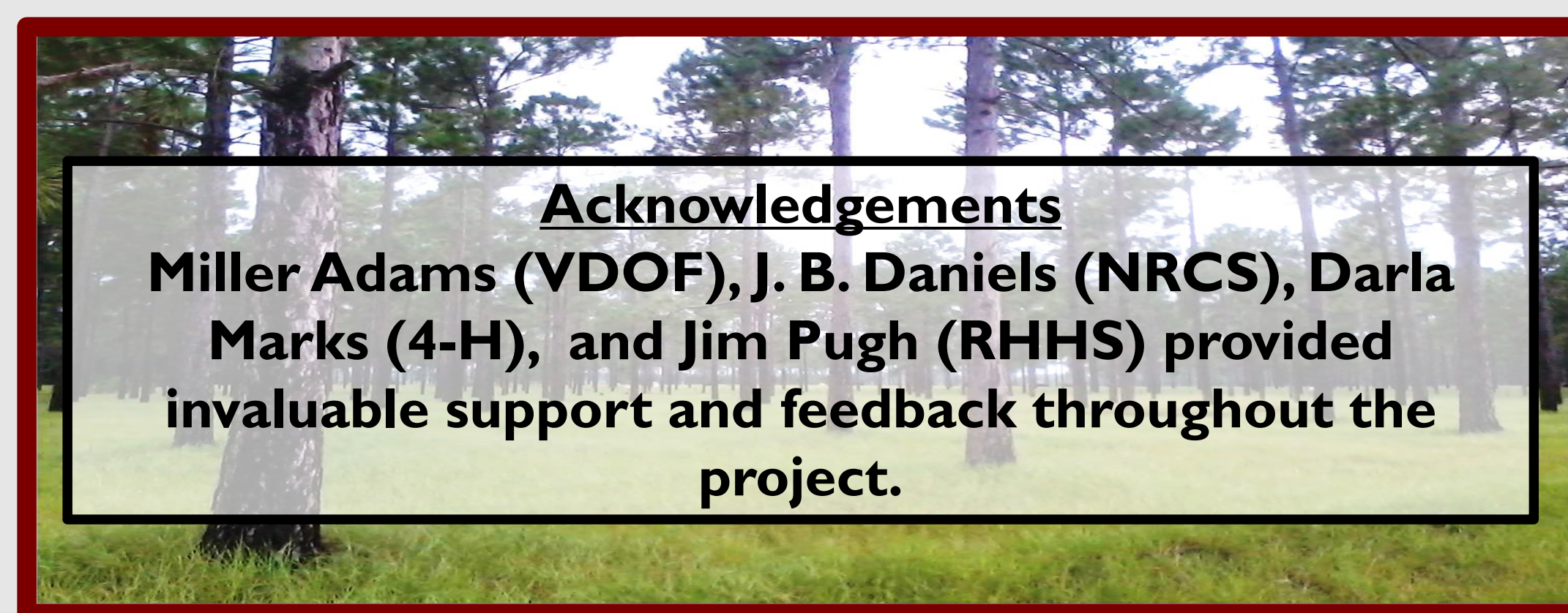
"From an educational perspective, just having the students involved in a real world activity outside of the classroom is really innovative. The students were engaged and involved. I have even spoken with a few of the students' parents and they are asking me about the silvopasture project. The students were talking to them about implementation of silvopasture in their operations at home." – Jim Pugh, Randolph Henry High School agriculture teacher

Students

- Engaged with resource specialists
- Learned skills in silvopastoralism
- Experienced the process of silvopasture implementation
- Gained confidence with scientific knowledge & skills
- Connected to agricultural issues in the county
- Exposed to various career options in agriculture

Teacher and 4-H agent

- Gained new curriculum and programming ideas
- Expanded professional network
- Exposed to new scientific information and skills
- Received resource and materials support to implement a new project



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