Students Use Sawmill to Learn Forestry Concepts
by Tracy Hmielowski

Learning forestry practices is difficult to accomplish in a lecture hall, which is why many programs include field-based curriculum. For example, the Arthur Temple College of Forestry and Agriculture (ATCOFA) at Stephen F. Austin State University in Texas requires undergraduate forestry students to attend a six-week field station made up of six separate one-credit-hour courses, with a focus on experiential learning. This provides instructors the opportunity to develop assignments that build upon content from earlier coursework in a hands-on learning environment.

Faculty at ATCOFA recognized that in one field station course, Harvesting and Processing, students were not understanding key concepts of scaling, optimization, and grading technology. To address this problem, the instructors incorporated a new activity that used these key concepts: Having students produce boards from a log using a portable sawmill.

“This was actually part of the class before but was phased out in the 1970s or 1980s,” says Jeremy Stovall, ATCOFA Associate Professor of Silviculture and co-author of a recent article on the topic published in Natural Sciences Education (NSE). Stovall assists in the Harvesting and Processing course, which is co-taught by co-authors Matthew McBroom and David Kulhavy, with support from teaching assistant Ryan Grisham.

Gaining a Deeper Understanding of Producing Boards for Consumer Use

The goals of incorporating the sawmill exercise were to improve students’ understanding of the process of producing boards for consumer use by using analytical skills to predict the outcome. In this activity, groups of students are given a log and need to estimate the volume based on log length and diameter using Doyle, Scribner, and International ¼ inch formulae. Students then need to estimate the boards they can recover, develop a plan for cutting the log, and perform their planned cuts using the portable sawmill. Stovall says by running into unexpected problems and experiencing challenges firsthand, they gain a deeper understanding of the process.

The instructors typically find that students overestimated recovery of boards from the log. Stovall pointed out that this is because students assume the logs are straight and taper consistently, “they will measure the small end without realizing the log narrows in the middle,” or they do not realize how much of the log will be lost as sawdust. For example, data from the 2015 class showed that students anticipated recovering an average of 7.3 boards but actu-

In the next issue of CSA News...

Perspectives on Tall Fescue

Tall fescue was once promoted as a “wonder grass” and rapidly spread across states like Kentucky, Tennessee, and Missouri. This was before farmers and researchers realized fescue had negative effects on cattle and horses. It took decades for forage specialists, animal scientists, and mycologists to identify the root of the problem—a toxic endophyte living within the grass. We look at a range of approaches to mitigating and eliminating fescue toxicosis and challenges of communicating science given the amount of misinformation on the topic.

FEATURING
Dr. Henry Fribourg, University of Tennessee
Dr. Glen Aiken, University of Kentucky
Dr. Craig Roberts, University of Missouri

Peer-Reviewed Computer Code

Publications that share the results of studies that incorporate or are based on models are widespread in ACSESS journals. But when a researcher wants to use an existing model, potentially to integrate with a model they have developed, there is no guarantee they will gain access to the code or that it will run as intended. To encourage quality documentation and public access to computer code, several ASA members have proposed a process for the peer-review and publication of code, and next month, we’ll discuss that plan along with the pros and cons of code as a peer-reviewed product.

FEATURING
Dr. Dennis Timlin, USDA-ARS
Dr. Olaf David, Colorado State University, Object Modeling System Lab
ally got 5.4 (means calculated for data from nine groups). However, this overestimate of recovery does not negatively impact grades because students are evaluated on a written report of their planned cuts, estimates of volume, description of lumber recovered, and challenges encountered. Student grades on the sawmill exercise average 98.5% while other assignments in the Harvesting and Processing course average 90.5%.

Including this exercise into the curriculum was not without its own challenges. One group is sawing, one group monitors for safety protocols, and other groups have to wait, which can make for a long, hot, day. To avoid this downtime, instructors added more activities for students to accomplish, including grading the logs and boards. This is not just busy work, as grading lumber is covered in other coursework and is an important skill to practice in the field.

Stovall says the instructors have also seen positive outcomes that are not related to the learning goals. “If one group has a really big log, another group will help them move it.” The instructors have seen students acting as leaders within their groups and even one year where a class presented a board with all of the students’ signatures as a gift to the caretakers of the site where the course was held.

The NSE article notes that inclusion of this activity has improved the overall course grades. Prior to the sawmill exercise, the class-size weighted mean grade was 82.9%, and after the sawmill exercise was included, the weighted mean grade was 92.2%. Instructors have also observed that student engagement and questions improved when touring sawmills. The authors recognize that comparing grades is not the ideal way to measure learning outcomes and hope to collect more detailed data to assess student knowledge using surveys and quizzes in future classes.

Incorporating the sawmill exercise into the curriculum for the Harvesting and Processing course has improved student understanding of key concepts. And it has received positive feedback from students, some of whom say it was the best part of their field station experience. As stated in the article, “While few of these students are likely to be sawyers in a sawmill, as natural resource managers, understanding the process in producing forest products such as sawtimber is critical for a successful career.”

Dig Deeper
Check out the open access article in Natural Sciences Education: Use of a Portable Sawmill for Forestry Instruction (see http://bit.ly/2d8ijx).