

NREM Strategic Planning
December 1, 2007

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BACKGROUND AND CURRENT STATUS

The Morrill Act of 1862 created the Land Grant University system. As the first Land Grant University, Iowa State changed the role of higher education. Prior to the Morrill Act, a university education was reserved for America's aristocracy. With the establishment of Land Grant colleges and universities, the resources of the academy were open to all, regardless of their station in life. They were established as "the people's universities".

In 1887, the Hatch Act was passed by Congress and provided yearly grants for agricultural research stations at the emerging Land Grants. Within a year, all Land Grants that accepted the funding were conducting research. While supported by agricultural interest, the research station still had to convince farmers that research endeavors were relevant.

The social contract of the Land Grant institutions, however, extends beyond the provision of classes at the university and research at their stations. With the support of agricultural interests, the Smith-Lever Act of 1914 was passed and the federal mandate of the Cooperative Extension Service was established. The Smith-Lever Act provided federal funding to the universities in support of the extension outreach function. The vision was to extend the reach of the university's research beyond its borders and out into the state, reaching those who had neither the time nor money to attend the university as students. Thus, the coupling of research, teaching, and extension has operated for approximately the past century.

The Department of Natural Resource Ecology and Management (NREM) is a member of the College of Agriculture and Life Sciences (CALs). Historically, and currently, NREM has a large undergraduate program that serves the needs of about 350 students (75% Animal Ecology and 25% Forestry majors). Graduates successfully gain employment with various natural resource agencies or organizations, both public and private, and our programs have been successful in providing the appropriate educational background. A strong commitment to undergraduate teaching and learning is an important focus of our department. Approximately 50 graduate students are currently affiliated with NREM. Similar to our undergraduate programs, NREM is committed to excellence in graduate education through formal coursework and support of research activities.

The department has a distinguished history of conducting high-quality research in the area of natural resource management and ecology. Major contributions are in the areas of tree improvement, nursery seedling production, valuation of the wood industry in Iowa, use of woody plants for shelterbelts, riparian buffers, woodlot management, urban forestry and urban ecology, composite wood and agriculture fiber products, soy flour based glues for the forest products industry, water quality, habitat management, avian habitat development in agricultural landscapes, population dynamics, predator-prey relationships, age and growth of fishes, fish culture, animal behavior, environmental education, and restoration ecology. Many of these contributions have been made through formal collaborative efforts with the Iowa Cooperative Fish and Wildlife Research Unit (75 years old and the first in the nation) and numerous informal efforts with groups such as the Leopold Center for Sustainable Agriculture, the U.S. Department of Agriculture ARS National Soil Tilth Laboratory, Iowa Department of Natural Resources, agriculture commodity groups, and various nongovernmental organizations.

The Extension program in the department is well known and respected in the state and region, despite having few faculty and staff with extension appointments. Extension faculty and staff are engaged in a variety of programs that transfer research results to natural resource managers, community groups, and private landowners. In addition to our formal Extension programs, NREM

faculty actively participate in outreach activities that maintain a close connection with practicing natural resource professionals and other stakeholder groups.

DEPARTMENT VISION AND MISSION

The Department of Natural Resource Ecology and Management is dedicated to the understanding, effective management, and sustainable use of our renewable natural resources through the land-grant missions of teaching, research, and extension. NREM's disciplinary focus is broad in scope, ranging from individual organisms to landscapes, from natural to managed ecosystems, from wilderness to agricultural and urban systems, from local to international environments, and from resource preservation to sustainable use. Understanding and effectively managing our natural resources requires long-term vision and multidisciplinary approaches involving NREM personnel working with people from other diverse disciplines across the university and within federal and state agencies and non-governmental organizations. NREM reflects a diversity of disciplines, including ecology and other biological sciences, social science, economics, sustainable resource management and use, and human dimensions. NREM serves society through the land-grant tradition of working with undergraduate and graduate students, state and federal government agencies, non-governmental organizations, businesses, and the public. As such, NREM provides answers to natural resource problems in Iowa, the Midwest, and the nation.

The vision that drives NREM is multidimensional and consists of the following:

- Providing a student-centered environment for instruction and advising, and promoting activities that foster social, learning, and professional networking;
- Producing graduates who are widely considered top-quality professionals - competent, capable, collaborative, dependable, and disciplined;
- Maintaining mutually productive and supportive relationships with stakeholders (landowners, agencies, parents, students, and conservation groups);
- Conducting excellent applied and basic research, particularly "solution science" that is relevant and focused on Iowa and the Midwest, but also has global application;
- Providing outreach and extension that serves the interest of stakeholders and promotes natural resource sustainability.

UNIVERSITY & COLLEGE OF AGRICULTURE AND LIFE SCIENCES MISSION AND GOALS

Iowa State University Mission

The overall mission of Iowa State University is to **create, share, and apply** knowledge to make Iowa and the world a better place. In carrying out its mission, Iowa State will increase and support diversity in the university community. Diversity enlivens the exchange of ideas, broadens scholarship, and prepares students for lifelong, productive participation in society. The University will **create knowledge** through world-class scholarship in teaching, research, and creative endeavors; **share knowledge** through outstanding undergraduate, graduate, professional, and outreach programs; and **apply knowledge** to improve the quality of life for current and future generations.

The Strategic Plan for the University can be found at: <http://www.iastate.edu/~strategicplan/>

College of Agriculture and Life Sciences Goals

Iowa State University's College of Agriculture and Life Sciences will enrich the lives of people in Iowa, the nation and the world through excellence in education, scholarship, service and leadership in food, agricultural, environmental and social sciences. Priority areas and accompanying goals for 2005-2010 have been identified to reinforce existing strengths and pursue the College's vision. The following College Goals mirror those of the University.

Education

Strengthen undergraduate, graduate and professional education to enhance students' success in the College of Agriculture and Life Sciences and in their chosen careers.

Goals

- Improve the rigor, challenge and international reputation of academic programs.
- Strengthen students' critical thinking, problem-solving abilities, creative abilities, and communication skills.
- Prepare students for working and living in a diverse, globally interdependent world.
- Create an environment that welcomes students to explore the variety of disciplines and career paths available in the College of Agriculture and Life Sciences.
- Increase interdisciplinary, experiential and entrepreneurial learning opportunities, such as learning communities, service learning, internships, and research experiences.
- Strengthen strategic educational partnerships with institutions in other countries.
- Enhance programs for high-ability students.
- Develop new recruitment strategies to attract students from many backgrounds to the College.
- Partner with K-12 schools and community colleges to facilitate transfer to and student success in the College.
- Enhance services to enable College of Agriculture and Life Sciences students find rewarding careers in their chosen field.
- Develop, recognize and reward excellent teaching.

Programs

Increase the number of research and graduate programs that are among the very best—especially in areas that build on College of Agriculture and Life Sciences strengths and address local and global critical needs.

Goals

- Recruit and retain outstanding faculty who are or will be leaders in their fields.
- Increase the number and elevate the overall quality of graduate and professional students.
- Leverage strengths in science and technology to enhance research and scholarly excellence with emphasis on interdisciplinary initiatives involving agricultural, food and life sciences, environmental sciences, and social sciences.

- Enhance research and extension programs in high-priority areas—air and water quality, bioeconomy, genomics, human health and wellness, food safety and security, and rural vitality.
- Improve facilities and support services for research.
- Enhance the visibility of outstanding faculty and staff, research accomplishments, and graduate and research programs.

Economic Impact

Translate discoveries into viable technologies, products and services to strengthen the economies of Iowa and the world.

Goals

- Expand the use of intellectual property developed in the College of Agriculture and Life Sciences and through the Iowa Agriculture and Home Economics Experiment Station.
- Strengthen extension and outreach programs aimed at enhancing the competitiveness of Iowa producers, businesses, and individuals served by the College.
- Foster an environment that encourages faculty, staff and students to engage in transfer of technology and entrepreneurial activities.

Iowa Life

Elevate the state's appeal as a place to live, learn, work and play.

Goals

- Strengthen partnerships and communications with Iowans to better identify, address, and solve problems.
- Enhance the vitality of Iowa's communities and well-being of its people through research and extension programs that help remove barriers to community development and improve quality of life.
- Promote the wise use of Iowa's resources and build a sustainable future.
- Expand learning opportunities for Iowans of all ages.
- Partner with Iowans to strengthen their communities' economies and entrepreneurial capacities.

University Life

Contribute to making Iowa State University a great place to learn and work.

Goals

- Recruit and retain faculty, staff and students who are dedicated to individual and organizational excellence and achievement.

- Expand the diversity of people, ideas and cultures, and nurture an environment in which diversity can thrive.
- Promote conservation of resources and enhance environmental quality.
- Advance the excellence of the College of Agriculture and Life Sciences through enhanced connections between the College and its alumni, friends and stakeholder groups.

DEPARTMENT OF NATURAL RESOURCE ECOLOGY AND MANAGEMENT GOALS

NREM is dedicated to the land-grant missions of undergraduate and graduate education, basic and applied research, and extension and outreach. Therefore, we are committed to the following:

- A strong undergraduate program serving students seeking a major in Animal Ecology (offering tracks that meet requirements for professional certification in fisheries and wildlife) or in the externally-accredited Forestry program.
- A strong graduate program with majors in animal ecology, fisheries biology, forestry, and wildlife biology, and active participation in the interdepartmental graduate programs of Biorenewable Resources Technology, Ecology and Evolutionary Biology, Genetics, Sustainable Agriculture, and Environmental Science.
- An excellent research program that spans basic to applied aspects of natural resource management. Meeting the research needs of Iowa citizens, state and federal natural resource agencies, and other constituents is of the highest priority.
- Highly respected extension and outreach programs and activities that address the many and growing expectations and needs of our stakeholders around the state and nation.
- Strong partnerships with Iowans that identify and solve natural resource problems.
- A strong web-based program of recruiting materials, research program activities, and extension materials and relevant on-line courses.

This plan contains specific goals and strategies that will help ensure NREM's continued leadership and excellence in natural resource teaching and education, research, and extension. Where appropriate, specific measurable goals, products, and timelines are outlined. Measurable goals not only guide departmental activities, but also serve to promote departmental growth in accordance with this strategic plan.

THE 2007-2012 NREM STRATEGIC PLAN

TEACHING

Background

As the department moves forward, it carries with it a rich history of success related to teaching and learning. The department has distinguished itself nationally in various disciplinary areas, but we strive to achieve more and sustain excellence in teaching and learning.

The college and department have set forth objectives and goals that serve to (1) incorporate intensive communication, environmental, ethics, and critical thinking and problem-solving activities into educational programs at the course and curriculum levels; (2) build capacity among instructional faculty as related to current learning theory, student-centered learning strategies and techniques, and classroom assessment techniques, both formative and summative; (3) integrate

teamwork both in the classroom and in the coordination of instruction within our programs; and (4) provide quality experiential learning opportunities through internships, summer employment, study-abroad programs, and on-campus learning communities.

NREM plays a critical role in the university through its training and mentoring of undergraduate and graduate students such that they are prepared for future challenges in natural resource ecology and management. These challenges will be complex and multidisciplinary. The education obtained in NREM reflects this complexity by employing a diversity of approaches, ranging from the classroom to outdoors, lectures to group projects, on-campus to off-campus activities, and local to international experiences. In addition, these experiences and opportunities are supported and integrated with other programs and departments (e.g., Biology and Ecology, Evolution, and Organismal Biology interdisciplinary graduate programs) that serve to provide students with a diversity of educational opportunities. The following goals and strategies represent specific approaches that will be used to sustain and enhance NREM's ability to excel in teaching and learning.

Goals & Strategies

Goal 1—Maintain excellence in teaching and learning

Strategy 1—Continue to develop a departmental focus on pedagogies of engagement.

- Support faculty in efforts to improve student learning using approaches appropriate to individual courses.
- Further develop service learning and learning community opportunities.
- Continue to emphasize and develop NREM's leadership role in student-centered learning (SCL).
- Continue to emphasize effective teamwork among students and teachers.

Measurable outcomes—by December 1, 2009: department will allocate \$10,000 to promote faculty efforts to improve student learning and all teaching faculty will participate in such activities; one or two learning communities will be supported; at least one department staff person will be involved in leading CELT or Project LE/ARN workshops; 50% of classes offered by NREM will include structured teamwork projects.

Strategy 2—Identify space in Science II that can be developed to improve the practice of SCL.

- Convert Room 128 Science II into a classroom similar to Rooms 202 and 233 and remodel Rooms 141 and 135 in Science II with flexible seating and permanent audio-visual equipment.
- Identify additional space for classroom teaching in Science II.

Measurable outcomes—by December 31, 2007: have Rooms 128, 135 and 141 remodeled.

Strategy 3—Develop and maintain a prioritized list that includes, but is not limited to, laboratory and field equipment and renovation and infrastructure needs that can take advantage of available funds.

Measurable outcomes—by May 15, 2008: create a list of equipment, renovation, and infrastructure needs by committee with representation from each of the major disciplines.

by May 15, 2009 the committee will develop a plan to obtain support with one-half of the requested funds coming from private donors and university funds.

Goal 2—Maintain curricula at the undergraduate and graduate levels that meet or exceed professional standards.

Strategy 1—Conduct annual reviews of curricula and options at the undergraduate level.

- Create a template of available courses, instructors, and times offered for each major and option per semester to be reviewed and updated annually.
- Identify courses that, if provided with more staff and better infrastructure, could draw more student credit hours (SCH) and determine whether increasing staff and infrastructure is feasible.
- Evaluate distribution of teaching efforts (i.e., number and level of courses taught, number of student credit hours generated) of individual faculty members.
- Review teaching efforts in relation to college and university benchmarks [e.g., cost/SCH, SCH/FTE].
- Curriculum Committees should conduct a review of undergraduate curricula, majors, and options every 2 years alternating with new catalog preparation.
 - Review feasibility of options being offered.
 - Review curricula to identify redundancies and eliminate unnecessary courses to reflect staffing requirements and limitations.
 - Review course requirements for graduate degrees.

Measurable outcomes—by October 1, 2007 (biannually thereafter): conduct above reviews and benchmark comparisons, and make recommendations for change if needed.

Strategy 2—At the end of every other Spring semester (alternate years with new catalog preparation) assess the current status of graduate courses taught in NREM and other departments.

- Create a template of available courses, instructors, and times offered for each major and option per semester to be reviewed and updated annually.
- Evaluate distribution of teaching efforts (i.e., number and level of courses taught, number of student credit hours generated) of individual faculty members.
- Review split-listed undergraduate and graduate courses (i.e., 500-level) to determine the whether course content is sufficient to warrant graduate-level credit.
- Integrate international graduate students into our program by mixing office assignments and having one graduate student-faculty social mixer per semester.

Measurable outcomes—by October 1, 2008 (biannually thereafter): conduct above reviews and make recommendations for change if needed.

Strategy 3—Evaluate the international components of the undergraduate curriculum.

- By examining the departmental student learning outcomes (SLO) matrix, determine if and how international content has been incorporated into courses.
- Assess the content and success of departmentally-sponsored or co-sponsored international courses and whether the current opportunities match the demands of our students (use exit interviews to determine student interest).

Measurable outcomes—by October 1, 2008: conduct above review and make recommendations for change if needed.

Strategy 4—Evaluate methods of further integrating the undergraduate majors offered by the department.

- Evaluate the impact on students and faculty of providing an integrated capstone course required for departmental undergraduate majors.
 - Thoroughly review the need for a capstone course, its fit with existing programs, and prerequisites for both majors.
 - Determine if all students in both majors and all options would be required to take a capstone course.
 - Consider staffing issues associated with teaching a capstone course.

Measurable outcomes—by March 1, 2008: present a recommendation to the faculty.

- Evaluate the impact on student learning and the mechanisms of providing a field camp required for department majors.
 - Determine the focus, feasibility (potential sites and season), staffing needs, and costs for a department-wide field camp.
 - Explore opportunities for financial support for students to reduce the extra burden of camp costs.
 - Determine if all students in both majors and all options would be required to participate in a field camp.
 - Determine whether it would be possible to have a captive semester in Animal Ecology (i.e., Animal Ecology sophomore series) to facilitate participation in the camp.

Measurable outcomes—by March 1, 2008: present a recommendation to the faculty.

Strategy 5—Support an undergraduate research program.

- Develop a department-wide program structure for undergraduate research.
- Develop a strategy for using 490s as part of the program.
- Publicize opportunities for undergraduate research assistantships in courses such as NREM 110, 120, and 211 and identify upper level courses and instructors that could provide research opportunities.

- Develop a list of faculty and projects that might be available and provide to students in courses as early as 100 level.
- Engage students at 200 level courses in such programs as Science with Practice.

Measurable outcomes—by March 1, 2009: have program structure in place.

Goal 3—Determine the efficacy of adding undergraduate and graduate NREM majors.

- Make a recommendation on the development of an undergraduate NREM major.
- Make recommendations on a NREM graduate major.
- Determine extent of defined professional niches for graduates.
- Ensure that curricula of proposed NREM majors are unique from existing majors.
- Evaluate the potential loss of students from traditional focal areas.
- Evaluate requirements for additional resources and the extent that increased demands will reduce resources for current efforts and programs.
- If recommendations are in favor of an undergraduate NREM major, develop a strong PR and recruiting program.

Measurable outcomes—by Sept 15, 2008: present the graduate NREM Major to the faculty for approval; by July 15, 2008: present the undergraduate NREM Major to the faculty for discussion

Goal 4—Continue to develop and implement outcomes assessment practices that effectively guide curriculum improvements.

Strategy 1—Departmental SLOs will be revised/modified as needed to align with College of Agriculture and Life Sciences SLOs, and reviewed when necessary to respond to institutional changes.

- Following approval of College SLOs, the departmental outcomes assessment committee will review and propose revisions to department SLOs for faculty consideration and approval

Measurable outcomes—by October 2007: complete revisions to departmental outcomes.

Strategy 2—Foster ongoing communication among faculty on principles and practices of learner-centered assessment.

- At two early-semester fall faculty meetings hold 2-hour sessions on outcomes assessment and structure to chart activities and progress.

Measurable outcomes—beginning in Fall 2007: conduct outcomes meetings, and each fall thereafter.

Strategy 3—The Outcomes Assessment Committee (OAC) will maintain and update a departmental template articulating how each course in departmental curricula addresses departmental learning outcomes.

- All faculty will provide information to OAC on course-level outcomes and assessment.
- All faculty will provide updated information to OAC as courses change.

Measurable outcomes—beginning in May 2008 and annually thereafter: OAC will update the template and present it to faculty in May of each year.

Strategy 4—Develop direct measures for departmental learning outcomes.

- Engage faculty in discussions of appropriate evidence of learning.
- Further develop and refine rubrics specific to selected outcomes.
- Complete a working plan for development of rubrics to guide direct assessment of departmental learning outcomes (there are presently 10).

Measurable outcomes—by October 1, 2009: complete a working plan for how outcomes will be assessed; plan will be operational by 2012.

Strategy 5—Communicate outcomes and how they will be assessed to students in NREM 110.

- Devote one class period to discussion of SLOs, and have students self-assess as beginning of portfolio for professional development.
- Emphasize important learning outcomes for curricula and programs.

Measurable outcomes—beginning in Fall 2007: devote regular class sessions in NREM110 to SLOs.

Strategy 6—Evaluate the feasibility (mechanism and staffing needs) of incorporating student electronic portfolios to measure department learning outcomes and compare to other methods of developing portfolios

- Freshman and sophomore years with help from advisors.
- Junior and senior years done by students.

Measurable outcomes—by December 2008: OAC will report on student use of electronic portfolios

Strategy 7—Conduct indirect assessment of SLOs by conducting surveys

- Continue to use survey instrument developed by OAC to conduct mail surveys at five-year intervals of our graduates, with special effort to query students 2 years and 5 years after graduation.
- Continue to administer exit survey of students as they graduate.
- Tabulate data and use to provide feedback for program changes.

Measurable outcomes—beginning in Fall 2008; collect and tabulate data, link to curriculum review at 5-year intervals.

Goal 5—Maintain excellence in undergraduate advising and mentoring.

Strategy 1—Evaluate and assess departmental advising relative to undergraduate academic programs.

- Distribute junior and senior advisees who have declared an option among faculty according to disciplinary expertise.
- Provide training for all faculty members who are responsible for advising.
- Conduct mentoring for new faculty members before assigning undergraduate advising responsibilities.

Strategy 2—Evaluate and assess departmental advising and support of student organizations.

- Provide mechanisms to support student organization activities (e.g., travel support).
- Determine methods to improve faculty involvement in student organizations.
- Department chair will determine methods for rotating faculty advising responsibilities.

Measurable outcomes—by October 15, 2008: complete assessments and adjustments to undergraduate advising and mentoring.

Goal 6—Enhance recruitment and retention of undergraduate and graduate students in the department.

Strategy 1—Increase the number of undergraduates entering and graduating from the departmental majors and options.

- Generate data to estimate the maximum number of students each option can handle with present staffing and areas for potential growth.
- Develop strategies for increasing enrollment in courses that are not usually full.
- Strengthen efforts focused on youth groups such as FFA, 4H, and Boy and Girl Scouts that have proven successful in recent years and other groups not presently being targeted.
- Develop broad career opportunity scenarios as a sub-set that appeal to potential students and their parents.
- De-emphasize NREM as an umbrella in recruiting efforts and reframe messages with specific “major” keyword identifiers.
- Restructure the web site to make information on majors easier to find including course and curricula descriptions that are presented in HTML and PDF formats.
- Identify opportunities for synergy with other departments and programs (e.g., ABE, Biology).
- Develop alumni career biographies for display on the department’s website.
- Develop a strategy to communicate with similar programs to guide students to the programs that best suit their needs.

- Use the departmental advisory council (see Goal 8 below) or identify stakeholder group(s) that will provide feedback on marketing techniques and opportunities for graduates.

Measurable outcomes—by October 15, 2009: complete above actions.

Strategy 2—Maintain 40-60 graduate students in the department (average of 3 per faculty with research appointments).

- Develop broad recruiting materials to increase unsolicited applications.
- Develop recruiting materials specific to targeted institutions.
 - Peer institutions.
 - Science and environmental programs at small liberal arts schools in Iowa and other areas of the Midwest (e.g., Grinnell, Luther, Cornell, Augustana, Carleton).
- Encourage regular maintenance and improved quality (i.e., presentation, content) of all faculty pages and descriptions of graduate opportunities on the department's website.

Measurable outcomes—by October 15, 2009: complete above actions.

Strategy 3—The department will support a 0.5 FTE staff person with a budget devoted to recruitment.

- Track results of recruitment activities.
- Continue active presence in programs like FFA, etc. and on-campus programs
- Integrate faculty and staff in recruiting efforts whenever possible.

Measurable outcomes—by October 15, 2009: have a plan and a staff person in place for accomplishing these goals.

Goal 7 – Enhance diversity through recruitment and retention of minority students and faculty in the department.

Strategy 1 – Participation in CALS and ISU programs relating to diversity enhancement and promotion, such as mentoring summer interns under the George Washington Carver Program (GWCP), the faculty research exchange program, the ISU ADVANCE Program, the Minorities in Agriculture and Natural Resource Sciences (MANRRS), and other diversity related programs.

Strategy 2 – Coordination with CALS and interdepartmental recruitment programs and target schools and areas with high minority enrollment or potential students from underrepresented groups.

Measurable outcomes – by Fall Semester, 2009 increase the percent of minority students in NREM from the current 3.7% by 2% to 5.7%. Increase number of faculty participating in GWCP, MANRRS, Faculty Research Exchange by December, 2008.

Goal 8—Establish an advisory council to help guide decisions and provide feedback on quality of program graduates and the focus and direction of our research (also see Research Goal 6) on a biennial basis.

Strategy 1—Establish a multidisciplinary council consisting of professionals from the option areas of the department to provide feedback on quality of our graduates.

Strategy 2—Use feedback from advisory council to guide decisions on curricula and department outcomes.

Measurable outcomes— by December 15, 2008 establish advisory council and hold first meeting.

RESEARCH

Background

Iowa State University is a land-grant institution with a mission to create, share, and apply knowledge to make Iowa and the world a better place. One of NREM's goals is to maintain an excellent research program that spans basic to applied aspects of natural resource management that meet the needs of Iowa citizens, state and federal natural resource agencies, and other constituents. To accomplish this, the department's research focus is aimed at three broad systems and their ecology. These include the aquatic, terrestrial, and human systems of Iowa and the world. Each of these systems interacts with the others requiring strong collaborative approaches to solving their problems. NREM maintains a faculty and staff that is competent in addressing issues in all three of these systems and is able to conduct collaborative research that provides holistic answers to natural resource problems. Problems that are addressed in these three systems require a collaborative approach not only because the three systems interact with each other, but also because they are found in a mosaic of native, agricultural, and urban settings in Iowa and the Midwest.

The goal of the department is to use integrative approaches to address natural resource ecology and management problems of agricultural, native, and urban landscapes. The department has a stable cadre of faculty and staff that has been successful in developing a strong reputation in these areas of research. The addition of new faculty members has increased opportunities for more collaborative and holistic research efforts in natural resource ecology and management. Successful collaborative research with nationally- and internationally-recognized peers continues to be a goal and will expand.

The department has been successful in obtaining significant external funding which will increase in importance as funding from the Agriculture Experiment Station and the state decrease. Increases in successful grant writing will be required to attract top-quality graduate students and post-doctoral candidates and maintain state-of-the-art facilities.

The department has few permanent university field facilities to conduct research, but our extensive history of working with landowners and public land (state parks, forests and preserves) collaborators provides many research sites in each of the major physiographic regions of the state. These opportunities provide landowner input and immediate feedback on research. Many research projects are also conducted on public lands, e.g., federal wildlife refuges, state and county wildlife areas, and lands managed by nonprofit conservation organizations. The department has a significant investment in field equipment for installation, sampling, and maintenance of perennial plant communities and for sampling of aquatic and terrestrial

communities. Maintenance and replacement of that equipment must continue if a strong field program is to be continued.

Goal & Strategies

Goal 1—Identify, evaluate and promote NREM’s role in emerging and on-going natural resource management issues including biofuels biomass production and processing, impaired terrestrial and aquatic ecosystems, loss of biodiversity

Strategy 1—Produce a one-page glossy document listing accepted research and extension publications and highlighting outside recognition of research applications.

Strategy 2—Create and maintain web pages on departmental site identifying the research activities of the department.

Strategy 3—Interact with clients, including advisory council(s), to determine potential role of NREM in developing research in emerging problem areas.

Strategy 4—Develop partnerships to provide a holistic approach to issues that are being studied.

Measurable outcomes—by December 15, 2008 (annually thereafter): complete above actions – may require hiring personnel outside the department (e.g., web master).

Goal 2—Maintain excellence in addressing natural resource ecology and management problems at multiple spatial scales.

Strategy 1—Maintain a high level of annual departmental funding that exceeds performance over the five-year period of 2002-2007.

- Support faculty in seeking funding from a wide variety of sources including state and federal agencies and private organizations.
- Increase support for individuals and collaborative efforts who seek funds from major granting sources such as USDA, NSF, EPA, (e.g., \$100,000 per year for 3 years). These individuals and collaborative groups will vary depending on the emphasis of major funding agencies.
- Capitalize on other sources of funding (e.g., college funds, university funds, new faculty development grants) for grant writing workshops and other activities associated with the development of significant proposals (i.e., travel to meet with colleagues, summer salary, mentoring time).
- Provide monetary departmental support for travel to meet appropriate potential research partners.
- Build capacity to support collaborative efforts within the department, between departments and between external partners by holding discipline-specific group research review meetings.
- Increase success rate to have 3 major grants in the department at any one time.

Measurable outcomes—by December 15, 2009 (annually thereafter): hold discipline-specific meeting with the goal of annually maintaining or increasing the number of major grants; by July, 2012: reach an average of \$3.5 million in annual extramural funding and maintain a research faculty participation index of 0.95 or higher.

Strategy 2—Develop the means to holistically measure the impact of research.

- Develop appropriate metrics for each research issue (e.g., number of citations, journals accepting publications, extension materials, acceptance by clients)
- Include metrics in annual AD-416 and AD-421 forms.
- Include metrics in departmental self-reported benchmarks and in faculty performance reviews.
- Share impacts with College of Agriculture and Life Sciences administration and public relations office.

Measurable outcomes—by December 15, 2009: establish metrics and complete above actions.

Goal 3—Evaluate the present adequacy of facilities and infrastructure needed to maintain and expand the research programs of NREM

Strategy 1— Provide up-to-date inventory of lab space, field sites, and equipment that can be used to support departmental research.

Strategy 2—Identify continuing needs for laboratory space, field sites, and equipment storage facilities.

Measurable outcomes—by December 15, 2008: complete above actions.

Strategy 3—Develop and maintain a prioritized list that includes, but is not limited to, laboratory and field equipment and renovation and infrastructure needs that can take advantage of available funds.

- Categorize the list as to research area (e.g., molecular, aquaculture) and research strategic element (e.g., water quality, bioeconomy).
- Develop timelines, materials lists, potential vendors, etc. for each listed item

Measurable outcomes—by May 15, 2008 (annually thereafter): complete above actions.

Goal 4—Encourage dissemination of research results by faculty, staff, and students through refereed publications, abstracts and posters at professional meetings, and extension materials for targeted clients.

Strategy 1—Exceed 30 publications per year (1-2 per FTE) with many of those publications in “high-impact” journals, if appropriate.

Measurable outcomes—by July 1, 2008: complete above actions.

Strategy 2—Provide mechanisms for departmental support for publishing research where page charges cannot be covered by grant or other funds.

Measurable outcomes—by July 1, 2008: complete above actions.

Strategy 3—Create at least one appropriate extension product at the end of each funded “applied” project.

Measurable outcomes—by July 1, 2008: complete above actions.

Strategy 4—Provide a means to increase departmental support for attending meetings to present results to \$3,000 annually per faculty member.

Measurable outcomes—by July 1, 2008: complete above action.

Strategy 5—Display research results on faculty and research team web sites (feature faculty of the month or research of the month on the web; two people per month—obtain assistance from support staff to update web page).

Measurable outcomes—by September 1, 2008: complete above action.

Strategy 6—Foster better internal dissemination of research results.

- Conduct annual NREM poster session in place of a seminar.
- Provide all appropriate faculty with copies or web addresses of new publications and extension materials.
- During at least two seminars each semester have two faculty or students present research activity update.

Measurable outcomes—by December 15, 2007 (annually thereafter during Fall semester): complete above actions.

Goal 5—Assure funding is available for outreach as part of all applicable research projects.

Strategy 1—Have an outreach plan for all applicable projects (e.g., what is presented on web site, faculty of the month, annual departmental seminar, workshops).

Strategy 2—Interact with appropriate state and federal agencies, NGOs and Extension faculty who will interpret the results of a completed research project.

Measurable outcomes—by December 15, 2009: complete above actions.

Goal 6—Strengthen departmental relationships with government agencies and nongovernmental organizations that can use the products of NREM research, provide insights on undergraduate and graduate student employment and provide and feedback on relevance of undergraduate curriculum.

Strategy 1—Establish a multidisciplinary council consisting of professionals from the option areas of the department to provide feedback on the quality of our graduates, and the focus and direction of our research (also see Teaching Goal 7).

Measurable outcomes—by December 15, 2008: establish advisory council.

Strategy 2—Establish a mechanism for contact with clientele.

- As a part of outreach expectations, each faculty member attends annually one state-wide meeting of clientele groups (e.g., Iowa AFS, Iowa AN, Iowa SAF, Iowa TWS, etc.).
- As a part of outreach expectations, each faculty member meaningfully interacts at least once annually with one agency.

Measurable outcomes—by December 31, 2007: faculty must participate and report on these activities as part of their annual review.

Strategy 3—Each February, hold departmental research meetings to identify potential for refocusing research efforts to address emerging issues in light of on-going programs.

Measurable outcomes—by February 15, 2008: (annually thereafter in February): conduct above action.

Strategy 4—Use annual meeting of the departmental advisory council (See Teaching Goal 7) to provide feedback on the products of NREM research and interactions of the department with end-users of the research (e.g., governmental and non-governmental organizations).

Measurable outcomes—by December 15, 2008: establish advisory council and hold first meeting.

Goal 7 – Enhancement of diversity through research programs

Strategy 1 – Recruit additional women/minority students in graduate programs and staff of research groups.

Measurable outcomes— by December 2009: increase women/minority students in our research program by 10%.

Strategy 2 – Promote participation of faculty in collaborative research with historically black universities/colleges and tribal universities/colleges.

Measurable outcomes – have at least two collaborative research projects in the department with historically black universities/colleges and tribal universities/colleges.

EXTENSION

Background

As a Land Grant institution, Extension plays a critical role in helping the university to accomplish that mission. Our goal, as the NREM Extension Unit, is to assist in accomplishing all three portions of the Land Grant mission: creating, sharing, and applying knowledge.

Although the Land Grant mission was initially aimed at solving agricultural problems, it rapidly expanded, based on early successes, to other areas of need. Today, extension professionals apply their expertise to a plethora of society's problems and a diversity of clientele. Natural resource problems in Iowa are diverse and are not confined to the few remaining "wild areas" of Iowa. Rather, they cut across a diverse landscape: from rural to suburban to urban; from forests to prairies to wetlands and streams; from row crops to tree farms and plantations, from farm ponds to fish hatcheries and to private aquaculture facilities.

Extension has been through many changes over the past 20 years, including:

- reductions in the number of field staff;
- splits in the appointments of campus specialists;
- reductions in the absolute dollars and in the percentage contributions of federal and state partners;
- changes in the demands and demographics of various client groups;
- new cost structures, such as charging for publications and programming;
- funding changes that included securing extramural funding to support basic extension programming;
- increased use of web-based technologies and electronic media;
- improved public access to many information sources—though university-based science, disseminated by extension, is still one of the most trusted sources.

In the past, the research and extension functions of various faculty were seen as mostly separate functions. Research faculty conducted research and published in journals read mostly by other researchers. Extension faculty translated and took that research to the public. As the university rewards system (i.e., promotion and tenure) became more formalized and institutionalized, disparities between faculty in these functions began to grow. Even though most faculty teach and many are active with outreach activities, few researchers have formal extension appointments. In contrast, Extension faculty often have formal appointments in teaching, research, extension, and administration. This provides not only a challenge to the extension faculty, but also to the extension function of a Land Grant university.

Despite dramatic changes in demographics of the Midwest, there have been few changes in the composition of field extension staff. During extension reorganization in the 1990s, ISU extension administration appointed more specialized livestock specialists to field positions. Despite the dramatic changes in the federal farm bills since 1985 as well demographic shifts, extension resources for natural resources were left largely unchanged or shrinking. The natural resources of forests, fisheries, and wildlife (and other natural systems) were left to the responsibility of 2-3 FTEs located on the ISU campus and responsible for the whole state and surrounding region. As we look at record high prices for corn and a rapidly expanding bioeconomy, the pressures on natural resources will become critical. At no time in our history has the need to educate Iowans on natural resources ecology and management been higher.

Goals and Strategies

Goal 1—NREM Extension programs will help improve the stewardship of natural resources in Iowa and the Midwest.

Strategy 1—Develop an integrated approach to NREM Extension programming.

- Hold regular Extension faculty/staff meetings.
- Maintain a holistic view of NREM Extension and develop or redevelop programs.

Measurable outcomes—by January 1, 2008: complete above actions.

Strategy 2—Build partnerships with agencies and NGOs to expand and promote natural resource education in Iowa and the Midwest.

- Become involved in the annual meetings of Iowa Department of Natural Resources (IDNR), County Conservation Boards (CCBs), Natural Resource Conservation Service (NRCS), Resource Conservation and Development Areas Organizations (RC&Ds), US Forest Service, US Fish and Wildlife Service, and other agencies by taking advantage of our alumni contacts within those agencies.
- Develop partnerships with NGOs like Iowa Conservation Education Council (ICEC), Iowa Environmental Council, Iowa Natural Heritage Foundation (INHF), Iowa Association of Naturalists (IAN), Iowa Association of County Conservation Boards (IACCB), Iowa Woodland Owners Association (IWOA), Iowa Urban and Community Forestry Council (IUCFC), Forest Council, and others, including student chapters of and professional organizations.

Measurable outcomes—by January 1, 2009: complete above action.

Strategy 3—Improve visibility of NREM Extension.

- Integrate websites.
- Use Extension meeting calendar to a greater extent and more effectively to advertise NREM programs.
- Work with Extension communications staff to develop news releases, video, web-based and other public-relations materials.
- Develop an NREM Extension center (Room 106 Science II) to be a front-line and common voice for the department.

Measurable outcomes—by January 1, 2009: complete above actions.

Strategy 4—Integrate faculty active in outreach with extension personnel to help expand contact with clients and provide unified extension and outreach messages.

- Identify key extension person for research projects that have a potential outreach component.
- PIs and assigned extension person should meet regularly to provide updates on project progress and to formulate best extension materials to prepare.
- PIs should notify key extension person when formal outreach activities are planned and have been completed.

Measurable outcomes—by January 1, 2008: complete above actions.

Goal 2—Expand integration of NREM research and extension programs with those of other departments, agencies, and organizations in Iowa and the Midwest.

Strategy 1—Provide a venue whereby Extension personnel communicate current client problems and program offerings to other faculty and staff.

- Summarize ideas and problems from the field and communicate those to other researchers.
- Help generate research ideas with other faculty and staff and cooperators.

Measurable outcomes—by January 1, 2008: complete above action.

Strategy 2—Design NREM's research to include Extension education as a necessary outcome, partnering throughout the research process.

- Work with NREM faculty and the NREM Graduate Student Organization to include co-authored Extension materials as an expectation for appropriate graduate student research.
- Co-author Extension publications and other materials with other faculty and staff.

Measurable outcomes—by July 1, 2008: complete above action.

Strategy 3—Provide other faculty and staff formal opportunities for outreach, whereby they share their research and other outcomes that have resulted from partnerships.

- Encourage presentation of research results at appropriate outreach and Extension meetings.
- List such presentations on the Extension Calendar so they “count” in our department’s outreach.

Measurable outcomes—by July 1, 2008: complete above actions.

Strategy 4—Use developing and existing technologies to assist in accomplishing the above strategies, including Web sites, Power Point presentations, printed and electronic publications, ICN, Breeze and other distance education techniques.

Measurable outcomes—by January 1, 2009: complete above actions.

Goal 3—Expand the ability and financial resources of NREM Extension to serve natural resource management needs in Iowa and the Midwest.

Strategy 1—Expand faculty and staff resources devoted to NREM Extension.

- Work with VP for Extension and others to increase FTEs devoted to NREM Extension.

Measurable outcomes—by June 30, 2009: complete above action.

Strategy 2—Extension professionals are encouraged to interact closely with multiple stakeholders to help identify extension and research needs.

- Extension professionals should seek to facilitate and become involved in field trial, demonstration and validation projects under varying conditions, including public, private and commercial sectors.
- Actively integrate research and extension activities during all phases of project development through completion.

Measurable outcomes—by January 1, 2008: complete above action.

Strategy 3—The scope and specifics of any extension component in a research project should be determined by the technology transfer or educational outreach needs required to effectively reach and impact diverse constituents in our state and region.

- Encourage faculty, research associates, and graduate students to incorporate Extension deliverables into their research projects from the beginning.
- Extension and outreach deliverables should be accomplished in a timely manner and under terms agreeable between researchers and extension specialists, and involve multiple stakeholders.
- “Writing for Extension” and “Understanding the Land Grant Idea” should be included in appropriate courses for NREM graduate students.

Measurable outcomes—by January 1, 2008: complete above action.

Goal 4 – Build diversity in the research/outreach program.

Strategy 1 - Use a community model to reach youth, families, producers, entrepreneurs, of underrepresented groups.

Strategy 2 - Translate key extension publications into Spanish/relevant languages.

Measurable outcomes—by June 30, 2009: have completed two activities addressed to specific underrepresented groups and have translated at least two extension bulletins to Spanish or other relevant language.

NREM STAFFING PLAN (2008-2013)

Faculty Plan

The department’s mission is to maintain a balanced and outstanding program in teaching, research, and outreach and extension in the area of natural resource ecology and management. The focus of natural resources is by nature broad and includes the aquatic, terrestrial, and human systems of Iowa and the world. The goal of the department is to maintain a faculty that is competent in teaching about, and conducting research in all of these systems. Problems that are addressed in these systems require a collaborative approach not only because they interact with each other, but also because they are found in a mosaic of native, agricultural, and urban settings in Iowa and the Midwest.

The University and CALS recognize scholarship in the three major land-grant university missions of teaching, research and extension. As a consequence appointments of new hires in the department should reflect the current departmental needs in those three areas of scholarship. Typically new

hires should be able to teach at least two courses in the department, as well as provide a unique research tool set that allows them to conduct individual and collaborative research both within and outside of the department. Extension faculty need to have appointments and skills sets appropriate to Extension needs, as well.

Hiring of new faculty members should progress in a manner that supports the broad mission of the department. Persons who can conduct research collaboratively across the department and teach undergraduate courses across majors should be encouraged. In a time when refilling faculty positions that have been vacated is not assured, a good strategy is to hire persons who can teach courses useful to both majors or multiple options within majors. However, specific teaching needs of the Animal Ecology and Forestry majors warrant special attention, as these are professional degrees that must meet certification and accreditation requirements of their respective professional organizations. Any courses taught by new hires should strive to meet the requirements of at least one of the professional societies related to our curricula: The Wildlife Society, the American Fisheries Society, and the Society of American Foresters.

The current NREM faculty includes 8.3 FTEs with 1 Extension position and 5 collaborator/adjunct positions that serve the Animal Ecology program (Fisheries and Wildlife), and 8 FTEs with 1 extension position and 2.5 adjunct/affiliate positions that serve the Forestry program. Future staffing considerations should reflect anticipated future changes in NREM faculty composition, present and future undergraduate and graduate enrollment, and the needs of maintaining certified and accredited programs.

The plan below lists teaching, research, and extension/outreach needs that may arise during the time frame of this plan due to anticipated retirements. Also included are potential needs that may arise because of changing issues confronting natural resource ecology and management. Numerous opportunities now exist where specific courses can fill the needs of more than one major. The potential of an undergraduate NREM major further emphasizes the need for faculty with broad backgrounds. While this plan proposes needs that will be created by retirees and other departures, some needs could be satisfied by changing responsibilities of existing faculty. An example of such a need might be the use and application of GIS/GPS in natural resources.

The following is a list of possible retirements/resignations during the life of this plan as well as faculty lost to another department:

- Bill Clark (population biologist, mammalogist; transferred to EEOB)
- Brent Danielson (landscape ecologist, mammalogist; transferred to EEOB)
- Diane Debinski (community ecologist; transferred to EEOB)
- John Downing (limnologist; transferred to EEOB)
- Rick Hall (tree genetics, silviculture for biomass production and wildlife habitat)
- Steve Jungst (bio-remote sensing, GIS/GPS)
- Mon Lin Kuo (wood adhesives and biomaterials for wood composites)
- Jim Miller (landscape ecology, conservation biology)
- Carl Mize (forest biometrics – biometrics)
- Jim Pease (Interpretation, social, wildlife extension)
- Lita Rule (economics, policy, administration)
- Dick Schultz (terrestrial ecology, soils, watershed)

The retirements and resignations will have an especially major impact on the faculty responsible for teaching the majority of content specific Forestry Major required courses. They will also result in the loss of the primary instructor and advisor to the interpretation options in both majors. The loss of faculty to the Department of Ecology, Evolution and Organismal Biology has also resulted in

loss of courses required in the Animal Ecology Major that these faculty were expected to continue teaching. The retirements and/or loss of this set of faculty will also have a major impact on the research activities of the department, especially in the areas of restoration ecology, woody plant genetics, silviculture, biometrics, human dimensions, policy and resource valuation, and sustainable materials science.

A general description of the areas of responsibility that will no longer be covered or will have a major reduction in coverage with these retirements include:

- Natural resource biometrics (basic sampling, data analysis in fisheries, wildlife, and forestry, design, regression, correlations, modeling)
- Natural resource valuation (ecosystem goods and services – bioeconomy, socio-economic)
- Sustainable perennial plant community management for multiple products & ecosystem services (forest, prairie, wetland)
- Wildlife habitat management
- Land use planning
- Ecotoxicology
- Biodiversity
- Social and human dimensions of resource management
- Natural resource interpretation
- Wildlife extension
- Urban plant communities
- Hydrology and watershed management
- Restoration
- Tree genetics
- Biomass production

The tool sets that will suffer major losses include:

- Biometrics
- Community ecology
- Econometrics
- Extension
- GIS/GPS
- Habitat modeling
- Hydrology and watershed management
- Human dimensions
- Limnology
- Natural resource interpretation
- Plant growth and development
- Soil ecology
- Toxicology
- Wood chemistry
- Woody plant genetics

One strategy that is not strongly recommended at this time is to hire faculty that are shared with other departments. While this may have some appeal to administrators, it is perceived as a difficult position for the individual faculty member. Also, with the potential for refilling only limited positions in the near future, dilution of the NREM faculty could have devastating impacts on our ability to maintain excellence in teaching, research, and extension. Loss of dedicated faculty lines is

especially problematic considering the losses that have already occurred and the potential to develop a new integrated NREM major.

As retirements occur, position announcements should be developed that address both the general subject areas of the lost positions and the tool sets that have been lost. These two should be integrated to provide the kind of person(s) needed to address the holes that need to be filled to meet teaching, research, and outreach/extension needs of the department. Retirements should be viewed as opportunities for reevaluating course needs in the various major and research directions of the department. Teaching needs must take into account the requirements of certification by the American Fisheries Society, The Wildlife Society, and the Society of American Foresters. These requirements are shown below:

American Fisheries Society Certification Requirements

The American Fisheries Society (AFS) views a fisheries professional as an individual with a specialized education in the sciences and technologies involving the structure, dynamics, and interactions of fishes, habitat, other aquatic organisms, and humans. Certified fisheries professionals may be generalists in fishery resources management or a specialist in one or more of the allied disciplines (e.g., aquaculture, physiology, genetics, toxicology, pathology). As such, course requirements for certification as a Fisheries Professional (Associate or Certified ranks) are broad. Relevant requirements for NREM include 42 credits in the biological sciences and 6 credits in human dimensions. Twelve of the biological science credits must be related to fisheries and aquatic sciences and include at least four courses. Of these courses, two must be directly related to fisheries science and at least one must cover principles of fisheries science and management. The course focused on fisheries science and management must be an upper division course (i.e., junior, senior, or graduate level), must be at least 3 credits, and must focus on fish population dynamics and habitat assessment and management. The remaining 30 credits in the biological sciences may be met with any number of courses (e.g., general biology, microbiology, zoology, ecology, ornithology). In addition to these requirements, AFS requires 6 credits in human dimensions. Appropriate courses include named courses in human dimensions of natural resource science and courses in policy, planning, administration, law, ethics, public relations, leadership, conflict resolution, and economics. These courses must focus directly on natural resource management.

Society of American Foresters Accreditation Requirements

The Society of American Foresters provides accreditation to professional forestry schools, and Iowa State has been accredited through SAF since 1935. This accreditation program stipulates that a minimum of 8 full-time equivalent faculty members with primary responsibility to the forestry major are required for continued accreditation. In addition, the forestry curriculum is required to lead to specific competencies in four general areas as per the following: (1) Ecology and Biology (including taxonomy and identification of forest and other tree species, their distribution, and associated vegetation and wildlife; soil properties and processes, hydrology, water quality, and watershed functions; ecological concepts and principles including the structure and function of ecosystems, plant and animal communities, competition, diversity, population dynamics, succession, disturbance, and nutrient cycling; assessments of ecosystems, forests and stands; and tree physiology and effects of climate, fire, pollutants, moisture, nutrients, genetics, insects and diseases on tree and forest health and productivity; (2) Measurement of Forest Resources (including identification and measurement of land areas and spatial analysis; design and implementation of comprehensive inventories that meet specific objectives using appropriate sampling methods and units of measurement.; and analysis of inventory data and projection of future forest, stand and tree conditions; (3) Management of Forest Resources (including development and application of silvicultural prescriptions appropriate to management objectives,

including methods of establishing and influencing composition, growth and quality of forests and understand the impacts of those prescriptions; analysis of the economic, environmental, and social consequences of forest resource management strategies and decisions; development of management plans with specific multiple objectives and constraints; use of valuation procedures, market forces, processing systems, transportation and harvesting activities that translate human demand for timber-based and other consumable forest products into the availability of those products; use of valuation procedures, market, and non-market forces that avail humans the opportunity to enjoy non-consumptive products and services of forests; and description of the administration, ownership, and organization of forest management enterprises; and (4) Forest Resource Policy, Economics, and Administration (including development of forest policy; use of federal, state, and local laws to govern the practice of forestry; the importance of professional ethics, including the SAF Code, and recognition of the responsibility to adhere to ethical standards in forestry decision making on behalf of clients and the public; and integration of technical, financial, human resources, and legal aspects of public and private enterprises).

The Wildlife Society Certification Requirements

A primary goal of The Wildlife Society is to support the education, training, and ethical practice of wildlife professionals throughout their careers. To that end, The Wildlife Society recognizes professional credentials with three distinct certificates: Certified Wildlife Biologist, Associate Wildlife Biologist, and Professional Development. Holding a certificate from The Wildlife Society places you in a category distinct from other wildlife professionals due to the integrity of the organization and the high standards of the certification process. You earn credibility and respect, which offers you an added advantage when applying for jobs, in public forums, and in legal proceedings. Many disciplines contribute to the title of wildlife biologist, so certification requirements must be broad to encompass the full breadth of the wildlife profession. The Society recognizes that strict application of rigid criteria would be detrimental to the continued growth of the profession. Course requirements for certification as a Certified Wildlife Biologist by The Wildlife Society are thus broad. Relevant requirements for NREM include 36 credits in biological sciences (6 credits in wildlife management, 6 credits in wildlife biology, 3 credits in ecology, 9 credits in zoology, 9 credits in botany, and 3 additional credits in any category), 9 credits in quantitative sciences (biometry and modeling are important options not currently available at ISU), and policy, administration, and law (6 credits).

Research Foci

Iowa State University is a land-grant institution with a mission to create, share and apply knowledge to make Iowa and the world a better place. The Department of Natural Resource Ecology and Management has as one of its goals to maintain an excellent research program that spans basic to applied aspects of natural resource management that meet the needs of Iowa citizens, state and federal natural resource agencies, and other constituents. To accomplish this, the department research focus is aimed at three broad systems and their ecology and management. These include the aquatic, terrestrial, and human systems of Iowa and the world. Each of these systems interacts with the other two requiring strong collaborative approaches to solving their problems. NREM maintains a faculty and staff that are competent in addressing issues in all three of these systems and are able to conduct collaborative research that will provide the holistic answers needed to solve problems. Problems that are addressed in these systems require a collaborative approach not only because the systems interact with each other, but because they are found in a mosaic of native, agricultural, and urban settings in Iowa and the Midwest.

The following are general areas of focus that the department presently addresses and that should be considered when writing faculty positions descriptions as they arise:

- Perennial plant community management
- Fisheries and aquatic resource management
- Wildlife management
- Improving surface water quality/quantity & aquatic communities
- Development of agroforestry conservation practices
- Perennial plant community restoration for multiple products & ecosystem services
- Biofuels & bioproduct development, production, and ecological effects
- Urban natural resource management
- Quality of life for rural and urban residents
- Social impacts & interactions with natural resources and their management

Non-tenure Faculty Positions

The goal of the department is to be able to hire new tenure-track faculty who will be successful in balancing teaching, research and outreach responsibilities. Typically new faculty will be expected to teach at least two required courses each year. At present, the retirements we anticipate over the next five years are among faculty that teach more than two courses per year. Ideally, the department should seek to increase the number of tenured faculty positions, especially considering the loss of positions associated with the movement of four previous positions to EEOB. However, in the short run the department will probably have to rely on non-traditional faculty (full-time and part-time adjunct untenured faculty positions) to teach a number of critical courses or the number of courses offered by the department will have to be reduced. At the time of preparation of this plan the following positions were being supported: 1) Restoration and Management of Perennial Plant Communities in Agricultural Landscapes; 2) Human Dimensions and Natural Resource Economics; 3) Natural Resource History and Policy; 4) Research Position in Tropical Terrestrial Ecosystems/Teaching Position in Applied Ecosystems Ecology; and 5) Wildlife Specimen Curator and Conservation Genetics, Systematics, Conservation of Freshwater Organisms. Each of these positions is assumed to have teaching, research, and outreach responsibilities. Critical issues to consider for these and any future positions include longevity and funding of the positions to provide continuity for both the persons and the responsibilities that they are assigned. Persons filling these positions should be given consideration for any applicable tenure-track positions that open.

In addition to the positions required to directly support the teaching program in the department, consideration must be given to provide continued support to members of the Iowa Cooperative Fish and Wildlife Research Unit housed in the department. Members of the Unit provide many cooperative research opportunities, train graduate students, and teach some important graduate courses. Members of the Unit are not tenured and their positions depend on continued federal funding. Retirements of members of this unit could take place during the period of this plan (5

years) and extended delays in refilling these positions might occur similarly to those for tenure-track faculty.

Support-Staff

The following positions provide important services to the department that allow faculty, graduate students, and undergraduates to function effectively and efficiently. These positions should be maintained unless duties are assigned to existing or new hire tenure-track faculty or staff positions. Persons in the curatorial positions would be required to hold and maintain applicable state and federal permits and certifications or make sure that such permits were secured for the department where applicable.

- Computer Specialist—position maintained at full-time person.
- Recruiting — $\frac{1}{2}$ time person to conduct active recruiting.
- Curator— $\frac{1}{4}$ time person to update and maintain dendrology collections.
- Curator— $\frac{1}{2}$ time person to update and maintain vertebrate collections for a 2-3 year period and then become a $\frac{1}{4}$ time position. If discussions of maintaining both teaching and research collections supports maintaining both, then this position should be maintained at $\frac{1}{2}$ time.
- GIS Specialist—maintain this full-time position for department wide support.