

The University Senate of Michigan Technological University

PROPOSAL 31-04

BS PROGRAM IN WILDLIFE ECOLOGY AND MANAGEMENT

Introduction

Despite significant expertise and reputation in the field of wildlife ecology and management, the School of Forest Resources and Environmental Science does not currently offer a major in this area. This proposal is to implement an undergraduate degree program in *Wildlife Ecology and Management* that provides students with the opportunity to pursue a curriculum containing all of the courses required for certification as an Associate Wildlife Biologist by the Wildlife Society. All of the courses necessary for this certification are offered at MTU, and the proposed degree program will attract students to the University who have interests in this certification. Students will not be required to pursue the courses necessary for certification, as free electives may be used to pursue other areas of interest in this field. This will attract students with interests in the broad field of wildlife ecology and management. While the job market in wildlife ecology and management is not huge, this degree program will produce graduates who are competitive for those jobs. The degree program also provides a sound undergraduate education for students who wish to enter other areas of the job market or graduate school.

I. Related Programs

The School of Forest Resources and Environmental Science (SFRES) at Michigan Technological University, proposes an undergraduate degree program in *Wildlife Ecology and Management*. Graduates of the program will be trained to: 1) manage wildlife in natural and managed ecosystems and, 2) develop and implement methods for ensuring the sustainability of natural resources.

The program will provide students with a broad educational experience, emphasizing the development of skills and knowledge in wildlife ecology, but also addressing the sociological, political, and economic facets of wildlife management. This multidisciplinary preparation will provide students with a sound background for employment potential in the highly competitive field of wildlife ecology and management. This field is anticipated to increase in the future due to high levels of interest in sustainable wildlife management, and due to threats to wildlife species and habitat posed by development, exotic species and climate change.

Faculty from the SFRES and several other MTU academic units will contribute to this program. The cooperating units include the Departments of Biological Sciences, Social Sciences, Civil and Environmental Engineering, and Geological Engineering and Sciences. The program will also capitalize on a variety of corporations, governmental agencies, and nonprofit organizations that deal with environmental concerns in the Upper Great Lakes Region.

The proposed Bachelor of Science degree program in *Wildlife Ecology and Management* is compatible with Michigan Tech's university-wide Initiative for the Environment and strategic goal of enhancing existing environmental sciences and engineering programs. It is also compatible with the SFRES's mission of educating students to solve natural resource problems in response to the needs of science and industry. The program is particularly well-suited for the Upper Great Lakes Region, where graduates will help meet the needs of resource-based industries, governmental agencies, private companies and nonprofit organizations.

The School of Forest Resources and Environmental Science at MTU, in collaboration with other academic units, is especially well-prepared to fill this gap in the undergraduate curriculum. The faculty, curriculum, and other necessary resources are largely in place. The SFRES faculty have distinct strengths in wildlife ecology, environmental assessment, environmental policy and economics, and conservation biology. In addition, a substantial number of prospective and enrolling undergraduates in the SFRES have indicated a primary interest in wildlife biology and conservation. The *Applied Ecology and Environmental Sciences* (AEES) major offers students a highly scientific approach to natural resource issues, with options relating to wildlife biology. The new major will focus on the technical and vocational aspects of ecosystem management that targets wildlife species and their habitats.

Interest in *Wildlife Ecology and Management* is widespread and growing throughout the Upper Great Lakes Region and across the country. The SFRES currently has cooperative agreements with 24 community colleges scattered throughout the region. These links have provided a steady flow of students into the Forestry program and AEES program, and will likely be a good source of students for the proposed program as well. The Native American community is another likely target audience. In addition, recruitment of students that do not belong to any specific target audience is projected to be very successful. The Lake Superior basin, with its important natural and economic resources, including state and national parks, is an ideal training ground for wildlife ecologists and wildlife managers.

There is no other program in *Wildlife Ecology and Management* in the Upper Peninsula, although, in other states, many forestry programs or school's of natural resources offer similar programs that are very successful. The School of Natural Resources and Environment at The University of Michigan has a Resource Ecology Program and Michigan State University offers undergraduate degrees in Fisheries and Wildlife Management, and Environmental Studies and Applications.

II. Rationale

Wildlife Ecology and Management is a broad ranging subject area that includes expertise in wildlife biology, zoology, botany and general biology as well as in the, social sciences, political sciences and communication.

The broad purpose of the Bachelor of Science degree in *Wildlife Ecology and Management* is to equip students with the knowledge, expertise, ethics, and perspective necessary to manage lands for wildlife species of concern, be they targets of conservation efforts or for recreational pursuits.

This program will uniquely satisfy a strong regional need. This need reflects the resource-based economy of the region. The region's universities currently lack a program comparable to that proposed here. The proposed program will also satisfy an institutional need consistent with the MTU Initiative for the Environment. This university-wide mandate has four broad goals: emphasis on environmental issues throughout the undergraduate curricula; promotion of multidisciplinary approaches in an environmental context; focus on the Lake Superior basin as a model; and emphasis on environmental education, research, and service.

The mission of SFRES is to solve natural resource problems in response to the needs of science and industry. The proposed program in *Wildlife Ecology and Management* will complement this by training undergraduates to be environmentally responsible professionals in a specific field.

III. Curriculum Design

The School of Forest Resources and Environmental Science trains both undergraduate and graduate students in ecosystem management, wildlife ecology and management, and forest ecology. The goals of this curriculum are to train students that:

- i) have a diverse hands on technical background in Wildlife Ecology and Management;
- ii) are able to assess the environmental conditions of terrestrial ecosystems;
- iii) can make land-use decisions that integrate utilization for wildlife with the maintenance and protection of ecosystem composition, structure and function;
- iv) have the necessary knowledge and skills in the areas of humanities, social sciences, political sciences and communication, and professional ethics necessary to work with their peers and other individuals to manage wildlife populations.

To obtain a Bachelor of Science degree in *Wildlife Ecology and Management*, students will be required to take a minimum of 36 credits in courses in the biological sciences (offered by the School of Forestry and Environmental Sciences and the Department of Biological Sciences), including wildlife biology and management, conservation biology, botany and zoology. In addition, 10 credits of physical sciences, and 9 credits of quantitative sciences are required (Table 1). Students aiming for certification by the wildlife society will take a minimum of 9 credits in humanities and social sciences, 12 credits in communications and 6 credits in policy, administration and law. Students aiming for this certification will be able to utilize some of their distribution electives and free electives toward this goal. These courses will allow students to meet the academic standards for certification as an Associate Wildlife Biologist by the Wildlife Society (Appendix A). After a number of years of experience, a graduate can then be able to become Certified Wildlife Biologist.

Table 1: Curriculum for proposed major in Wildlife Ecology and Management

1. Major Requirements

FW1050 Natural Resources Seminar (s)	1
FW2010 Vegetation of North America (f)	4
FW2050 Measuring Forest Resources (f)	3
FW3012 Survey of Silviculture (f)	1 FW2010 & FW2050
FW3020 Forest and Landscape Ecology (f)	3 FW2010 & (BL1040 or BL2160)
FW3170 Land Measurements and GPS (f)	1 FW3540
FW3180 Geomorphology, Landscape s and Ecosystems (f)	2
FW3190 Multiresource Assessment (f)	3 FW2050 & FW3020 & MA2720
FW3330 Soil Science (f)	4 CH1100
FW3410 Conservation Biology (s)	3 UN2002
FW3540 Remote Sensing and GIS (s)	4 MA2720
FW3610 Ornithology (s) Or	
FW4240 Mammology (f) 4	
FW3630 Wildlife Habitat and Population Ecology (f)	4
FW3800 Insect Ecology (f)	2
FW3840 Forest Health (f)	3 FW3020
FW4080 Forest Economics and Finance (s)	3
FW4130 Biometrics (s)	2 MA2720

FW4610 Wildlife Ecology and Management (s)	3
FW4810 Integrated Resource Assessment (f)	4 FW3540 & FW3020 & (FW3190 or FW3410)

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2. Cognate Requirements

BL1040 Principles of Biology (f)	4
BL2160 Botany (s)	4
BL2170 Zoology	4
MA1135 Calculus for Life Sciences (f, s, su) Or	
MA1150 Calculus (f, s, su) Or	
MA1160 Calculus with Technology (f, s, su)	4
MA2720 Statistical Methods (f, s)	4
CH1100 General Chemistry (f, s)	4

24

3. General Education Requirements

UN1001 Perspectives on Inquiry (f, s, su)	3
UN1002 World Cultures (s, su)	4
UN2001 Revisions (f, s, su)	3
UN2002 Institutions (f, s, su)	3
Distribution Electives	12
FW3110 Natural Resource Policy (s)	3

28

4. Free Electives

22

Total Credits Required for Graduation 128

University course requirements will be met by requiring students to fulfill General Education Requirements, including credits in Perspectives, World Cultures, Revisions, Institutions, Natural Resource Policy and other Distribution courses. A total of 128 credits will be needed to graduate in this degree program (Figure 1).

IV. Students

A significant increase in the number of students coming to Michigan Technological University is expected with the implementation of this program. Presently, the School of Forest Resources and Environmental Science has 110 undergraduate students, divided approximately equally between the Forestry Program and AEES program. Michigan Technological University has a reputation, fostered by students and alumni alike, for being a "tough" University with high standards for graduation. The quality of the School's incoming freshman compares very well with the at-large average for MTU. Students entering MTU average 24.3 on the ACT; those entering the School of Forest Resources and Environmental Science average 23.2. These scores are higher than the Michigan and National averages of 20.2 and 20.3, respectively. This standard will be maintained or enhanced with the addition of this degree program.

Approximately 50% of the School of Forest Resources and Environmental Science undergraduates enter as transfer students. Agreements with 24 community colleges bring students into a 2+2 program into the School, whereby dual degrees are given, one with the cooperating community college (first two years) and one with MTU (second two years). These

agreements, along with the implementation of a degree program in *Wildlife Ecology and Management*, will attract more students from regional community colleges with compatible two-year programs. It is anticipated that similar 2+2 programs will be established with other interested institutions for the B.S. in *Wildlife Ecology and Management*. This program will strengthen the bond between MTU and community colleges in the Upper Great Lakes Region.

Every student accepted into the School of Forest Resources and Environmental Science is offered financial aid from various sources: the School, various faculty on research projects, and/or the MTU Financial Aid Office. A minimum of \$1000 as a work-study grant is offered to all incoming students. Many of our students utilize these grants by working with faculty on research grants dealing with wildlife, forestry, and other applied ecology issues. The professional and personal experiences gained from this opportunity provide our students a unique advantage over students in other programs throughout the Upper Midwest. Over 30 additional scholarships are given annually to qualifying students by the School of Forest Resources and Environmental Science; they range in value from \$100 to \$1000. Efforts will be made to acquire additional scholarships for students in the *Wildlife Ecology and Management* program. The School's Dean and Advancement Officer will work closely with faculty to provide additional scholarship opportunities.

Students are provided an environment that encourages development of leadership capabilities and professional ethics, and encourages them to take responsibility for their actions and their personal and professional growth. To help students in these endeavors, various student organizations are available including Xi Sigma Pi -- the national forestry honor society, the MTU *Forester*--the only departmental yearbook produced annually at MTU, the Student Chapter of the Society of American Foresters, the Student Chapter of the Wildlife Society, Student Chapter of the Society for Conservation Biology, and a Chapter of the Timber Wolf Alliance. Students are also encouraged to attend local and regional professional meetings and to interact with professionals in seminars, courses, and the School's Advisory board meetings. Funding is often available for travel to these functions, which are often held in the Upper Peninsula. Such professional meetings provide a rich opportunity for undergraduates to associate with practicing professionals.

Students in this degree program will be encouraged to gain some of their professional work experience by working for ecological and environmental agencies during the summer, by taking a semester to work abroad on various ecological/environmental projects, or by taking a semester to work as an intern or in cooperative programs established by the School and outside organizations.

V. Careers in Wildlife Ecology and Management

A Bachelor of Science Degree in *Wildlife Ecology and Management* will prepare students for a variety of career options. Students may find employment in the private sector as managers of wildlife-oriented lands. Additional opportunities will be found in state and federal agencies. Other students will pursue this degree program because it is what interests them, and use it as a more broadly defined qualification as they enter the job and career market.

VI. Institutional Resources

The administration of the proposed *Bachelor of Science in Wildlife Ecology and Management* program will be as described in Section VII. Briefly, the program will be housed and administered in the School of Forest Resources and Environmental Science. Students will be exposed to course work, faculty, and research being conducted in a number of supporting programs at MTU.

A. School of Forest Resources and Environmental Science

The mission of the MTU School of Forest Resources and Environmental Science is to solve natural resource problems in response to the needs of science and industry. Implicit in this

statement is the belief that a major part of the School's mission is to provide graduates with a general university education as well as knowledge and skills in the historical, ethical, conceptual, and practical bases of forestry and ecological sciences, so they can effectively communicate this information to others and contribute to continued development of their profession. The development of a B.S. *in Wildlife Ecology and Management* is consistent with this mission and will provide a broadening of the scope of the undergraduate programs within the School and the University. The research mission of the School is to develop and assess means for more efficient management and utilization of forest resources while maintaining a clean environment, coupled with the maintenance of ecosystem diversity, stability, and integrity. The proposed B.S. program dovetails with this mission and with undergraduates in the program having the opportunity to work with and learn from faculty and researchers in the School and across campus.

Academic Programs. The School of Forest Resources and Environmental Science currently offers the following degree programs:

Bachelor of Science in Forestry.

The baccalaureate degree program in forestry introduces students to all aspects of the profession. After completing a core of courses in basic forestry, science, communications, mathematics, and economics, students can choose electives from the following specializations: ecosystem management, wildlife ecology and management, or forest ecology. During the fall semester of their junior year, students devote their time to a field practicum at the Ford Forestry Center, becoming familiar with such activities as site quality estimation, mapping, estimating tree growth, and log scaling and grading.

Bachelor of Science in Applied Ecology and Environmental Sciences

The Applied Ecology and Environmental Sciences program prepares students to understand and find solutions to environmental problems posed by development. Students learn how to manage ecosystems and ensure the conservation of natural resources. This program is interdisciplinary and educates students with the sociological, political, and economic facets, as well as the basic and applied sciences, of development. Ecology students spend a semester of outdoor study at the Ford Forestry Center and choose from four concentrations: Wildlife Conservation Ecology, Plant Ecology and Wetlands, Communicating Natural Resources or Outdoor Recreation (being developed).

Certificates

Certificate in Industrial Forestry

School of Forest Resources and Environmental Science and the School of Business and Economics (SBE) jointly award a Certificate in Industrial Forestry. Business students can use the certificate to obtain a working knowledge of the forestry and wood products industries. Credits earned for the certificate may be applied to BSBA technology core. SFRES students can use the certificate to obtain a working knowledge of business and management. The Certificate in Industrial Forestry is designed to give students a working knowledge of the fields of Forest Resources & Environmental Science and General Business and Management.

Certificate in Outdoor Recreation (in development)

This certificate is under development and will be based on a new concentration in the Applied Ecology and Environmental Sciences curriculum. This is being developed in collaboration with the Isle Royale Institute who are contributing their experience in this area.

Secondary School Teacher Certification in General Science

Students in the Applied Ecology and Environmental Sciences may also work towards this certificate which is necessary to be recommended for a Michigan Secondary Provisional Certificate.

Minors

Plant Biotechnology Minor (Joint with Biological Sciences) - This minor provides students with an introductory understanding of the field of biotechnology with particular emphasis on plant biotechnology. Students majoring in fields impacted by biotechnologies--business administration, biomedical engineering, environmental engineering, chemical engineering, as well as chemistry and humanities--will benefit from this minor.

Plant Sciences Minor (Joint with Biological Sciences) - This minor provides students the opportunity to study and develop an understanding of the plant sciences and their role as a foundation of modern society. Open to all majors.

Engineered Wood Products Minor - Wood is the single-most important industrial raw material in the world. This minor provides students with a basic knowledge of wood and engineered wood composite properties; industrial processing and manufacturing methods; and all types of wood products and will benefit future careers in engineering, forestry, business, or other fields.

Remote Sensing Minor (Interdisciplinary) - Remote Sensing is measurement from a distance, sensing from afar. It uses the whole electromagnetic spectrum and is applied on a huge variety of scales, from microscopic to satellite or astronomical levels. It is used where direct sensing is impossible or difficult. Most of the remote sensing faculty have active research programs that require student workers and this experience is good professional training. The field is highly interdisciplinary and extremely broad and team based, including specialists in atmospheric physics and chemistry, biological and earth sciences, electrical engineering, forestry and ecology, civil, and environmental engineering, oceanography, limnology, image and signal analysis, astronomy and computer sciences. The Remote Sensing Institute has faculty from 9 different departments and has a number of advanced lab facilities as part of a NASA center of excellence.

Ecology Minor (Joint with Biological Sciences) - This minor provides students from many disciplines the opportunity to study ecology and develop an understanding of organismal interactions within the environment. It provides the foundations as well as an in-depth examination of both terrestrial and aquatic ecosystems

Graduate Degrees

Master of Science in Forestry. The M.S. program permits independent study in a broad spectrum of natural resources management or wood science. Interdisciplinary studies are encouraged and may include course work in engineering, business, and science.

Doctor of Philosophy in Forest Science. The Ph.D. program allows students to conduct research and pursue in-depth studies in selected areas of forest or wood science. Students enrolling in this program are expected to have demonstrated outstanding ability in previous academic work.

Doctor of Philosophy in Forest Genetics and Biotechnology

The Forest Molecular Genetics and Biotechnology program provides the skills and knowledge for successful career development in the areas of genetic engineering of trees, lignin and cellulose biosynthesis, tree genomics and bioinformatics, genetic control of flowering and pollution tolerance in trees and molecular ecology.

The proposed B.S. in *Wildlife Ecology and Management* is a logical extension to the academic programs already offered by the School. This program will broaden and diversify the student body and emphasize more management-based concepts of wildlife ecology and environmental studies.

Faculty. All of the faculty in the School of Forest Resources and Environmental Science hold the Ph.D. degree, and many are considered national and international experts. They share a commitment to quality teaching and to providing an excellent learning environment. Active in their professions, the faculty share their expertise and keep current through research and by participating in conferences, presenting seminars, and publishing in professional journals: There are 23 research and tenure-track faculty and administrators in the School who contribute to our undergraduate teaching mission.

In addition there are a large number of adjunct faculty who informally work with undergraduates.

B. Supporting Programs at MTU

Almost every academic unit at MTU offers course work relevant to students pursuing the B.S. in *Wildlife Ecology and Management*. The following departments will most likely provide academic support for students pursuing this degree:

Department of Biological Sciences. The Department of Biological Sciences provides instruction and training through a curriculum that incorporates critical thinking and problem solving as well as communication skills. The Department offers undergraduate programs leading to the B.S. in Biological Sciences and the B.S. in Clinical Laboratory Science. Specific options within biological sciences are general biology, ecology, microbiology, molecular biology, plant sciences, and preprofessional studies. An honors in biological sciences program is available for qualified students who are willing to conduct independent research projects during their senior year. There is a dual degree program in Environmental Biology and Engineering offered in cooperation with the Department of Civil and Environmental Engineering.

Department of Social Sciences. The Department of Social Sciences offers two degree programs at the undergraduate level: B.S. in Social Sciences (General and Science, Technology, and Society options), and Bachelor of Liberal Arts (History option). Courses in natural resource policy are cross-listed in the School of Forest Resources and Environmental Science and the Department of Social Sciences and there is currently one joint faculty position (two-thirds in the Department of Social Sciences and one-third in the School of Forest Resources and Environmental Science).

Department of Civil and Environmental Engineering. The Department of Civil and Environmental Engineering offers a B.S. in Environmental Engineering degree program. Emphasis is on the control of environmental pollution through prevention, pollutant removal and destruction, and modeling of natural systems; areas of course work and research can be broadly classified as: 1) engineering of process systems to control environmental pollution, 2) analysis and modeling of the impact of pollutants on the environment, and 3) waste minimization/source reduction.

Department of Geological and Mining Engineering and Sciences. The Department of Geological and Mining Engineering and Sciences offers B.S. programs in Geological Engineering, Geology, and Applied Geophysics. These programs emphasize geoscience applications and technology development in understanding and protecting the Earth and its resources. Courses in geological and water resources can be taken as electives by students in the proposed degree program.

C. Physical Facilities

The School of Forest Resources and Environmental Science occupies space in a number of buildings located on the campus of Michigan Technological University and in the surrounding local area.

The *U.J. Noblet Forest Resources & Environmental Science Building*: This facility honors the founder of the MTU forestry program and is the home of the Forestry and Applied Ecology and

Environmental Sciences programs. It houses most of the office space, classrooms, and laboratories. Also located here are conference/study areas, graduate student offices, greenhouse, and utilities/services.

The Ford Center & School Research Forest: The Ford Center is located forty miles south of the Michigan Tech campus. The Center is a 4,547 acre facility for research and education pursuant to the overall mission of the School. Physical facilities are designed to accommodate programs of education, research, and service. A modern dormitory and related facilities provide year-round housing capability for 94 people. A dining hall, four classrooms, a large conference/meeting room, and office buildings provide support facilities. This facility is used for the Integrated Field Practicum during the Fall semester of the junior year for Forestry, Applied Ecology and Environmental Sciences majors. It will also be used similarly for the Wildlife Ecology and Management Majors.

Isle Royale Sands Research Facility The Isle Royale Sands Research Facility is located 2 miles south of the Michigan Tech campus. This building houses some of the larger laboratory equipment used in the wood science research programs.

D. Library Resources

The proposed degree is based on courses currently offered for Applied Ecology and Environmental Sciences, Forestry, and Biological Sciences majors. The basic library resources are already in place supporting these programs.

Specifically, students will be able to locate relevant periodical literature through the electronic databases offered on the library web site such as: AGRICOLA, Animal Behavior Abstracts, several ASFA (Aquatic Sciences and Fisheries Abstracts) databases, Biological & Agricultural Index, Ecology Abstracts, Environmental Sciences and Pollution Management, Web of Science, and Wildlife Worldwide.

The databases are supported by library subscriptions to major journals in the areas of forestry, ecology, conservation, biology and wildlife. A partial listing of resources includes: the journals and monographs published by the Wildlife Society, BioOne (electronic versions of 65 journals produced by major scientific societies and nonprofit organizations which focus on biological, ecological and environmental sciences), and individual titles such as American Naturalist, Conservation Biology, Ecology, Forest Ecology and Management, Journal of Animal Ecology, Journal of Ecology, Audubon, Environment, Natural Areas Journal, and Wetlands Ecology and Management.

As a selective Government Documents depository, the Library receives in paper, electronic or microform about 96% of all US Forest Service materials, 89% of Environmental Protection Agency materials, and about 55% of the Fish and Wildlife Service materials. If there are necessary categories of documents not currently received, they can be added to the selection list during July of any year.

Interlibrary loan/ document delivery service is provided as a back-up to locally held materials. The service is open to any student, faculty member, researcher or staff member associated with Michigan Tech. Electronic processing and delivery of periodical literature has sped up the process; the average wait between requesting an article and delivery is now between three and five days. Books requests, on average, are filled within seven working days.

As the program matures, specific deficiencies in the Library holdings may become apparent. A reevaluation of library resources, with the potential of adding new resources should be included in the program assessment when it reaches its enrollment capacity.

E. Computer Facilities

The MTU computer system is a full member of the MERIT network linking computing facilities at the University of Michigan, Michigan State University, Wayne State University, Oakland University, Western Michigan University, and MTU. MTU maintains a distributed computing policy, where the network backbone, access to outside networks, communications, consulting, and support services are centrally maintained while computing facilities in individual academic and administrative units are maintained locally, usually with an on-site Systems Administrator being responsible for maintenance and consulting.

The School of Forest Resources and Environmental Science computing system supports faculty, staff, administrative, and students. The central computing services are provided by three Sun servers and 3 PC servers. The main student computer laboratory contains 20 SunRay terminals and 10 Dell P4/2.4ghz PCs. The teaching computer laboratory has 19 SunRay terminals. A graduate student computer laboratory has 7 Dell P4/2.4ghz PCs. Students have access to high-speed black and white laser printers and a color laser printer.

Software available in the labs includes a suite of applications (word processors, spreadsheets, database management programs, statistical analysis systems, etc.). Through the MTU network, students have access to electronic mail and the Web. The main and teaching laboratories have capacities of 30 and 19 students and, when not reserved for regularly scheduled classes, are open on a first come, first served basis. Students are encouraged to use the labs for independent study. University computer policy provides for these labs to be the major point of access to computing facilities for students in the School of Forest Resources and Environmental Science.

GIS and Remote Sensing software utilized for teaching and research includes: ERDAS, Arc/Info, and ArcView. The major portion of undergraduate instruction in geographic information systems is conducted in the teaching laboratory.

VII. Program Administration

Responsibility for administration of the program will reside with the Dean of the School of Forest Resources and Environmental Science, who reports to the Executive Vice-President and Provost for Academic Affairs. The Dean also serves as Director of the Ford Forestry Center. The Dean has overall responsibility for School performance including: (1) recommendations for hiring and salary increments; (2) recommendations for promotion, tenure, and termination; (3) evaluation of faculty and staff performance; (4) identifying and pursuing the educational objectives of the School; (5) allocation of budget to line items and approval of expenditures; (6) allocation of space; and, (7) maintaining progress toward fulfillment of the School's mission.

The School of Forest Resources and Environmental Science is governed by a Charter which outlines administrative policies and procedures and the rules for academic governance within the School. Consistent with the Charter, policies on admissions, course offerings and degree requirements fall under the jurisdiction of the Curriculum Committee. The Curriculum Committee is composed of three faculty members elected by the entire faculty for a period of three years. The Chair of the committee rotates to the member in his/her final year of service. *Ad hoc* subcommittees may be formed by the Dean when substantial changes to degree programs are necessary, but all curriculum changes must be approved by the Curriculum Committee and then by the Associate Dean and faculty of the School of Forest Resources and Environmental Science. Substantive changes in course offerings and degree programs must be approved by a majority vote in a regularly scheduled faculty meeting. Changes in the *Wildlife Ecology and Management* Program must conform with the rules outlined in the Charter of the School of Forest Resources and Environmental Science. Additional requirements to assure academic quality and the integrity of this new program are outlined in the University and Board of Control Procedures Manuals.

Responsibility for admissions to the Program in *Wildlife Ecology and Management* lies with the Admissions Office at Michigan Technological University. Applicants will be judged on the basis of their high-school academic performance, and scores from the Preliminary Scholastic Assessment Test (PSAT), the Scholastic Assessment Tests (SAT), or the American College Test (ACT). Students in good standing (minimum average of 2.5 on a 4.0 scale) at another college may also apply for admission. Admission policies and procedures are outlined in more detail in the Undergraduate Catalog of Michigan Technological University. Once admitted, academic progress will be monitored following standard MTU protocols.

VIII. Program Costs

The School of Forest Resources and Environmental Science already has an excellent cadre of faculty members with expertise in the areas covered by the proposed program. In the past three years three new Ph.D. ecologists have joined the School to complement a program traditionally strong in this area. The program will be able to draw upon the expertise of environmental sciences faculty and course offerings in several complementary programs at MTU, including: The Department of Social Sciences, with its emphasis on environmental policy; the Department of Biological Sciences, with its expertise in basic biology, limnology, ecology and the Lake Superior Ecosystems Research Center; the Department of Civil and Environmental Engineering, with one of the best programs in environmental engineering nation-wide; and the Department of Geological Engineering and Sciences, with its emphasis on atmospheric and environmental studies and its strong program in geology and remote sensing. Consistent with its mission, MTU is a leader in the application of remote sensing and computer technology in the environmental sciences. Requests for institutional support are linked to projected enrollments through time. The enrollment break-points are for the first new faculty member is 35 students in the initial 2-3 years. The second new faculty member will be requested when we reach 75 new students. If enrollments increase faster or slower than anticipated, internal resources will be allocated in proportion to the increase in enrollment.

A. School of Forest Resources and Environmental Science

No new faculty are requested until the student enrollment reaches 35, when a new position should be filled. The tentative area of expertise will be wildlife modeling and management.

B. Start-up cost needs

At this time, additional funding to launch this major are not necessary. The major will be publicized during ongoing recruitment efforts. The major will be added to brochures when they are scheduled for reprinting. The program will also be advertised on the School web site.

Summary:

Proposed new major: Wildlife Ecology and Management

Cost to start up: No additional funding requested until program is established and new student numbers reach 35.

Anticipated enrollment:

2004-5
15

2005-6
30

2006-7
50

2007-8

80

Future requests for support:

New faculty line once enrollment exceeds 35 students (excluding any decrease in enrollment in other SFRES programs). Another faculty line will be requested when enrollment reaches 75.

Adopted by Senate: 7 April 2004

Approved by President: 22 April 2004