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James M. Schmierer Jr.

School of Forest Resources and Environmental Science, Michigan Technological University, Houghton

Glenn D. Mroz

School of Forest Resources and Environmental Science, Michigan Technological University, Houghton

Scott D. Noble

School of Forest Resources and Environmental Science, Michigan Technological University, Houghton

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The FERM: Forest and Environmental Resource Management

James M. Schmierer, Jr.¹, Glenn D. Mroz² and Scott D. Noble³

ABSTRACT: In order to foster greater technical competency and to improve confidence in the field, undergraduate students are offered a course known as the FERM, Forest and Environmental Resource Management. Teams of students from forestry and applied ecology degree programs work with faculty, staff, and an advisory board to implement sustainable resource management plans developed by students on the School Forest lands. The FERM program is designed to provide a variety of hands-on experiences in realistic field and management settings that incorporates research and conservation objectives. Specific activities include timber sale preparation and administration, wildlife and ecological surveys, road layout, tree planting, regeneration surveys, study plot layout and establishment, and permanent plot remeasurements. Assessment in the FERM emphasizes student outcomes achieved using group and individual instruction, guided inquiry, technical training, site visits, applied field exercises, and professional interaction. This promising program provides high-quality learning experiences for students but also presents significant challenges.

INTRODUCTION

Societal demands on forestry professionals are greater than ever before. Properly training future forest practitioners requires the development of many specific skills and abilities as a part of the total educational experience. A level of comfort in the woods, an understanding of multiple resource values, application of basic operational forestry procedures, positive interaction with the public, co-workers, and allied professionals, sound problem-solving and decision-making skills, and good oral and written communication skills have been identified as abilities required of practicing forestry professionals (Brown and Lassoie 1998; Zundel and Needham 1996). The traditional approach to forestry and natural resources education may not provide the type of learning experiences that foster skills development. The emphasis of the traditional approach is on curriculum development, and centers on specific courses required and the sequence in which they are taught (Brown and Lassoie 1998; Jensen and Doescher 1998). A more effective approach to university education is to design specific learning experiences (Spence 2001).

School Forester, Dean, and Research Forester, School of Forest Resources and Environmental Science, Michigan Technological University, 1400 Townsend Drive, Houghton, MI 49931-1295; email:

¹ jmschmie@mtu.edu,

² gdmroz@mtu.edu,

³ sdnoble@mtu.edu.

Utilizing outcomes-based techniques in college degree programs is a way to foster development of the crucial skills and abilities that future natural resource professionals will rely on to be effective throughout their careers. Outcomes-based educational approaches are based on a student's ability to demonstrate what they have learned by exhibiting a certain level of proficiency with a particular set of skills in a realistic environment. Effectiveness of instruction and student assessment rely on how well the given outcomes have been achieved (Zundel and Needham 2000). A unique outcomes-based approach to learning known as the FERM has been developed in order to provide quality learning experiences for forestry and applied ecology students in a realistic setting.

THE FERM PROGRAM

The School of Forest Resources and Environmental Science at Michigan Technological University has instituted a new program known as the FERM: Forest and Environmental Resource Management. The FERM represents an opportunity for professional development of foresters and ecologists in which practical experience and skills are attained in an intimate team environment with appropriate guidance from School faculty and staff. Each FERM team is self-initiated, and unlike typical courses, FERM endeavors are not only academic, but also real, on-the-ground implementations of forest and environmental resource management on portions of the 5,600 acre Research Forest. The decisions made and the work accomplished by students directly impact the resources, the environment, the School, and society. In addition to traditional activities accomplished by resource managers, the FERM experience provides challenges that are unique among most undergraduate education programs. One of the greatest benefits of this program is the students' ability to see and evaluate the ecological and economic effects of their own land management strategies on the ground during the completion of their college education.

FERM STRUCTURE

Enrollment in the FERM is open to both forestry and applied ecology majors who have completed basic coursework in forest measurements and dendrology. Each FERM class becomes a management team that works to implement management plans developed for School lands during the year-long senior capstone sequence which have been reviewed and/or revised by the Research Forest and Ford Center Management Committee, which functions as the board of directors (Figure 1). Semester objectives are laid out on a timeline and the FERM team works with resource professionals and faculty in the school to accomplish them. The FERM class is an elective that can be repeated by students during the completion of their undergraduate coursework, and is offered during fall, spring, and summer semesters.

FERM ACTIVITIES

Administrative activities include weekly meetings, long-range planning and scheduling, weekly and semester progress reviews and reporting, procedures and internal controls development, timber sale contract development, oversight of the sealed bid process, and equipment/supply inventory, maintenance, and purchasing. Field activities include timber and ecological assessments, wildlife surveys, regeneration surveys, GPS data collection, boundary and sale unit line establishment, permanent plot remeasurements, research plot establishment, measurements, and photographic documentation, timber marking, tree planting, timber sale supervision and administration, road/BMP assessments, post-sale assessments, and infrastructure maintenance and installation (trails, signs, gates, etc.). Technical training consists of GPS/GIS mobile data collection testing and updating, development and use of data analysis software and spreadsheet utilities, and web content development.

ASSESSMENT

Student assessment in the FERM program emphasizes student outcomes achieved with a combination of group and individual instruction, guided inquiry, technical training, site visits, applied field exercises, and professional interaction. At the end of each semester, the FERM team produces a final oral and written Implementation Report that is presented to the Research Forest and Ford Center Committee. These reports also provide consistency and a mechanism for long-term tracking from semester to semester as student membership in the FERM changes and activities on the ground are completed. Peer review and evaluation of team progress reports are also used to assess individual and team performance.

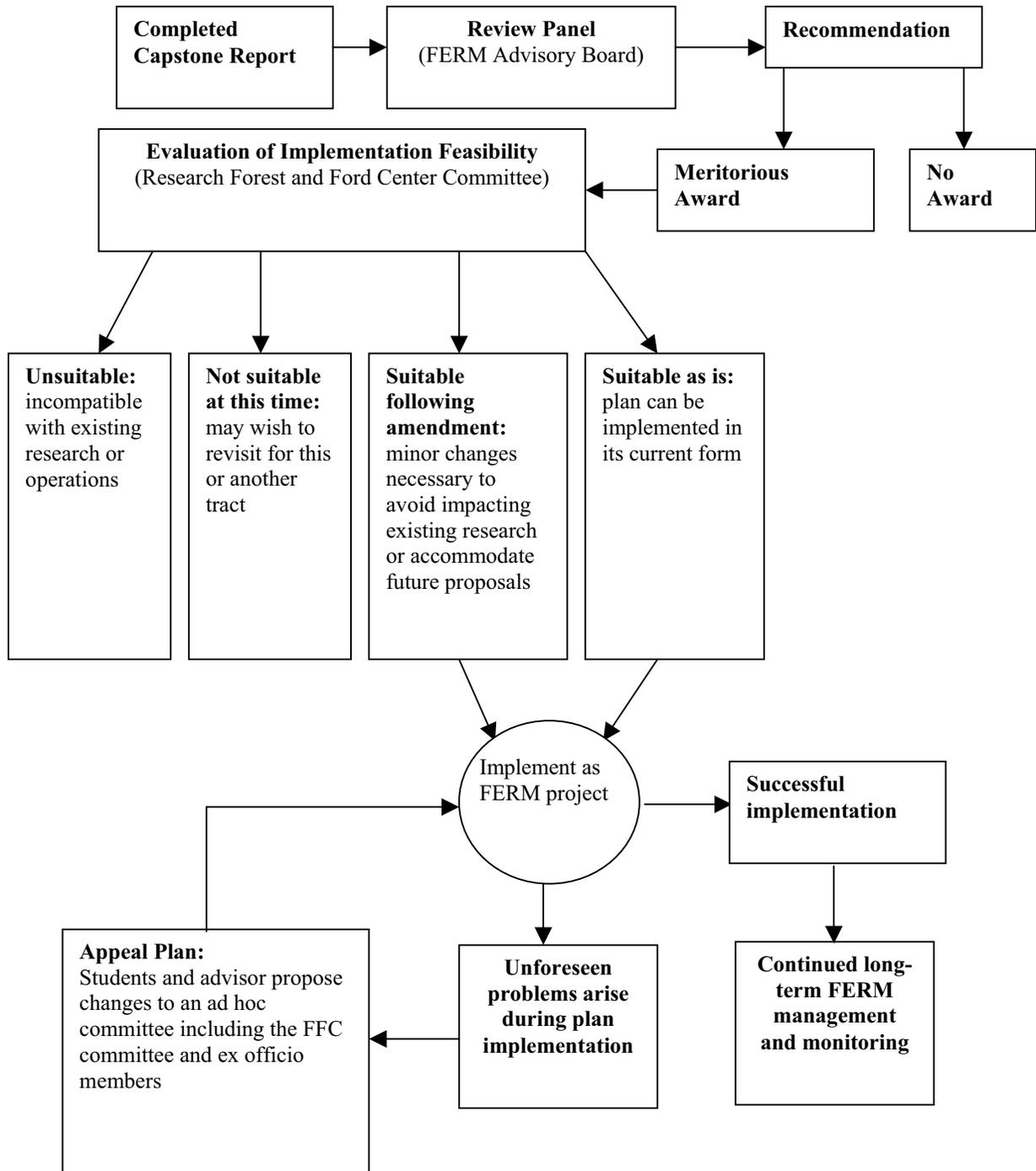


Figure 1. School of Forest Resources and Environmental Science-FERM Integration Model.

CONCLUSIONS

The FERM initiative represents a unique educational opportunity, but also presents significant challenges for instructors and student participants. The long-term nature of on-the-ground activities included in management and conservation plans requires that all work accomplished by each semester's team be carefully documented in the final Implementation Report. Scheduling around other classes and extreme weather presents yet another challenge. Still more difficulties are encountered if enrollment exceeds ten students in any one semester. However, the FERM approach holds great promise for improving natural resources education delivery by providing the most realistic learning experiences possible. FERM activities using the latest techniques and state-of-the-art tools also provide students with a direct link to conservation, sustainable management, and applied research on the Research Forest. Working independently and as a team, producing tangible results, and reporting to a board of directors all provide valuable real-world experience and a powerful learning environment. The FERM, collectively with other inquiry-based and outcomes-based courses in the School of Forest Resources and Environmental Science curriculum are crucial in developing competent, confident graduates who are well-equipped to move directly into the work force or graduate school.

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