

DEPARTMENT OF NATURAL RESOURCES

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STRATEGIC VISION

Spring 2004

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An Overview of the Department of Natural Resources

Brief History

The Department of Natural Resources at Cornell University began as the Nation's first four-year college of forestry (1898-1903). It evolved into the Department of Forestry (1911-1948) and the Department of Conservation (1948-1970) within the College of Agriculture and Life Sciences, before becoming the Department of Natural Resources (DNR) in 1970.

By the early 1970's, the DNR was recognized nationally for its multidisciplinary programs that pulled together the knowledge bases and approaches of biologists/applied ecologists, social scientists, and a humanist. Unlike many university "fish and wildlife biology" departments, DNR has, for over 30 years, included multidisciplinary programs addressing complex natural resource and environmental management problems by combining both the biological and human dimensions of resource management in ways now being advocated world-wide as the preferable model. Such approaches are acknowledged throughout the international natural resource management community as the only ones likely to make significant progress in identifying sustainable solutions to natural resource and environmental management problems. This view was emphasized recently in an editorial in *Conservation Biology* (Mascia et al., 17(3):649, June, 2003):

The disconnect between our biological knowledge and conservation success has led to a growing sense among scientists and practitioners that social factors are often among the primary determinants of success or failure ... conservation interventions are the product of human decision-making processes and require changes in human behavior to succeed. Thus, conservation policies and practices are inherently social phenomena, as are the intended and unintended changes in human behavior they induce. ... To preserve the earth's natural heritage, the social sciences must become central to conservation science and practice.

Today, the Department is a leader in research, education, and outreach activities in areas as wide-ranging as conservation biology; fisheries, forest, wetlands, and wildlife science and management; quantitative ecology; ecosystem biology and biogeochemistry; human dimensions of natural resource management; environmental policy and institutional analysis; and environmental management and education. Department programs focus on improving understanding of the biological, ecological, social, political, institutional, cultural, and technical contexts in which environmental and natural resource management decisions occur. (See Appendix 1 for a brief summary of DNR mission and program areas.)

Conceptual Framework: DNR Contributions to Society

There is a growing need to make informed, scientifically defensible decisions concerning appropriate strategies to achieve conservation or management objectives. Current conservation and management programs are built upon advances in the monitoring, assessment, and science of population and ecosystem biology, conditioned on the social, historic, political, economic, and legal context of human interactions with those environments. Whereas biological understanding is clearly a cornerstone of this endeavor, substantial uncertainty remains about the impacts of management decisions, and how to make those decisions and allocate resources in the presence of such uncertainties. The Department of Natural

Resources, in pursuing its mission (see p. 6), strives to help address a key question facing 21st century conservation and management: “Given uncertainty in our understanding of the dynamics of natural systems, and how those dynamics may be influenced by human actions, how can we make effective decisions for conservation and management of living resources in a scientifically defensible way?”

The collective activities of the Department help inform the adaptive management processes used by natural resource managers and other professionals (Figure 1). Our research provides data necessary for informed decisions, and insights critical to improving decision-making processes. Our extension and outreach activities help citizens, resource professionals, and policy makers understand better the complexities of the resource management challenges requiring societal attention, and how those challenges may be addressed more effectively. Our teaching activities help create a citizenry aware of resource management and environmental challenges, their implications, and potential paths toward solutions, as well as help create a cadre of informed future resource and environmental management scientists and professionals.

Figure 1 illustrates the Department’s contributions to addressing these challenges. First, resource conservation and management is based on the notion of making decisions and taking actions to achieve objectives set by people. This involves the process of formulating objectives and weighing alternatives, informed by understanding the uncertainties in the natural and human systems society attempts to manage, and the technical, human, and ethical challenges of implementing a plan aimed to meet successfully those objectives. Ecological, political, social, and historical analyses help inform understanding of the context in which these processes occur, and how the future context may be shaped.

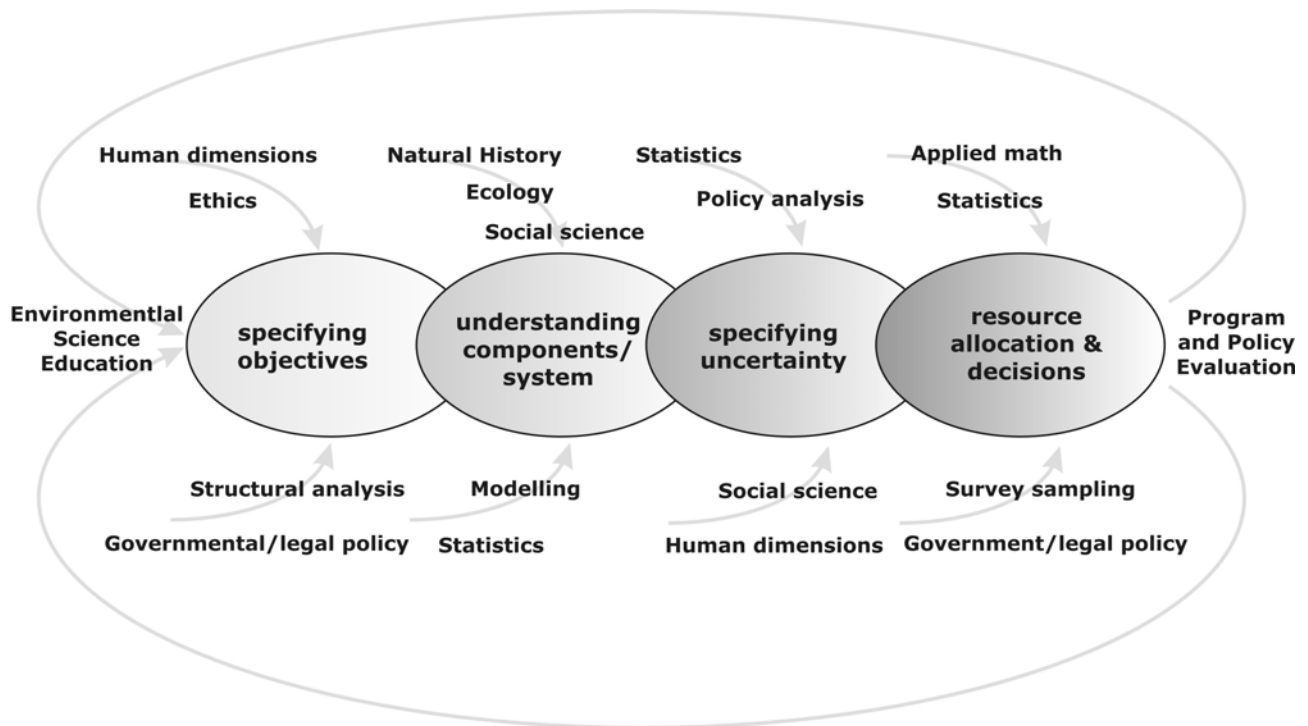


Figure 1. A simplified framework representing an adaptive natural resource management process, illustrating how Department of Natural Resources expertise contributes to each component, through research, extension/outreach, and teaching future resource professionals and citizenry how to be effective within this management framework.

The process of setting objectives is a distinctly human endeavor, integrating scientific information, stakeholder perspectives, legal considerations, economics, the context of social structures, and ethical concerns. Department faculty focus theories and techniques from the social sciences, humanities, education, policy studies, structural analysis, and integrative human dimensions studies to understand better the factors and constraints involved in objective-setting. The resulting knowledge is shared with agencies and organizations charged with resource conservation and management, with citizens seeking to be involved in management decision processes, and with students seeking to understand their future role within these processes.

Second, an adaptive management process includes modeling the components of natural and human systems, or the systems overall. Such modeling provides a basis on which to begin to identify and analyze the forces and dynamics that influence society's ability to achieve conservation and management objectives. Department faculty engage in social science inquiry as noted above, as well as studies in natural history, ecology, population dynamics, and statistics as they engage in modeling systems and their components. Modeling involves integrating what we know, or believe we know, about such systems into a framework that others may use for making decisions, and is inherently quantitative. Thus, modeling involves collaboration between ecological and social science researchers, and statistical and mathematical modelers, and involves sharing that information with those who may make use of it, through our research and extension/outreach functions. Teaching focuses on improving abilities of students to both do modeling, and to critique modeling processes and conclusions.

Third, characterizing uncertainty is a uniquely human task, informed by modeling and theory. Techniques from the policy sciences, human dimensions inquiry, and social and statistical sciences inform work in this area, and help define a range of possible outcomes and associated implications depending on the variables involved.

Finally, resource allocation decisions must be made. Possible strategies must be identified, given the sources of uncertainty, including ecological system unknowns, and social and political constraints. This is, in part, a technical activity, using methods in applied math, statistics, and computational sciences, but informed by the limits posed by the ecological, legal, political, cultural, social, and human context in which the decisions will be implemented. Evaluation of decisions and actions is a key element that leads to continual improvement over time. Evaluation focuses on ecological outcomes, and human decisions and outcomes, as well as the processes used to achieve them. Department research, extension/outreach, and teaching focus on improving these processes through better knowledge, and better use of knowledge.

Figure 1 illustrates the importance of integrating a variety of disciplinary areas within a single department. It demonstrates that the components of the Department of Natural Resources all relate to a common, underlying purpose: enabling current and future resource professionals, citizens, and policy makers to make appropriate resource allocation decisions under conditions of uncertainty. It also demonstrates clearly the need for diverse faculty and staff in such a department; adequate representation must be given to each of the main conceptual areas. This conceptual framing integrates toward a common purpose the diverse areas of DNR teaching, outreach, and research.

A unique characteristic of the Department of Natural Resources is that its members have investigated multidimensional, complex issues related to the management of renewable natural resources for many

years, including both domestic and international emphases. Hence, there has been an evolution of an applied ecological focus coupled with social science expertise to foster interdisciplinary research approaches, contributing also to coordination of research, teaching, and outreach functions. This approach enables the Department's faculty, staff, and students to address emerging, complex environmental and natural resource management problems that often frustrate more narrowly-defined academic units. Despite, or maybe because of, our broad disciplinary diversity, we continue to take pride in fostering a collegial environment that supports inquiry, learning, professional development, and service to society.

Relationship to the College of Agriculture and Life Sciences Priority Areas

The College of Agriculture and Life Sciences identifies four priority areas within its academic focus: (1) Land-Grant Mission; (2) Applied Social Sciences; (3) Environmental Sciences; and (4) New Life Sciences. The conceptual framework underlying the organization of the Department of Natural Resources (DNR) explained above illustrates the contributions of the DNR to all of these priority areas:

- (1) Land-Grant Mission: The Department of Natural Resources includes a vibrant extension and outreach program, described in more detail below. Extension and outreach relationships with stakeholders, county extension educators, management and conservation organizations domestically and internationally, policymakers, and others provide an opportunity to develop and share information related to objective-setting and decision-making processes. DNR's scholarship benefits natural resource stakeholders, resource and conservation managers, and citizens generally in New York, the nation, and the world.
- (2) Applied Social Sciences: The Department boasts a potentially (and recently) strong program in Resource Policy and Management, described in detail below. As indicated in Figure 1, the social sciences are a key element of the conceptual framework of DNR, contributing to efforts to understand better the processes of objective-setting, specifying uncertainty, and making decisions. This element of DNR has experienced several unfilled retirements in recent years; filling a faculty position in this area is a Department priority, discussed in greater detail in a later section, and is critical to restoring this area as a key strength of DNR.
- (3) Environmental Sciences. The Department's program in Resource Ecology and Management is linked integrally to the environmental sciences, and is described in detail below. DNR work in environmental sciences is key to our efforts at modeling natural systems and their components. In addition, DNR is a key participant in the new CALS undergraduate major in the Science of Natural and Environmental Systems.
- (4) New Life Sciences: Here, too, elements of the Resource Ecology and Management program (described below) provide leadership in areas such as biocomplexity, biodiversity, conservation biology, and biogeochemistry. There is potential to increase our participation in this university initiative, discussed later in relationship to future faculty positions, particularly related to the Biocomplexity and Biogeochemistry Initiative (BBI).

Mission

The mission of the Department of Natural Resources is:

- *To develop knowledge and facilitate learning to improve society's stewardship of natural resources and the environment.*

We pursue this mission by focusing on improving understanding of:

- How natural processes and human activities influence the composition, structure, function, and health of terrestrial and aquatic ecosystems;
- The characteristics and dynamics of fish, aquatic, wildlife, forest, and wetland resources;
- How management actions can enhance the conservation and sustainable use of natural resources within terrestrial and aquatic ecosystems, as well as overall ecosystem health;
- Decision-making processes with respect to natural resources and environmental conservation, including enhancing integration of biological and human dimensions in such decisions; and
- How management actions and policy decisions can improve environmental stewardship and the quality of life by reducing negative impacts associated with plants, animals, and ecosystem processes.

Program Areas

Research, teaching, and outreach/extension activities in the DNR focus on the interface of ecological systems and human relationships with those systems, guided by the overall goal of informing decision-making contexts and processes at all stages, as illustrated in Figure 1. By integrating our understanding of aquatic, terrestrial, and human systems with the needs of policymakers, managers, and citizens, we help foster informed decisions to improve society's stewardship of natural resources, and contribute to improving decision-making processes and contexts.

As illustrated earlier in Figure 1, our emphasis is problem-focused and integrative, applying theory and empirical data from ecological and social sciences to address important natural resource and environmental conservation issues. Scholarly inquiry, education, and outreach are focused on two major program areas, **Resource Ecology and Management (REM)**, and **Resource Policy and Management (RPM)**. REM includes focus on community and ecosystem ecology, as well as population and species ecology; RPM includes focus on policy and human dimensions (Figure 2).

The unifying theme underlying these two programmatic foci emphasizes that an array of scientific disciplines and approaches is necessary to help society achieve the ability to truly implement ecosystem-based management, to solve complex problems of conservation and management, and to ensure sustainable human societies into the future. Examples of problems addressed in both the REM and RPM program areas, from complementary disciplinary vantage points, include:

- Sustainable exploitation of species of economic importance;
- Management of overabundant or invasive species;
- Conservation and restoration of scarce species and their habitats; and
- Mitigating the effects of human-induced changes on the environment.

Figure 2 illustrates how we envision these program areas conceptually, and in relation to each other.

Resource Ecology and Management (REM)

REM faculty and staff strive to develop knowledge related to ecological system processes and functions, community-level interactions, population-level concerns, and natural history. Focal topics within this program area include conservation biology, population modeling, quantitative ecology, ecosystem biology and biogeochemistry, and fishery, aquatic, forest, wildlife, and wetland sciences. Scholarly attention is focused on patterns in the structure and function of aquatic and terrestrial ecosystems, the processes and environmental factors that control those patterns at several spatial and temporal scales, and how humans influence these patterns, processes, and environmental factors. REM faculty work with many collaborators external to the Department, including the Departments of Ecology and Evolutionary Biology; Genetics and Development; Crop and Soil Sciences; Chemistry and Chemical Biology; Earth and Atmospheric Sciences; Biological and Environmental Engineering; Horticulture; Avian and Aquatic Animal Medicine (College of Veterinary Medicine); and the Cornell Lab of Ornithology.

Resource Policy and Management (RPM)

Faculty and staff within this program area seek to improve understanding of environmental policy and management decision-making processes and outcomes, and the contexts (e.g., political, cultural, social, ethical) in which those decisions and outcomes occur. Focal topics within this program area include community-based natural resources management, environmental education, human dimensions of natural resource management, policy and institutional analysis, program development and evaluation, institutional and technological change, and risk analysis and management. Scholarly activity within the RPM program focuses on producing and interpreting knowledge about human behaviors, attitudes, values, norms, institutions, and societal processes in relation to human interactions with aquatic and terrestrial ecosystems, and focuses on human communities and institutional processes at local, state, regional, national, and international scales. Collaborations exist with faculty and staff in the Departments of Communication, Education, Development Sociology, and Applied Economics and Management; and with the Polson Institute for Global Development, the Program on Environment, Governance, and Development at the Einaudi Center, the Cornell International Institute for Food, Agriculture, and Development, the American Indian Program, the Johnson Graduate School of Management, and the Community and Rural Development Institute.

As Figure 2 illustrates, faculty within each of the major program areas (RPM, REM) pursue research, teaching, and outreach in various focal areas (outer ring). Within this framework, groups of faculty may organize together to enhance their collective focus on broader topics (see overlapping circles), such as landscape management, population management, and applied ecology, with an ultimate goal that collective Department outcomes in research, teaching, and outreach will contribute to an improved societal ability to implement and achieve the goals of ecosystem-based management. An example of such collaboration is a project funded by the National Science Foundation, engaging both RPM and REM faculty and staff in examining the biological, technical, social, and ethical dimensions of wildlife fertility control, focusing specifically on urban and suburban communities faced with the challenge of managing burgeoning populations of white-tailed deer and/or feral cats. Other opportunities for within-

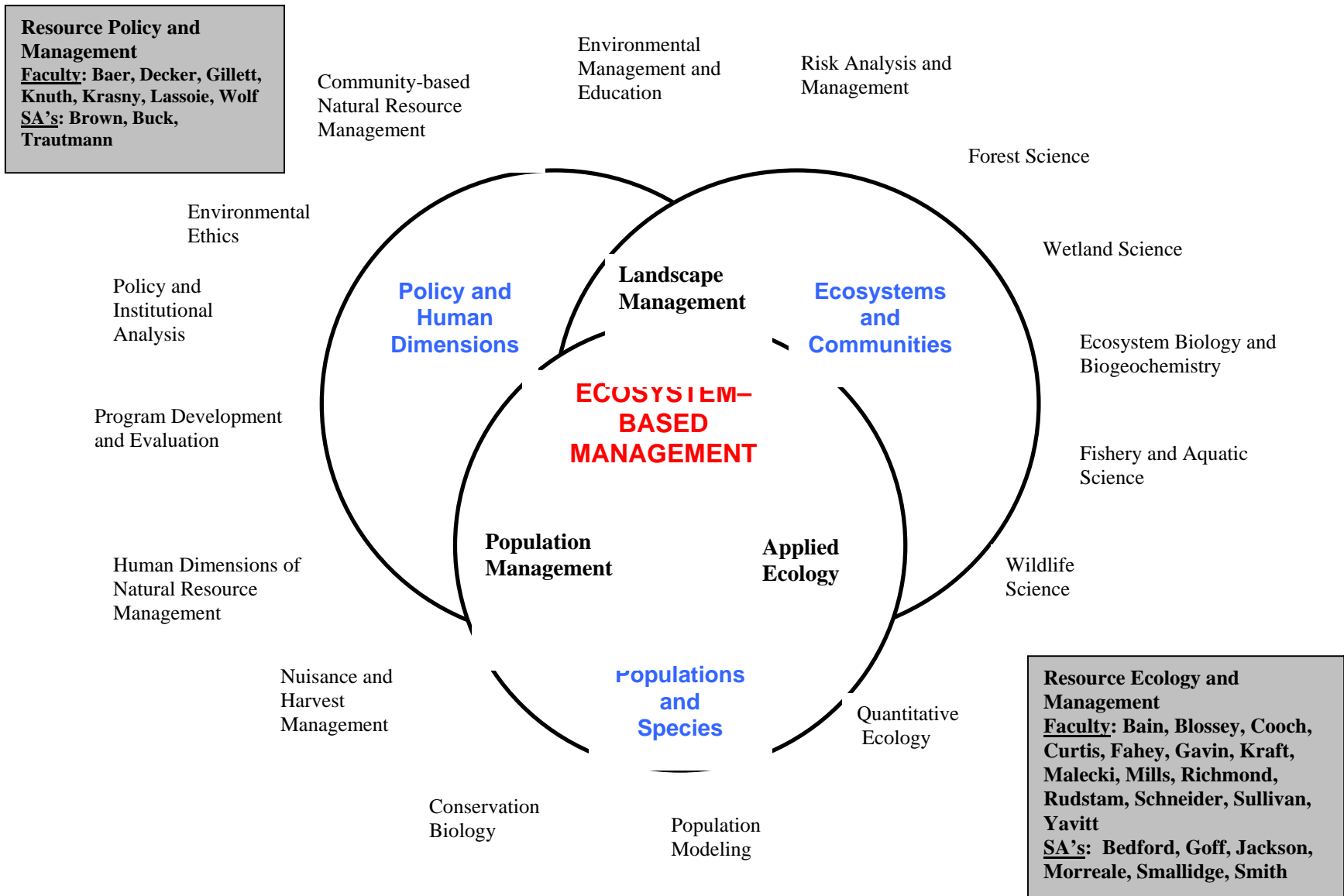


Figure 2: Programs and Focal Areas within the Department of Natural Resources.

program or cross-program area collaboration are limited only by the interest and availability of faculty and staff.

Functional Areas

Faculty and staff within the Department of Natural Resources hold responsibilities in several functional areas, summarized here, then described in more detail below:

- **Research:** Expanding the scientific and scholarly information available for integrated environmental and natural resources management through excellence of research in applied (problem-focused) ecological and social sciences, and public policy analysis, domestically and internationally.
- **Teaching:** Providing undergraduate and graduate education programs that are challenging, prepare students to meet the changing needs of society for effective, integrated environmental and natural resource management, and result in an overall rewarding student experience.
- **Extension and Outreach:** Fostering stewardship of natural resources and the environment by increasing public awareness of new discoveries and understanding of the complexity of problems, and disseminating cutting-edge environmental science and natural resource management knowledge and tools for learning, domestically and internationally. Interactions focus on natural resource management professionals and educators, environmental and conservation leaders, public policy decision makers, natural resource users, and diverse adult and youth populations.

Research

Active research programs exist in both of the major program areas, Resource Ecology and Management, and Resource Policy and Management. In 2003, Department faculty published 65 refereed publications (4.6 per research FTE), 64 other publications (4.6 per research FTE), and 3 books. In 2002, the Department of Natural Resources was the leading department in the College of Agriculture and Life Sciences in terms of total direct costs generated annually from sponsored grants and contracts (\$4.8 million); second in the College in total direct costs generated per faculty (\$318,000), and third in the College in total indirect costs generated. The discrepancy between being first in direct costs and third in indirect costs reflects our problem-focused mission and our service to stakeholders. A portion of our research program is supported by government agencies and non-government organizations, who benefit directly from the results of our studies but who do not pay full indirect costs.

Research provides the basis for our mission, and for our contributions to our other functions (teaching, extension/outreach). Given the diversity of Department members and the multidisciplinary character of the Department (see Figure 2), we strive to appreciate the different ways to engage in research and the different research structures (i.e., types of publications, scope of funding opportunities, modes of working with graduate students). Nevertheless, we are committed to accountability to document goals, productivity, and accomplishments.

Teaching

The undergraduate program in Natural Resources provides a biologically-based major that focuses on the interface of nature (populations, species, communities, and ecosystems) with the human institutions involved in environmental conservation and management. The curriculum integrates the disciplinary perspectives

represented in Figure 2 with the operational perspectives represented in Figure 1, and thus emphasizes the biology and ecology of natural systems and their conservation and management, while including substantial attention to the social science/human aspects of environmental management and conservation. Courses provide rich opportunities for hands-on experiential learning through several field-based courses (including a policy course in Washington, D.C.), complemented by numerous opportunities to work with faculty in conducting field and laboratory research, engage in internships based at the Department's field facilities at the Arnot Teaching and Research Forest, the Cornell Biological Field Station, and the Little Moose Field Station in the Adirondacks, and join research projects at the Hubbard Brook Experimental Forest. The major prepares students for graduate school, or for entry-level positions in environmental and/or resource management agencies at local, state, federal, and international levels, or for jobs in the private for-profit (e.g., environmental consulting) or non-profit sectors.

Concentrations are available in:

- Applied Ecology, providing students with advanced study of species and population biology and ecosystem ecology as applied to the conservation and management of organisms and their habitats;
- Resource Policy and Management, providing students with advanced study in the institutions and policies that humans apply to resource and environmental management; and
- Environmental Studies, providing students an opportunity to design their own upper-level focus on a program of study focused on the interactions of humans and their environment.

The Department also participates in the new undergraduate major, Science of Natural and Environmental Systems (SNES). Dr. Tim Fahey (of DNR) serves as the Undergraduate Program Director and Advising Coordinator. Several DNR faculty serve as academic advisors to students within the major. Our courses contribute to SNES concentrations in Environmental Biology, and Sustainable Development. Department faculty also advise students in the General Studies major, and in the Biology and Society major. As of Fall, 2002, we offer an undergraduate minor in Natural Resources in addition to the major.

We have an outstanding teaching faculty whose commitment has been recognized repeatedly by students, the College, the University, and the SUNY and Land Grant systems through various teaching and advising awards. Enrollment in the major hovers around 240 students. In 2003 (Spring and Fall), we taught 52 courses; 91 students enrolled for independent study or teaching assistant credit; and faculty mentored 24 Research Honors students, 25 student interns in research and/or extension activities, 6 Cornell Presidential Research Scholars, 2 Hughes Scholars, 3 Udall Scholars, and 3 Cornell Science Inquiry Partnership Fellows.

DNR faculty participate in the Graduate Field of Natural Resources, as well as other graduate fields (e.g, Zoology, Public Affairs, Biometry). In 2003, typical of recent years, we enrolled 80 graduate students, with 36 in RPM and 44 in REM. This included 45 Ph.D., 24 M.S., and 11 M.P.S. students. Many graduate students compete successfully for NSF graduate fellowships, EPA STAR awards, Fulbrights, and other awards.

Extension and Outreach

The Department of Natural Resources is committed to increasing public awareness about the sound stewardship of natural resources and the environment. Extension and outreach programs continue to be a hallmark of the Department, and are supported to a large degree by external funding. Focal areas include the Ecology and Management of Landscapes, Fish and Wildlife Biology and Management, and Environmental Inquiry and Youth Education. In 2003, DNR faculty and staff produced 26 extension and/or instructional publications (4.3 per extension FTE) and provided 123 extension workshops (20.2 per extension FTE). Recent initiatives focus

on healthy forests and sustainable ecosystems, the Cornell Maple Program, forester stewardship capacity, public participation processes, farm pond management, in-stream habitat quality, Master Forest Owners, and K-12 science outreach. Our extension faculty have been leaders in initiating the NY Chapter of the Association of Natural Resource Extension Professionals (www.dnr.cornell.edu/ext/nyanrep) in their continuing efforts to expand the number, professionalism, and integration of campus-county partnerships focused on natural resource education needs. Cornell undergraduates gain exposure, and modest involvement in extension programming, through participation as student interns at the Arnot Teaching and Research Forest. Graduate students serve as Graduate Teaching Fellows in our K-12 science outreach program, gaining teaching experience while conducting outreach programs that benefit teachers and youth in urban and rural schools. Both of these initiatives represent our efforts to integrate fully our three functions of research, teaching, and extension/outreach.

Audiences for DNR extension and outreach activities include schools (K-12), extracurricular clubs and organizations, county-based extension professionals, community-based organizations such as Environmental Management Councils, professional societies (international, national, regional), university and college committees, and government decision makers at all levels (e.g., municipal, town, county, state, national, international), and non-governmental organizations with a natural resource and/or environmental mission.

Vision, Goals, and Objectives

Vision:

The Department of Natural Resources will be recognized internationally as the leader in research, scholarship, and education in the fields of natural resource ecology, management, and policy, and will provide leadership in improving society's stewardship of natural resources and the environment.

Overarching Goals for 2004-2009

- The Department of Natural Resources shall recruit a tenure-track faculty member specializing in policy and management (see faculty staffing needs below).
- Facilities of the Department of Natural Resources will be renovated appropriate to the current and future needs they are intended to meet. This includes Bruckner Hall (all floors), Fernow Hall, and the Resource Ecology and Management (REM) facility off campus.
- Implement fundraising efforts, including establishing endowments, to support DNR faculty positions and research, teaching and extension facilities.
- The Department of Natural Resources will strive to continue the strengths outlined in this document, and commits to achieving the vision and mission stated herein.

Goal 1: Support and Enhance Research Productivity

Objectives

- A) Support and facilitate faculty research efforts in our key program areas: Resource Policy and Management, and Resource Ecology and Management (including focal areas in population and species ecology, and community and ecosystem ecology).
- B) Support efforts to integrate research activities between program areas (see Figs 1 and 2), toward improving society's ability to implement ecosystem-based management approaches.
- C) Develop state of the art laboratory facilities for each key program area.
- D) Enhance and increase useful space for successful programs (e.g., staging areas, labs, staff offices).
- E) Foster interdisciplinary research and faculty collaborations within DNR (see Figs. 1 and 2) and across campus, including working with other Departments and programs to develop future faculty positions.
- F) Foster research collaborations with resource management agencies and organizations.
- G) Establish an endowed faculty position in each program area.

Goal 2: Support and Enhance Education

Objectives

- A) Develop and maintain a program to recruit and educate diverse graduate student and undergraduate student populations, including the funding to support graduate student assistantships.
- B) Strive for our graduates to excel in prestigious graduate and professional schools and to become leaders in research and management related to natural resources conservation.
- C) Provide for non-major students a broad exposure to the principles and applications of natural resource ecology, management, and policy.
- D) Develop a state of the art teaching facility, including teaching laboratories, and suitable storage and staging areas for field-based courses.
- E) Develop modern graduate student offices, with state-of-the-art technology.

Goal 3: Support and Enhance Extension and Outreach

Objectives

- A) Work with county extension educators, private landowners, environmental educators, government and non-government organizations, educators in schools, resource managers, and policy makers to ensure their access to research findings (knowledge) and innovative tools for learning that improve understanding and use of natural resources. Develop a better understanding of the needs of these groups and how DNR programs can help meet those needs.
- B) Encourage the active involvement of DNR faculty and staff in professional societies, policy advisory boards, and consulting roles.
- C) Foster outreach collaborations with CCE county associations, conservation and resource management agencies, and other organizations.
- D) Involve graduate students and interns in applied research and extension demonstration and teaching projects.
- E) Enhance the development and application of distance education methods for continuing adult education.

Faculty Staffing Needs (2004-2009)

To fulfill the vision and goals identified in this strategic document, the DNR has identified key faculty needs. These are projected for a 5-year time horizon. Other faculty needs are still under consideration (see “Strategic Questions”).

- The Department has included in its annual report to the Dean, for several years in a row, a priority for filling an **Assistant Professor of Natural Resource Policy and Management** (see appendix for position description). This position continues to be the top priority for the Department. This position is necessary to be able to reinvigorate and maintain the strength of the RPM program area, and to offer two courses (including one sophomore-level core course, and one senior-level advanced specialty course) identified as important in the recent curriculum revision process.
- The Department also seeks opportunities to work collaboratively with other CALS units to address critical faculty needs, particularly when the needs of other units correspond with or complement needs for the long-term future of DNR. One of these partnerships involves DNR and the American Indian Program (AIP) in the College of Agriculture and Life Sciences. Working collaboratively (during FY 2003-2004) the Department and the American Indian Program agreed to develop a faculty search for an **Assistant Professor of Environmental and Native American Studies** (see appendix for position description). The search for this position began, but was postponed until 2006. In the interim, a visiting assistant professor is being recruited. These efforts are designed to enhance teaching programs in both AIP and DNR, include an active natural resource/American Indian studies research focus, and provide leadership and vision to the campus American Indian community.
- The Department also seeks to build collaborative relationships with related departments in CALS, and has worked actively with the Department of Ecology and Evolutionary Biology (EEB) toward securing positions relevant to the university-wide Biocomplexity and Biogeochemistry Initiative (BBI). During FY 2003-2004, this included active participation in a search for an **Assistant Professor of Terrestrial Community Ecology and Biocomplexity** which resulted in the successful candidate choosing EEB as the home department. The Department of Natural Resources seeks to continue this partnership with EEB in the BBI by securing College permission to search for an **Assistant Professor of Global Ecology and Ecosystem Modeling** (see appendix for position description) whose home department would be DNR.

Strategic Questions

The Strategic Vision Committee identified several issues that merit further discussion among the Department community, and recommend DNR faculty engage in deliberative discussions about these topics in FY 2004-2005, and beyond if needed:

- Evaluate whether the Department of Natural Resources should change its name. A name change would require approval from the Dean, CALS Faculty Senate, and Provost. Alternatives suggested to date include Department of Conservation; Department of Environmental Sciences; Department of Environmental Studies; Department of Environment; and others. Background: does the adoption of this new vision statement, and further articulation of the Department’s mission, imply the need for a new

name that will better convey to students and others the breadth and depth of our program; or does the current name achieve that goal?

- Evaluate the most appropriate configuration for DNR's future involvement in environmental ethics. Alternatives suggested to date include an instructor or lecturer position, an assistant professor position, or relying on other Cornell units to provide course opportunities in this area. *Background:* To date, the environmental ethics activities in the Department have been largely teaching-oriented, and were intended to be college-wide. Should future efforts focus mostly on teaching, or should an active research component be expected?
- Evaluate whether the Department/Graduate Field should increase involvement in offering a professional graduate degree in natural resources/environmental management. *Background:* Recent efforts to create a college-wide masters of environmental management have floundered, yet other institutions have thriving professional/terminal degree programs. Such a degree may be a service to professionals and perhaps help generate revenue, but faculty are concerned about the time required for such a program vs. the benefits of involvement.
- Evaluate whether the Department should develop a continuing education program for DNR alumni and/or natural resource management/conservation professionals to enable them to stay current regarding new developments. *Background:* Interest and time availability of faculty should be explored, along with potential needs among alumni and others. Other institutions provide these programs; is there a demand DNR should/could meet?
- Evaluate the extent to which DNR should become involved in, or lead, distance learning programs directed toward undergraduate and graduate students. *Background:* Other institutions are advertising their distance learning courses to our students, and DNR must be able to advise students on how such courses relate to their Cornell requirements. DNR has been involved in distance learning on a limited basis. Should involvement expand?
- Engage Department faculty in considering the future of the Graduate Field, including developing a graduate curriculum, and appropriate allocations of resources (e.g., space, financial support) among MPS, MS, and PhD students. *Background:* The Graduate Field has agreed recently on new subject area descriptors, awaiting approval from the Graduate School. The Department's role in the graduate field is most strongly through graduate courses, student office space, and financial support (i.e., Teaching Assistantships). Department faculty should consider if any changes are warranted in approaches guiding resource allocation decisions, and the Department's interest in an organized graduate curriculum.
- Engage in discussions with other departments regarding curriculum issues, including teaching collaborations and cross-listing courses, and considering which courses beyond the DNR "core" DNR should provide vs. relying on other departments. *Background:* DNR has been exploring collaborations as outlined earlier. DNR should consider which curriculum needs the Department should make a commitment to providing (through faculty and other resources) and for which areas it is desirable to partner with or rely on other departments (recognizing DNR has less content control in such situations).

Strategic Vision Committee Members (2003-2004)

Evan Cooch
Paul Curtis
Clifford Kraft
Barbara Knuth, Chair
Steven Wolf
Joseph Yavitt

Department of Natural Resources
College of Agriculture and Life Sciences, Cornell University

Mission

The Department of Natural Resources at Cornell University began as the Nation's first college of forestry (1898-1903). It evolved into the Department of Forestry (1911-1948) and the Department of Conservation (1948-1970) within the College of Agriculture and Life Sciences, before assuming its current name in 1970. Today the Department is a leader in research, education, and outreach activities in areas as wide-ranging as conservation biology; fisheries, forest, wetlands, and wildlife science and management; quantitative ecology, ecosystem biology and biogeochemistry, human dimensions of natural resource management, environmental policy and institutional analysis, and environmental management and education. Our mission is:

To develop knowledge and facilitate learning to improve society's stewardship of natural resources and the environment.

We pursue this mission by focusing on improving understanding of:

1. how natural processes and human activities influence the composition, structure, function, and health of terrestrial and aquatic ecosystems;
2. the characteristics and dynamics of fish, aquatic, wildlife, forest, and wetland resources;
3. how management actions can enhance the conservation and sustainable use of natural resources within terrestrial and aquatic ecosystems, as well as overall ecosystem health;
4. decision-making processes with respect to natural resources and environmental conservation, including enhancing integration of biological and human dimensions in such decisions; and
5. how management actions and policy decisions can improve environmental stewardship and the quality of life by reducing negative impacts associated with plants, animals, and ecosystem processes.

Approaches

1. Expand the scientific and scholarly information available for integrated environmental and natural resources management through excellence of research in applied (problem-focused) ecological and social sciences, environmental ethics, and public policy analysis, domestically and internationally.
2. Provide undergraduate and graduate education programs that are challenging, prepare students to meet the changing needs of society for effective, integrated environmental and natural resource management, and result in an overall rewarding student experience.
3. Foster public stewardship of natural resources and the environment by increasing public awareness of new discoveries and understanding of the complexity of problems, including the knowledge, tools, and understanding of decision and management processes needed to achieve solutions.
4. Disseminate cutting-edge environmental science and natural resource management knowledge and tools for learning, domestically and internationally, to natural resource management professionals and educators, environmental and conservation leaders, public policy decision makers, natural resource users, and diverse adult and youth populations.

Program Areas

Research, teaching, and outreach/extension activities in the Department of Natural Resources focus on the interface of ecological systems and human relationships with those systems. We produce and disseminate knowledge and information about aquatic and terrestrial ecosystems, including associated human activities and impacts. By integrating our understanding of aquatic, terrestrial, and human systems with the needs of policymakers, managers, and citizens, we help foster informed decisions to improve society's stewardship of natural resources.

Our emphasis is problem-focused and integrative, applying theory and empirical data from ecological and social sciences to address important natural resource and environmental conservation issues. Scholarly inquiry, education, and outreach are focused on two major program areas, Resource Ecology and Management (REM), and Resource Policy and Management (RPM). The unifying theme underlying these two programmatic foci emphasizes that an array of scientific disciplines and approaches is necessary to solve complex problems of conservation and management of populations, species, and ecosystems, and to ensure sustainable human societies into the future. Problems addressed in both the REM and RPM program areas, from complementary disciplinary vantage points, include sustainable exploitation of species of economic importance, management of overabundant or invasive species, conservation and restoration of scarce species and their habitats, and mitigating the effects of human-induced changes on the environment. Research and scholarship across these program areas strive to improve incorporation and integration of both human and biological dimensions into natural resources decision-making processes, and provides analysis of the biological, ecological, political, institutional, cultural, ethical, and technical contexts in which environmental decisions occur.

- **Resource Ecology and Management (REM)**

Focal topics within this program area include applied ecology, conservation biology, ecosystem biology and biogeochemistry, quantitative ecology, fishery and aquatic science, forest science, and wildlife science. Scholarly attention focuses on patterns in the structure and function of aquatic and terrestrial ecosystems, the processes and environmental factors that control those patterns at several spatial and temporal scales, and how humans influence these patterns, processes, and environmental factors. Diverse taxa and systems are studied, although many faculty have expertise in wildlife, fish, forests, and wetlands.

- **Resource Policy and Management (RPM)**

Focal topics within this program area include community-based natural resources management, environmental ethics, environmental management and education, human dimensions of natural resources management, policy and institutional analysis, program development and evaluation, and risk analysis and management. Scholarly activity within the RPM program focuses on producing and interpreting knowledge about human behaviors, attitudes, values, norms, institutions, and societal processes in relation to human interactions with aquatic and terrestrial ecosystems, and focuses on human communities and institutional processes at local, state, regional, national, and international scales.

Vital Statistics

Faculty and senior academic staff number 30, including 19 tenure-stream professors, 7 in RPM and 12 (plus 2 Courtesy Faculty through the USGS Cooperative Fish and Wildlife Research Unit) in REM. Undergraduate majors number about 195; graduate students total 80, with 36 in RPM and 44 in REM. This includes 45 Ph.D., 24 M.S., and 11 M.P.S. students. In 2003, Department faculty published 65 refereed publications (4.6 per research FTE), 64 other publications, and 3 books; faculty and staff produced 26 extension and/or instructional publications (4.3 per extension FTE) and provided 123 extension workshops (20.2 per extension FTE). In 2002, the Department was the leading unit in the College of Agriculture and Life Sciences in terms of total direct costs generated annually from sponsored grants and contracts (\$4.8 million); and second in the College in total direct costs generated per faculty (\$318,000).

Appendix B. Faculty Position Descriptions

Assistant Professor in Natural Resource Policy and Management

Assistant Professor in Environmental and Native American Studies

Assistant Professor in Global Ecology and Ecosystem Modeling

4-17-04 -- DRAFT

**POSITION ANNOUNCEMENT
DEPARTMENT OF NATURAL RESOURCES
NEW YORK STATE COLLEGE OF AGRICULTURE AND LIFE SCIENCES
CORNELL UNIVERSITY**

POSITION: Assistant Professor of Natural Resource Policy and Management

STARTING DATE:(requested August, 2005)

LOCATION: Department of Natural Resources
New York State College of Agriculture and Life Sciences
Cornell University
Ithaca, NY 14853

RESPONSIBILITIES: The successful candidate will develop a nationally-recognized teaching (50%) and research (50%) program focusing on the social and policy aspects of natural resources management. Teaching responsibilities will include: (1) an introductory sophomore-level core course of the major, focusing on natural resources policy, which provides a foundation for other upper-level courses in the Resource Policy and Management concentration; (2) a senior-level advanced course in Human Dimensions of Natural Resource Management, focused on theoretical constructs and applications; and (3) leadership for a graduate seminar for students in the Resource Policy and Management subject area in the Graduate Field of Natural Resources. The research component should apply contemporary social science theory and employ quantitative and qualitative methods to improve understanding of social processes, decision-making, and human behavior associated with the conservation and management of natural resources, and may include a combination of domestic and international emphases. The research program may address how social, political, or institutional factors influence, enhance, or constrain efforts to achieve stewardship and conservation of natural resources and associated ecosystems, and may focus on developing and applying theory related to community-based natural resources management. The individual will be an active contributor to the undergraduate and graduate concentration in Resource Policy and Management, sharing leadership with other faculty for seminars, discussion groups, supervision of undergraduate and graduate student research, and related activities. The individual will secure external funding, mentor students, and contribute significantly to the natural resources and environmental policy and management literature through journal articles and other peer-reviewed publications. Collaboration with faculty, staff, and graduate students in the Department of Natural Resources is expected, and with other College of Agriculture Life Sciences and/or Cornell University departments as appropriate to the successful candidate's area of expertise. Service to society through consultation and other outreach activities is expected of all faculty.

QUALIFICATIONS:

- ❖ Interdisciplinary background with Ph.D. and graduate majors/minors and other education in appropriate combinations of applied social science and ecological science fields related to the duties described above. Education and/or experience in theory and application of community-based natural resource management concepts is desirable. Focus may include a combination of domestic and international experience.
- ❖ Experience in teaching, student advising, and research related to this position, either post-doctoral or pre-doctoral.
- ❖ Evidence of ability to work with other researchers in interdisciplinary inquiry, and with natural resource managers in applied research settings.
- ❖ Demonstrated understanding of challenges and approaches in contemporary and future natural resource and environmental management.
- ❖ Evidence of ability to attract extramural research support and coordinate and lead an innovative research program.
- ❖ Evidence of ability to apply and refine a variety of quantitative and qualitative social science research techniques.

SALARY: Competitive, commensurate with background and experience. An attractive fringe benefits package is available.

TARGET REVIEW DATE: To be determined.

APPLICATIONS: Send letter of application, current curriculum vitae, undergraduate and graduate transcripts, statement of teaching philosophy, statement of research interests and professional goals, and the names (including mailing and email addresses, and phone numbers) of three references to Search Committee Chair, Department of Natural Resources, Fernow Hall, Cornell University, Ithaca, NY 14853-3001.

Cornell University is an Affirmative Action, Equal Opportunity Employer

POSITION ANNOUNCEMENT

**AMERICAN INDIAN PROGRAM AND
THE DEPARTMENT OF NATURAL RESOURCES
CORNELL UNIVERSITY**

POSITION: Assistant Professor of Environmental and Native American Studies
Tenure track, 9-month position (with possibility to generate summer salary through external funding)

STARTING DATE: TO BE DETERMINED

LOCATION: Joint appointment between the American Indian Program(AIP) and the Department of Natural Resources (DNR), in the College of Agriculture and Life Sciences

RESPONSIBILITIES: The position will carry a 50 percent teaching and 50 percent research responsibility. Teaching will include at least two courses every year, with a third alternate-year course. Courses will focus on topics of mutual interest to the Department of Natural Resources (DNR) and the American Indian Program (AIP), and will reflect the expertise of the successful candidate. Research must demonstrate scholarly achievement, but also have practical relevance to the American Indian community at large and/or Indian communities locally or regionally. Research areas will reflect the expertise of the successful candidate. Research and teaching areas of potential mutual interest to DNR and AIP include but are not limited to environmental justice; indigenous peoples and the environment; environmental law and Native American communities; and/or the role of local/indigenous knowledge or traditional ecological knowledge in conservation and sustainable development processes.

The successful candidate will be an active participant in the undergraduate and graduate concentrations in Resource Policy and Management in DNR, advising undergraduate students, and mentoring graduate student research. In addition, the successful candidate will play a key role for the American Indian Program by advancing the interests of the program, providing leadership in the campus Native American community and working directly with students of the Program. The individual will secure external funding to support a research program, and contribute significantly to the Native American studies and natural resources/environmental policy literatures through journal articles and other peer-reviewed publications. Collaboration with faculty, staff, and graduate students in the Department of Natural Resources and the American Indian Program is expected, and with other College of Agriculture and Life Sciences and/or Cornell University departments as appropriate to the successful candidate's area of expertise. Service to society through consultation and other outreach activities is expected of all faculty.

QUALIFICATIONS: Ph.D. in Environmental Policy, Native American Studies, Natural Resources Policy, or related fields.

SALARY: Competitive, commensurate with background and experience

APPLICATION: Please submit a letter of application, resume, academic transcripts, and the names and contact information of three to five references to:

Ms. Kelly Tillotson, Search Committee Support
Department of Natural Resources
Cornell University
Ithaca, New York 14853

DRAFT FOR DISCUSSION

Global Ecologist / Ecosystem Modeler

Cornell University has long needed an individual capable of addressing **regional- to global-scale ecosystem processes utilizing modeling as a major analytic and synthetic tool**. Two years ago, the External Advisory Committee for the Biogeochemistry Program placed this as their top priority recommendation for the university-wide program.

The general issues this position could address include:

- Processes and impacts of human-driven **global change** processes in ecological systems, for example, land-use change, invasive species, climate change, and altered global biogeochemical cycles.
- Complex **biological feedbacks** in global systems.
- Role of **ecosystem structure** (composition) on chemical and energy fluxes (biogeochemistry) within global systems.

This position could bring one or more of the following skill set to Cornell:

- **Modeling**, particularly at large spatial scales (landscape, regional, continental, global) and across multiple ecological levels (physiological, population, community and ecosystem). This includes the ability to integrate phenomena across these scales.
- **Working with large data sets**, including computational methods for data mining, data manipulation and analysis.
- Ability to work with **global observations**, such as remote sensing-derived data.

It is the combination of the problems addressed, research questions, skill set, and scale of inquiry that would make this a unique and forward-looking position for us. The position would address problems in both basic and applied ecology. The extent of human impact on global systems makes this position especially critical as international attention becomes increasingly focused on the global change problem and possible solutions.

Linkages: Possible home departments for this position include the Departments of Natural Resources (DNR), Earth and Atmospheric Sciences (EAS), and Ecology and Evolutionary Biology (EEB). Within DNR, this position would link with faculty working on modeling natural systems and their components from mathematical and statistical perspectives, with biogeochemists, and with the global focus of faculty within both major program areas (Resource Ecology and Management, Resource Policy and Management). Linkages in EAS would include faculty using computational advances to further our understanding of the roles of land, ocean and atmosphere transport and reservoirs in biogeochemical cycles. Within E&EB, this position would link with faculty working with ecosystem, community, and physiological processes. For the university, this position is directly relevant to the Biogeochemistry Program, the Biogeochemistry and Biocomplexity Initiative, Computational Biology, and Computer and Information Systems.

Teaching responsibilities might include ecosystem modeling (ideally, with computer lab), advanced ecological remote sensing, and seminars in the individual's area of expertise. Departments that could be expected to support this need include: EAS, DNR, Computational Biology, and CS.