

E. Final Report of the Comprehensive Program Review
Department of Natural Resource Ecology and Management
Iowa State University
Site Visit Conducted April 22-25, 2008

Introduction

This external review of the Department of Natural Resource Ecology and Management (NREM), Iowa State University, was requested by Dr. Wendy Wintersteen, Dean of the College of Agriculture and Life Sciences (CALs). A comprehensive assessment of departmental teaching/learning, research, and extension/outreach activities was requested, in accordance with the requirements of the College, Iowa State University, and the Iowa State Board of Regents.

The team members assembled for the review were chosen for their experience and ability to span the disciplinary and programmatic breadth of NREM. Team members included:

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Review team members were provided with a 146-page self-study document in advance of their on-campus visit. The chair of NREM, Dr. David Engle, scheduled a busy and productive site visit for 22-25 April, logistics of which were ably overseen by the interim associate chair of NREM, Dr. Joe Morris. The review team received a departmental overview from Dr. Engle and a tour of facilities by Drs. Engle and Morris. The team then participated in question and answer sessions with Associate Provost Holger, Dean Wintersteen and Associate Deans Colletti and Acker, the Chair's Internal Advisory Committee (Drs. Morris, Hall, Pease, and Otis) and Self-Study Coordinating Committee (Drs. Fairbanks, Randall, Jungst, and Ms. Hentges), undergraduate and graduate students, merit and professional and scientific staff, external stakeholders, tenured faculty, untenured and non-tenure eligible faculty, all departmental faculty, and CALS department chairs. Opportunities for discussion also ensued regarding the following areas: Undergraduate programs; Graduate programs; Extension/Outreach; Research; and Diversity.

On April 25 the team presented a summary of their preliminary findings to the Provost's and Dean's groups, and then to NREM faculty.

The report is organized into seven sections. Each section was written collaboratively by the review team, with individual team members taking responsibility for organization of specific sections. The first section contains an overview and executive summary. The final section consists of conclusions, acknowledgments, and responses to questions posed by Dean Wintersteen. All intervening sections contain a brief statement to provide context, followed by observations of perceived departmental strengths, challenges, and recommendations for effecting improvements.

1. Executive Summary

NREM has demonstrated steady progress since its creation in 2002. A broad-based vision was articulated in its strategic plan, relocation and space enhancements were completed, publication rate has increased, and publication quality is high. New hires have expanded the scope and capacity of the already-broad departmental research portfolio. Several new collaborations indicate the promise of substantial future growth in research prominence. Graduate students of high quality are recruited into NREM, and faculty members are committed to securing adequate long-term support for students they accept. The department offers exceptional instruction in two undergraduate majors, Animal Ecology and Forestry. Especially notable attributes of the undergraduate curriculum are the commitment of the faculty to experiential, student-centered learning and the practical experience gained by students during a required 3-month work activity. NREM also has maintained a small but well-regarded extension program that is augmented exceptionally well by outreach efforts of teaching-research faculty as well as a cadre of government employees and alumni throughout Iowa.

The department is faced in the short-term with the challenge of replacing its chair, Dr. Engle, who will depart in mid-2008. Anticipated retirements, coupled with uncertainty regarding reallocation of tenure-track faculty lines, have raised the question of the proper future direction and balance of NREM research and undergraduate teaching programs. According to students, faculty, staff, and administrators, faculty currently seem more divided along historic disciplinary lines (Animal Ecology and Forestry) than immediately following the creation of NREM. We suggest that when considered jointly these challenges present a unique opportunity for departmental growth and unification.

To facilitate greater unification and sense of community based on a shared vision, we offer the following observations and recommendations:

- Complete a national search for a Chair in a timely fashion. Faculty unity is essential in recruiting a Chair who is committed to the broad vision of integration in NREM, a champion and practitioner of open communication among all faculty, students and stakeholders, and a promoter of equitable treatment of the NREM disciplinary groups in a manner that promotes respect, trust, and a sense of common purpose across groups.
- Consider devoting a faculty retreat to facilitated discussion that addresses the broader vision with which the department was created and identifies the underlying interests shared by NREM faculty.
- Form an external advisory council composed of representatives of the various constituencies served by the department's programs.
- Consider fostering NREM's development and unity at the college level by allocating 2-3 new faculty lines over the next 5 years to enable attainment of a critical mass in "cross-disciplinary" areas required for integration of Animal Ecology and Forestry.

- Consider transforming the undergraduate curriculum from two multi-option disciplinary majors to an integrated NREM core (e.g., a common ecology course, a “society and natural resources” course, 3-6 credits in each of the 3 disciplinary offerings and a common capstone experience) with majors and no options in Natural Resource Ecology and Management, Forestry, Fisheries, and Wildlife.
- Do not offer undergraduate courses with low enrollments.
- Ensure that undergraduate curricula continue to meet certification and accreditation standards of professional societies.
- Seek immediate clarification from the Education Director of the Society of American Foresters (SAF) regarding the following excerpt from the SAF Accreditation Handbook: *“The educational program for which accreditation is sought must show that a minimum of eight full-time equivalent (FTE) faculty members who participate in the program have their primary academic responsibilities in the forestry program and report to the responsible academic head.”*
- Target grant opportunities that take advantage of the disciplinary diversity within NREM and the College of Agriculture and Life Sciences/College of Liberal Arts and Science (CLAS) by forming and participating in teams to address grand environmental challenges.
- Secure additional investment by the CALS to maintain essential extension programming, including specialist positions, operating budgets, and support staff.

NREM is experiencing a cultural adjustment that is normal following a merger of two historically distinct departments. As the faculty addresses current challenges, we are confident that increasing cohesiveness, stability, and growth will follow. Numerous opportunities await NREM: a new cohort of faculty provides valuable expertise; there is strong representation of NREM in administrative posts at Iowa State; the Provost’s support creates a favorable university environment; and healthy enrollments and demand for courses offer the potential for NREM to prosper in the Resource Management Model. We hope that the findings and recommendations of the review team are helpful as the department strives to achieve all of its potential.

2. Administration

Context: In 2002 the CALS created NREM from faculty in the departments of Animal Ecology and Forestry, which were eliminated. The Chair of the previous Forestry Department served as NREM Chair for 2 years, followed by an Interim Chair for 1 year. Subsequently, a national search was conducted and Dr. David Engle was selected to become the Chair in 2005. Dr. Engle is leaving Iowa State University for family reasons during summer 2008. NREM completed a departmental strategic plan in December 2007. The department hosts two federally funded units (the Iowa Cooperative Fish and Wildlife Research Unit (ICFWRU) and the North Central Region Aquaculture Center (NCRAC)) staffed by faculty who contribute significantly to the department's research and graduate programs.

Strengths:

- Favorable climate exists for conducting scholarship of teaching and fostering teaching excellence.
- Rich history of disciplinary excellence in Animal Ecology and Forestry provides a strong foundation for the merged department.
- Chair has moved NREM forward in transition from two departments to one by building bridges to other CALS departments, Iowa State University administration, and multiple stakeholder groups.
- Clearly articulated set of goals and objectives are stated in the current strategic plan.
- The proactive approach to creation of NREM is viewed favorably by external stakeholders and ISU administration.
- Appointment of Associate Chair is an important addition to administrative leadership in NREM.
- Formation of an Internal Advisory Committee to the Chair expands faculty governance.
- Chair has been an effective advocate and mentor for junior faculty.
- Creative use of salary savings in seed grant program has stimulated external grants.
- Use of NREM student ambassadors as recruiters is an excellent way of providing tangible, “peer” connections for high school students.
- Support staff enjoys the “family” atmosphere of the NREM work environment.
- Considerable experience in merit and professional and scientific staff provides continuity.
- Staffing model commendable for including both IT and GIS support personnel.
- Department works well with and derives substantial benefit from its partnerships with NCRAC and ICFWRU.

Challenges:

- Void in leadership is created by departure of Chair.
- True integration of department has proven elusive; faculty are still struggling with departmental identity and creating an NREM that is greater than the sum of its Animal Ecology and Forestry parts.
- Faculty need to recapture the energy, excitement, and broader vision associated with the merger of Animal Ecology and Forestry.
- Concern exists among faculty that the higher administration and decision makers in both Iowa State University and the state of Iowa may perceive natural resource concerns as detrimental to the bioeconomy initiative.
- The impending shift to a Resource Management Model has created uncertainty and apprehension regarding resource allocation and program planning, especially related to lab-based instruction and other pedagogical innovations.
- Anticipated retirements of faculty will require balancing of instructional needs with building of research programs by new hires.
- Space constraints threaten ability to recruit top-tier faculty and students.
- Late entry into the university fund-raising campaign placed NREM at a disadvantage in developing and gaining support for priorities identified for programmatic, student, faculty, and facilities support.
- Several critical vacancies in support staff create workload stresses for existing staff and leave some functions unmet.
- Support staff feels vulnerable due to lack of administrative consistency resulting from frequent turnover in leadership.

Recommendations:

- Form an External Advisory Council composed of representatives of the various constituencies served by the department's programs.
- Faculty unity is essential to recruit a Chair who is committed to the broad vision of integration in NREM, a champion and practitioner of open communication among all faculty, students and stakeholders, and a promoter of equitable treatment of the NREM disciplinary groups based on respect, trust, and a sense of common purpose.
- Move towards a common philosophy that embodies integrated natural resource management and transcends disciplinary boundaries.
- Consider devoting a faculty retreat to facilitated discussion that addresses the broader vision with which the department was created and identifies the underlying interests shared by all NREM faculty.
- Proactively pursue partnerships with EEOB/Biology and related departments in the CALS and CLAS to justify development funds for new facilities as part of a Life Sciences initiative.

- Seek partnerships and external relationships consistent with incorporation of objective, science-based natural resource management into a holistic framework that targets a sustainable bioeconomy.
- Fill vacancies in support staff positions in a timely manner to improve efficiencies in departmental operation.
- Consider an adaptive strategy that takes advantage of external stakeholder expertise for instruction and delivers a clear expectation of new faculty commitments to required course offerings.

3. Faculty

Context:

Since the merger of Forestry and Animal Ecology in 2002, NREM has undergone substantial change in the composition of its faculty, with nine hires in tenure-eligible positions and four hires in non-tenure-eligible positions. Several open tenure-eligible lines are likely to occur from retirements within the next 5-8 years. Disciplinary expertise in forestry, fisheries, and wildlife remains good, and several of the post-merger hires bring broader, interdisciplinary interests to the department. Input is being collected for a comprehensive faculty staffing plan.

Strengths:

- Several faculty have national and international research and extension reputations.
- Faculty are well-known and respected throughout Iowa State University for their excellence in and scholarship of teaching.
- Energetic, enthusiastic, and close-knit junior faculty exhibit great potential for professional growth.
- Varied academic backgrounds of faculty enrich the diversity of ideas and experiences to be shared with students and colleagues.
- Impressive gender balance among faculty further enhances the diversity of ideas and provides exceptional role models for women students.
- The objective, systematic approach to soliciting input on key needs related to faculty staffing is commendable.

Challenges:

- The department is lean in terms of tenure-track lines, especially given its scope, student enrollment, and vision for conducting integrative science.
- Philosophical discord is evident between faculty who emphasize integration across disciplines and faculty who emphasize curricular needs associated with existing discipline-specific undergraduate majors.
- Anticipated faculty retirements, especially in Forestry, have created a sense of urgency to adopt a staffing plan.
- Several faculty members are approaching consideration for promotion and tenure, which can create stress within the department.
- The department lacks an effective faculty mentoring system.

Recommendations:

- Consider providing NREM with 2-3 new faculty lines over the next 5-6 years to enable attainment of a critical mass in “cross-disciplinary” areas required for integration of Animal Ecology and Forestry.
- Seek immediate clarification from the Education Director of SAF regarding the following excerpt from the SAF Accreditation Handbook: *“The educational*

program for which accreditation is sought must show that a minimum of eight full-time equivalent (FTE) faculty members who participate in the program have their primary academic responsibilities in the forestry program and report to the responsible academic head.” We suggest that the current NREM Chair solicit this clarification in conjunction with the Internal Advisory Committee.

- Craft a staffing plan that incorporates elements of the Stakeholder Delphi process, clarification regarding SAF accreditation, and faculty visioning.
- Explore, adopt, and implement best practices for mentoring of assistant and associate professors.

4. Teaching

Undergraduate Program

Context:

The undergraduate program enjoys healthy enrollments with about 300 students, which is approximately 11 percent of the CALS enrollment. About one-fourth of the undergraduates are in the Society of American Foresters (SAF) accredited B.S. forestry degree program and three-fourths are in the animal ecology major, which enables completion of the courses needed for graduates to become certified by The Wildlife Society (TWS) or by the American Fisheries Society (AFS). Graduates in both majors are highly competitive in the job market.

Strengths:

- Faculty are committed to student-centered learning with emphasis on experiential field components that are highly interactive.
- Focusing on learning-based outcomes is an excellent approach to evaluating and structuring curricula.
- Faculty and TAs are accessible and devoted to education of undergraduates.
- Abundant internship opportunities are readily accessible through an electronic job board.
- Providing Animal Ecology options that meet certification standards (AFS, TWS) and forestry options accredited by SAF is appropriate and noteworthy.
- Manageable class sizes and laboratory sections exist.
- Integrated forestry semester and camp creates a close-knit cohort of forestry students.
- Requirement of work experience for undergraduates is commendable and leads to graduates who are better prepared for careers in natural resources.
- Reported placement rates for graduates (94-95%) are impressive.
- Stakeholders have generally positive impressions of NREM graduates.

Challenges:

- Two majors, each with five options,
 - spreads faculty too thin,
 - delays declaration of majors by students, and
 - leads to options with great disparities in enrollment
- Classes with low enrollments detract from faculty productivity in research, extension and service areas.
- There is no consensus among faculty on whether to create an integrated undergraduate major in Natural Resources Ecology and Management.
- Desire exists for a field camp experience in Animal Ecology, but large enrollments are problematic.
- No capstone experience currently exists that integrates across the NREM core disciplines.

- Animal Ecology and Forestry students currently are segregated in terms of classes, and students desire greater integration and opportunities to interact.
- There is an apparent lack of integrated resource management concepts being taught in either Animal Ecology or Forestry majors.
- Wildlife students experience delayed exposure in discipline-specific issues, practices, and concepts.
- Capstone course ideally should reinforce integrated concepts across forestry, wildlife and fisheries ecology and management, teamwork, exposure to stakeholders, and other professional skills learned previously; currently “capstone” is the first exposure for Animal Ecology majors.
- Curricula lack readily identified natural resource social science offerings, beyond policy and limited economics.

Recommendations:

- Where possible, explore the possibility of reducing the number of course offerings by adopting an integrated format/approach that meets the needs of more than one major.
- Do not offer undergraduate courses with low enrollments.
- Consider transforming the undergraduate curriculum from a multi-option disciplinary focus to an integrated core (e.g., 3-6 credits in each of the 3 disciplinary offerings and a common capstone experience) with majors in Natural Resource Ecology and Management, Forestry, Fisheries, and Wildlife.
- Explore avenues for providing students with early exposure to social values and issues in natural resources that will be reinforced in the capstone experience (e.g., by partnering with other social science departments, prioritizing hiring of a faculty member in natural resource social science in the faculty staffing plan, or tapping in to non-academic expertise of stakeholder groups).
- Ensure that undergraduate curricula continue to meet certification and accreditation standards of professional societies.

Graduate Program

Context:

NREM previously offered M.S. and Ph.D. degrees in 4 majors. Recently the Animal Ecology major was dropped and the Wildlife Biology major was renamed, resulting in three majors now offered: Fisheries Biology, Forestry, and Wildlife Ecology. Current enrollment in these majors includes 18 M.S. and 8 Ph.D. students. Additionally, NREM serves as the home department for several inter-departmental majors; 9 M.S. and 5 Ph.D. students currently enrolled in inter-departmental majors have NREM faculty as their major professor. The total graduate enrollment of 40 students equates to an average of about two per tenure-track faculty member. The NREM Strategic Plan includes a goal to increase both numbers and diversity of graduate students. Although NREM is successful in recruiting high-quality students, the limited availability of student support, especially research assistantships, constrains the desired growth in enrollment. The NREM graduate program is administered by a Director of Graduate Education and a Graduate Admissions Committee of four faculty members. A Graduate Student Organization actively promotes student camaraderie, professional development, and representation in departmental governance. The department is considering whether to develop and offer an additional new major in Natural Resource Ecology and Management.

Strengths:

- The Graduate Student Organization is effective in organizing graduate student activities and has a positive influence on student morale and collegiality.
- The high quality of NREM graduate students is evident, and students are competitive for interdepartmental and federal fellowship support.
- The availability of teaching assistantships is good compared to other natural resources departments.
- The requirement for graduate students to complete a teaching experience is exemplary.
- The requirement to prepare at least one paper for publication is excellent.
- Faculty members exhibit an exceptional commitment to securing multi-year funding for incoming graduate students.
- The broad range of expertise among NREM faculty should position them well to pursue large, interdisciplinary research grants.
- The replacement of the Animal Ecology and Wildlife Biology majors with a single major, Wildlife Ecology, is a positive step for reducing redundancy.

Challenges:

- Limited availability of funding, especially for research assistantships, is constraining the desired growth in graduate student enrollment.
- Students perceive that disciplinary divides among faculty are reducing opportunities for interaction and scholarly endeavor across disciplines.

- Seminars are poorly attended.
- Few activities aim specifically to encourage interaction of graduate students with faculty across disciplinary lines.
- Activities associated with integrative, large-scale research have not yet materialized among faculty, and this limits opportunities for graduate students.
- Demand exists for focused “modular” courses offered for portions of a semester.
- There is no consensus among faculty on whether to create a graduate major in Natural Resource Ecology and Management.
- No organized peer mentoring system exists to aid students in the orientation process.

Recommendations:

- Consider forming faculty teams to apply for large interdisciplinary grants that are well matched to existing departmental strengths and expertise. Such grants will expand opportunities and funds for graduate research, especially at the Ph.D. level.
- To increase participation at seminars, consider making seminars more attractive (e.g., through careful selection of speakers using student input) and/or implementing an attendance requirement.
- Consider offering 1-credit or 2-credit modular courses focused on specific research or thematic needs identified by students.
- Before proceeding with establishment of a new graduate major, develop a clear understanding and solid rationale for doing so. At a minimum, a feasibility analysis should consider the demand for such a program, the critical mass of faculty concentrated in the proposed area, the effect of such an addition on existing majors, and the advantages to be gained in terms of national prominence.
- Input from NREM stakeholders indicates support for a new NREM graduate major designed to achieve rigor in the theory and practice of interdisciplinary research and competency in integrated resource management.
- Adopt a peer mentoring system for incoming students.

5. Research

Context:

Research activities in NREM generally fall into three broad categories: 1) natural resource products and services; 2) mitigating effects of large-scale agriculture and anticipating change; and 3) the scholarship of teaching. NREM faculty, staff, and students conduct applied research, publish regularly in scholarly outlets, and secure a reasonable level of funding in support of their activities. Importantly, indicators of productivity point to a positive overall trajectory in the research program over time.

Strengths:

- Several prominent scientists are on the faculty, many with well-funded research programs.
- Faculty take advantage of a diverse array of funding sources, from local to international.
- Rates of publication have increased since merger and are reasonably strong.
- Many publications appear in high-impact journals.
- Leadership in scholarship of teaching is praiseworthy.
- Affiliations with NCRAC and IFWCRU enhance and complement core faculty research productivity.
- Recent hires have expanded the scope of research expertise.

Challenges:

- Relatively little activity by faculty to join or form research teams that address grand environmental challenges (e.g., climate change, water).
- Tendency to focus inward results in some missed opportunities to collaborate with faculty in other academic units on interdisciplinary projects.
- External support declined during 2006-07 relative to 2003-05.
- Increasing graduate enrollment will require additional grant dollars.
- Unstable source of seed grant funds inhibits development of research programs by junior faculty.

Recommendations:

- Target grant opportunities that take advantage of the disciplinary diversity within NREM and CALS/CLAS by forming and participating in teams to address grand environmental challenges.
- Carefully consider cultivating relationships with foundations as potential sources of environmental grant funds in agroecosystems (e.g., principles of sustainability for the bioeconomy).
- Increase visibility of research programs and products with annual departmental poster sessions to which stakeholders are invited. Highlight problem-oriented, integrated research-extension activities at large public venues such as the Iowa State Fair.

6. Extension/Outreach

Context:

Extension and outreach have a long and renowned history at Iowa State University that truly embraces the land-grant mission. Likewise the departments that formed NREM had a strong history of excellent extension programming and individual faculty outreach to the Iowa citizenry and beyond. Today extension is in a critical period with stagnant federal funding and flat to reduced state funding. NREM extension staffing is at a significant juncture with recent shifts in appointments (i.e., Dr. Morris), new hires (Dr. Randall and Mr. Clayton), and the imminent retirement of Dr. Pease.

Strengths:

- Outstanding reputation, productivity, and impact of programs exist.
- Citizen science with Iowa Nature Mapping and Master Conservationist Program are creative and useful innovations with potential for further discovery.
- A high level of departmental commitment to extension/outreach is apparent, including faculty with no extension appointment.
- Successful involvement of non-university natural resource professionals (e.g. Iowa Department of Natural Resources) in programming efforts statewide is commendable.
- Programming in youth education and mass media are superlative and impact recruitment into Iowa State University departments.

Challenges:

- Reduced funding and staffing levels threaten viability of programming efforts and reduce opportunities for meeting changing stakeholder needs relative to other CALS departments.
- Faculty with combined extension and teaching appointments can constrain program development and functioning.
- Off-campus programming efforts are restricted by lack of natural resource expertise in county and area offices.
- Over 40% of the approximately 2.4 extension full-time equivalents in NREM are soft-funded.
- Very limited operating budgets and no support staff funding hamper programming efforts.
- Retention of young faculty and staff.
- Impending retirement of Dr. Jim Pease.

Recommendations:

- Additional investment by the CALS is essential to maintain essential programming, including specialist positions, operating budgets, and support staff.
- Consider a functional Extension/Research split for future positions and integrate Extension into all grants and research activities in NREM.
- Opportunities exist for developing regional programs in natural resource extension in conjunction with County Conservation Boards.

7. Conclusions and Acknowledgments

The review team concludes that the Department of Natural Resource Ecology and Management is a viable and productive academic unit. Since its creation, NREM has maintained strong undergraduate programs in Animal Ecology and Forestry, fueled by the faculty's commitment to excellence in student learning opportunities. Research productivity has grown, and new faculty hires in cross-disciplinary areas bode well for continued growth in extramural support, graduate student enrollment, and publication of findings with high impact for scientists and citizens. Outreach is strong among NREM faculty and augments formal extension programs to the benefit of Iowans. NREM enjoys considerable support from and is held in high regard by its stakeholder groups. The review team hopes that its findings and recommendations will prove useful to the faculty and administrators charged with charting a future course for NREM that embraces the best qualities associated with an academic unit comprising multiple disciplines and serving a critical role in the land-grant mission.

The review team is extremely appreciative of the hospitality provided to us by members of Iowa State University before, during, and after our campus visit. Special thanks are extended to Dean Wintersteen and her staff in the CALS, and to Provost Hoffman and other university administrators with whom we met. NREM provided us with an informative self-study document as preparation, fine accommodations during our stay, prompt and efficient transitions between meetings, and a busy but productive work schedule. Participation by faculty, staff, and students at meetings was outstanding and provided an ideal environment in which to conduct a review; we are grateful to all who took time out of their schedules to engage in open and constructive exchanges. In virtually all of our interactions, we came away impressed by the desire among all parties to improve and strengthen the department.

We are especially grateful to Dr. David Engle for his efforts in assembling the review team, attending to details of travel and other logistics, providing the self-study document, responding in a timely fashion to requests for additional information, adjusting our itinerary as needed during our visit, and providing support for completing the report. We are indebted to Dr. Joe Morris for his prompt attention to scheduling details, his unfailing commitment to organize meetings and keep us on time, and his willingness to serve as the team's chauffeur. We recognize and appreciate the incredible investment of time and resources expended by the Department of Natural Resource Ecology and Management and the College of Agriculture and Life Sciences in preparing for and implementing this review.

Responses to Questions Posed by Dean Wintersteen (*Questions are in italics*)

1. *Is NREM achieving its strategic goals?* The department created a strategic plan in 2003, shortly after its creation. A newly revised strategic plan was approved in December, 2007. For purposes of addressing the question, we refer to selected goals from the 2003 strategic plan. In short, the department has attained the majority of its goals:
 - a. NREM has maintained undergraduate curricula that meet certification standards of the American Fisheries Society and The Wildlife Society and Society of American Foresters accreditation of the forestry major.
 - b. Faculty publication rates have increased substantially during the period 2003-07, but external funding peaked in 2004.
 - c. Space relocations and enhancements have been completed successfully.
 - d. Outcomes-based assessment is underway at the undergraduate level.
 - e. Undergraduate student diversity remains low.
 - f. Two faculty hires emphasized areas of emerging importance (biomass conversion and wildlife diseases)
 - g. Extension programs have provided valuable science-based educational programs to Iowans.

2. *Are undergraduate and graduate curricula flexible enough to address and attract the best students and train them for emerging demands in private and public sector employment?*
 - a. Undergraduate: Student quality in NREM generally is average for the CALS. Integrated forestry semester and work experiences for undergraduates are commendable and lead to graduates who are prepared for careers in natural resources. Placement rates for graduates (94-95%) are excellent, a testament to the value employers place on NREM graduates. Increased flexibility in the curriculum could improve the ability of graduates to address the complex problems facing natural resource professionals. Specifically, we have recommended that the NREM faculty consider transforming the undergraduate curriculum from a multi-option disciplinary focus to an integrated core (e.g., 3-6 credits in each of the 3 disciplinary offerings and a common capstone experience) with majors in Natural Resource Ecology and Management, Forestry, Fisheries, and Wildlife. Such a transformation is a substantial undertaking and likely will require additional capacity for teaching. We also note that no consensus has emerged at this point regarding either core integration or addition of a NREM major.
 - b. Graduate: Student quality is high at the graduate level. No data on placement were provided, but we were told it is quite high. Personalized curricula at the graduate level enable tailoring of training to specific needs and thereby enhance the preparation of students for successful careers following graduation. In this regard, then, sufficient flexibility exists in the graduate curriculum. Some faculty in NREM have expressed a desire to add a graduate major in Natural Resources Ecology and Management,

at least in part to aid efforts at recruiting students who are interested in an integrated program that crosses disciplinary boundaries. Before doing so we recommend conducting a feasibility analysis to consider, at a minimum, the demand for such a program, the critical mass of faculty concentrated in the proposed area, the effect of such an addition on existing majors, the ability to offer a synthetic core course in the major, and the advantages to be gained in terms of national prominence and program growth.

3. *What do you recommend the college and department should be doing to continue to move NREM forward on their trajectory toward increased national visibility and prominence with respect to teaching/learning, research, and extension? See the Executive Summary and the body of the final report for abbreviated and complete lists of recommendations, respectively.*
4. *How should we configure the workloads of the faculty to ensure excellence in teaching and research? Seeking somewhat lighter teaching responsibilities while new faculty members are building their programs seems appropriate and currently is practiced. Likewise, reduced committee service in formative years will foster an improved climate for successful research development. It is important to note that a “one-size fits all” model for functional allocations likely is not applicable in departments such as NREM where some majors have greater per capita demands for teaching. Alternatively, greater integration of majors could permit a more equitable distribution of course responsibilities among faculty.*
5. *Please help the college to assess the understanding of and commitment to mission-oriented research by faculty in NREM with Experiment Station appointments. NREM faculty uniformly expressed a thorough understanding of and commitment to mission-oriented research. The specific research being conducted is focused on “solution science” pertaining to natural resources. Moreover, faculty are enthusiastic about sharing their findings beyond the scientific community, and the outreach efforts of those without extension appointments is a wonderful example of the land-grant mission at work.*
6. *Given the College’s and University’s focus on the bioeconomy, please consider the Department’s participation in the transformation in agriculture and the agroecosystem to obtain sustainable, new carbon along with food, feed and fiber as well as conserving and protecting natural resources. NREM has an established research program associated with poplar, a potential lignocellulosic feedstock. The department also participated recently in a joint hire who will explore biomass conversion for energy and chemicals. In Iowa, NREM is uniquely positioned to contribute essential information about the ecological principles critical to ensuring long-term sustainability of a bioeconomy. Faculty in the department are concerned about venturing into this important realm of inquiry, because they understand the economic drivers at work and question the*

support their research would receive at higher levels in the university administration.