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## CSREES Department of Forestry, Fisheries & Wildlife Comprehensive Review

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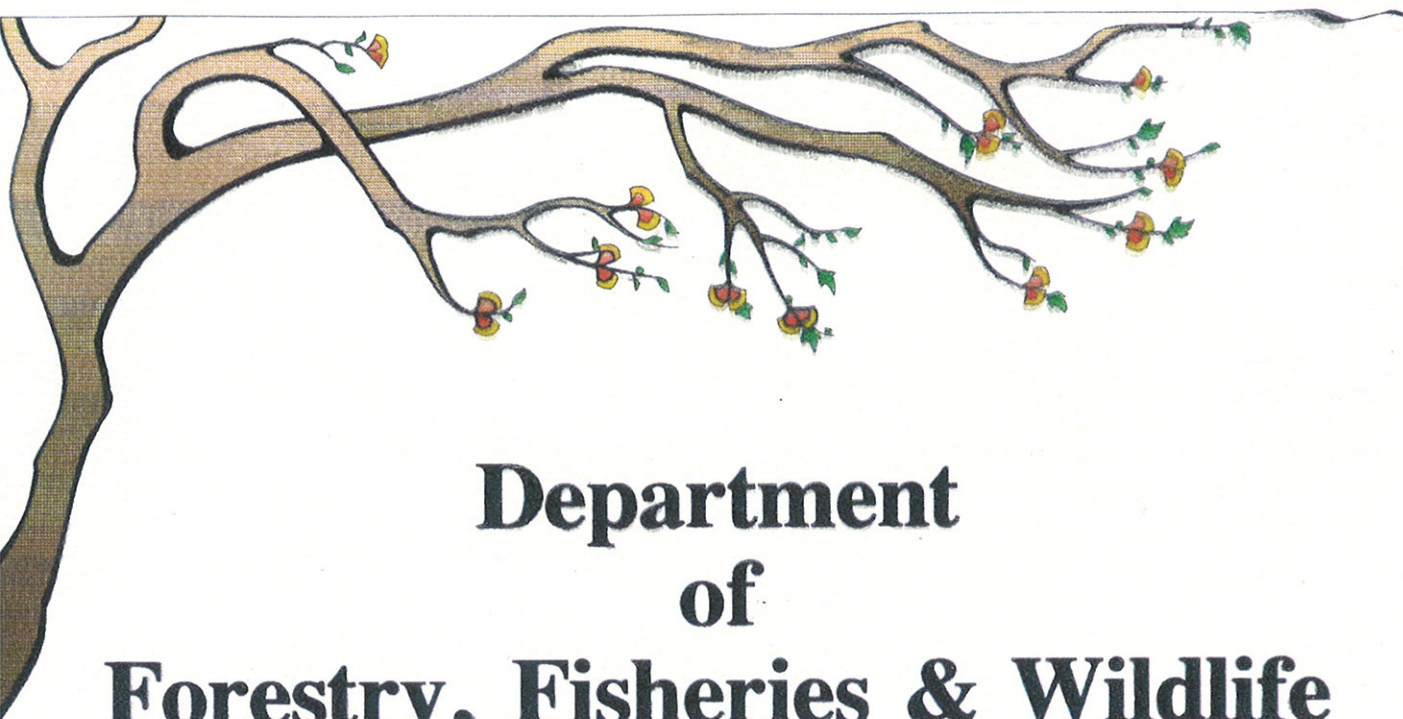


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# **Department of Forestry, Fisheries & Wildlife**



**CSREES Comprehensive Review**

**April 9-11, 1996**

## **Acknowledgements**

We acknowledge here the thoughtful contributions made to this document by FFW faculty and particularly express appreciation to the following for their leadership and authorship of the sections:

Teaching - Dr. Ed Peters

Research - Dr. Steve Ernst

Graduate - Dr. Kyle Hoagland

Extension - Dr. Scott Hygnstrom

Nebraska Forest Service - Mr. Tom Wardle

In addition, the Department expresses thanks to our secretarial staff for their patience in assembling this document and, in particular, to Ms. Marcy Tintera who converted text from several sources into a common format and produced the final copy.

The department acknowledges and thanks the Review Team for their efforts in helping us determine the future course of the Department of Forestry, Fisheries and Wildlife.

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# Forestry, Fisheries & Wildlife

## Comprehensive Review Schedule

April 9-10-11, 1996

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Monday, April 8, 1996

	Location	Leader
7:30 p.m. Review Team meeting	Ramada Hotel	Jim Miller

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Tuesday, April 9, 1996

### OVERVIEW OF THE DEPARTMENT AND UNIVERSITY

7:30 a.m.	Breakfast with the UNL Administration	ECU	Vice-Chancellor Omtvedt
9:30 a.m.	Departmental Overview; Goals and Objectives of the Review	ECU	Gary Hergenrader
11:00 a.m.	Tour of FFW facilities		Gary Hergenrader
12:00 noon	Informal luncheon with Faculty	ECU	Gary Hergenrader

### TEACHING PROGRAM

1:00 p.m.	Overview of the Teaching Program	ECU	Ed Peters
	Where is our Teaching Program going in the future		All faculty discussion with Review Team
2:45 p.m.	Discussion session with undergraduates	ECU	No faculty present
3:15 p.m.	Break		

## GRADUATE PROGRAM

3:30 p.m.	Graduate Program overview	ECU	Kyle Hoagland
	Graduate Program plans for the future		Graduate faculty discussion with Review Team
4:15 p.m.	Discussion session with graduate students	ECU	No faculty present
5:15 p.m.	Adjourn		
6:30 p.m.-8:30 p.m.	Dinner with Faculty and IANR Administration		Walnut Grove Tree Farm
9:00 p.m.	Return to Hotel		

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**Wednesday April 10**

## OUTREACH PROGRAMS

### Nebraska Forest Service

8:00 a.m.	Overview Private Lands program Public Lands/Community Forestry Resource Protection  Future Directions	ECU	Tom Wardle Dennis Adams Dave Mooter Don Westover  Gary Hergenrader and faculty discussion with Review Team
10:00 a.m.	Break		
	Cooperative Extension		
10:15 a.m.	Overview  Future directions in Extension	ECU	Scott Hygnstrom  All faculty discussion with Review Team
12:00 noon	Luncheon with IANR Department Heads and District Directors	ECU	

## RESEARCH PROGRAM

1:00	Overview	ECU	Steve Ernst
	Future Directions in Research		All faculty including Agroforestry Center faculty; discussion with Review Team
2:45 p.m.	Break		
3:00 p.m.	Discussion session with FFW Support Staff	ECU	Jeanne Andelt
4:00 p.m.	Opportunity for Small Group/Individual Faculty meetings with Review Team		
5:30 p.m.	Adjourn		
Evening	Review Team works on Exit Report		

## THURSDAY, APRIL 11

7:30 a.m.	Breakfast with Department Head	ECU	Gary Hergenrader
8:30 a.m.	Exit Report work session		Jim Miller
10:00 a.m.	Exit report to UNL Administration		Jim Miller
11:00 a.m.	Exit report to FFW Faculty, Staff, and Students		Jim Miller
12:00 noon	End of the formal review		





## Review Team

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## EXECUTIVE SUMMARY

### Present Situation

The Department of Forestry, Fisheries and Wildlife has experienced significant change since the 1989 Comprehensive Review. Much of the change has resulted from recommendations made by that Review Team and also because of planning efforts by the Department that interface well with the IANR Strategic Plan.

The Department has gained new faculty positions in limnology, landscape ecology, aquaculture, and environmental education. A faculty position in extension forestry became vacant due to resignation and the Department was not allowed by IANR Administration to refill the position. No faculty positions were lost in the Nebraska Forest Service; moreover, four new service forester positions were added through cooperative funding agreements with outside agencies. In addition, the NFS was completely reorganized to delegate more supervisory and administrative authority to the District Foresters and Assistant State Foresters.

IANR embarked on a strategic planning process several years ago to develop a plan that would direct Institute programs to meet future needs. That plan has been continuously revised and updated to address current situations and needs. FFW has developed action plans that are relevant to natural resources and help achieve the objectives of the IANR plan. All FFW programs, but especially the research, extension, and NFS programs have a major emphasis on interdisciplinary activities, collaborative partnerships, and effective teamworking to address the overall thrust of the action plans and that is the development of sustainable agroecosystems.

In 1990 the College of Agricultural Sciences and Natural Resources began offering a B.S. degree in Natural Resources. At the same time, a new major in Fisheries and Wildlife was established. Currently, there are 133 Fish and Wildlife majors in the Department. FFW faculty also advise 65 students in the Environmental Studies major, a joint program between the College of Agricultural Sciences & Natural Resources and the College of Arts &

Sciences. Since 1989 student credit hour production by the Department has essentially doubled and current SCH/FTE teaching faculty ranks third in the College, a position that has been held for the past two years.

The Graduate Program in FFW has experienced remarkable growth. In 1991 there were only 11 graduate students in the Department; today there are 45 students working on graduate degrees. The M.S. degree is offered in Forestry, Fisheries, & Wildlife and a Ph.D. degree is available through the Horticulture-Forestry Ph.D. program. Students interested in a Ph.D. in wildlife or fisheries utilize this avenue to gain their degree. Since the last review, six new graduate courses have been developed by FFW faculty.

Funding to support FFW programs over the last six years has varied considerably depending on the source. For the teaching, research, and extension programs funding from state appropriations, except for salary increases, has been static or declining. This is particularly evident when inflation is factored in. On the other hand, funding to support forestry research from McIntire-Stennis has increased from about \$121,000 per year in 1990 to nearly \$164,000 per year in 1996. For the NFS, state funding has mirrored the situation in teaching, research, and extension: money has been provided for salary increases but nothing else. In addition, FFW, like other units in the IANR, have suffered small but telling budget reductions as a result of inadequate funding by the Nebraska Legislature. On the positive side, Federal support through the U.S. Forest Service for State and Private forestry programs has increased from about \$400,000 in 1990 to almost \$700,000 in 1995. The increase in Federal funding along with cooperative agreements made with outside agencies has enabled the NFS to hire four additional service foresters to deliver forestry technical assistance to landowners. The real bright spot in funding for FFW has been the outstanding success of faculty in garnering outside grant support. In the period 1985-89 FFW was near the bottom of 20 IANR units with respect to outside funds brought in by the faculty. Currently, FFW ranks second out of 20 units for funds brought in to support departmental programs through grants and contracts. This is a remarkable achievement of which the faculty should be justifiably proud.

With respect to facilities, the Department is even more crowded than it was in 1989. Lack of space continues to be a major need to accommodate the growth that has occurred in the program. However, much of the existing space has been renovated and even though overcrowding is still a problem, the available space is used much more efficiently. A new 4500 square foot aquatic microcosm facility was developed by the Department that has greatly augmented the aquatic research program. Temperature and lighting can be regulated within close tolerances greatly facilitating some kinds of research endeavors. Since 1989 the Department has acquired access to and management responsibilities for three new properties. Prairie Pines is a 145 acre tree farm on the outskirts of Lincoln that has a wide variety of plant materials useful to our teaching and research program; Cedar Canyon near North Platte in western Nebraska is a 640 acre parcel that is home to Nebraska's first state forest and is used for research and demonstration purposes; Barta Brothers ranch is a 6000 acre property in the Nebraska Sandhills that has several hundred acres of tree plantings and will be used mainly for research by FFW and other Institute faculty.

### Current Issues

Over the past three years there has been an ongoing discussion about creating a School of Natural Resources & Environment at UNL that would bring a focal point to natural resources programs and facilitate the kind of faculty and programmatic interactions that are needed to address the complex environmental problems extant today. Under the current proposal, FFW would become an integral part of the new school. However, that would mean very significant changes for the Department as it now exists. FFW faculty support the creation of a School and believe items of concern, like maintaining the identity of the Nebraska Forest Service, can be satisfactorily resolved.

The delivery of educational programming by electronic means is currently a popular subject for discussion by IANR faculty including those in FFW. FFW faculty have the expertise and interest to effectively deliver programs via the Internet to outstate locations as well as to utilize multi-media approaches in the classroom on campus. However, they are concerned about the availability of the necessary financial resources and time required to develop effective delivery systems. Moreover, they are concerned about what impact the diversion to financial resources to support distance education will have on their current programs.

A major issue is the continuing erosion of state resources to support the basic infrastructure vital for departmental programming. This is the situation for both the TRE and NFS sections of the Department. The NFS, in particular, has an unhealthy dependence on Federal funds to operate its programs. An additional state investment of only \$100,000 would bring great dividends. Faculty have demonstrated the ability to generate considerable outside funding to support their research and extension efforts but those efforts can only continue to be successful if they can be overlain on a basic infra-structure that provides the necessary physical space and support personnel. Outside grants cannot be expected to provide this basic framework of support; that is a state obligation.

The need for additional space is a recurrent theme in faculty discussions. Program growth has severely taxed existing available space. A new Natural Resources complex is currently in the planning stages but until that facility becomes a reality, other ways will need to be found to address the space issue.

#### **Potential New Faculty Positions**

As described above, the primary emphasis for the Department with respect to additional financial resources is to shore up the basic infrastructure that supports all departmental programming. This includes support personnel (extension assistants, laboratory technicians, computer support specialists), operating support, and physical facilities. That notwithstanding, programs of the Department would be greatly enhanced if the following gaps in current faculty expertise could be corrected with new faculty positions:

1. Extension Forester (Riparian Zone Management emphasis). This position is sorely needed to serve as coordinator for extension programs in the Department and to provide leadership for all forestry extension programs. Expertise in riparian zone management would fit well with the current emphasis on the riparian zone in our research and extension programs and would bridge the gap between extension and research efforts.



2. **Stream Ecologist.** Nebraska's streams and rivers are of critical importance to irrigated agriculture, wildlife, including both resident and migratory birds, fisheries, municipal water supplies, and a host of other users that place demands upon flowing water. Given that importance, FFW's current research efforts in this area are inadequate. Furthermore, there are no stream ecologists in any other IANR units. A stream ecologist whose research interests include flow requirements necessary to sustain different components of river ecosystems would be a very useful addition to the faculty in FFW.
3. **Systems Ecologist.** As will be discussed in the self-study document, FFW faculty are actively engaged in research projects that deal with agro-ecosystem sustainability and focus specifically on agricultural/natural system interfaces. Research in landscape ecology is one natural bridge between the different systems being studied and will contribute much to the understanding of system functions. However, a systems ecologist with expertise in ecological modeling is a necessary component of the overall research effort and would serve to tie the different components together in models that would greatly enhance understanding of whole systems.
4. **Natural Resource Economist.** A natural resource economist, whose interests are in the valuation of indirect or less-tangible outputs from ecosystems, has been a long-standing need in IANR. For example, what economic benefits accrue if 100 acres of wildlife habitat are developed and game species flourish? This position would enable us to put our contributions to society in real economic terms that are understood by people. The position need not necessarily be housed in FFW; it could, instead, be in the Agricultural Economics Department. Wherever it was located, we would expect strong interaction with FFW faculty and collaboration on research projects.

# Objective and Review Expectations

## Objective

The primary purpose of this review is to receive an unbiased and critical assessment of the quality of FFW's current programs and a realistic evaluation of the probability for success in the course we have charted for the future. We hope the Review Team will offer creative suggestions to help us improve current operations and secure the financial, human, and physical resources needed to achieve our vision.

## Review Expectations

Upon completion of this review, the Department expects the Review Team to have assessed not only the current programs and future emphases, but also these specific issues:

1. Is the proposed formation of a School of Natural Resources and Environment, of which FFW would be a part, a viable option to provide a focus for natural resources/environmental programs at UNL and to increase the visibility of FFW programs?
2. The Department is proposing areas that will receive emphasis in the future as it contributes to meeting the educational needs of Nebraskan's, the nation, and the world. Are these emphasis areas appropriate? Are the current programs and proposed emphasis areas of sufficient quality, and is the need for them compelling enough to justify additional financial investments in them? Have we correctly identified the additional faculty expertise required to make the programs successful? Are the human resources needs we have identified in support personnel to enhance the basic support infrastructure reasonable and appropriate?
3. In research, we plan to focus on the biology and ecology of the interface between human-altered and natural ecosystems. The knowledge gained from these efforts will contribute to the overall objective of developing sustainable agroecosystems. Our goal is to achieve both national and international recognition for the Department's efforts in this area. Is the proposed area one in which we can achieve our goal?

4. What opportunities to serve people's needs is the Department missing either from lack of awareness or because our emphases will be elsewhere? Should we give greater attention to these opportunities at the expense of those we have chosen to pursue?

5. Distance education is being discussed in many states and several are moving forward with plans to build delivery systems. FFW faculty are very interested in this area and several have the expertise to make substantial contributions to this area. It is recognized that the development of distance education will be a time-consuming and costly endeavor. Given the financial resources needed to operate conventional departmental programs, to what extent should FFW be involved in the development of distance education?

## VISION FOR FFW

*The year is 2005. Forestry, Fisheries & Wildlife has not existed as a separate department for several years. Instead, FFW faculty have become part of a School of Natural Resources & Environment. The School occupies a new state-of-the-art facility that houses both faculty who have formal appointments in the School and engages other University faculty and scientists from state and federal agencies who collaborate on educational, research, and service programs of mutual interest. Faculty and staff are located in dynamic clusters whose composition changes to meet emerging needs. Faculty from the old department of FFW constitute the core of ecological expertise in IANR. There is great emphasis on interdisciplinary teams in teaching, research, extension, and service and significant interaction with natural resource agencies outside the University. The traditional teaching, research, and extension roles are blurred and each faculty member contributes their most effective skills to all four areas. School faculty have a strong role in assisting economic development in the state, in environmental decision-making in the state, and are major players in providing leadership for statewide environmental education through their teaching, research, extension, and service programs. Much of the interaction of citizens with School programs occurs through electronic means. The School is designated, and widely recognized, as an area of excellence within the University of Nebraska system.*



## INTRODUCTION

### **Role and Mission**

**To provide leadership for natural resource conservation through education, research, and service programs based on sound ecological and management principles.**

Faculty in FFW work in a variety of venues and serve the citizens of Nebraska, across the nation, and around the world through their appointments in teaching, research, extension, and Nebraska Forest Service. Most faculty have appointments in two or more administrative programs and provide a suite of services to clientele which span the breadth of educational programs, research and demonstration, and public service and information on a daily basis. We have organized this document along the general lines of teaching, research, extension, and Nebraska Forest Service, and include under these headings reference to T, R, E, NFS.

### **The Planning Process**

The directions set forth in this document were developed through faculty discussions that began with an all-department meeting in the summer of 1994 and continued throughout 1995. Part of that effort involved the development of departmental action plans to fit within the framework of the IANR Strategic Plan. The Strategic Plan guided the development of the action plans which in turn identified the emphases and direction for FFW for the next four years. The IANR Strategic Plan, and the four FFW Action Plans for the period 1995-1999 that relate to it are included as a part of the appendix.

Over the past three years, Gary Hergenrader served as chair of an ad hoc committee appointed by the Vice-Chancellor to consider the needs and directions for natural resources programs at UNL in the 21st century. This committee, called the Natural Resources/Environmental Sciences Planning Committee, consisted of the Head/Chairs of units that were involved in natural resources programming at UNL. The committee developed a concept paper entitled "Environmental Sciences/Natural Resources Programs for

the 21st Century at UNL". The paper emphasized that in order to properly address the complex environmental problems of today, a new approach was needed, one based upon interdisciplinary involvement in the educational, research, and service programs, partnerships with external natural resource agencies, and a landscape scale approach to problems in ecosystems. This management approach would help break down barriers that currently inhibit interactions between university administrative units. The committee recommended that a new entity be formed at UNL, perhaps a School of Natural Resources & Environmental Sciences, under whose umbrella the approach described above could be facilitated. The concept paper developed by the committee is included in the Appendix. At the same time a faculty committee, called the Natural Resources Strategic Planning Committee, was considering the same kinds of environmental issues outlined above. That committee's report similarly emphasized the need for an entity like a School of Natural Resources that would provide a focal point for natural resources programs and facilitate collaboration.

#### **Setting: Nebraska Natural Resources, Agriculture, and People**

Nebraska contains a total of 49.4 million acres (77,047 square miles). Of that total, 1.2% is water and 98.8% land. Unlike many Great Plains and other western states, Nebraska's lands are largely in private ownership (approximately 94% private, 6% public). Agriculture constitutes by far the predominant use of the land with 44.3 million acres being farm or ranch land. Those agricultural lands are almost evenly split between cropland and range or pastureland. Over 20 million acres of rangeland occur in Nebraska including approximately 12 million acres in the Nebraska Sandhills, one of the largest grass-stabilized dune regions in the world. Contained within the Sandhills are more than 2000 natural lakes that range from completely fresh water to some so alkaline that only brine shrimp, brine fly larvae, salt-tolerant algae, and bacteria live in them.

Nebraska has a vast reservoir of underground water--some 2 billion acre feet that occur mostly in the High Plains Regional (Ogallala) Aquifer that underlies 59% of the state. There is enough water in underground storage that if it were evenly spread across the state, it would create a lake more than 35 feet deep. The water is of very high quality and easily

accessed in most places. Those features, coupled with its nearly ideal temperature, provide the basis for optimism about the emerging aquaculture industry in the state. The abundant water supplies have enabled the development of extensive irrigation, some 8.0 million acres, a figure that puts Nebraska second nationally in irrigated acres. Although early in its development surface water supplies provided most of the irrigation, today more than 70% of the acres are irrigated with pumped groundwater. Nationally, Nebraska ranks tenth in the number of stream miles. Despite the relative abundance of surface and ground water resources, there is heated competition from diverse interests for the use of that water.

The state's fertile soil, abundant water, and ready availability of current information on crop and livestock production from the IANR have allowed intensive cultivation and advanced farming methods to produce record high crop yields in recent years. Major crops include corn, soybeans, wheat, sorghum, oats, alfalfa, edible beans, sugar beets, potatoes, and horticultural crops. Livestock production is even more important in terms of gross receipts than crop production, with Nebraska ranking first nationally in commercial cattle slaughter and fifth in pork production. Overall, Nebraska ranks fourth nationally in sales of agricultural products. Clearly agriculture has been the predominant influence on the development of Nebraska's soil and water resources and will continue to influence these resources well into the future.

Agriculture significantly impacts the state's flora and fauna. These impacts have been both positive and negative. Some species have thrived in the agricultural setting, especially white-tailed deer and ring-necked pheasants, while others have suffered declines concurrent with the conversion of rangelands to cropland. This has been especially evident for species like sharp-tailed grouse, prairie chicken, and white-tailed jackrabbit. In addition, the conversion of large expanses of grassland to crop production has taken its toll on many grassland-dependent birds and populations of some are declining to alarming levels. Today Nebraska has hunting seasons for white-tailed and mule deer, elk, antelope, turkey, ring-necked pheasant, Northern bobwhite, prairie chicken, sharp-tailed grouse, Hungarian partridge, doves, waterfowl (especially ducks and geese), rabbits, squirrels, and several species classified as non-game (eg. crows, coyotes). Nebraska's rivers, streams, lakes,



reservoirs, and farm ponds contain, depending on their geographic location, diverse assemblages of both warm-water and cold-water fishes that provide a broad range of fishing opportunities for anglers in the state.

Nebraska's woodland resources, comprising approximately 2 million acres are very diverse. The state's forests include species such as limber pine and mountain maple that are characteristic of more western forests as well as pawpaw and sycamore, which are more commonly found in the east. The Niobrara River near Nebraska's northern border contains white birch, black walnut, and ponderosa pine in places growing side by side. Planted woodlots and windbreaks comprise approximately one-quarter million acres but are important because of the role they play in protecting crops, soil, and wildlife as well as structures and roads.

Nebraska's human population relative to the land area is very small--only 1.6 million residents as of the last census. Moreover, this population has a very skewed distribution; 50% of the population lives in the first tier of counties directly adjacent to the Missouri River (Nebraska's eastern border) plus Lancaster county, home of the state capitol in Lincoln. Seventy-five percent of the population lives in the eastern quarter of the state. As a consequence of this distribution, some areas of central and western Nebraska are sparsely populated and there is a net outmigration from many of these areas. This has important economic and political consequences for local units of government that people expect to provide public services.

## **ADMINISTRATIVE STRUCTURE**

### **Administrative Structure of the University of Nebraska**

The University of Nebraska system is comprised of four components; the University of Nebraska-Lincoln (the land-grant component), the University of Nebraska-Omaha, the University of Nebraska-Kearney, and the University of Nebraska Medical Center-Omaha. The chief executive officer for the entire system is the President. Each of the four major components is headed by a Chancellor (Figure I-1). The Institute of Agriculture and Natural Resources is a separate component of the University of Nebraska-Lincoln and is headed by a

# UNIVERSITY OF NEBRASKA ORGANIZATIONAL CHART

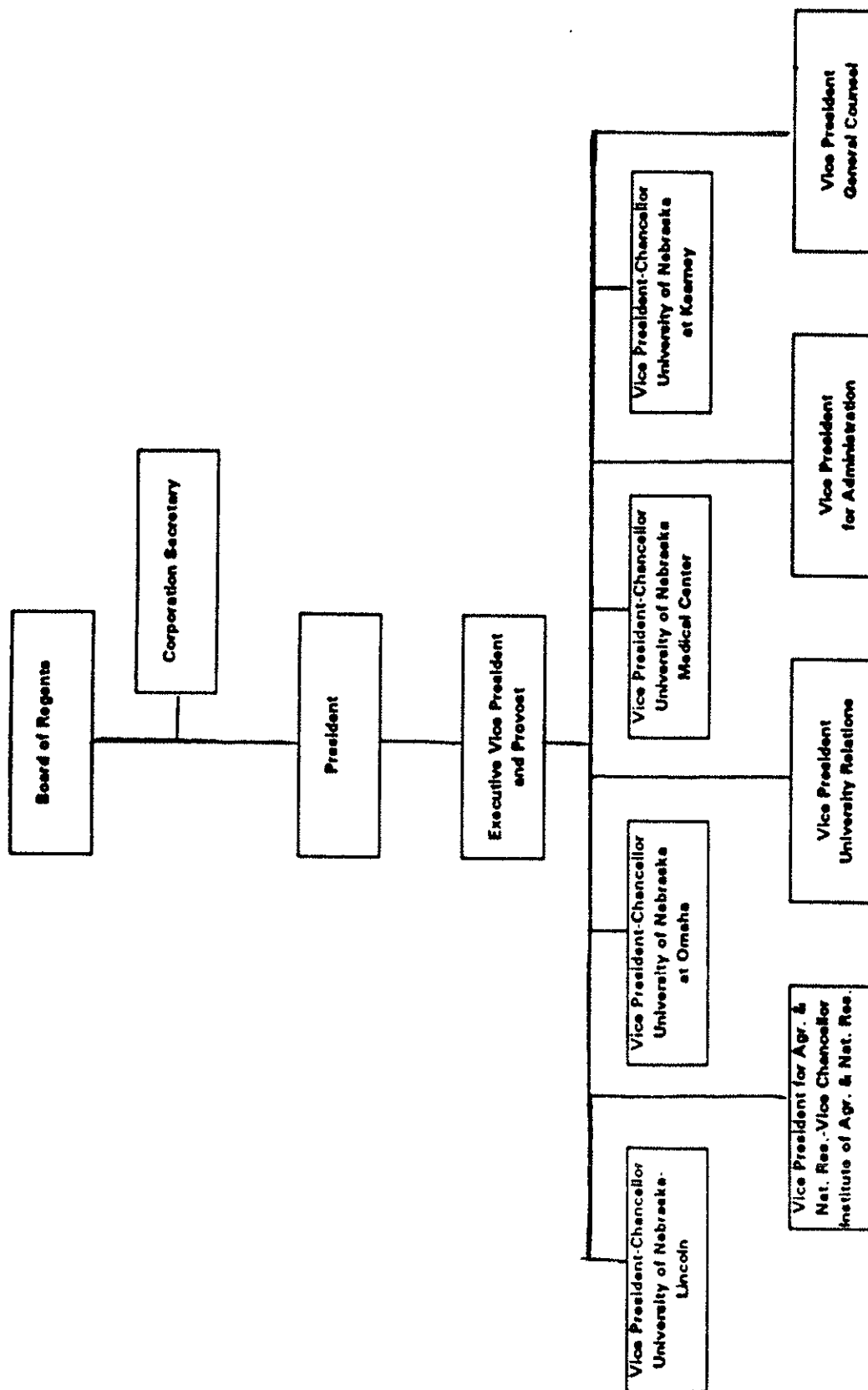


Fig. I-1

Vice-Chancellor (Fig. I-2). This position is unique in the University in that the IANR Vice-Chancellor serves on the President's Executive Council with the four Chancellors.

### **Administrative Structure of the Institute of Agriculture and Natural Resources**

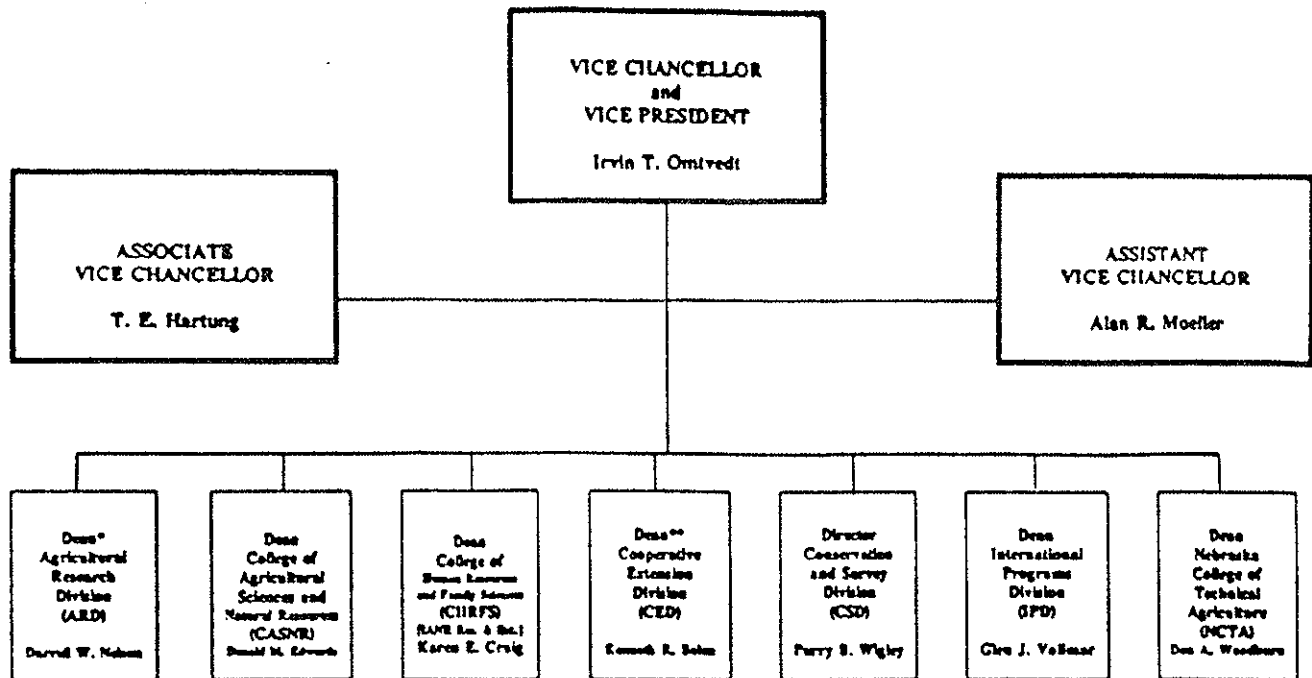
The IANR is headed by a Vice-Chancellor. The three major divisions of the Institute, the College of Agricultural Sciences & Natural Resources (teaching), the Agricultural Research Division (research) and the Cooperative Extension Division (extension) are headed by Deans/Directors. There are three other components headed by Deans/Directors--College of Human Resources and Family Sciences, International Programs, and the Conservation and Survey Division. Figure I-3 shows the organizational structure of IANR. Departments are administered by Heads who report to the respective Dean for each program area represented in the department. Thus the Head of FFW reports to the Dean of the College of Agricultural Sciences & Natural Resources for the teaching program, to the Dean of the Agricultural Research Division for research, and to the Dean of the Cooperative Extension Service for extension. Unlike the other department heads, however, the Head of FFW has a joint appointment as the Nebraska State Forester and in this capacity has administrative responsibility for the Nebraska Forest Service, a component of the Department of FFW. The State Forester reports directly to the Vice-Chancellor of the Institute of Agriculture and Natural Resources.

### **The Position: Head and State Forester**

The position of Head, Department of Forestry, Fisheries & Wildlife and Nebraska State Forester is unique. Although five other state forestry agencies (Kansas, Colorado, Texas, North Dakota, New Hampshire) are affiliated in some manner with universities, no other state combines the role of leader for a major academic program in forestry, fisheries, and wildlife or other similar program with that of leader for the state forestry agency. The State Foresters of the agencies cited above most often report directly to a vice-president, provost, or vice-chancellor. The Nebraska State Forester reports directly to the Vice-Chancellor of IANR. However, the Head of FFW, in keeping with the academic programs in the Department, reports to the Deans of Research, Extension, and Resident Instruction. The position operates successfully, however, primarily due to the support and understanding

**INSTITUTE OF AGRICULTURE AND NATURAL RESOURCES  
UNIVERSITY OF NEBRASKA**

Fin. I-3



- \* Director of Agricultural Experiment Station
- \*\* Director of Cooperative Extension

**IANR ADMINISTRATIVE UNITS**

**Agriculture and Natural Resources  
Academic Departments**

**AGRICULTURAL ECONOMICS**  
Gary D. Lynne  
**AGRICULTURAL LEADERSHIP,  
EDUCATION AND COMMUNICATION**  
Earl B. Russell  
**AGRICULTURAL METEOROLOGY**  
Blaine L. Blod  
**AGRONOMY**  
P. Stephen Saenziger  
(1-496, Kenneth G. Cassman)  
**ANIMAL SCIENCE**  
Elton D. Aberle  
**BIOCHEMISTRY**  
Marion H. O'Leary  
**BIOLOGICAL SYSTEMS ENGINEERING**  
Glen J. Hoffman  
**BIOMETRY**  
David B. Marr  
**ENTOMOLOGY**  
Sharon S. Quisenberry  
**FOOD SCIENCE AND TECHNOLOGY**  
Stephen L. Taylor  
**FORESTRY, FISHERIES AND WILDLIFE**  
Gary L. Hergenroder  
**HORTICULTURE**  
Paul E. Read  
**PLANT PATHOLOGY**  
Anne K. Vidaver  
**VETERINARY AND BIOMEDICAL  
SCIENCES**  
John A. Schmitz

**Human Resources and Family Sciences  
Academic Departments**

**FAMILY AND CONSUMER SCIENCES**  
Shirley L. Baugher  
**NUTRITIONAL SCIENCE AND  
DIETETICS**  
Marilynn Schnepf  
**TEXTILES, CLOTHING AND DESIGN**  
Rita C. Koss

**District Centers**

**NORTHEAST RESEARCH AND  
EXTENSION CENTER - Concord**  
Robert D. Fritschen  
**PANHANDLE RESEARCH AND  
EXTENSION CENTER - Scottsbluff**  
Charles A. Hibbard  
**SOUTH CENTRAL RESEARCH AND  
EXTENSION CENTER - Clay Center**  
Charles L. Stonecipher  
**SOUTHEAST RESEARCH AND  
EXTENSION CENTER - Lincoln**  
Randolph Cantrell  
**WEST CENTRAL RESEARCH AND  
EXTENSION CENTER - North Platte**  
Pete W. Jacoby, Jr.

**IANR Program Units**

**COMMUNICATIONS AND INFORMATION  
TECHNOLOGY**  
T. E. Hartung  
**4-H YOUTH DEVELOPMENT**  
Delvyn D. Dearborn  
**NEBRASKA FOREST SERVICE**  
Gary L. Hergenroder  
**NEBRASKA STATEWIDE ARBORETUM**  
James H. Locklear  
**OFFICE OF PROFESSIONAL AND  
ORGANIZATIONAL DEVELOPMENT**  
Daniel W. Wheeler

**Interdisciplinary Centers**

**AGRICULTURAL RESEARCH AND  
DEVELOPMENT CENTER - Ithaca**  
Daniel J. Duncan  
**CENTER FOR ADVANCED LAND  
MANAGEMENT INFORMATION  
TECHNOLOGIES (CALMIT)**  
Donald C. Rundquist  
**CENTER FOR BIOLOGICAL CHEMISTRY**  
Marion H. O'Leary  
**CENTER FOR BIOTECHNOLOGY**  
Donald P. Weeks  
**CENTER FOR GRASSLAND STUDIES**  
Martin A. Marenzeller  
**CENTER FOR LEADERSHIP DEVELOPMENT**  
Allen G. Blesch  
**CENTER FOR RURAL COMMUNITY  
REVITALIZATION AND DEVELOPMENT**  
Sam M. Cordes  
**CENTER FOR SUSTAINABLE  
AGRICULTURAL SYSTEMS**  
Charles A. Francis  
**CENTER FOR WATER AND  
ENVIRONMENTAL PROGRAMS**  
Bob G. Voth  
**FOOD PROCESSING CENTER**  
Stephen L. Taylor  
**GREAT PLAINS REGIONAL CENTER FOR  
ENVIRONMENTAL CHANGE**  
William E. Enderling  
**GREAT PLAINS VETERINARY EDUCATIONAL  
CENTER - Clay Center**  
Gary P. Rupp  
**INDUSTRIAL AGRICULTURAL PRODUCTS  
CENTER**  
Milford A. Hanna

October 19, 1995

provided by faculty and staff. Much of the responsibility for day to day operations is delegated to and carried out by these dedicated people. Without their commitment, support, and enthusiasm, the Head/State Forester position could not be successful.

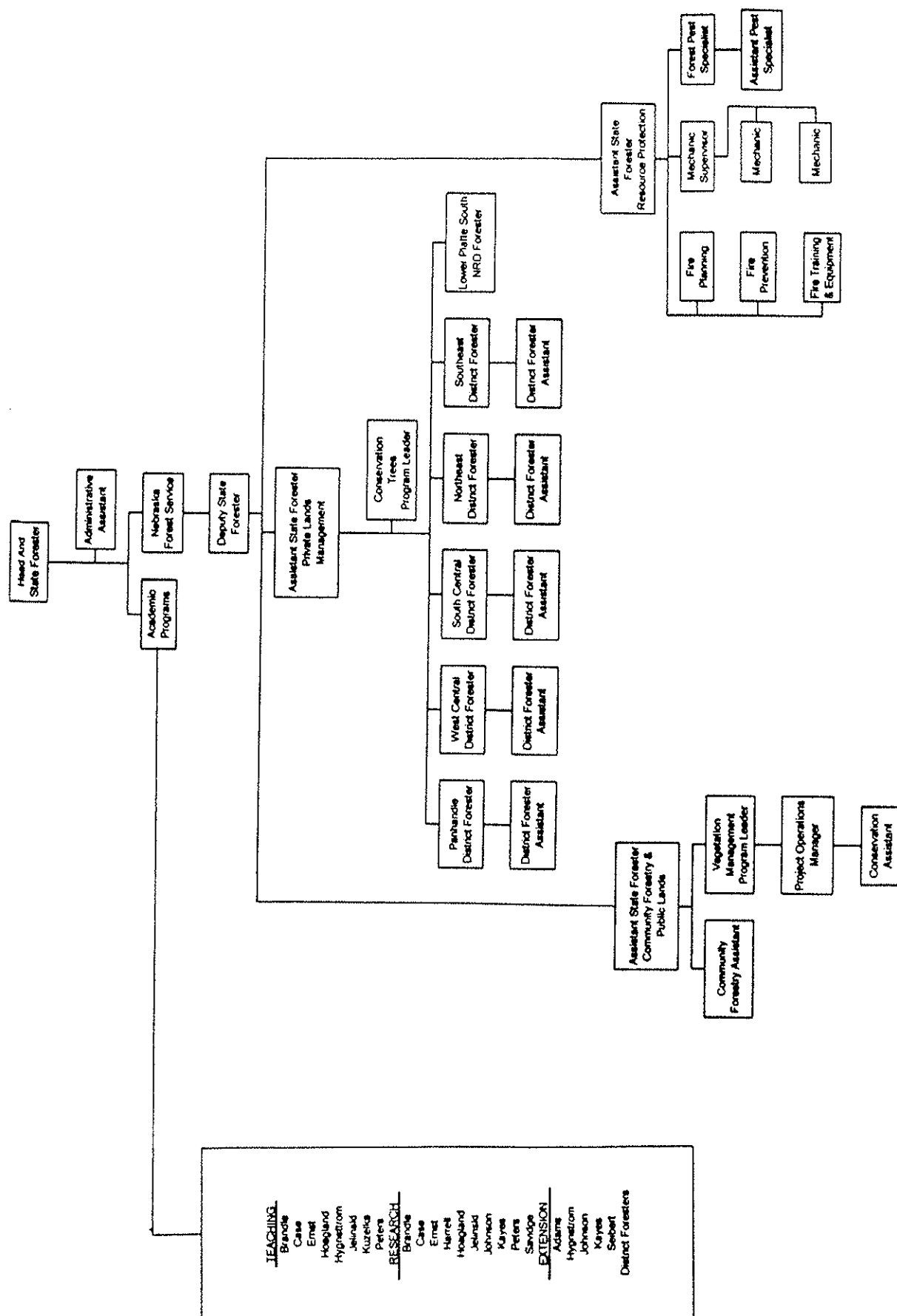
### **Administrative Structure of the Department of Forestry, Fisheries & Wildlife**

Current organization of the Department of FFW is shown in Figure I-4. The teaching, research, and extension functions are coordinated by the Head in collaboration with committees relevant to their respective areas: Teaching Committee, Research Committee, and Extension Committee. Because of the relatively small number of faculty having assignments in each of the areas, each committee is composed of all faculty who have an appointment in the particular area. Other standing committees in the Department are the Graduate Committee, which administers all aspects of the graduate program, the Promotion and Tenure Committee, which receives and acts on promotion and tenure recommendations for faculty, the Facilities Committee, which has oversight responsibility for the Departments' field facilities, and the Wildwood Trust Committee, which recommends awards to undergraduate and graduate students from the Wildwood Trust endowment fund. The Nebraska Forest Service is administered by the State Forester, the Deputy State Forester, and three Assistant State Foresters. The Deputy has a 0.5 FTE administrative assignment, and the Assistant State Foresters have administrative assignments ranging from 0.15 to 0.30 FTE. The three Assistant State Foresters are responsible for the different program areas as shown in Figure I-4.

### **FFW PERSONNEL**

FFW personnel are classified in three categories: Faculty, Managerial/Professional, and Office/Service. Personnel in all three categories play essential roles in carrying out the teaching, research, extension, and public service functions of the Department. A hallmark of FFW is how well people work together as a team, regardless of their status as faculty, managerial/professional, or office/service. All individuals are highly valued for their contributions to the Department's mission. As a consequence of this work environment and teamwork spirit, FFW enjoys a reputation on campus for being a very desirable place to

Fig. I-4



work. We receive many applications from employees in other UNL units whenever openings occur in the Managerial/Professional or Office/Service ranks.

### **Faculty**

Currently, the Department has 28 faculty and most of them have joint appointments. A roster of FFW faculty showing current appointments is given in Table I-1. At present there are 4.10 FTE in teaching, 4.31 FTE in research, 4.39 FTE in extension, and 11.4 FTE in the Nebraska Forest Service. These figures exclude those FTE fractions assigned to departmental administration.

### **Managerial/Professional**

There are 13 people in the M/P category in FFW having assignments ranging from Administrative Assistant to District Forester Assistant. All except two of the people are assigned to the Nebraska Forest Service and one other is joint between TRE and NFS. Only two of the thirteen are support by state appropriated dollars. A Managerial/Professional roster is given in Table I-2.

### **Office/Service**

Office/Service staff perform functions that include Secretarial, Mechanic, Laboratory Technician, Research Technician, and Conservation Assistant. At present there are 15 people with assignments in the Office/Service area. Table I-3 displays their names and titles.

### **Faculty Turnover**

During the period 1989-95 faculty turnover has been relatively low. Only two faculty members, Dr. Mike Kuhns, Extension Forester, and Dr. Tom Schmidt, Vegetation Management Program Leader, NFS, left to take new positions. During this same period, four new faculty members were hired into the department: Dr. Kyle Hoagland, Limnology, Dr. Terry Kayes, Aquaculture, Dr. Dennis Jelinski, Landscape Ecology, and Dr. Tom Seibert, Environmental Education. In addition, the department has hired temporary faculty to teach additional sections of Natural Resources 100, the introductory course in the curriculum—Dr. Rick Holland and Dr. Patti Boehner. Two other temporary faculty were

Table I-1

## FFW FACULTY ROSTER

<u>NAME</u>	<u>RANK</u>	<u>TENURE</u>	<u>APPOINTMENT</u>	<u>INSTITUTION/DEGREE</u>	<u>YEARS IN DEPT</u>
* Arumuganathan, K.	Asst. Prof.	NA	1.00R	Ohio U./PhD	2
Adams, Dennis	Forester	NA	.75NFS, .25E	U. of Nebraska/MS	23
Brandle, Jim	Assoc. Prof.	T	.70R, .30T	U. of Missouri/PhD	21
Case, Ron	Professor	T	.75T, .25R	Kansas State U./PhD	24
DeWald, Scott	Assoc. For.	NA	.75NFS, .25E	Duke/MF	18
Ernst, Steve	Assoc. Prof.	T	.75R, .25T	Michigan State U./PhD	11
Harrell, Mark	Assoc. For.	NA	.75NFS, .25R	U. Wisconsin/ PhD	16
Hergenrader, Gary	Professor	T	.50NFS, .17T, .17R, .16E	U. Wisconsin/PhD	15
Hoagland, Kyle	Assoc. Prof.	T	.75R, .25T	U. Nebraska/PhD	6
Hygnstrom, Scott	Assoc. Prof.	T	.70E, .30 T	U. Wisconsin/PhD	8
Jelinski, Dennis	Asst. Prof.	N	.60T, .40R	Simon Fraser U./PhD	3
Johnson, Ron	Professor	T	.69E, .31R	Cornell U./ PhD	17
Karloff, Steve	Asst. For.	NA	.75NFS, .25E	U. Nebraska/MS	11
Kayes, Terry	Assoc. Prof.	N	.75E, .25R	U. Wisconsin/ PhD	6
** Kuzelka, Bob	Assoc. Prof.	NA	.70S, .30T	U. Texas/MS	8
Lodes, Rich	Assoc. For.	NA	1.00NFS	U. Nebraska/MS	21
Lovett, Bill	Assoc. For.	T	1.00NFS	U. Illinois/MS	19
Mooter, Dave	Forester	NA	1.00NFS	U. Nebraska-Omaha/MPA	18
Nickerson, Doak	Assoc. For.	NA	.75NFS, .25E	Chadron State/MA	17
Peters, Ed	Assoc. Prof.	T	.75T, .25R	Brigham Young U./PhD	21
Rasmussen, Eric	Assoc. For.	NA	1.00NFS	U. Nebraska/BS	26
Rasmussen, Steve	Assoc. For.	NA	.75NFS, .25E	U. Nebraska/MS	14
Savidge, Julie	Assoc. Prof.	T	.60T, .40R	U. Illinois/PhD	9
Seibert, Tom	Asst. Prof.	NA	.75E, .25NFS	U. Illinois/PhD	2
Straight, Rich	Assoc. For.	NA	1.00NFS	Iowa State U./MS	11
Wardle, Tom	Assoc. For.	NA	1.00NFS	U. Nebraska/MS	20
Westover, Don	Forester	NA	1.00NFS	Stevens Point/MS;U.Nebraska/MA	21
Wilson, Jon	Assoc. For.	NA	.75NFS, .25E	Duke/MF; U.Nevada/MS	9

\* Research Assistant Professor, Center for Biotechnology

\*\* Scholarly Service component is with the Water Center/Environmental Programs

## ADJUNCTS/COURTESY APPOINTMENTS

<u>NAME</u>	<u>RANK</u>	<u>AFFILIATION</u>	<u>INSTITUTION/DEGREE</u>
Bleed, Ann	Asst. Prof.	Nebr. Dept. Water Resources	U.Wisconsin/PhD
Holland, Rick	Asst. Prof.	Nebr. Game & Parks Comm.	U.Nebraska/PhD
Klopfenstein, Ned	Asst. Prof.	National Agroforestry Center USFS	Iowa State U./PhD
Merchant, Jim	Assoc. Prof.	CSD, CALMIT	U.Kansas/PhD
Rietveld, Bill	Professor	National Agroforestry Center, USFS	U.Arizona/PhD
Schoeneberger, Michele	Asst. Prof.	National Agroforestry Center, USFS	N.Carolina St.U./PhD
Schumann, Carol	Asst. Prof.	National Agroforestry Center, USFS	Michigan State U./PhD



Table I-2

## FFW MANAGERIAL/PROFESSIONAL STAFF

<u>NAME</u>	<u>TITLE</u>	<u>DEGREE/INSTITUTION</u>	<u>PROGRAM</u>	<u>YEARS IN DEPT.</u>
Allison, Rachel	Dist. Forester Asst.	MPA/U. Missouri	NFS-North Central RC&D	2
Andelt, Jeanne	Admin. Asst.		Forestry, Fisheries and Wildlife	21
Barnes, Tom	Dist. Forester Asst.	MSF/Clemson	NFS-Nemaha NRD	1
Bolander, Bruce	Manager	BS/Kansas State	NFS-Tree Distribution/ Tree Improv./Research	18
DuPlissis, John	Dist. Forester Asst.	MS/U. Minnesota	NFS-Lower Elkhorn NRD	2
Holz, John	Manager	MS/U. Nebraska	Forestry, Fisheries and Wildlife	2
Overstreet, John	Dist. Forester Asst.	MS/U. Kentucky	NFS-Pine Ridge	1
Schmaderer, Tom	Manager	MS/U. Nebraska	NFS-Vegetation Management	19
Stepanek, Laurie	Forest Pest Mgmt. Asst.	BS/U. Nebraska	NFS-Insect/Disease	4
Virchow, Dallas	Extension Asst.	MS/U. Nebraska	IPM-Vertebrates	7
Vogltance, Bob	Manager		NFS-Fire	18
Wiles, Larry	Manager		NFS-Fire	17
Woollen, Rich	Dist. Forester Asst.	MS/U. Idaho	NFS-Lower Loup NRD	2

Table I-3

## FFW OFFICE/SERVICE STAFF

<u>NAME</u>	<u>TITLE</u>	<u>YEARS IN DEPT.</u>
Baldwin, Mahlon	Mechanic Supervisor	10
Boardman, Rodney	Mechanic II	2
Cieslik, Mike	Ag. Research Tech. II	11
Hajek, Ann	Clerical Asst. III	7
Ingersoll, Stacy	Research Tech. III	1
Kyhn, Gordon	Ag. Research Tech. II	6
Lineberry, Sandy	Staff Secretary III	3
Paxton, Connie	Clerical Asst. II	1
Pleiss, Tom	Conservation Asst. I	4
Schafer, Linda	Staff Secretary II	1
Severn, Aris	Research Tech. II	1
Sieber, Michelle	Staff Assistant	2
Smith, Diana	Staff Secretary II	5
Tintera, Marcy	Staff Secretary III	10
Vietz, Don	Mechanic II	19

hired to teach Dr. Savidge's courses while she was on a faculty development leave: Dr. Cliff Lemen who taught FFW 311, Wildlife Ecology and Management, and Dr. Ben Gawne who taught FFW 211, Wildlife Biology and Conservation.

## **FACILITIES**

The faculty, staff, and graduate students of FFW are housed in three separate facilities: the Plant Industry building where Forestry, Aquatics, and Nebraska Forest Service headquarters staff are located, Natural Resources Hall where Wildlife personnel are housed, and the Biochemistry Building where some graduate students are located. This physical separation is highly undesirable because it inhibits communication and interaction between the different components of the department. The new Natural Resources facility currently in the planning stage will, when completed, remedy this problem. Apart from the physical separation, the department is very crowded. There is simply not enough space to accommodate the growth that has occurred, especially in the research and graduate program.

On the positive side, much of the space that is occupied has been almost completely renovated, this renovation occurring in phases over the last several years in both Plant Industry and Natural Resources Hall. The latest renovation in Natural Resources Hall involved the complete remodeling of NRH 203, the department's main classroom. In addition, we converted the NRH conference room to a computer laboratory for graduate student use. The most recent phase of the remodeling included the renovation of forestry offices and laboratories in the basement and the administrative suite on the first floor of the Plant Industry building. Although the amount of space available is the same, we were able to gain some efficiencies by reorganizing the space.

### **Field Research and Demonstration Facilities**

The facilities described here are utilized primarily for research, demonstration, and field-scale testing. They include land either owned by the University or under its control. These facilities are located across the state and provide a variety of field situations where

research and demonstration projects can be conducted. Preeminent among these is the land the Department controls at the Agricultural Research and Development Center (ARDC) 25 miles north of Lincoln at Mead, Nebraska. At the ARDC, FFW has almost 600 acres available for our use; currently that facility is primarily used for forestry and water quality research although some wildlife research is also carried out. Two major interdisciplinary projects, the Integrated Farm (research) involving Agronomy, Animal Science, Horticulture, FFW, and the ARDC, and the Microfarm (internship/teaching) are also located in part on these areas. In the future we are planning to develop an aquaculture research and demonstration facility at the ARDC site.

Horning Farm, a 240 acre tract near Plattsmouth, is utilized almost exclusively for forestry research and demonstration. Much of our tree selection and improvement work is located here as is the collaborative effort with the U.S. Forest Service, National Agroforestry Center, that is located in Lincoln. The Department has projects established on other University-owned sites across the state including Rogers Memorial Farm near Lincoln, the Gudmundsen Sandhills Research Center near Whitman, and the Northwest Agricultural Lab near Alliance. Through various agreements we also have projects established at the National Arbor Day Foundation at Nebraska City, the Hastings Naval Ordinance Depot, the Harlan County Lake and other sites. Since the last Departmental review in 1989, FFW has acquired access to or been given responsibility for three additional properties. Prairie Pines is a 145 acre farm on the outskirts of Lincoln that has been converted entirely to trees and native prairie. This property donated by Walt and Virginia Bagley, includes a choose-and-cut Christmas tree operation as well as a modern residence. We plan to use this property for research and teaching purposes. In the future, the residence may be converted to an Environmental Education Center. Included with the gift of this farm is an endowment to provide operating and maintenance funds for the property. Cedar Canyon is a 640 acre tract near North Platte that the Department acquired from the Farmers Home Administration. It consists of about 100 acres of cropland and 540 acres of pasture containing a stand of eastern red cedar trees. A windbreak demonstration project is being established on the cropland

while the rangeland will be used to demonstrate red cedar management in rangeland. Hardwood trees are being planted on the bottomland to test the suitability of the area for growing various species of hardwood trees. Finally, in 1992 the University was given a deferred gift of a 6000 acre ranch in northcentral Nebraska by the Barta brothers. This tract consists of Sandhills grazing land on which has been established several hundred acres of windbreaks and other tree plantings. FFW will have management responsibility for the tree resources on the property and will use the property for forestry and wildlife research when the ranch is transferred to the University, an event that is to occur this year. Fortunately, along with the property the Barta brothers provided a very generous endowment to support operations at the site.

Clearly, from the foregoing, the Department has available a wide range of field sites for the conduct of its field research program. About the only shortcoming is that we have no field facility under our control where aquatic research can be adequately conducted. For this we rely on privately-owned lakes and ponds, on publicly-owned waters, including facilities owned and operated by the Nebraska Game & Parks Commission. The establishment of a facility for aquaculture research and demonstration is a critical need for the development of Nebraska's aquaculture industry.

The aquatic research program was significantly enhanced by the creation of an aquatic microcosm lab in the Service Building on campus. Here 4500 sq. ft. were converted to a temperature and light controlled environment. Temperatures can be regulated down to 50°F and the light environment emulates the spectral quality of daylight in the photosynthetically active range. The availability of this microcosm facility has enabled faculty and graduate students to investigate research questions that previously could not be addressed because of a lack of a suitable research laboratory. The renovation was completed in March 1993, and since that time six graduate student projects have been completed in it, two of them Ph.D.'s.

The Fire Control section of the Nebraska Forest Service has a shop facility in Lincoln Air Park West. This shop, and the three mechanics there support, the Federal Excess Personal Property program (FEPP), Departmentally-owned vehicles, and other Department operations.

## **Departmental Progress on Changes Recommended by the 1989 Review**

The 1989 Review Team made numerous recommendations covering various aspects of the Department's programs. This section will provide a summary of the current status of those recommendations. Those recommendations made for specific programs will be dealt with in those program sections of this document. Here, we will consider general recommendations that are relevant to all programs.

### General Recommendations

#### **1. Provide relief for the severe limitations in physical facilities for the Department.**

Status: Significant progress has been made since the last review in improving departmental space. Almost all space occupied in Plant Industry has been renovated. Although the amount of space is the same, efficiencies have been gained by rearranging space. All faculty in Plant Industry, except those in the NFS-Fire Program, have new offices, several have new laboratories, graduate student space has been improved, and there is a new administrative suite that greatly improves the working environment for clerical and administrative staff. The new conference room in Plant Industry provides an attractive and functional setting for small group meetings, seminars, and informal faculty and staff interaction. In Natural Resources Hall all faculty offices have been renovated since the late 1980's and the classroom in 203 NRH was completely remodeled two years ago. The conference room in NRH has been converted to a computer lab for graduate student use. It currently contains 4 microcomputers and two work stations. Still on the renovation agenda for NRH are projects for improving space for graduate students in 204 NRH and in the basement as well as remodeling the teaching laboratory in 102 NRH. A new facility to support our program in aquatic research has been developed by remodeling 4500 square feet in the Service Building. These renovations have greatly improved the quality of space occupied by the Department but have not alleviated the overall space shortage. That shortage will be remedied when the new Natural Resources facility, currently in the planning stage, is constructed.

**2. The department head should delegate additional responsibilities to other staff.**

Status: A number of activities have been delegated to others. The administrative structure of the Nebraska Forest Service was reorganized in 1992 giving more direct administrative authority to the Deputy State Forester, the Assistant State Foresters, and the District Foresters. In addition, some administrative items have been delegated to the chairs of the various departmental committees, and to the administrative assistant. However, the demands on the Head/State Forester continue to grow. Some faculty, both in the TRE and NFS are concerned that as these demands continue to grow, the time requirements of the position will not allow the Head/State Forester enough time to provide the vision and leadership which will be necessary for the department to continue to grow and prosper over the next five years. It is important for the Head/State Forester and the Department to continue to find creative ways to address this issue. If a School of Natural Resources is formed and FFW is incorporated into the School, this point will become moot.

**3. The department needs to increase its level of external funding through both grants and cooperative arrangements.**

Status: This has been a remarkable success story for the faculty. During the period 1985-89, faculty in FFW brought in an average of \$31,383/FTE in research grants and contracts, a sum that ranked the department near the bottom of IANR units. In 1990 faculty generated \$67,804/FTE, and ranked 4th in IANR. In 1992 that sum had increased to \$295,985/FTE and placed FFW 1st out of 20 units. Since then outside grants and contracts for research have fluctuated between \$255,458 and \$311,368, ranking the department second out of 20 units in IANR for the last 3 years. Outside funds brought in by the faculty for research for the period 1992-95 exceeded the ARD average by more than 3 times. Total grant and contract funds for all program areas (except for the NFS) received by the faculty were: 1991 - \$296,385; 1992 - \$754,190; 1993 - \$677,488; 1994 - \$1,343,012; 1995 - \$865,241. The faculty were given a challenge and they responded.



4. **Closely related to achieving the previous recommendation: The Department needs to increase the number of refereed journal publications.**

Status: There has been considerable improvement here as well with the publications rate increasing from 1.0/research FTE for the period 1988-90 (38% of ARD rate of 2.65/FTE) to 3.12/research FTE (90% of ARD rate of 3.47/FTE) in 1995. While this represents a 300% improvement, we expect this to continue to improve as the faculty publish the results from studies supported by their successful grant efforts. Contributing to this success is the reduction in teaching overload that was addressed during the same period providing time for faculty to meet their research obligations. Our goal is to exceed the ARD average in the next year.

5. **Consider an FFW newsletter to improve communication among Forestry, Fisheries and Wildlife personnel.**

Status: A bi-weekly newsletter "Naturally Speaking" was initiated in July, 1990. The newsletter is an effective vehicle for communicating to all departmental personnel information of interest relative to departmental activities.

## CURRENT FISCAL CLIMATE AND ITS IMPACT ON PROPOSED PROGRAM DIRECTIONS

The University of Nebraska, like most other institutions of higher education, finds itself in a fiscal climate of uncertainty. Over the past several years state support for the University has been relatively flat, with only modest increases provided for faculty and staff salaries, little or no increases for operating, and few new funded program initiatives. At the same time, federal funding sources seem destined to shrink, given the current mood of Congress.

In the sections of this self-study that follow, new faculty, support personnel, and operating funds are identified and justified that are essential to achieve the program goals and objectives that have been set out. Considering the fiscal situation described above, it is legitimate to question how realistic our vision for FFW is. We believe the following:

1. New program directions and developments are possible and will result from funding provided by a variety of sources. However, the basic infrastructure upon which such programs depend -- support staff, operating funds, and physical facilities -- are the primary responsibility of the state. It is not reasonable, for example, to expect faculty to generate the operating support through grants for the teaching program. Nor is it reasonable to expect support staff, be they clerical, laboratory technicians, or other essential personnel, to be funded mainly by non-state sources. The state must provide the necessary infrastructure to enable program success.
2. We are receptive to and will willingly pursue a variety of mechanisms to bring new faculty to the Department. For example, FFW could develop a **Visiting Scientist Program**. A budget line of perhaps \$50,000 could be established to support the program. A Visiting Scientist would spend 1-2 years in the Department during which time they would teach some of our current courses as

well as courses in their specialty. We would recruit these scientists based upon their ability to enhance and interact with faculty research programs during their time here. Given the current glut of post-doctoral associates in the scientific community, FFW should have no trouble attracting qualified people to a real academic position for a one or two year assignment. This Visiting Scientist program would bring new ideas and new expertise to the faculty on a regular basis without there being a permanent commitment made to a regular tenured faculty position.

Another idea would be **Shared Faculty Positions**. These could be positions shared between two UNL departments who have a common interest, or between a UNL department and an outside agency. Such an arrangement is currently being explored between FFW and the U.S. Forest Service National Agroforestry Center for a person who would serve as national liaison for the Agroforestry Center to CSREES for both research and extension. That position's University role would be in extension forestry with an emphasis on riparian zone management. A position shared between FFW and 4-H has already been established and is working well -- the Environmental Education specialist position. Other arrangements also make sense (i.e. resource economist position jointly shared between FFW and Ag. Economics).

A third idea would be very **Non-traditional Faculty Appointments** where FFW would provide half of the support (including salary) for a faculty position with the expectation that the person in the position would generate the other half through outside grants and contracts. Another variation on this theme would be faculty positions that are established to operate with certain programs or time lines and when those programs are over, the position also ends.

Finally, if IANR Administration is serious about improving natural resources programs within the Institute, they must be willing to reallocate resources from other more traditional areas of agriculture to natural resources programs.





## TEACHING

The department has 4.10 FTE in teaching (excluding administration) distributed among nine faculty. Table T-1 shows the teaching faculty and the courses they teach. All teaching faculty in FF&W have appointments in two or more administrative programs and provide a complex of services to clientele which span the breadth of educational programs, research and demonstration, and public service and information on a daily basis. Because of this, our teaching program is woven tightly to the objectives and activities of our other programs.

Philosophy and Issues : The primary goal of the faculty of the Department of Forestry, Fisheries and Wildlife is to convey to students in courses and clientele in all venues the interdependence of natural ecosystems in the biosphere. We see humans as a part of nature, co-dependent with other species on natural systems for their long term well being. We see conservation as an ethical imperative to the sustainable management of our natural resources.

Long Term Vision: The need for an understanding of the role of humans in the evolution and functioning of ecosystems is increasing. This need is not so much for the future of ecosystems but rather for the future of *Homo sapiens*. Today we have the opportunity to make a range of decisions, but with the passage of time the range becomes more restricted. Our long term vision is to prepare students to become leaders in application of the ecosystem approach to resource management during the 21st century. To do this they need to be able to understand the complexity of environmental issues, work in multidisciplinary teams to resolve environmental problems and productively address a multiplicity of environmental and societal goals.

Table T-1

Current Faculty Teaching Appointments  
and Course Assignments in FFW

<u>NAME</u>	<u>APPOINTMENT</u>	<u>COURSE ASSIGNMENT</u>		
Jim Brandle	.30 FTE	FFW 417/817 FFW 849	Agroforestry Systems in Sustainable Ag Woody Plant Growth & Development (with Paparozzi, Horticulture)	3 cr. 3 cr.
Ron Case	.75 FTE	NR 100 FFW 350 FFW 404/804 FFW 450/850	Introduction to Natural Resources Wildlife Management Techniques Forestry, Fisheries & Wildlife Seminar Biology of Wildlife Populations	3 cr. 3 cr. 1 cr. 4 cr.
Steve Ernst	.25 FTE	FFW 423/823 FFW 811	Integrated Resources Management (with Jelinski) Plant Tissue Culture	3 cr. 4 cr.
Kyle Hoagland	.25 FTE	FFW 404/804 FFW 459/859 FFW 860	Forestry, Fisheries & Wildlife Seminar Limnology Advanced Limnology	1 cr. 4 cr. 3 cr.
Scott Hygnstrom	.30 FTE	FFW 348 FFW 448/848	Wildlife Damage Management Advanced Topics in Wildlife Damage Mgmt.	3 cr. 2 cr.
Dennis Jelinski	.60 FTE	FFW 224 FFW 423/823 FFW 810	Ecology of Woody Plant Communities Integrated Resources Management (with Ernst) Landscape Ecology	4 cr. 3 cr. 3 cr.
Bob Kuzelka	.30 FTE	NR 281 FFW 323 FFW 415/815	Hydrogeography Natural Resources Policy Water Resources Seminar	3 cr. 3 cr. 1 cr.
Ed Peters	.75 FTE	NR 100 FFW 461/861 FFW 462/862 FFW 491/891 FFW 404/804	Introduction to Natural Resources Fisheries Science Fisheries Biology Ichthyology Forestry, Fisheries & Wildlife Seminar	3 cr. 4 cr. 3 cr. 4 cr. 1 cr.
Julie Savidge	.60 FTE	FFW 211 FFW 311 FFW 858	Wildlife Biology and Conservation Wildlife Ecology and Management Conservation Biology	3 cr. 3 cr. 3 cr.
All Faculty		FFW 901	Seminar Topics	1 cr.



## UNDERGRADUATE PROGRAMS

The undergraduate program serves students from a variety of majors. Faculty in FFW advise 133 students who are majoring in Fisheries and Wildlife and 65 students majoring in Environmental Studies. These students comprise many of those who enroll in our courses. However, most of our courses attract a much wider audience from other majors in Natural Resources and virtually every college on campus. During the 1989 academic year, enrollment in courses taught by FFW faculty generated 780 Student Credit Hours (SCH) with 2.79 FTEs of teaching faculty. Since that time SCH rose to a peak of 1,501 during 1993-94 and remained between 1,200 and 1,400 in the 1994 - 1995 and 1995 - 1996 academic years. During the past five years FFW has averaged 362.9 SCH/FTE. Up to 1993 FFW ranked first among CASNR departments in SCH/FTE and since 1993, with the addition of 0.75 FTE teaching, we have averaged third (Table T-2). Despite this strong record, funds received from CASNR to support the teaching program has consistently ranked next to last. This is an area the Administration must give serious attention to if FFW is to maintain a viable teaching program.

### Changes in Teaching FTE Since 1989

Since our 1989 review we have added new teaching faculty positions in Limnology (Hoagland; 0.25FTE) and Landscape Ecology (Jelinski; 0.60FTE). In addition we have hired two temporary faculty (Holland 1992 to 1994; Boehner 1994 to 1995) to teach additional sections of NR 100 at night. During the fall semester 1995, temporary faculty were also hired to teach FFW 211 (Gawne) and FFW 311 (Lemen) while J. Savidge was on faculty development leave. The calculated overall departmental teaching load for the 1994 - 1995 academic year was 5.4 FTE compared to a budgeted 4.10 FTE. For the period 1990-1994, calculated teaching load consistently exceeded the budgeted FTE by 1.25-1.50 FTE.

### New Courses Since 1989

Our current courses are listed in Table T-3. Since 1989 several new courses have been developed which have broadened our program and provided new avenues for our students to expand their academic backgrounds and career choices. These courses are: **FFW 224 Ecology of Woody Plant Communities**; expanded our course offerings to include

Table T-2

College of Agricultural Sciences and Natural Resources  
Faculty FTE to Student Credit Hours(SCH)  
Based on Fall Enrollment and Budgeted Faculty FTE

Department	1992-93			1993-94			1994-95			1995-96		
	SCH	FTE	SCH per FTE	SCH	FTE	SCH per FTE	SCH	FTE	SCH per FTE	SCH	FTE	SCH per FTE
Agriculture General	495		0.00	478		0.00	836		0.00	944		0.00
Biometrics	629	2.45	256.73	991	2.45	404.49	948	2.45	386.94	937	2.45	382.45
Ag Biochemistry	470	1.64	286.59	673	1.47	457.82	634	2.05	309.27	814	1.45	561.38
Ag Communications			0.00			0.00			0.00			0.00
Ag Economics	2,021	7.32	276.09	2,294	7.67	299.09	2,124	7.72	275.13	2,331	7.72	301.94
Ag Education(AgLEC)	2,503	10.36	241.60	2,292	8.56	267.76	2,440	8.66	281.76	2,564	8.53	300.59
Ag Engineering(BSE)	853	5.11	166.93	932	5.46	170.70	1,244	5.46	227.84	1,515	5.46	277.47
Ag Meterology	42	0.74	56.76	42	0.74	56.76	39	0.74	52.70	57	0.74	77.03
Agromony	2,573	10.96	234.76	2,894	10.06	287.67	2,890	10.41	277.62	2,819	10.80	261.02
Animal Science	2,200	10.74	204.84	2,221	10.51	211.32	2,377	10.21	232.81	2,583	10.31	250.53
Entomology	336	1.64	204.88	325	1.57	207.01	383	1.96	195.41	374	1.96	190.82
Food Science	622	3.00	207.33	636	3.00	212.00	441	3.10	142.26	469	3.10	151.29
Forestry	1,244	3.32	374.70	1,501	4.17	359.95	1,237	4.17	296.64	1,389	4.17	333.09
Horticulture	577	3.27	176.45	630	3.27	192.66	642	3.77	170.29	771	3.56	216.57
Plant Pathology	117	1.04	112.50	150	1.04	144.23	147	1.04	141.35	168	1.04	161.54
Vet Science	297	1.79	165.92	260	1.88	138.30	506	1.92	263.54	325	1.72	188.95
Chorus			0.00			0.00			0.00			0.00
<b>Totals</b>	14,979	63.38	236.34	16,319	61.85	263.85	16,888	63.66	265.28	18,060	63.01	286.62
Foundation Courses	615			629			697			600		
Off Campus Courses	580			731			491			539		
<b>Totals</b>	1,195			1,360			1,188			1,139		
<b>Grand Total</b>	16,174	63.38	255.19	17,679	61.85	285.84	18,076	63.66	283.95	19,199	63.01	304.70

Table T-3

## Courses of Instruction in Forestry, Fisheries and Wildlife

The courses offered in forestry, fisheries and wildlife provide: 1) knowledge of the potentials and limitations of plant and animal resources; 2) an introduction to forestry, fisheries and wildlife sciences and practices; 3) intensive study in individual phases of forestry, fisheries and wildlife; and 4) opportunity for research.

100. Introduction to Natural Resources (3 cr L, 0 Lec 3)  
For course description, see Natural Resources 100

105. Forestry and Natural Resources Orientation (Natural Resources 101) (1 cr L, 0 Lec 1) PN only. Prereq: Freshman, first year College of Agricultural Sciences and Natural Resources, or transferring major students. Recommended that this course be taken after or concurrently with NRES 100.  
For course description, see Natural Resources 101

211. Wildlife Biology and Conservation (3 cr L, 0 Lec 3) Prereq: Sophomore standing or permission.  
Introduction course on wildlife ecology and biology, interrelationships between humans and wildlife, and basic principles in wildlife management. Natural history of selected Nebraska wildlife, controversial issues concerning wildlife, and international wildlife management will be discussed. Open to nonmajors.

212. Landscape Plants I (Horticulture 212) (3 cr L, 0 Lec 6)  
Prereq: HORT 130  
For course description, see Horticulture 212

213. Landscape Plants II (Horticulture 213) (3 cr L, 0 Lec 2, Lab/Field 2) Prereq: HORT 212  
For course description, see Horticulture 213

224. Ecology of Woody Plant Communities (4 cr L, 0 Lec 3, Field/Lab 3) Prereq: BIOS 101 and 101L and either BIOS 109 or 112 or permission.

A study of the ecology of woody plant communities. Topics include: the biology and ecology of trees, the structure and dynamics of populations and communities of organisms in riparian and upland woody plant environments, how to rehabilitate woody plant areas, and how to manage them for long-term ecological benefits. Field trips will examine specific woody plant communities, methods for describing plant populations and communities, and effects of management. Several off-campus field trips will be scheduled for Saturdays.

291. Independent Study in Forestry, Fisheries and Wildlife (1-5 cr L, 0 Lec 0) Prereq: Permission.  
Individual or group projects in research, literature review, or extension of course work under supervision and evaluation of a departmental faculty member.

318. Great Plains Forestry (3 cr L, 0 Lec 2, Lab 4) Prereq: BIOS 109 or permission.

A discussion of the history, biology, and use of trees in the Great Plains region. Topics include: physical and vegetative characteristics of the Great Plains, the biology of trees, shelterbelts, woodland management, urban and community forestry. A field-oriented lab will emphasize practical applications and techniques. One all-day field trip will be made.

311. Wildlife Ecology and Management (3 cr L, 0 Lec 3) Prereq: BIOS 101 and 101L, and either NRES 100 or FFWS 211, or permission, sophomore standing.  
Wildlife ecology and population biology and enhancement of wildlife populations through management. Emphasis on both game and nongame species. Basic concepts in conservation biology will be included. Designed for wildlife and biological sciences majors.

315. Study Tours in Natural Resource Management (1-3 cr each, max 6 cr L, 0 Lec 0) PN only. Prereq: Permission.  
Group educational experience combining lectures, discussions and/or seminars with tours to broaden a student's knowledge of specific aspects of natural resources management. Choice of subject matter and coordination of on- and off-campus study at the discretion of the instructor.

323. Natural Resources Policy (Natural Resources 323) (3 cr L, 0 Lec 3) Prereq: Junior standing.  
A course dealing with the conflicts and common ground perpetuated by increasing demands on our natural resources. Policy development and issue analysis will be stressed. Historical policy actions will be reviewed and evaluated.

348. Wildlife Damage Management (3 cr L, 0 Lec 2, Lab 3) Prereq: FFWS 211 or permission.

Fundamentals of prevention and control of damage caused by vertebrate pests, prime pests, birds and mammals. Includes the philosophical, ecological and behavioral basis for controlling population levels or individuals of pest species.

358. Wildlife Management Techniques (3 cr L, 0 Lec 2, Lab 3) Prereq: BIOS 320 or AGRO 440

A survey of techniques utilized in wildlife management emphasizing habitat analysis, field techniques, criteria of sex and age, and annual damage control.

399. Independent Study in Forestry, Fisheries and Wildlife (1-5 cr L, 0 Lec 0) Prereq: 8 hrs forestry, fisheries and wildlife or closely related areas and permission.  
Individual or group projects in research, literature review, or extension of course work under supervision and evaluation of a departmental faculty member.

402/802. Aquatic Insects (Biological Sciences 402/802)  
Entomology 402/802 (3 cr L, 0 Lec 2, Lab 3) Prereq: ENTO 115 or permission. Offered odd-numbered calendar years.  
For course description, see Entomology 402/802

403/803. Fundamentals of Crop Physiology (Agronomy, Horticulture 403/803) (2 cr L, 0 Lec 4) Prereq: BIOS 325 or equivalent.  
For course description, see Agronomy 403/803

404/804. Forestry, Fisheries and Wildlife Seminar (1 cr per sem, max 2 cr L, 0 Lec 0) Prereq: Junior standing or above in natural resources or permission.  
A seminar involving technical aspects of forestry, fisheries, and wildlife management.

406/806. Microclimate: The Biological Environment (Agricultural Meteorology, Agronomy, Geography, Horticulture, 406/806, Biological Sciences 457/857) Water Science 408 (3 cr L, 0 Lec 3) Prereq: MATH 106 or equivalent, 5 hrs physics, and junior standing in any of the physical or biological sciences or engineering, or by permission.  
For course description, see Agricultural Meteorology 406/806

409/809. Horticulture Crop Physiology (Horticulture 409/809) (4 cr L, 0 Lec 3) Prereq: BIOS 325 or permission.  
For course description, see Horticulture 409/809

415/815. Water Resources Seminar (Agronomy, Geography 481/881, Natural Resources 415, Geology 415/815) (1 cr L, 0 Lec 3) Prereq: Junior standing or above, or permission.  
For course description, see Agronomy 481/881

417/817. Agroforestry Systems in Sustainable Agriculture (3 cr L, 0 Lec 3) Prereq: 12 hrs biological or agricultural sciences. At least one course in production agriculture and one course in natural resources is strongly suggested. Offered odd-numbered calendar years.

A study of the roles of woody plants in sustainable agricultural systems of temperate regions. Emphasis will be on the ecological and economic benefits of trees and shrubs in the agricultural landscape. Topics include: habitat diversity and biological control, shelterbelts structure, function, benefits and design, intercropping systems, silvopastoral systems, riparian systems, and production of timber and specialty crops. A comparison of temperate agroforestry systems to those of tropical areas will be included.

423/823. Integrated Resources Management? (Natural Resources 423) (3 cr L, 0 Lec 3) Prereq: Senior standing in natural resources or related major, or permission of instructor.  
Integrated and multiple-use management will be stressed and analyzed. Economic, political, social, and physical impacts on natural resources management priorities will be evaluated.

448/848. Advanced Topics in Wildlife Damage Management (2 cr L, 0 Lec 2) Prereq: FFWS 348 or graduate standing.  
In-depth study of economic, global, and public policy issues relative to situations in which wildlife damage personal property or natural resources, threaten human health and safety, or are a nuisance. Demonstration and discussion of technological advances in fertility control, damage resistance, toxicology, behavioral modification, and biological management. Participation in a three day professional conference is strongly encouraged.

456/856. Biology of Wildlife Populations (Biological Sciences 456/856) (4 cr L, 0 Lec 3, Lab 3) Prereq: BIOS 320 or permission.  
A study of the principles of population dynamics. Management strategies for consumptive and nonconsumptive fish and wildlife species will be presented utilizing principles developed.

454/854. Population and Community Ecology (Biological Sciences 454/854) (4 cr L, 0 Lec 3, Lab 4) Prereq: BIOS 320 or equivalent.  
For course description, see Biological Sciences 454/854

456/856. Mathematical Models in Biology (Biological Sciences 456/856) (3 cr L, 0 Lec 3) Prereq: Junior or senior standing in biological sciences, MATH 106 or 107 or permission of instructor.  
For course description, see Biological Sciences 456/856

459/859. Limnology? (Biological Sciences 459/859, Water Science 459) (4 cr L, 0 Lec 3, Lab 4) Prereq: 12 hrs biological sciences, including introductory ecology, 2 sems chemistry.  
The physical, chemical, and biological processes that occur in fresh water. A study of the organisms occurring in fresh water and their ecology, the biological productivity of water and its causative factors, eutrophication and its effects. May also be offered at Cedar Point Biological Station.

461/861. Fisheries Science? (4 cr L, 0 Lec 3, Lab 3)  
A study of fisheries biology, emphasizing the determination and evaluation of vital statistics for the management of fish populations. In addition the basis of specific management techniques will be discussed. May also be offered at Cedar Point Biological Station.

462/862. Fisheries Biology (Biological Sciences 492/892) (3 cr L, 0 Lec 3) Prereq: BIOS 491/891 or equivalent.

Study of the biology of fishes with emphasis on those factors that affect fishes in the natural environment. Consideration will be given to techniques used in the analysis and management of fish populations.

469/869. Bio-Atmospheric Instrumentation (Agricultural Meteorology, Agronomy, Geography, Mechanized Systems Management 469/869, Horticulture 407/807) (3 cr L, 0 Lec 2/Lab 1) Prereq: MATH 106, 4 hrs physics, junior standing, physical or biological science major. Offered fall semester of odd-numbered calendar years.  
For course description, see Agricultural Meteorology 469/869

475/875. Water Quality Strategy (Agronomy, Civil Engineering, Community and Regional Planning, Geology, Mechanized Systems Management, Political Science 475/875, Natural Resources, Sociology, Soil Science, Water Science 475) (3 cr L, 0 Lec 3) Prereq: Senior standing or permission.  
For course description, see Agronomy 475/875

491/891. Ichthyology (Biological Sciences 491/891) (4 cr L, 0 Lec 3, Lab 4) Prereq: 12 hrs biological sciences.  
A study of fishes, their taxonomy, physiology, behavior and ecology, the dynamics of fish stocks and factors regulating their production. May also be offered at Cedar Point Biological Station.

496/896. Independent Study in Forestry, Fisheries and Wildlife (1-5 cr L, 0 Lec 0) Prereq: 12 hrs forestry, fisheries and wildlife or closely related areas and permission.

Individual or group projects in research and literature review under supervision and evaluation of a departmental faculty member.

499H. Honors Thesis (3-6 cr L, 0 Lec 0) Prereq: Admission to the University Honors Program and permission, AGRO 299H recommended.  
Conduct a scholarly research project and write a University Honors Program or undergraduate thesis.

807. Plant-Water Relations (Agronomy 807, Biological Sciences 817) (3 cr L, 0 Lec 3) Prereq: BIOS 325 or equivalent, MATH 106 recommended, or permission of instructor.

818. Landscape Ecology (Horticulture 812) (3 cr L, 0 Lec 3) Prereq: 12 hrs biological sciences or related field including BIOS 320, or permission.

811. Plant Tissue Culture (Biological Sciences, Horticulture 811) (4 cr L, 0 Lec 2, Lab 4) Prereq: BIOS 109, 325 includes CHEM 109, 110, BIOS 221, or equivalents, or permission.

817. Agroforestry Systems in Sustainable Agriculture (3 cr L, 0 Lec 3) Prereq: 12 hrs biological or agricultural sciences. At least one course in production agriculture and one course in natural resources is strongly suggested. Offered odd-numbered calendar years.

848. Advanced Topics in Wildlife Damage Management (2 cr L, 0 Lec 2) Prereq: FFWS 348 or graduate standing.

849. Woody Plant Growth and Development (Horticulture, Biological Sciences 849) (3 cr L, 0 Lec 2) Prereq: BIOS 221 or CHEM 251, BIOS 325 or permission of instructor. Offered fall semester of even-numbered calendar years.

858. Conservation Biology (3 cr L, 0 Lec 3) Prereq: 12 hrs forestry, fisheries and wildlife or related field, including BIOS 320, 241 or AGRO 315 or equivalent, or permission.

860. Advanced Limnology (Biological Sciences 860) (3 cr L, 0 Lec 3) Prereq: FFWS 459/859 or equivalent.

899. Masters Thesis (6-10 cr L, 0 Lec 0)

901. Forestry, Fisheries and Wildlife Seminar (1 cr per sem, max 4 cr L, 0 Lec 0) Prereq: Permission.

907. Agricultural Climatology (Agronomy, Horticulture 907, Geography 952) (2 cr L, 0 Lec 3) Prereq: 9 hrs plant science, 3 hrs statistics. Offered fall semester of odd-numbered calendar years.

908. Microclimate of the Biological Environment-Advanced Topics (Agronomy, Geography, Horticulture, Mechanized Systems Management 908) (3 cr L, 0 Lec 3) Prereq: 12 hrs biological sciences or related field. Offered spring semester of even-numbered calendar years beginning spring 1990.

909. Crop Responses to Environment (Agronomy, Horticulture 909) (3 cr L, 0 Lec 3) Offered fall semester of even-numbered calendar years.

915. Horticulture Crop Improvement and Breeding (Agronomy, Horticulture 915) (3 cr L, 0 Lec 3) Offered spring semester of even-numbered calendar years.

943. Advanced Avian Physiology (Animal Science 943) (3 cr L, 0 Lec 3) Prereq: One semester of physiology or ornithology or permission of instructor.

950. Seminar in Horticulture and Forestry (Horticulture 950) (3 cr per sem, max 6 cr L, 0 Lec 0)

959. Advanced Community Ecology (Biological Sciences 959) (3 cr L, 0 Lec 3)

996. Research Other Than Thesis (1-6 cr L, 0 Lec 0)

999. Doctoral Dissertation (cr an L, 0 Lec 0)

a plant ecology component which gives our students a better understanding of plant communities and compliments FFW 311 (Wildlife Ecology and Management). **FFW 315 Study Tours in Natural Resources Management**; provides a course for off campus studies and allows students to see first hand ecosystems and management activities outside Nebraska. This course has offered trips to Wyoming, Texas and Mexico and Belize. **FFW 448/848 Advanced Topics in Wildlife Damage Management**; provides additional background for undergraduates and graduate students in an area for which our program has become widely acclaimed. **FFW 417/817 Agroforestry Systems in Sustainable Agriculture**; provides our students a better understanding of how trees can be integrated with agriculture and builds on the long standing reputation of our department in windbreak research and their effects on crop productivity. **FFW 810 Landscape Ecology**; addresses relationships among spatial patterns, temporal patterns, and ecological processes. **FFW 858 Conservation Biology**; discusses the important factors which influence the survival of species and communities in space and time.

#### New NR Degree Initiated in 1990

Changes in the requirements for the BS degree CASNR have also been important to our programs. In 1990 a BS degree in Natural Resources was separated from the BS in Agriculture. This has provided increased visibility for natural resources programs and has given students a better sense of identity within CASNR. At the same time a new intercollege Environmental Studies major was developed. This has provided a direct link between our introductory courses and an increased breadth of majors in the College of Arts and Sciences.

A Curriculum Revitalization Task Force revamped the core requirements, formalized communications intensive class designations beyond typical writing classes and recommended the development of an introductory core course for all incoming CASNR students (AG/NR 103). In addition, it added a capstone experience requirement which students in the Fisheries and Wildlife major meet with the Integrated Resources Management course (FFW 423/823).

### Campus-wide Changes in Curriculum Since 1989

Changes in the humanities and social science requirements have included additions of Multicultural and International focus courses as part of a student's program. These requirements have been adopted on a campus wide basis with the institution of new General Admission Requirements and General Liberal Education requirements. These call for the inclusion of Essential Studies (ES) courses and Integrative Studies (IS) courses in every student's program. All of these magnify the need for our faculty to be actively involved with their advisees to avoid unnecessary delays in completion of graduation requirements. UNL has installed a new registration/course enrollment system that has greatly improved the speed and efficiency of registering for classes by students. However, it also reduces the interaction of student with adviser and we have some concerns about this.

### Minors

During the last five years minors have been instituted for programs in CASNR, and we currently have a minor in Forestry, Fisheries and Wildlife approved. Several others, including one in conservation biology, have been discussed, but none has been proposed to the CASNR Curriculum Committee.

### The FIPSE Process

In 1992, the teaching faculty participated in the development of a program to improve teaching effectiveness. Called the FIPSE process (after the source that provided the funding), it involves assessment of each individual faculty's teaching effectiveness. Much of the assessment process is self-assessment. Each faculty develops a teaching portfolio that addresses student evaluations of his/her courses, a summarization of peer review activities (classroom visits by colleagues), student advising activities, professional development activities related to teaching, a written self-evaluation of teaching, and a statement of annual and long-term teaching goals. The teaching portfolio is discussed with the Department Head at the performance evaluation meeting and mutual concurrence about the progress being made is reached. The portfolio provides a useful road map for charting future teaching improvement as well as an historical record of what has been achieved. The Department is still in the process of implementing FIPSE.

### Action Plans for 1995-1999

As part of the planning process in IANR each department develops action plans with specific action items for a two to five year time horizon (Section 1). These action plans fit within the overall action plans of the Institute. Two of the action plans that our department developed in 1995 directly demonstrate our continuing emphasis on improvement of our undergraduate programs.

To meet the IANR action plan to: **Enhance Natural Resources Management** we are increasing our educational and research efforts in riparian zone ecology and management and we are continuing to develop programs in landscape ecology and conservation biology. To accomplish this we are coordinating teaching, research and extension programs with a variety of other departments and faculty through the Water Center, the Center for Sustainable Agriculture, the USFS National Agroforestry Center, and the Center for Grassland Studies. In FFW we have identified a faculty position in Riparian Zone Ecology (Extension/Teaching) as a necessary addition to augment this emphasis. In addition, because of the critical importance of rivers and streams in Nebraska and the competing demands for the water in them, we have also recognized the need for a stream ecologist position (Teaching/Research) to fill this gap in our expertise in the aquatics area of our department.

To accomplish the objectives of improving our undergraduate programs: 1) We have undertaken a review of our current courses and their content to eliminate unnecessary overlap and build a program that provides our students with a solid grounding in basic principles of science, and develops their abilities to be problem solvers who can communicate effectively with professional colleagues and the general public; 2) We have emphasized the connections among our courses, especially at the freshman and sophomore levels, so that students are more adequately prepared to enter our advanced courses. Considerations have included specific prerequisites and a process of admission to upper division courses after completion of a prescribed set of course work at a specified level of accomplishment. Modifications for courses may include combining subject material and developing team-taught courses. An example is the combination of portions of FFW350 (Wildlife Management Techniques) and portions of FFW461 (Fisheries Science) to create a Fisheries and Wildlife Techniques course

that would be required of all students in our major. Team teaching has been used effectively in several courses with the most recent efforts being the capstone course Integrated Resources Management (FFW 423/823) where Ernst and Jelinski are collaborating. The values of team teaching are many, but a loss of credit for teaching is still a roadblock to its widespread use in CASNR; 3) To make courses more accessible we are teaching several classes either in the evening or during summer sessions. We have taught evening sections of NR100 for 4 years and taught the daytime section on the city campus each spring semester since 1990. Both have expanded our exposure to new mixes of students. The evening sections have attracted more non-traditional students who can not attend classes during the day and has allowed on-campus students more flexibility in their restrictive daytime schedules. During the summer sessions Limnology (FFW 459/859) has been taught on campus and at the Cedar Point Biological Station. In the summer of 1997 we are planning to offer both Limnology and Fisheries Science (FFW 461/861) on campus during the same summer session; 4) We have investigated teaching classes via satellite down link to sites around Nebraska. However, none have been broadcast at this time. Other courses may be offered in asynchronous or synchronous modes via the World Wide Web (eg. FFW 423/823). It seems likely that the only way these latter proposals will be completed is with additional teaching FTE's to cover courses now taught by faculty who are already over extended in teaching.

#### MAJORS:

During the past five years the development of the Bachelor of Science in Natural Resources has allowed students to identify more precisely the areas of career emphasis they wish to pursue. Within this curriculum, the FISHERIES AND WILDLIFE MAJOR has been and will continue to be a primary academic home for students in our department for the foreseeable future. The requirements for the major are shown in Table T-4. The development of a ENVIRONMENTAL STUDIES MAJOR has attracted students with diverse interests related to natural resources. Our faculty, through advising and the courses we teach, are active participants in the WATER SCIENCE MAJOR.

PLANS FOR 1996-2000: To further enhance our undergraduate programs we are proposing to:

Table T-4

## Requirements for the Fisheries and Wildlife Major

## Fisheries and Wildlife

**Head:** Professor G. L. Hergenrader, Department of Forestry, Fisheries and Wildlife  
**Professor:** Case  
**Associate Professors:** Brandle, Ernst, Hoagland, Hygnstrom, Kuzelka, Peters, Savidge  
**Assistant Professor:** Jelinski

Fisheries and wildlife professionals are responsible for the conservation, protection, regulation, and management of our nation's fish and wildlife resources. Their management strategies must provide for both consumptive (hunting, fishing) and non-consumptive uses (bird watching, non-game species enhancement, threatened and endangered species protection, and others).

Students who successfully fulfill the requirements in the fisheries and wildlife major are prepared to enter postgraduate programs as well as competitively enter the work force. The curriculum reflects minimal civil service requirements of the federal government for wildlife and fisheries biologists and incorporates most course requirements for certification in professional societies. With judicious use of electives, graduates can also meet requirements for positions as zoologists and refuge managers. Further, the breadth of the curriculum prepares graduates to address complex environmental issues and to interact professionally with a multitude of natural resources disciplines in order to develop solutions to problems. Typical careers for graduates of this major include fisheries biologist or wildlife biologist with private consulting firms and utility companies, zoos, as well as with governmental resource management agencies at the local, state, or federal level.

## Major Requirements

<b>College Integrative Courses</b> .....	6
NRES 103 (Food, Agriculture and Natural Resource Systems) .....	3
NRES 423 (Integrated Resources Mgt) .....	3
<b>Mathematics and Analytical Skills</b> .....	8-11
Mathematics and Statistics (beyond college algebra) .....	5-8
MATH 103 (College Algebra and Trigonometry) (5 cr) or MATH 102 (Trigonometry) (2 cr) .....	
<i>Students qualifying for a higher mathematics course, as determined by the testing procedures of the mathematics department, will have met the above requirement and must select from one of the following</i>	
MATH 104 (Calculus for Managerial and Social Sciences) (3 cr) .....	
MATH 105 (Finite Mathematics for Managerial and Social Sciences) (3 cr) .....	
MATH 106 (Analytic Geometry and Calculus II) (5 cr) .....	
BIOM 201 (Intro to Biometry) or MATH 180 (Elements of Statistics) (3 cr) .....	3
<b>Computer Science</b> .....	3
AGRI 271 (An Intro to Computer Applications in Agric) (3 cr) .....	

<b>Communication</b> .....	12
Written Communication .....	6
Select from: ENGL 150, 151, 254, 255, or ALEC 200 .....	
Oral Communication .....	3
Select from: COMM 109, 209 or 311 .....	
Communications Electives .....	3
Select from: ENGL 101, 102, 150, 151, 252, 253, 254, 255, ALEC 200; COMM 109, 209, 311, VAED 120, 325 .....	
<b>Natural Science</b> .....	43-49
<b>Biological Sciences</b> .....	8
BIOS 101 (General Biology) and 101L (General Biology Lab) (4 cr) .....	
BIOS 320 (Principles of Ecology) and BIOS 322 (Ecology Lab) (4 cr) .....	
<b>Plant Resources</b> .....	10-12
BIOS 109 (General Botany) (4 cr) .....	
Select two courses from the following: .....	
FFWL 224 (Woody Plants) (4 cr) .....	
FFWL 310 (Great Plains Forestry) (3 cr) .....	
BIOS 471 (Plant Taxonomy) (4 cr) .....	
BIOS 455 (Great Plains Flora) (3 cr) .....	
BIOS 473 (Freshwater Algae) (4 cr) .....	
BIOS 477 (Biology of Aquatic Plants) (3 cr) .....	
AGRO 442 (Range Plants) (3 cr) .....	
<b>Animal Resources</b> .....	13-16
BIOS 112 (Intro to Zoology) (4 cr) .....	
Select one course from the following: .....	
BIOS 381 (Invertebrate Zoology) (4 cr) .....	
BIOS 386 (Vertebrate Zoology) (4 cr) .....	
BIOS 488 (Natural History of the Invertebrates) (3 cr) .....	
Select two courses from the following: .....	
FFWL 491 (Ichthyology) (4 cr) .....	
BIOS 493 (Herpetology) (4 cr) .....	
BIOS 494 (Ornithology) (4 cr) .....	
BIOS 495 (Mammalogy) (3 cr) .....	
BIOS 487 (Field Parasitology) (4 cr) .....	
ENTO 402 (Aquatic Insects) (3 cr) .....	
ENTO 482 (Field Entomology) (4 cr) .....	
<b>Physical Sciences</b> .....	12-13
CHEM 109 (General Chemistry II) (4 cr) .....	
CHEM 110 (General Chemistry III) (4 cr) .....	
PHYS 141 (Elem General Physics) (5 cr) or PHYS 151 (Elements of Physics) (4 cr) .....	
<b>Social Sciences</b> .....	12
ECON 211 or 212 or AECN 141 .....	3
<b>Social Science electives</b> .....	9
Select from: anthropology, criminal justice, economics, educational psychology, geography (excluding physical), history, human development and the family, political science, psychology, and sociology .....	
<b>Humanities</b> .....	9
Select from: AECN/ALEC 388, art (theory and history), classics, English (literature), history, music (theory and history), modern languages and literatures, philosophy, religion, and theatre arts and dance (theory and history) .....	

**NOTE:** One three-credit-hour course with an international focus and one three-credit-hour course with a multicultural focus, as defined in this bulletin (see "International Affairs Minor, Agricultural Emphasis") on page 37 and "Essential Studies Requirements for the Bachelor of Science Degree" on page 98), are to be completed as part of the requirement in natural sciences, social sciences, and humanities.

## Major Requirements and Electives

**NOTE:** Two courses at the 300-level or above with a communication intensive requirement are to be completed as a part of the major requirements. (Check with your adviser for a listing of these courses)

<b>Natural Resources</b> .....	7
NRES 100 (Intro to Natural Resources) (3 cr) .....	
NRES 101 (Forestry and Natural Resources Orientation) (1 cr) .....	
NRES 323 (Natural Resources Policy) (3 cr) .....	
<b>Geology, Soils, Water, Climate</b> .....	3-4

elect one course from the following:

AGRO 153 (Soil Resources) (4 cr) .....	
GEOL 101 (Physical Geology) and 102 (Physical Geology Lab) .....	
NRES 281 (Hydrogeography) (3 cr) .....	
GEOG 252 (Meteorology) and 251 (Meteorology Lab) (4 cr) .....	
Fisheries and Wildlife Management .....	20-27
FFWL 311 (Wildlife Ecology and Mgt) (3 cr) .....	
FFWL 350 (Wildlife Mgt Techniques) (3 cr) .....	
FFWL 404 (Wildlife Seminar) (1 cr) .....	
elect one course from the following: .....	
FFWL 450 (Biology of Wildlife Populations) (4 cr) .....	
FFWL 459 (Limnology) (4 cr) .....	
FFWL 461 (Fisheries Science) (4 cr) .....	

## Major Electives

elect from the following: .....	9-16
FFWL 211 (Wildlife Biology and Conservation) (3 cr) .....	
FFWL 348 (Wildlife Damage Control) (3 cr) .....	
FFWL 462 (Fisheries Biology) (3 cr) .....	
NRES 415 (Water Resources Seminar) (1 cr) .....	
BIOS 241 (General Genetics) (4 cr) .....	
BIOS 316 (Biogeography) (3 cr) .....	
BIOS 372 (Evolution) (3 cr) .....	
BIOS 373 (Biopsychology) (4 cr) .....	
BIOS 454 (Population and Community Ecology) (4 cr) .....	
BIOS 462 (Animal Behavior) (3 cr) .....	
BIOS 470 (Prairie Ecology) (4 cr) .....	
BIOC 221 (Intro to Biochemistry) (4 cr) .....	
AGRI 200 (Intro to Pesticides and Their Use) (2 cr) .....	
AGRI 489 (Employment Seminar) (1 cr) .....	
AGRO 204 (Field Crop Production) (3 cr) .....	
AGRO 240 (Forage Crop & Range Mgt) (4 cr) .....	

AGRO 315 (Genetics) (4 cr) .....	
AGRO 440 (Range Ecosystem) (3 cr) .....	
AGRO 444 (Rangeland Analysis) (3 cr) .....	
AECN 261 (Intro to Land Economics) (3 cr) .....	
MSYS 354 (Soil and Water Conservation Systems) (3 cr) .....	
POLS 210 (Intro to Public Admin) (3 cr) .....	
POLS 310 (Public Organizations) (3 cr) .....	
MNGT 360 (Human Resource Mgt) (3 cr) .....	
MNGT 361 (Personnel Administration) (3 cr) .....	
GEOG 419 (Remote Sensing) (3 cr) .....	
GEOG 498 (Geographic Information Systems) (4 cr) .....	
CHEM 251 (Organic Chemistry) (3 cr) .....	
PHYS 142 (Elem General Physics) (5 cr) .....	

and/or any optional courses listed but not taken under geology, soils, water, climate, plant resources, animal resources, mathematics and statistics, or fisheries and wildlife management headings in this program

<b>Free Electives</b> .....	0-8
<b>Minimum Requirement for Graduation</b> .....	128



## MODIFY EXISTING COURSES

To better accommodate the changing needs of students we are proposing to modify several of our existing core courses. The Orientation Course (FFW 101) no longer seems to fill the purpose for which it was originally designed and we are considering changes to accommodate more active learning for our majors in NR 100 (Introduction to Natural Resources). Wildlife Management Techniques(FFW 350) and Fisheries Science (FFW 461) currently cover a number of similar subjects and merging of some topics into a Wildlife and Fisheries Techniques course as part of a set of general prerequisites for advanced courses will streamline our major. This will allow focusing courses like Fisheries Science more on applications of management. In addition we propose to require the combination of FFW 311 Wildlife Ecology and Management and FFW 224 as prerequisites for our advanced courses to assure that our students have a background in ecological principles and field biology. FFW 310 (Great Plains Forestry) will be retitled and changed to a general forest management course that utilizes expertise of NFS personnel in a teaching role when resources and time permit.

To accomplish these changes we are depending on a degree of faculty redirection, flexibility, and coordination. However, proposed changes also require more active involvement in laboratory and field activities that will require additional laboratory (field and classroom) facilities. Presently available facilities are not sufficient to accommodate our current laboratory courses and the requirements of proposed changes will probably double the need for teaching laboratory facilities. Our current teaching laboratory in Natural Resources Hall is used by FFW 224, FFW 350 and FFW 461/861 during fall semesters and FFW 348, FFW 459/859 and FFW 491/891 during spring semesters. The room can not be closed off from the rest of the building because it is needed for access to an outside door. The seating can handle a maximum of 15 students and availability of electricity to use microscopes is provided by extension cords and power strips taped to the tables. Plans to develop labs for several other courses have been discouraged by the abysmal laboratory facilities. We also see opportunities to expand our use of computers for simulations and interactive teaching in our classroom activities, but the facilities are not available in or near classrooms where we teach. Similarly, our teaching budgets are not adequate to support

creative efforts without using research or other funds. The operating budget for teaching has been \$5,622 since 1986 and is now divided among the larger faculty teaching more courses to more students. To accomplish these changes we need Graduate Teaching Assistants to actively assist with the teaching of laboratory sections. Currently, FFW has 0.62FTE in teaching assistant funding and most teaching assistants volunteer while on Research assistantships or register for independent study credit. In this situation faculty are in essence subsidizing the teaching program with their research grants.

### DEVELOP NEW COURSES

To enable our students to address emerging issues in natural resources and use appropriate technology for the development of management plans, we plan to develop several new courses in field biology, stream ecology and management, and landscape ecology. These courses will expand opportunities for undergraduate and graduate students in areas we see as potentials for areas of excellence for FFW. However, all of our discussions about these courses return to the need for active problem solving approaches to teaching and learning which require laboratory and/or interactive computer system facilities. We are committed to providing a quality educational experience for our students, but we need the faculty, facilities, and support to do it.

The recent developments in CASNR and UNL general education requirements have prompted our review of all FFW courses in relation to designations such as; Communications Intensive, Essential Studies, and Integrative Studies courses. We are preparing applications to submit for approval of appropriate courses to respective curriculum committees. In addition, we have recognized a fundamental weakness in our curriculum at the sophomore level -- lack of an appropriate course that provides a basic understanding of plant and animal ecology and ecosystem functioning. We intend to develop FFW 2xx Field Ecology (or Ecosystem Management), a laboratory course that would provide students with experience in plant and animal communities and the factors that influence their distribution and abundance. This course is needed to replace the experiences introductory biology/ecology courses are no longer providing. It would be taught at the sophomore level and be a prerequisite for FFW 311 and FFW 224.

## OTHER TEACHING ISSUES

### Distance Education

Faculty in the Department are keenly aware there is a groundswell of interest developing across the state in having University resources, including academic courses be delivered via electronic means to place-bound learners. The Nebraska Network 21 project, a visioning process that involved input from over 800 citizens across Nebraska, developed a vision for the year 2020 that included the offering of comprehensive and interactive educational opportunities throughout the state. The University of Nebraska-Lincoln is clearly at the hub of this vision. FFW faculty are interested in serving the educational needs of Nebraskans through distance learning, but there are many hurdles that must be overcome before distance education becomes a reality. The development of courses that can be delivered by electronic means will require tremendous amounts of faculty time, a lesson we have learned as faculty have begun utilizing multi-media techniques and resources (e-mail, World Wide Web, etc.) in their on-campus courses. It is also expensive, as we have learned from our efforts to acquire a portable multi-media teaching station for use in 203 NRH. It will be very expensive to acquire the hardware, software, computer support personnel, and operating funds needed to make distance education a reality. Faculty in FFW believe they should be a part of the effort to develop distance education but are very concerned about where the additional faculty, support staff, and operating support will come from.

### LOSS OF BASIC "OLOGY" COURSES FROM THE CURRICULUM

Fish and Wildlife majors rely heavily on courses offered by the School of Biological Sciences, especially at the upper level undergraduate/graduate student level. Over the years, vacancies have occurred on the Biological Sciences faculty, through resignation or retirement. Several of the positions have remained unfilled or have been converted to an emphasis in molecular biology, which is in keeping with one of the main thrusts of the School of Biological Sciences. Consequently, faculty expertise, and the courses they taught in areas of interest to our students, have been lost. The following courses were routinely taken by our students but are no longer offered:

BioSci 316	Biogeography
BioSci 374	Survey of the Plant Kingdom
BioSci 455/855	Great Plains Flora
BioSci 463/863	Quantitative Field Ecology
BioSci 470/870	Prairie Ecology
BioSci 477/877	Biology of Aquatic Plants
BioSci 493/893	Herpetology

In addition, we have concerns about the following courses that are either offered so infrequently as to be unreliable, are offered by a faculty member who may soon retire, or for some other reason have questionable status.

BioSci 471/871	Plant Taxonomy
BioSci 473/873	Freshwater Algae
BioSci 494/894	Ornithology
BioSci 495/895	Mammalogy

Our students rely on the above courses as fundamental components of their programs or to broaden and enhance their educational experience. Even some very basic courses are in question. For example, BioSci 109 Introductory Botany, will not be offered this fall semester. The situation has been developing over a period of several years and it has been brought to the attention of UNL Administration several times. However, the situation has not been resolved.

### SUMMARY OF NEEDS

Teaching program needs, identified and justified in the above sections are summarized below:

#### FACILITIES:

- \* Renovate the teaching laboratory in 102 Natural Resources Hall
- \* Develop a new teaching laboratory
- \* Develop computer facilities in our classrooms, especially a portable multi-media teaching station for 203 NRH

FACULTY:

- \* Riparian Zone Ecologist
- \* Stream Ecologist

STAFF:

- \* Additional teaching assistantship funds

OPERATING FUNDS:

- \* Increase operating funds to department





# GRADUATE PROGRAM

## I. Program Description

### A. Introduction

The Graduate Program in FFW is a prospering program in the Department. Over the past five years, our graduate student population has increased dramatically from 16 to 45 students (see Section III.B.), primarily by increases in funding support through extramural grants (from 3 students on grants in 1989 to 21 in 1995) and through the addition of non-funded students (3 to 14) supported by foreign governments or full-time employment in a variety of state and federal agencies. The size of our department facilitates a high degree of direct interaction with individual faculty and allows students to play an active role in department activities. Thus, the M.S. and Ph.D. degrees in the department offer very personalized programs of study in an area that is currently attracting large numbers of students.

### 1. M.S. Program

The Graduate College at UNL provides three M.S. degree options, two of which are offered in FFW:

*Option I* should be chosen by students who are preparing for careers in research and scholarly work. This option requires a minimum of 30 credits, consisting of 6-10 thesis credits, 2 seminar credits, at least 9 credits of graduate-level only courses, and at least one-half of the total credits must be taken in the major department. Nearly all M.S. candidates in FFW elect Option I.

*Option II* is a non-thesis program of study and thus should be selected by students who do not intend to enter a Ph.D. program. rather they are obtaining additional course work and training in an often previously chosen career. This option requires 36 credit hours of course work, with the same conditions as for Option I. except that 12 credits must be in graduate-level only courses. In addition, Option II students must present one departmental seminar that relates to their job/career activities.



## 2. Ph.D. Program

A Doctor of Philosophy degree with specialization in Forestry is available through an interdepartmental program in Horticulture and Forestry. The guidelines for this program follow the general requirements of the Graduate College, with a minimum of 90 credits (12-55 dissertation credits), including a language or research tool requirement. Typically 30-40 hours are accepted from a Master's program. In recent years, faculty have used the Horticulture/Forestry Program as a mechanism to direct doctoral students in fisheries and wildlife. Several faculty in FFW also hold courtesy appointments in other departments that grant the Ph.D. degree (Biological Sciences, Agronomy, and Entomology), which provides them access to the respective Ph.D. programs.

## 3. Graduate Courses

The department offers 11 graduate level courses (excluding independent study, seminar, and thesis/dissertation courses), including four graduate-only courses (i.e., 900- or 800-level only). In addition, 13 graduate courses are cross-listed in FFW from other departments, including courses in the Departments of Agronomy, Agricultural Meteorology, Biological Sciences, Biological Systems Engineering, Entomology, and Horticulture. All of these courses are described below, except those recently approved for cross-listing [Population and Community Ecology (BioSci 854), Aquatic Insects (Ent 802), Mathematical Models in Biology (BioSci 856), and Advanced Community Ecology (BioSci 959)] and new courses recently added to our curriculum [Agroforestry Systems in Sustainable Agriculture (FFW 817) and Advanced Topics in Wildlife Damage Management (FFW 848)]. In addition, Biometry 801 and 802 may be used as part of the course work constituting a major in FFW.

## Courses

- 803. Fundamentals of Crop Physiology.** Agronomy, Horticulture 803:1-2 cr II. Offered first eight weeks of semester. For description, see Agronomy 803.
- 804. Forestry, Fisheries and Wildlife Seminar.** 1 cr per sem, max 2 cr I, III.
- A seminar involving technical aspects of forestry, fisheries, and wildlife management.
- \*807. Plant-Water Relations.** Agronomy 807, Biological Sciences 817:1-3 cr I.
- For description, see Agronomy 807.
- 808. Microclimate: The Biological Environment.** Agriculture, Meteorology, Agronomy, Geography, Horticulture, Mechanized Systems Management 808, Biological Sciences 837:1-3 cr I.
- For description, see Mechanized Systems Management 808.
- 809. Horticulture Crop Physiology.** Horticulture 809:1-4 cr II.
- For description, see Horticulture 809.
- 810. Landscape Ecology.** 3 cr II; Disc/sem 3. Prereq: 12 hours biological sciences or related field including BioSci 320 or permission.
- Study of the spatial arrangements of ecosystems, the interaction among component ecosystems through the flow of energy, materials and organisms, and alteration of this structure through natural or anthropogenic forces.
- \*811. Plant Tissue Culture.** Biological Sciences, Horticulture 811:1-4 cr II; Lect 2, Lab 4. Prereq: BioSci 109, 325 (includes Chem 109, 110, Biochem 221) or equivalents or permission.
- A general survey of techniques used in plant cell, tissue and organ culture, including focus on current research. Laboratory will emphasize hands-on manipulation of plant cells, tissues, and organs, including examples from woody and herbaceous plant species.
- 815. Water Resources Seminar.** Agronomy, Geography 881, Geology 815:1 cr II.
- For course description, see Agronomy 881.
- 823. Integrated Resources Management.** 3 cr II; Lect 3. Prereq: Permission of instructor.
- Integrated and multiple-use management will be stressed and analyzed. Economic, political, social, and physical impacts on natural resources management priorities will be evaluated.
- \*849. Woody Plant Growth and Development.** Biological Sciences, Horticulture 849:1-3 cr II. Offered even-numbered calendar years.
- For description, see Horticulture 849.
- 850. Biology of Wildlife Populations.** Biological Sciences 850:1-4 cr II; Lect 3, Lab 3.
- A study of the principles of population dynamics. Management strategies for consumptive and nonconsumptive wildlife species will be presented utilizing principles developed.
- 858. Conservation Biology.** 3 cr II; Lect 3. Prereq: 12 hours forestry, fisheries and wildlife or related field, including BioSci 320, 241 or Agron 315 or equivalent, or permission.
- Current issues in conservation biology. Emphasis will be on using theoretical principles from the areas of ecology and genetics to effectively preserve and manage biological diversity and small populations.
- 859. Limnology.** Biological Sciences 859:1-4 cr II; Lect 3, Lab 4. Prereq: 12 hrs biological sciences including introduction, ecology, 2 sems chemistry.
- The physical, chemical, and biological processes that occur in fresh water: a study of the organisms occurring in fresh water and their ecology, the biological productivity of water and its causative factors: eutrophication and its effects.
- \*860. Advanced Limnology.** Biological Sciences 860:1-3 cr I, Lect 3. Prereq: 11 & 35, 45 & 814 or equivalent.
- An in-depth consideration of selected areas of limnology, including stream limnology, primary production, secondary production, nutrient cycling, and eutrophication.
- 861. Fisheries Science.** 4 cr II; Lect 3, Lab 3.
- A study of fisheries biology emphasizing the determination and evaluation of vital statistics for the management of fish populations. In addition, the basic aspects of management techniques will be discussed.
- 862. Fisheries Biology.** Biological Sciences 892:1-4 cr I.
- For description, see Biological Sciences 892.
- 875. Water Quality Strategy.** Agronomy, Community and Regional Planning, Civil Engineering, Geology, Mechanized Systems Management, Political Science 875, Natural Resources Sciences 475:1-4 cr I.
- For description, see Agronomy 875.
- 891. Ichthyology.** Biological Sciences 891:1-4 cr I.
- For description, see Biological Sciences 891.
- 896. Independent Study in Forestry, Fisheries and Wildlife.** 1-5 cr; Prereq: 12 hrs forestry, fisheries and wildlife or closely related areas and permission.
- Individual or group projects in research and literature review under supervision and evaluation of a departmental faculty member.
- \*899. Masters Thesis.** 6 cr III.
- 901. Forestry, Fisheries and Wildlife Seminar.** 3 cr per sem, max 4 cr I, II. Prereq: Permission.
- Presentation and discussion of various forestry, fisheries, and wildlife topics.
- 907. Agricultural Climatology.** Agronomy, Horticulture 907, Geography 912:1 cr I.
- Offered odd-numbered calendar years. For description, see Horticulture 907.
- 908. Micrometeorology of the Biological Environment—Advanced Topics.** Agronomy, Geography, Horticulture, Mechanized Systems Management 908:1-3 cr II. Offered odd-numbered calendar years.
- For description, see Mechanized Systems Management 908.
- 909. Crop Responses to Environment.** Agronomy, Horticulture 909:1 cr I.
- Offered odd-numbered calendar years. For description, see Horticulture 909.
- 915. Horticultural Crop Improvement and Breeding.** Agronomy, Horticulture 915:1-3 cr II. Offered even-numbered calendar years.
- For description, see Horticulture 915.
- 943. Advanced Avian Physiology.** Animal Science 943:1-3 cr II.
- For description, see Animal Science 943.
- 950. Seminar in Horticulture and Forestry.** Horticulture 950:1 cr per sem, max 6.
- For description, see Horticulture 950.
- 996. Research Other Than Thesis.** 1-6 cr I, II, III. Prereq: Permission.
- 999. Doctoral Dissertation.** 6 cr III.

## 4. Program administration

The FFW Graduate Program is administered primarily by the FFW Graduate Committee (GC). The GC is comprised of four faculty members, with representatives from the forestry, fisheries, and wildlife areas, and one graduate student representative. The chair and other members of the committee rotate approximately every three years. Current members of the GC are Hoagland (chair), Peters, Jelinski, Savidge, and Helzer (graduate student representative).

The GC recommends operating policies that are approved by the whole FFW Graduate Faculty before implementation. These policies include guidelines for student acceptance and admittance to the program, and stipend levels. In addition, the committee recommends nominees for the Widaman Trust and other awards.

The major advisor and advisory committee (three members total for M.S., five for Ph.D. with at least one outside member) supervise the student's course work and research program. In addition, the advisory committee conducts the written and oral comprehensive exams, as well as the final thesis/dissertation defense. Both M.S. (Option I) and Ph.D. students are required to present two seminars in the department's regular seminar series; the first is a thesis/dissertation prospectus and the second is the final defense. Option II M.S. students are required to present one seminar. Following this public presentation, the advisory committee convenes to conduct the defense. Both the comprehensive exams and the defense are announced in advance in the Department newsletter, including an abstract, to allow direct input from the entire graduate faculty.

#### **B. Graduate Faculty**

Membership in the Graduate Faculty may be held as either a Graduate Faculty Member, which allows the member to serve as the major advisor for Master's degree students only, and to serve on Ph.D. committees, or as Graduate Faculty Fellow, which allows the member to serve as the major advisor for M.S. and Ph.D. students. A faculty member must be either a Member or Fellow to serve on a graduate student's advisory committee.

## Graduate Faculty

<u>NAME</u>		<u>RANK</u>	<u>AREA OF RESPONSIBILITY</u>
Ann S. Bleed <sup>1</sup>	M	Asst. Prof.	Avian Biology
James R. Brandle	F	Assoc. Prof.	Shelterbelt Ecology
Ronald M. Case	F	Professor	Wildlife Ecology
Stephen G. Ernst	F	Assoc. Prof.	Forest Genetics
Mark O. Harrell	M	Assoc. Prof.	Forest Insects
Gary L. Hergenrader	F	Professor	Department Head
Kyle D. Hoagland	F	Assoc. Prof.	Limnology
Richard S. Holland <sup>1</sup>	M	Asst. Prof.	Fisheries
Scott E. Hygnstrom	M	Assoc. Prof.	Wildlife Damage
Dennis E. Jelinski	F	Asst. Prof.	Landscape Ecology
Ron J. Johnson	F	Professor	Wildlife Biology
Terrence B. Kayes	F	Assoc. Prof.	Aquaculture
Ned B. Klopfenstein <sup>1</sup>	M	Asst. Prof.	Forestry
Robert D. Kuzelka	M	Assoc. Prof.	Natural Resources Policy
James W. Merchant <sup>2</sup>	F	Assoc. Prof.	CALMIT
Edward J. Peters	M	Assoc. Prof.	Fisheries
Willis J. Rietveld <sup>1</sup>	F	Professor	Agroforestry
Julie A. Savidge	F	Assoc. Prof.	Wildlife Ecology/Conservation Biology
Michele M. Schoeneberger <sup>1</sup>	M	Asst. Prof.	Forestry
Thomas F. Seibert	M	Asst. Prof.	Environmental Education

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<sup>1</sup> Adjunct

<sup>2</sup> Courtesy Appointment

## C. Admission Procedures/Standards

### 1. Procedures

The FFW Graduate Committee recently reviewed its procedures for handling inquiries from prospective graduate students, as well as the subsequent responses to their continued interest in the graduate program in FFW. Our goals have been to keep in close contact with prospective students, streamline our procedures to reduce unnecessary paperwork and student application fees, and optimize the graduate faculty's exposure to potential students.

### 2. Standards

The FFW Graduate Faculty recently approved the following guidelines for acceptance:

GRE (combined) >1600 = acceptable with full graduate standing

<1600 but >1400 = provisional acceptance\*

<1400 = unacceptable\*\*

GPA (overall) >3.25 = acceptable with full graduate standing

<3.25 but > 3.0 = provisional acceptance\*

< 3.0 = unacceptable \*\*

\*provisional acceptance typically requires two graduate-level courses (to be determined through consultation between the Graduate Committee chair and the major advisor) in the student's first semester, with a grade of B or better

\*\*the prospective advisor can petition the Graduate Committee for provisional acceptance based on exceptional circumstances (approval requires a simple majority vote of the Graduate Committee)

#### D. Funding Levels and Sources (for 1995-96)

Department stipend levels (including tuition remission for 12 hours per semester) for 1995-96 are as follows:

First year M.S. = \$11,000

Second year = \$11,200

First year Ph.D. = \$11,500

Second year = \$11,700

Third year = \$11,900

Funding to provide these stipends presently comes from the following sources:

State assistantships	6
McIntire-Stennis	4
Extramural grants	21
Non-funded*	<u>14</u>
Total	45

\*funded by foreign governments or full-time employment

#### E. Graduate Student Orientation/Handbook

A copy of the FFW Graduate Student Handbook is included as part of the Appendix.

## II. Degrees Conferred (1990-1995; Ph.D. in bold)

A total of 27 M.S. and 4 Ph.D. degrees were granted to FFW students from 1990-95, including none in 1990, 5 in 1991, 3 in 1992, 5 each in 1993 and 1994, and 13 in 1995 (including 2 Ph.D.):

Beilik, I., 1995, M.S., Effects of aeration, fertilization, and sac-fry stocking density on large-scale pond production of fingerling walleye. Current position: Aquaculture specialist in private industry (Kayes)

Brohman, M.A., 1991, M.S., Biology and ecology of *Dioryctria ponderosae* Dyar and *Dioryctria tumicolella* Mutuura, Munrow and Ross. Current position: Environmental analyst supervisor, Nebraska Games & Parks Comm. (Harrell)

Burbach, K.M., 1992, M.S., Sources of nitrate loading to Willow Creek, Nebraska, based on stable nitrogen isotope ratios. Current position: Extension Education UNL (Spalding and

Hoagland)

- Carder, J.P., 1994, M.S., Combined effects of alachlor and atrazine on benthic algal communities in agricultural streams. Current position: Ph.D. student, Oak Ridge National Laboratory (Hoagland)
- Chapman, R.C., 1995, M.S., Channel catfish movements in the Platte River, Nebraska. Current position: Veterinary technician (Peters)
- Cramer, T.A., 1993, M.S., Limnological and habitat influences on wetland bird communities in the Nebraska sandhills. Current position: Environmental consultant, Dames & Moore (Savidge)
- Delisle, J.M., 1995, M.S., Avian use of fields enrolled in the Conservation Reserve Program in southeast Nebraska. Current position: Data base manager, Nebraska Natural Heritage Program (Savidge)
- Desmond, M.J., 1991, M.S., Ecological aspects of burrowing owl nesting strategies in the Nebraska panhandle. Current position: Ph.D. student, UNL (Savidge)
- Fitzmaurice, R.L., 1995, M.S., Avian use of riparian corridors and adjacent cropland in east-central Nebraska. Current position: Environmental communications, D.J. Case & Assoc. (Johnson)
- Foster, N.S. 1990, M.S., A report on black-tailed prairie dogs in Nebraska -- their biology, behavior, ecology, management, and response to a visual barrier fence. Current position: Self-employed educator (Hygnstrom)
- Garcia, J.M.O., 1995, **Ph.D.**, Interaction of genotype and environment in carbon isotope discrimination and gas exchange of ponderosa pine (*Pinus ponderosa* Doug. ex Laws.) Current position: Assistant Professor, Dept. of Agriculture and Forest Science, University of Chihuahua, Chihuahua, Mexico (Cregg)
- Gebre, M.G., 1993, **Ph.D.**, The role of organic solutes in dehydration tolerance of several *Populus deltoides* clones. Current position: Postdoc, Oak Ridge National Laboratory (Kuhns/Brandle)
- Holz, J.C., 1994, M.S., Effects of phosphorus reduction on a sandpit lake: plankton community response and lake restoration implications. Current position: Ph.D. student at UNL. (Hoagland; Biological Sciences)

- Ihrie, D., 1995, M.S., An evaluation of the ecoregions of Nebraska using multivariate statistics.  
Current position: Nebraska Department of Environmental Quality (Peters)
- Jasch, B.A., 1992, M.S., The influence of alfalfa root structure on plains pocket gopher damage and behavior. Current position: None (Case)
- Johnson, L.M., 1995, **Ph.D.**, Physiology of *Achnanthes longipes* Ag.: nutritional requirements for the secretion of extracellular polymeric substances. Current position: none (Hoagland; Biological Sciences)
- Kessler, K.K., 1991, M.S., Bird responses to monofilament lines at backyard feeders. Current position: Ph.D. student, Utah State University (Johnson)
- Kim, M.S., 1995, M.S., Micropropagation of green ash (*Fraxinus pennsylvanica* Marsh.): A comparative study of three genotypes. Current position: Ph.D. student at UNL. (Klopfenstein)
- King, J.W., 1991, M.S., Effects of the Conservation Reserve Program on selected wildlife populations in southeast Nebraska. Current position: Environmental specialist, Nebraska Public Power District (Savidge)
- Langan, M.M., 1995, M.S., Growth responses of *Typha* ref. *latifolia* and *Scirpus* ref. *acutus* to agrichemical contamination. Current position: Education Specialist, State Museum (Hoagland; Biological Sciences)
- McBride, M.J., 1995, M.S., Benthic macroinvertebrate communities associated with forested and open riparian areas along the central Platte River. Current position: Technician at USGS consulting firm (Peters)
- Michl, G., 1995, M.S., A test of the index of biotic integrity for streams in the Sandhills Region of Nebraska. Current position: Nebraska Department of Environmental Quality (Peters)
- Poague, K.L., 1994, M.S., Converted railroad corridors as avian habitat in southeast Nebraska. Current position: Wild Bird Habitat stores (Johnson)
- Pochop, P.A., 1991, M.S., House sparrow response to monofilament lines at nest boxes. Current position: Denver Wildlife Research Center (Johnson)
- Popp, A., 1993, M.S., Changes in benthic invertebrate composition in response to reservoir aging. Current position: Technician, Lacawona River Corridor Association, PA (Hoagland)



- Schmaderer, T.R., 1995, M.S., non-thesis option. Current position: Vegetation Management Project Manager, Nebraska Forest Service (Kuzelka)
- Silvia, T.D., 1995, M.S., Riparian habitats of the central Platte as a corridor for dispersal of small mammals in Nebraska. Current position: None (Case)
- Spawn, R.L., 1994, M.S., Effects of alachlor on the algal community of a midwestern agricultural stream. Current position: Technician, USGS consulting firm (Hoagland)
- Sunderman, N.J., 1995, M.S., Avian use of field windbreaks, herbaceous fencerows, and associated cropfields in east central Nebraska. Current position: Wildlife biologist, Idaho Power and Light (Johnson)
- Vercauteran, K.C., 1993, M.S., Home range and movement characteristics of female white-tailed deer at Desoto National Wildlife Refuge. Current position: Ph.D. student, UNL (Hygnstrom)
- Yu, S.L., 1992, M.S., Logistic regression models of habitat use by three cyprinids in the Platte River, Nebraska. Current position: Ph.D. student at UNL. (Peters)
- Zhang, D., 1994, M.S., Response of cantaloupe to wind protection: evaluation and modeling. Current position: Ph.D. student, UNL (Brandle)
- Zhang, H., 1993, **Ph.D.**, Windbreak shelter and physiological responses of corn. Current position: Postdoc, UCLA (Brandle)

### III. Current Graduate Students

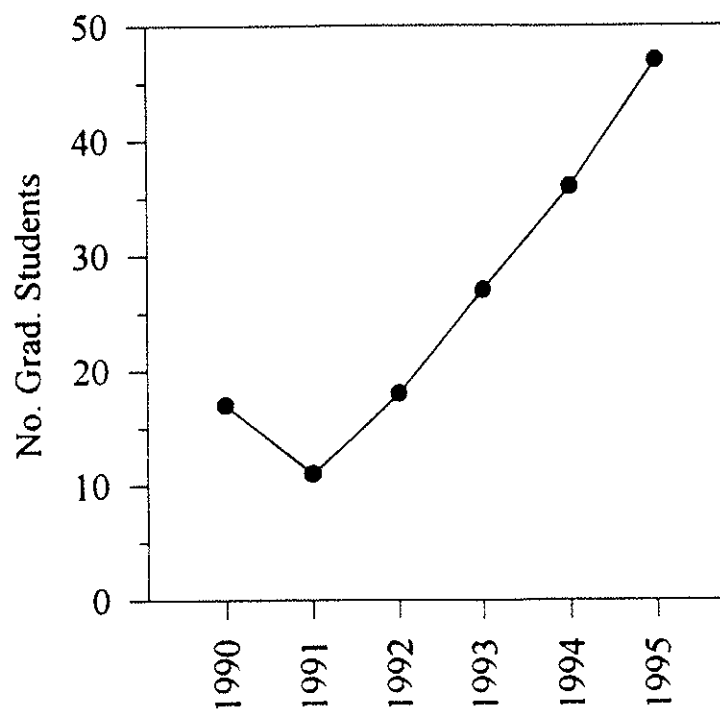
#### A. Summary of Present Graduate Students

NAME	ADVISOR	DEGREE	BEGAN	THESIS TOPIC
Albrecht, Frank	Hoagland	MS/II	-	na
Baker, Deb	Case	MS	6/94	Pocket gopher influence on alfalfa
Beecher, Nancy	Johnson	MS	8/94	Natural predators of crop pests in organic and non-organic systems
Colt, Chris	Jelinski	MS	8/94	Neotropical bird use of riparian forests
Cover, Mike	Hygnstrom	MS	8/94	Elk population dynamics and distribution
Desmond, Martha	Savidge	PhD	8/92	Population genetics of burrowing owls
Ekstein, Jason	Hygnstrom	MS	3/95	Deer movements in an urban forest
Frankforter Jill	Hoagland	MS	1/94	Ecological factors controlling wetlands
Good, Barbara	Brandle	MS	7/92	Habitat use by birds along the Platte River
Gubanyi, Joseph	Savidge	PhD	5/93	Migrant bird use of riparian forests
Hatsell, Heather	Hoagland	MS	1/95	UV light effects on algal distribution
Helzer, Chris	Jelinski	MS	8/94	Grassland bird use of wet meadows
Hofpar, Rob	Peters	MS	6/95	Biology of sturgeon
Holz, John	Hoagland	PhD/ SBS	9/95	Nutrient effects on aquatic food webs
Kim, Mee Sook	Klopfenstein	PhD	9/95	Molecular diagnostic tools for agroforestry ecosystems
Laux, Eric	Peters	MS	3/94	Alwife introduction to Lake Ogallala
Lee, Scott	Schoeneberger	MS	1/94	Biology of germination of juniper
Ludwig, Daniel	Hoagland	MS/II	10/94	na
Marsh, Mark	Brandle/Hayden	PhD (Econ.)	1/94	Windbreak economics under climate change
Meier, Tammy	Savidge	MS	8/95	Sandhill cranes

Messad, Ibrahim	Peters	PhD		Atrazine effects on fish
Nelson, Karen	Hoagland	MS	1/94	Chronic atrazine effects on lotic algae
Niven, Chris	Jelinski	MS	8/94	Landscape modeling of NPS inputs
Oda, Haruko	Savidge	PhD	1/95	undecided
Paramale, Sudha	Ernst	PhD	12/95	Characterization and expression of tobacco s-adenosylmethionene
Pipher, Zeke	Kayes	MS	9/94	Trout rearing densities
Porath, Mark	Peters	MS	5/94	Walleye feeding ecology
Rabbe, Michael	Hoagland	MS	8/94	Use of HGM in wetland classification
Rager, Kim	Hoagland	MS	5/94	Organic matter processing in rivers
Ritter, Michael	Savidge	MS		Ecology of the Mariana common moorhen (Guam)
Schmitt, Tim	Hoagland	MS	1/95	Riparian buffer strips
Schroer, Mary	Hoagland	MS	1/94	Insecticide effects on wetland benthos
Smith, Dave	Jelinski	MS	8/94	Landscape assessment of the Central Platte River
Steinauer, Robert	Jelinski	MS	5/94	Fen vegetation community analysis
Suratman, Nazip	Brandle	MS	12/95	Windbreak effects on snapbeans
Terwilliger, Rebecca	Savidge	MS	10/95	Burrowing owl ecology
VerCau-teren, Kurt	Hygnstrom	PhD	1/96	Dispersal patterns and vulnerability of white-tail deer
Wu, Wanli	Jelinski	PhD	8/95	Biochemical fluxes in the Platte River

Yu, Shyi-Liang	Peters	PhD	1/93	Habitat use by stream fish
Zhang, Dongsheng	Brandle	PhD	8/94	Windbreak structure analysis
Zhou, Xinhua	Brandle	PhD	1/94	Aerodynamics of windbreaks

#### B. Graduate Student Population Trend, 1990-95



### C. Honors and Awards (competitive awards within IANR)

#### Widaman Trust Graduate Student Awards

- 1991 Michael Gebre (Kuhns)
- 1992 Hehui Zhang (Brandle)
- 1993 Joseph Gubanyi (Savidge)
- 1994 Martha Desmond (Savidge)
- 1994 Shi-Liang Yu (Peters)

#### Nebraska Statewide Arboretum Graduate Student Research Awards

- 1991 Hehui Zhang (Brandle)
- 1992 Kevin Poague (Johnson)
- 1993 Natalie Sunderman (Johnson)
- 1994 Xinhua Zhou (Brandle)
- 1995 Timothy Schmitt (Hoagland)

#### Nebraska Chapter of the Wildlife Society Scholarship

- 1993 Kurt VerCauteren (Hygnstrom)
- 1994 Martha Desmond (Savidge)
- 1995 Deb Baker (Case)

#### Other Awards

- |      |                |  |
|------|----------------|--|
| 1993 | Martha Desmond | Milton E. Mohr Fellowship (Savidge)        |
| 1993 | Hehui Zhang    | F.E. and O.M. Johnson Fellowship (Brandle) |
| 1995 | Tamara Meier   | Larson Minority Fellowship (Savidge)       |

### IV. Graduate Program Response to Recommendations in 1989 Review

The 1989 CSRS review highlighted two areas in the final recommendations to the Department regarding the graduate program, including: (1) graduate student space must be improved, and (2) additional graduate-level only courses (900- and 800-levels) are needed. Actions taken to remedy concerns in the first recommendation are discussed in

Section V.1. below. The second recommendation also has been addressed through the addition of new graduate courses in the Department (FFW 858 Conservation Biology, FFW 810 Landscape Ecology, FFW 848 Advanced Topics in Wildlife Damage Management, FFW 811 Plant Tissue Culture, and FFW 817 Agroforestry Systems in Sustainable Agriculture) and upgrading one course to graduate-level only (FFW 860 Advanced Limnology).

## **V. Graduate Program Issues**

1. Graduate student office and laboratory space has been an ongoing concern in our graduate program. This situation has been remedied to some extent through newly acquired office space in the (former) Biochemistry Building. Nevertheless, due to the dramatic increase in our graduate student population, adequate laboratory space remains a problem and office space in another building is not an optimal situation. Recent renovations of graduate student research and office space in Rms. 3, 6 and 12 in Plant Industry and addition of the Aquatic Microcosm Facility in the Service Building have alleviated space needs to some extent, but additional needs persist, particularly with respect to laboratory space and quality of space in Natural Resources Hall.
2. Continued erosion of State and Federal dollars to support graduate student research assistantships is a major problem. The relative level of State dollars appropriated to the Department has declined because of budget cuts and failure to keep pace with inflation. The same is true of McIntire-Stennis Funds. Thus, as our RA stipends necessarily increase, fewer stipends are available. Coupled with the nearly total lack of teaching assistantships available through CASNR (FFW currently receives only a little more than three quarters of one regular assistantship), this places an undue emphasis on the necessity to obtain extramural grant funds to support our graduate students. This is in contrast to City Campus departments, such as Biological Sciences, that receive significant appropriations for direct graduate student support of TAs.

3. A majority of faculty in the Department are presently in favor of proposing a Ph.D. program in FFW. Discussions regarding the pros and cons of such a program continue. Given the current and projected future emphasis on Natural Resources in the Institute, these discussions appear to be particularly timely and in need of final resolution. At the same time, faculty are concerned about the apparent overproduction of Ph.D.s at the national level.

4. Teaching overloads, primarily in undergraduate courses, continue to impact our graduate program by preventing graduate faculty from developing and offering new courses on a regular basis. Many of our courses are already given on an alternate year basis; consequently, new courses can only be offered at the expense of existing ones. Additional teaching FTEs have been requested on an ongoing basis.

5. Strong consideration is also currently being given to a department name change. Our faculty and graduate student population have grown significantly over the past five years and several faculty feel that the department would be better represented and better served by a new, more integrated name. Others feel that the current name has and continues to serve us well. Current discussions are also underway at the IANR level and university-wide regarding the formation of a new School (or Division) of Natural Resources and Environmental Studies, with FFW as a member of the core group of units making up the School. Thus, these discussions have a direct bearing on our deliberations.

6. Physical separation of our graduate students and faculty into two buildings (and now three) continues to limit interactions, particularly those in wildlife with other areas and vice versa.

7. With respect to items 1 and 3 above, another issue in the Department has centered around the question, should we place a limit on the total number of graduate students because of budget and space limitations?

8. Finally, the continuing reduction in the number of graduate courses in organismal biology offered by the School of Biological Sciences has serious consequences for our graduate program. This situation has been discussed with the Administration on numerous occasions, but it has not yet been resolved.







## RESEARCH

### Introduction

While research in the Department of Forestry, Fisheries and Wildlife (FFW) is quite varied, historically field biology and ecology have been and will continue to be dominant themes. Because of the environmental and management issues addressed, the faculty's research is usually interdisciplinary in nature and requires strong ties with collaborators in other departments, colleges, universities, agencies, and foundations.

During the past five years, FFW has demonstrated a marked increase in grants received and journal articles published. During the period 1990-1995, FFW generated \$4,083,141 in extramural research support (an average of \$680,523 per year or \$157,894 per year per departmental research FTE). By comparison, FFW generated an average of \$31,383 per year per departmental research FTE during the period 1985-1989. Greater collaboration in recent years with resource management agencies and foundations has allowed us to participate in the transfer of newly developed knowledge or technology to the private sector.

In 1995, the Agricultural Research Division at UNL surveyed both IANR faculty and clientele and asked them to rank six major ARD research areas in order of importance. Tied for first among clientele were *Environment and Natural Resources* and *Value-Added Processing of Commodities*. Faculty ranked *Environment and Natural Resources* as the most important program. The highest research priority for the North Central Division of the Agricultural Experiment Stations is *Environment and Natural Resources*. The Dean of ARD has stated "We intend to use this information to help make decisions regarding reallocation of resources within the Agricultural Research Division. Enhancing research efforts in these high priority areas should allow ARD to better meet the needs of Nebraska's agriculture and people."

Below is a summary of FFW research activities since 1990 (Projects and Programs section). Following that is a summary of our future plans, including a proposal for a primary research focus for the department.

## **A. PROJECTS AND PROGRAMS**

### **1. Personnel With Research Appointments/Projects**

Jim Brandle (70% Research, 30 % Teaching)

Ron Case (25 % Research, 75 % Teaching)

Steve Ernst (75 % Research, 25 % Teaching)

Mark Harrell (25 % Research, 75 % NFS)

Kyle Hoagland (75 % Research, 25 % Teaching)

Scott Hygnstrom (70% Extension, 30% Teaching; has CRIS project but no research appointment)

Dennis Jelinski (40% Research, 60% Teaching)

Ron Johnson (31% Research, 69% Extension)

Terry Kayes (25 % Research, 75 % Extension)

Ed Peters (25 % Research, 75 % Teaching)

Julie Savidge (40 % Research, 60 % Teaching)

### **2. Research Activities Since Last CSREES Review (1989)**

Research activities since the last FFW CSREES Review are grouped roughly according to the Action Statements of the FFW Action Plans submitted to IANR in 1991 (see Appendix for copies of the Action Plans). Because the Action Plans were not intended to be all-inclusive (due to their shorter-term nature), additional groupings are also included per ongoing departmental and individual investigator activities. The Faculty Vitae in the Appendix contain a listing of grants and publications by individual investigators.

### **Action Plan Thrusts**

#### **a. Sustainable agroecosystems and profitability**

Sustainable production systems must be economically as well as environmentally sound. Production efficiency is one element of sustainable systems. Integration of resource conserving practices into such systems is another. FFW programs and expertise have much to contribute in this area.

#### Research Accomplishments:

1. Interdisciplinary project on windbreaks as components of sustainable agroecosystems developed. Brandle, Schoeneberger, Johnson, Case, Harrell.
2. Research projects on filter strips and other agroforestry practices as wildlife corridors that incorporate concepts of biodiversity and wildlife damage management initiated. Case, Johnson, Hygnstrom, Jelinski.
3. Evaluation of the use of filter strips for remediation of water quality problems expanded. Hoagland, Peters.
4. Evaluation of new species for use in agroforestry practices initiated. Brandle, Lovett (NFS).
5. Collaboration with National Agroforestry Center and Sustainable Agriculture Center greatly strengthened. All.

**b. Riparian zone and wetland ecology and management, emphasizing conservation biology principles**

Riparian habitats and wetlands are important features of Nebraska's landscapes. These ecosystems provide habitats for resident and migratory birds, terrestrial and aquatic wildlife, woodland-dependent species; provide travel corridors for wildlife; and help maintain biological diversity. These systems also reduce soil erosion and help remove water pollutants. Riparian habitats and wetlands are critical components of sustainable landscapes and provide significant economic benefits. At the same time, riparian habitats and wetlands are impacted by a host of human activities: drainage, habitat fragmentation, clearing of bottom-land forests, fertilizer and pesticide use and other perturbations that significantly affect the viability of these systems and the benefits they provide.

#### Research Accomplishments:

1. Research in riparian zone and wetland ecology, significantly expanded. Savidge, Peters, Jelinski, Hoagland, Brandle.
2. Capitalized on funding opportunities provided by external agencies to support riparian and wetland research emphasis. All.
3. Participated in the development of a North Central regional research project on riparian zone ecology and management. Hoagland, Savidge.
4. Linkages with other agencies to better coordinate research activities greatly strengthened, i.e. FWS, EPA, USGS, USFS, Nebraska Game & Parks. All.
5. Demonstration area on University property developed to show riparian zone and wetland management principles. Brandle, Hoagland, NFS.
6. Departmental GIS workstation established. Seibert.

#### c. Related Studies

##### Research Accomplishments

1. Projects on the biology of algal attachments to fixed surfaces and its role in biofouling expanded. Hoagland.
2. Investigations on the biological controls of competence, induction, and differentiation in the development of specific plant tissues and organs continued. Ernst.
3. Effect of climate change on agroforestry systems in the northern Great Plains. Brandle, Schoeneberger, Guertin.

#### 3. Funding Summary (1990-1995)

From 1990-1995 FFW was very successful in obtaining extramural support. Over the past four years, FFW has ranked second in the ARD with respect to outside funds awarded to faculty; in 1989 FFW ranked 17th out of 20 units. This increase in funding was in large

part responsible for the expansion of our research program and increase in graduate student numbers and support. Our goal is to maintain or increase the Department's level of grant productivity, and specifically increase our publication productivity during the next five years to equal or surpass the ARD average.

The faculty of FFW are disappointed at the level of appropriated support they receive from the ARD. Considering the stated emphasis on natural resources and environmental issues in the IANR Strategic Plan and the performance of the faculty in garnering outside funds, more support from the ARD to enhance research infrastructure and graduate research assistantships seems justified. In 1990 appropriated support per FTE to FFW was 11.6% less than the average support for the 22 units in ARD. In subsequent years that percentage has varied between 11.1% and 4.4% below the average. For 1995 appropriated support to FFW was 9.8% less than the ARD average. Table R-1 shows funds received from the various sources to support the FFW research program.

Table R-1. Sources and amounts of funds by year to support FFW research

Year	<u>State Appropriated</u>		<u>Formula</u>	<u>Grants</u>
	State Operating	State Grad Asst.	Mc-Sten. Funds	Extramural Funds
1990	\$25,965	\$43,200	\$121,045	\$250,196
1991	\$31,180	\$52,490	\$135,076	\$281,510
1992	\$32,465	\$46,310	\$139,954	\$905,116
1993	\$30,048	\$35,260	\$139,165	\$741,105
1994	\$30,048	\$36,504	\$167,333	\$998,591
1995	\$30,691	\$37,964	\$164,047	\$906,623

## **B. FUTURE RESEARCH PLANS**

### **1. Proposed Departmental Research Focus**

#### **a. Introduction**

As a department, much of our research activity is associated with the biology and ecology of the interface between human-altered and natural ecosystems. This area of emphasis occurred as a consequence of the evolving research interests of the faculty members. Recently we decided that these collective efforts should be coordinated as a formal department focus, and that FFW should strive to attain national and international recognition in this area. In this section of our review document, we describe current faculty interests and expertise, and propose actions as to how we plan to achieve such recognition.

#### **b. *Proposed Area of Focus***

FFW proposes the following as the primary research focus of our department.

#### Biology and Ecology of the Interface Between Natural and Human-altered Systems

This emphasis is compatible with the IANR Strategic Plan to contribute to the development of sustainable agroecosystems. Obviously the focus described above is quite broad, and we believe it is necessary to further focus in some key areas that will contribute to our understanding of the ecology of the interface between natural and agricultural systems. Based on our current and proposed future strengths, we therefore propose to emphasize the following areas--

1. Wildlife Damage Management in agricultural and urban systems with research and technology transfer in sustainable control practices.



2. Relationships between agricultural and urban systems and the short and long term health and vigor of aquatic environments.
3. Role of woody vegetation in agroecosystem sustainability.

c. **Justification**

To be competitive for the limited research funds expected to be available in the future, we believe it is in the best interests of the Department and individual faculty to have a primary departmental research focus. Having a focus will allow us to achieve the critical mass of faculty, support personnel, and equipment necessary to individually and cooperatively compete for grants, publish in widely-recognized journals, attract high quality graduate students, post-doctoral associates and visiting faculty, and make a positive impact on how agricultural and natural ecosystems can best co-exist. We understand this focus will not encompass all the research activities of the Department, but believe such a focus and identity is essential for the reasons stated.

The overall focus and emphasis areas reflect two FFW Action Plan Statements for the 1995-1999 period, as stated below (see Appendix for copies of the 1995-1999 Action Plans):

1. *Improve the management of Nebraska's natural resources to enhance environmental quality and ecosystem integrity.* This action plan expresses interest in specific concrete actions that address environmental quality, ecosystem integrity, and natural resources management. One objective of this action plan's research activity is "to strengthen research, extension, and teaching programs in natural resources management by focusing on riparian zone ecology, ecosystem restoration, landscape ecology, conservation biology, and surface water quality."

2. *Continue to develop and demonstrate approaches based on ecological principles that make agricultural production systems economically and environmentally sustainable.* One objective of this action plan that is related to research activity is to "emphasize research on biological resources as integrated components of sustainable agricultural production systems."

The action plans summarized above are quite broad in coverage. However, we will use the three study areas proposed above (Section b, items 1 and 3) to help us focus our research efforts and resources to maximize our impact in the broader area of the biology and ecology of the interface between natural and human-altered systems.

d. **Current Faculty and Research Foci in The Proposed Focus Areas**

1. *Wildlife Damage Management:* Case, Hygnstrom, Johnson.
2. *Water Quality and Habitats in Great Plains Lakes, Rivers and Wetlands:* Hoagland, Jelinski, Peters, Savidge, Seibert.
3. *The Role of Woody Vegetation in Agroecosystem Sustainability:* Brandle, Case, Harrell, Johnson, Schoeneberger, Dosskey, and NFS.
4. *Landscape-scale Assessment of Biodiversity:* Jelinski, Savidge, Seibert.

b. **Current Research Needs Relative to the Emphases Stated Above**

1. **Additional Faculty Expertise Needed**

- a. Systems Ecologist with applied modeling experience. As noted earlier, faculty in FFW are actively engaged in research projects that deal with agroecosystem sustainability and focus specifically on agricultural/natural system interfaces. Research in landscape ecology is one natural bridge between the

different systems being studied and will contribute much to our understanding of system functions. However, the faculty have recognized that a Systems Ecologist with expertise in ecological modeling is a necessary contribution to the overall research effort. We would expect this person to utilize the data coming from the different projects dealing with the agriculture/natural system interface to put together models that could display whole system function and interactions. This is a faculty position we believe is critical to our program and would like to add such a position to the Department.

- b. Stream Ecologist. This position was identified as an important need for the teaching program. It is no less important for the research program. Given the importance of Nebraska's rivers and streams to Nebraska's irrigated agriculture, its wildlife, including both resident and migratory birds, and fisheries, and a host of other users that place demands upon the water, FFW's current research efforts focused on flowing water are inadequate. A stream ecologist whose research interests include flow requirements necessary to sustain different components of river ecosystems would be a very helpful addition to the faculty in FFW.
- c. Natural Resource Economist. A natural resource economist, whose interests are in the valuation of indirect or less tangible outputs from ecosystems, has been a long-standing need in IANR. For example, what economic benefit ultimately results from developing x acres of new wildlife habitat that ultimately increases

populations of both game and non-game birds? Or, how do the opportunities (or lack of them) to go fishing in Nebraska, especially in eastern Nebraska where human population versus fishing opportunities are decidedly out-of-balance, impact the economy? This position would enable us to put our contributions to society in real economic terms. This position would not necessarily be housed in FFW; it could, instead, be in the Agricultural Economics Department. Wherever it was located, however, we would expect strong interaction with FFW faculty and collaboration on research projects.

## **2. Support Positions**

The most critical support position needed that would benefit the research program is a Computer Specialist. This need is a broad one that covers all departmental program areas, not just research. For research, however, we would expect the position to train faculty on use of various software programs, develop specific software applications related to faculty projects (i.e. Windbreak Economic model) develop components of the research program that would become part of the Department's home page on the World Wide Web, and generally have responsibility to oversee computer operations in the Department.

In addition to the Computer Specialist, a Research Tech. III is needed to support the Water Quality and Agroforestry work at the ARDC.

### 3. **Infrastructure Needed**

Finally, since 1990, the Department has been engaged in an on-going effort in collaboration with the Nebraska Game & Parks Commission to have Congress establish a FWS Cooperative Research Unit at UNL affiliated with FFW. Federal officials had advised us that Nebraska was a high priority for a new unit, and in 1994-95 our hopes were high. Then came the election of 1995, the efforts to achieve a balanced budget, and major reductions in the budgets of Federal agencies, including the Cooperative Research Unit program. FFW has not given up on its goal to have a unit established, but when that might occur is dependent upon a more favorable Federal budget picture.





## **OUTREACH PROGRAMS**

### **Introduction**

Outreach programs are provided by various faculty and staff in the Department of Forestry, Fisheries and Wildlife. Most of these programs are interdisciplinary because of the integrated nature of our department and include rural and urban, adult and youth, wildlife enhancement and damage management, environmental education, how-to information, and educational information to facilitate public policy decisions. FFW personnel work closely with faculty in other departments and maintain contact and close working relationships with other state or federal agencies, particularly the Nebraska Game and Parks Commission, U.S. Forest Service National Agroforestry Center, U.S. Fish and Wildlife Service, U.S.D.A.-APHIS-Animal Damage Control, Nebraska Department of Environmental Quality, Nebraska Department of Agriculture, Nebraska Health Department, Natural Resources Conservation Service, and Natural Resources Districts.

### **Cooperative Extension**

University of Nebraska Cooperative Extension addresses one of the five major missions of the Institute of Agriculture and Natural Resources (IANR): teaching, research, extension, service, and international programs. Extension faculty and staff provide the majority of outreach programming in FFW. They have joint appointments in teaching, research and service, and have offices that are in the same areas with teaching, research, and Forest Service personnel throughout the Department. Joint appointments and office proximity are viewed as strengths because they enhance communication and teamwork and increase the visibility and understanding of extension activities among non-extension faculty.

County extension offices in Nebraska are organized into 21 Extension Programming Units (EPUs) that allow greater subject area focus among county staff, improved efficiency, and increased program opportunities for clientele. FFW extension personnel work regularly with extension educators and assistants located in county and district offices statewide.



### Personnel with Extension Appointments

Personnel changes have occurred since our last departmental review. Our *extension forester* position became vacant in 1991 and has not been reauthorized. This loss has greatly weakened our ability to respond to a variety of forestry-related opportunities and needs, especially overall coordination of statewide extension forestry activities, cooperative programming with wildlife personnel, a forestry shortcourse for forestry-related professionals, and educational inputs on pertinent public policy issues. An *aquaculture specialist* position was filled in 1990 and has focussed on developing basic aquaculture awareness and the necessity of policy decision and critical infrastructure development to support effective aquaculture development in the state. A temporary *environmental education* position was added in 1994 through the cooperation with the 4-H Youth Development unit. Primary duties include development of K-12 enrichment activities for use in schools and camps, environmental education curriculum materials through CD ROM and the internet, and coordination of the Project Learning Tree program.

Extension specialist appointments in FFW are paired with research, teaching or service. Nebraska Forest Service personnel at the five district centers have 25% extension appointments.

<u>Extension Specialists</u>	<u>FTE</u>
Dennis Adams, forestry (RREA)	0.25
Scott Hygnstrom, wildlife damage	0.70
Ron Johnson, wildlife	0.69
Terry Kayes, aquaculture	0.75
Tom Seibert, environmental education	0.75
 <u>Nebraska Forest Service District Foresters</u>	
Scott Dewald, Southcentral	0.25
Steve Karloff, Southeast	0.25
Doak Nickerson, Panhandle	0.25
Steve Rasmussen, Northeast	0.25
Jon Wilson, Westcentral	0.25
 <u>Extension Assistant</u>	
Dallas Virchow, wildlife damage	1.00

<u>Support Staff</u>	
Linda Schafer	0.52
Michelle Sieber	0.46
Diana Smith	0.53
Marcy Tintera	0.15

## **Outreach Program Outcomes, 1990-1995**

The following two major issues and related areas were the focus of extension programming during 1990-1995. Direction was provided by the 1989 CSRS department review and the 1991-95 Department Action Plans.

### **A. Sustainable Agroecosystems and Profitability**

Our goal was to develop and promote sustainable systems that were both profitable and resource conserving. Focus areas included agroforestry, aquaculture, and wildlife damage management. Specific issues addressed were:

- Windbreaks
- Filter Strips for Remediation of Water Quality Problems
- Riparian Zone Management
- Wetland Management
- Wildlife Corridors/Biodiversity
- Agroforestry in Forest Stewardship Plans
- Use and Protection of Woody Plant Materials
- New Species for Use In Agroforestry Practices
- Aquaculture Policy Development and Interagency Coordination
- Aquaculture Development and Programming
- Aquaculture Networking
- Increased Aquaculture Awareness and Resource Libraries
- Wildlife Damage Management in Aquaculture, Agroforestry and  
Alternative Crop Systems
- Wildlife and Forestry Aspects of the Conservation Reserve Program

### **B. Environmental Education**

Our goal was to expand environmental education programs in Nebraska, with an emphasis on 4-H/youth and urban audiences. Specific programs implemented and issues addressed include:

School Enrichment Programs

- \* Project Learning Tree
- \* Tree Care Workshops
- \* Arborists' School
- \* Directional Pruning Workshops
- \* Forestry Field Days
- Living Wild Resources Team
- Earthbound at Nebraska State Fair
- Husker Harvest Days Exposition

Urban Wildlife Enhancement

Family and Youth Outdoor Recreational Activities  
Urban Wildlife Damage Management  
Sandpits, Lakes, and Small Impoundment Management

- \* Nebraska Forest Service programs that have a major educational component associated with them.

**Resources Committed**

The Extension personnel identified on page 2 provided the majority of outreach programming for 1990-1995. The majority of activities were funded through a variety of extramural sources (range--\$140,000 to \$228,000 per year) (Table E-1). State-appropriated funds were also used to support outreach programs (\$8,900 to \$20,800 per year) (Table E-2).

**Table E-1. Extramural support (\$) for Extension programming, 1990-1995**

Program	1990	1991	1992	1993	1994	1995
Aquaculture	0	8,750	5,983	28,691	38,965	41,970
Forestry	0	19,373	19,373	19,373	19,373	19,373
Wildlife	35,985	38,108	3,151	41,789	4,155	9,098
Wildlife damage	103,747	97,606	163,038	94,847	87,300	157,470
Total	139,732	163,837	191,545	184,700	149,793	227,911

**Table E-2. State-appropriated operating support (\$)  
for Extension programming, 1990-1995.**

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1990	\$ 8,796
1991	\$19,736
1992	\$20,736
1993	\$13,219
1994	\$17,504
1995	\$17,767

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## **1989 CSRS Review Document Identified Extension Needs**

The following were identified by FFW staff as priority needs in extension for 1990-1995. All were requests for additional personnel, which reflects upon the high demand for extension programming in natural resources and the limited opportunities that existing extension staff have to integrate additional activities. A significant thrust was proposed in Western Nebraska to meet the needs of people across the state.

1. C-line Extension support staff (2.0 FTE)

To provide assistance with extension wildlife and forestry programming: 4-H fair and projects, Project Learning Tree, demonstrations, computer programs, etc... Positions to be located on East Campus.

2. A-line Extension Specialist (0.5 FTE Extension, 0.5 FTE Research)

To provide leadership in forestry and wildlife programming in Western Nebraska. Position to be located at the West Central Research and Extension Center.

3. B-line Extension Assistant (1.0 FTE)

To assist Extension Specialist in implementing extension programs in Western Nebraska. Position to be located at the West Central Research and Extension Center.

4. C-line Extension Secretary (0.5 FTE)

To provide secretarial support for Extension staff at the West Central Research and Extension Center.

None of the above positions were filled during 1990-1995. FFW extension staff are still overextended and have a difficult time meeting the needs of institutional teams and demands of the public. To further exacerbate the situation, our Extension Forester left the University in 1990. The position was encumbered in the Institute's reallocation process and we have been without an Extension Forester for five years.

## **Responses/Accomplishments Relative to the 1989 CSRS Review Recommendations**

### **General Recommendations (pertinent to Extension)**

1. The department needs to increase its level of external funding through both grants and cooperative arrangements.

During 1990 to 1995, funding for extension programming increased from \$139,732 to \$227,911 (Table E-2). The key to this increase, however, was in extramural support, as 90% to 94% of the annual budgets came from grants and cooperative funding arrangements. Based on increasing demands and the success of FFW extension personnel, we feel that an increase in the state-funded extension allocation to FFW should be considered by the Administration.

### **Extension Recommendations**

1. Stress interdisciplinary approach to teaching, research and extension.

The Department maintains a high level of interdisciplinary activities, that are evident throughout the review document.

2. Develop an advisory group for identification and prioritization of research and extension opportunities.

Advisory groups were developed for the IPM and aquaculture programs in 1993 and 1994, respectively.

3. Develop closer administrative-level ties with the Nebraska Game and Parks Commission and develop cooperative programs.

Budget reduction at the Nebraska Game and Parks Commission resulted in the loss of 0.5 FTE funding for the Extension Wildlife Specialist position in 1991. Administrative discussions have been held with NGPC personnel to reinstate at least part of this funding. No formal agreements have been developed, with the exception of several state-funded research/demonstration projects.

4. Seek alternative funding for faculty that are currently dependent on IPM funding.

Funding for the IPM Extension Specialist has been changed from 88% to 35% IPM-funded. Efforts continue to get 100% state funding for the position.

5. Solve the dilemma of on-campus physical facilities.  
Facility renovation status given in Section 1; New Natural Resources Building in planning stage.
  6. Develop programs to address the need for public use of private lands.  
No formal action plan but hunter-landowner relations and associated topics are addressed in the media (mostly radio, newspapers) each year.
  7. Develop interdisciplinary continuing education programs for natural resources professionals, educators and volunteer leaders.  
FFW Action Plans include this area.
  8. Consider development of interdisciplinary programs on total resource management that promote sustained community resource bases.  
Ongoing discussion.
  9. Consider means of improving coordination in program planning to include identification of: issues in need of attention, time and resources needed to address issues, reallocation of time and resources to deliver effective programs.  
This is an on-going process that ties directly into the IANR strategic planning process, action planning in FFW, and reallocation/redirection of resources mandated by the Vice-Chancellor's office.
- FFW developed an interdisciplinary Living Wild Resources Team (6 UNL units, 1 outside agency), provided key leadership for the multi-agency Earthbound Program at the Nebraska State Fair, and participated in the interdisciplinary Priority Initiative Conservation Reserve Program Team. All of these efforts were focused on total integrated resource management and included environmental, economic, and social aspects.



## Summary of Accomplishments

The accomplishments achieved related to our action plans are detailed in the following summary reports:

NE229 ENVIRONMENTAL EDUCATION — LIVING WILD RESOURCES  
:TEXT

### **\*ACCOMPLISHMENTS:**

CES leadership with interdisciplinary, multi-agency educational programs included participation in Earthbound at the Nebraska State Fair and inservice training on CRP management; details below. An inservice training program at the annual April Update meetings addressed New Models for Decision Making: The Role of Ethics, a topic of importance in environmental education and conflict resolution.

Earthbound was again a major attraction at the Nebraska State Fair (637,111 attending) with an estimated 95,570 youth and adults participating. Earthbound, initiated in Nebraska in FY93, is a precedent-setting, multi-discipline, multi-agency environmental education effort celebrating Nebraska's quality land, air, water, and living wild resources. A highlight in FY95 was a large (25' diameter) wetland centerpiece that demonstrated 5 Nebraska wetland types (freshwater, saline, wet meadow, farmed, and wooded). A handicap-accessible boardwalk across the wetland included an infrared trip device that periodically played an environmental message from the Little Billy Goat Gruff and troll - a special attraction to children. Exhibits by participating agencies surrounded the wetland centerpiece, creating a unique-area effect. IANR/CES developed a coordinated 60' exhibit area that integrated aquaculture, wetland living wild resources, wetland soil resources, vegetation/energy-load relationships, and Nebraska entrepreneurial products. The products and farmed wetland exhibits helped address the economic and social aspects of environmental stewardship and sustainability. In addition, 1074 youth or adults submitted Earthbound conservation cards with commitments to begin or continue one or more of the 15 suggested conservation activities. These "I'm doing my part" cards provided a mechanism for people to demonstrate commitment to stewardship and adoption of activities that carry an environmental ethic. A formal evaluation of Earthbound this year included findings that

participants: appreciated or enjoyed Earthbound exhibits and felt that they should be continued and/or expanded; judged the exhibits to be an attractive and informative opportunity for learning; and believed that Earthbound was excellent for children.

Increased attention was given the Conservation Reserve Program (CRP) because contracts are beginning to expire and there is need for information on options for landowners and on maintaining wise land stewardship. Environmental education information on living wild resources and conservation was included and integrated as part of the CRP team output. CES led efforts to compile a CRP desk reference in a 3-ring binder format for use by personnel in CES and 5 other participating agencies, farm consultants, and others interested. CES coordinated a CRP management inservice workshop (train the trainer) with 55 agency personnel and consultants participating. Evaluations were positive, indicating that participants were helped greatly or some in applying and teaching CRP appraisal and decision making. The extension CRP team conducted a variety of other educational activities during FY95 and more are planned for FY96. Moreover, CES personnel actively participated in two legislative task forces that provided input and recommendations on CRP and related farm issues. Other environmental policy issues and concerns related to EPA's Endangered Species Protection Program, wetlands, and grasslands were monitored and addressed as needed by appropriate Extension personnel.

Nebraska's first annual *Wildlife Habitat Evaluation Program* contest and outing was conducted by an interdisciplinary Nebraska team that included participation or assistance from the Nebraska Game and Parks Commission, Natural Resources Districts, and others. Six youth teams, each with an adult volunteer leader, participated, and one team went to the national contest in North Carolina. Nebraska Pheasants Forever chapters sponsored state awards, t-shirts, and expenses of the team's travel to the national event. The focus was on life skills development and resource conservation education for all participants but with opportunities for competitive aspects for those interested. This program was an excellent joint effort among agency and private participants toward mutual goals. This national program is being developed and adapted jointly by Nebraska and Kansas for this Great Plains area.

Evidence of improved forestry management skills include 95 Tree City USA's, up from 90 in FY94; 2 million trees sold in the Conservation Trees Program; and forester-assisted management completed for 31 acres of woodland improvement and 43 acres of tree planting. CES maintains close cooperation with Nebraska Forest Service efforts. Project Learning Tree (PLT) trained 191 educators during FY95 using the well-balanced PLT environmental education curriculum. The educators in turn delivered information and materials to approximately 4775 students. To overcome the difficulties of delivering certification workshops to rural Nebraska, an on-line PLT certification program has been opened on the world wide web. This pilot project may serve as a model for a National effort.

Environmental education messages on stewardship and wise pesticide use were included in commercial pesticide applicator training, reaching at least 221 structural category applicators (mostly urban) along with the total 2,990 commercial applicators trained. The popular and growing pesticide container recycling project is now active in 27 counties with recycling available at 54 sites.

CES was principal sponsor for the first Nebraska Youth Environmental Summit, a strong success with ~50 youth from across Nebraska participating in this inter-agency cooperative, hands-on, educational effort. One result is strengthened cooperative relationships between state Natural Resources Districts, Game and Parks Commission, Department of Environmental Quality, and others.

A partnership has been established with the Nebraska Department of Education and connections made with a variety of schools and teachers to better provide environmental education opportunities for K-12 students. Four-H camp offerings are being evaluated and strengthened to enhance effectiveness as centers of environmental awareness and education, and to provide activities that compliment the school Math-Science curriculum. For the FY96 camping season, many new hands-on, fun activities will enhance camp offerings while providing teachers with practical connections to the new Nebraska Math-Science

Frameworks. The partnership efforts will ensure that future curriculum offerings through school enrichment and camps mesh with K-12 curriculum needs.

The interactive computer kiosk on "Neotropical Migrant Birds," developed for Earthbound last year, was accessed for information 55,000 times during use at the Henry Dorly zoo and other sites, FY95. The kiosk on rodent biodiversity, which uses the same computer base, was accessed 95,000 times total during FY93 and FY94. These kiosks use a highly interactive touch-screen format that responds with color slides and video of animals and their habitats, brief recorded messages, flight paths, and sounds. These kiosks, developed in cooperation with the US Fish and Wildlife Service and the Nebraska Game and Parks Commission have been used in programs for zoos, schools, and conservation education facilities across Nebraska.

Suggestions on outdoor conservation/wildlife activities for families were included in  $\geq 10$  news articles, 12 radio programs, 2 TV programs, and 8 presentations. Information related to sustainable natural systems, biological diversity, and relationships to agriculture, medicine, and peoples' daily lives was incorporated into  $\geq 6$  news articles, 12 radio programs, 2 TV programs, and 14 presentations.

Free seeds for wildlife food plots, provided by the Nebraska Game and Parks Commission, were distributed through Extension offices statewide and through the Commission office. The 2000 5-pound bags and 29 50-pound bags distributed in FY95 seeded 792 acres of habitat and involved 8525 youth, parents, and teachers. Extension's role in the Commission's Wildlife Habitat Improvement Program resulted in an estimated 1319 acres of habitat maintained or improved.

Based on questionnaire responses, we estimate that 15% of the sign-up for Nebraska's 1.4 million acres of CRP land resulted because of wildlife benefits. Other questionnaire responses indicate that the publication Who's Who in Great Plains Songbirds resulted in about 275 acres of habitat improved, and the publication Windbreaks and Wildlife, used nationwide, resulted in about 37,500 acres of windbreaks being established, improved, or

maintained and 750,000 adjacent acres improved as wildlife habitat in agricultural landscapes. The initial printing of 50,000 copies of Windbreaks and Wildlife have been distributed and another 18,000 copies were printed in FY95. Seven forestry-related information and education publications were completed for use in Nebraska.

Conservation educators or other staff taught about 3,000 4-H campers at camping centers, and 41 adult volunteers (248 hours) taught 743 persons. About ten student volunteers taught about 1000 children in 20 school classes, and 10 taught Hunter Safety to about 100 youth. Four-H conservation, wildlife, and forestry projects had 22,403 participants, with 287 involved at the Nebraska State Fair. In cooperation with the Nebraska Game and Parks Commission, new activities on the environment are being written for FY96 implementation in the hunter education program, which reaches approximately 7000 youth annually.

The Extension Wildlife Awards program, completely funded by donors, has recognized 18 Nebraska extension professionals for outstanding wildlife educational programs, and another will be added during early FY96.

Approximately 80% of activities reported here were in support of one or more of Nebraska's extension priority initiatives.

**\*IMPLICATIONS:**

There are growing needs for factual, objective, and balanced environmental education and natural resources conservation information to assist clientele in dealing with a broad range of questions, concerns, and issues. There is also a need for increased appreciation and understanding of natural resources and the interrelatedness of agriculture, natural resources, and life support systems. Special emphasis should be taken to include non-farm audiences.

## \*KEYWORDS

Sustainable natural resources, 4-H youth, Agriculture, Conservation Reserve Program, CRP, Wildlife management, Habitat, Songbirds, Fishing, Conservation, Endangered species, Pesticide, Extension educators, Farmers and ranchers, Homeowners, Families, Private landowners, Youth meetings, Inservice training, Publications, Radio, Television, News articles, Slide tapes, Video tapes

## \*QUANTIFIED IMPACTS

### Programs and materials developed

Earthbound at Nebraska State Fair, including new integrated, multi-agency arrangement with exhibits surrounding a large wetland centerpiece

Earthbound wetland center display, 25' diameter (with Dept. Environ. Quality and others):

Integrated IANR earthbound exhibits (60' exhibit area) on aquaculture, living wild resources - wetlands, wetland soil resources, vegetation/energy-load relationships, and Nebraska entrepreneurial products.

Interactive touch-screen kiosk on *Neotropical Migrant Birds*: information accessed 55000 times

*Wild World of Pest Management* program - refined lesson plans; reached more people  
Annual Christmas Tree Directory

*Landscape Tree Appraisal* NF 94-180

*Timber Talk* quarterly newsletter

*Backyard Wildlife: Planting for Habitat* Nebguide G84-671-A (Rev. 12/94)

### Public policy issues related to environmental action:

Increased awareness	105,767 individuals
	28,992 families
	95 communities

Increased participation	1,074 individuals
	537 families
	95 communities

Numbers adopting environmentally-appropriate practices:	1,074 individuals
	537 families
	95 communities

Numbers of practices adopted	15 by individuals 15 by families 4 by communities
Knowledge gained	139,347 persons
Youth participating	28,586 youth
Habitat improved	999,443 acres
Teaching meetings	191
Television programs produced	13
Radio programs produced	37
News articles written	63
Newsletters	19
Multi-agency cooperation enhanced	12 agencies

**\*EXPENDED FTE**

	Prof	Para
1988	1.3	0
1989	2.1	0
1990	1.9	0
1991	0	0

**\*VOLUNTEER**

	FTE	No.
1988	0	0
1989	.37	57
1990	.40	61
1991		
1992	65 vol.	810.5 hours
1993	55 vol.	318 hours
1994	59 vol.	401 hours
1995	53 vol.	343 hours

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Nebraska 1995 Annual Report:  
Integrated Pest Management

Narrative Summary of Accomplishments

Vertebrates

Most of our work in 1995 focused on the six priority issues identified by the Nebraska IPM Steering Committee in 1994, including youth programming, policy education, totally integrated systems, private industry, alternative control techniques, and economic thresholds. We educated over 2,500 youth in western Nebraska through several school enrichment programs focussing on wildlife management. Over 40 youth and adults participated in the new Wildlife Habitat Evaluation Contest and over 130,000 youth and adults have learned about neotropical migrants and rodent biodiversity through an interactive touch-screen kiosk. Committee action and legislative testimony contributed to the development of a state-funded wildlife damage management position (USDA-APHIS-ADC) in eastern Nebraska and a proposal for a cooperatively funded Conservation Reserve Program (Kerry-Nelson). Teamwork and cooperative programming led to the development of five programs (over 1,200 adults educated) through the Turfgrass Science Team, Extension Swine Workgroup, and Urban Pest Management Team. Over 175 pest control operators (PCOs) were trained in the proper means of trapping and handling urban wildlife. Two PCOs were enrolled in and passed the three-credit course "Wildlife Damage Management." Efforts have continued, through a series of meetings in Lincoln and Omaha to clarify agency and organizational roles and responsibilities regarding wildlife damage management. Alternative control techniques have been highlighted in the book, "Prevention and Control of Wildlife Damage," which was completed and went on sale in February, 1995. Consisting of 93 chapters from 75 contributing authors, it is the most widely used reference in the field. Over 4,500 copies have been sold. An evaluation of the impact of the "handbook" is currently being conducted. In addition, a review paper entitled "Biological Management (Control) in the Last Quarter Century" was presented at the 16th Vertebrate Pest Conference. Efforts are underway to develop an annotated bibliography on biological control in vertebrate pest management, in cooperation with the Denver Wildlife Research Center. Finally, we have explored the development of economic models and thresholds for prairie dogs, pocket gophers, house mice, and white-tailed deer. Computer programs are being developed that conduct cost-benefit analyses and assist in the decision-making process.



### Objective 1

#### Number of county and regional pest control demos

1992	12	2
1993	0	0
1994	2	2
1995	2	2

### Objective 2

#### Private crop consultants gaining knowledge

1992	2
1993	50
1994	45
1995	177

#### Volunteer participation

1995	3
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#### Quantified impacts

Wildlife Damage Handbook income	\$202,500
Money saved annually due to Handbook	\$200 million

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## Nebraska Aquaculture

Aquaculture continues to be the fastest growing component of U.S. agriculture, but development in the USDA North Central Region (NCR) and Nebraska in particular remain slow because of a reluctance by state and local governments, financial institutions, and the private sector to make essential investments in appropriate legal, risk-management, lending, and marketing infrastructure needs, as well as research, development, technology transfer and general education. Despite this, the industry in the region and state has grown and matured since 1990. Presently, there are 44 licensed fish farmers in Nebraska, and about 15 unlicensed hobby producers. The number of licensed fish farmers has declined by about 20% since 1990 due to a shakeout of marginal operations that were started during the 1980's farm crisis, but failed due to poor siting, lack of sufficient study, bad advice from amateur or unscrupulous consultants, or inadequate financing, entrepreneurial drive or business acumen.

Despite this, prospects for development of a significant aquaculture industry in Nebraska in the long-term are far better now than they were in 1990: first, because the surviving producers are more sophisticated; second, because more Nebraskans are better informed about the enormous economic potential and environmental benefits of aquaculture; and third, because certain key state leaders and leadership groups are becoming better informed and more engaged in fostering aquaculture development. To a large extent these three general outcomes have been due to extension outreach activities of the University of Nebraska Aquaculture Program, which came into being with the hiring of Dr. Terry Kayes in September 1990. Since then, Dr. Kayes estimates that he has been instrumental in saving Nebraskans from making over \$1.5 million in unsound aquaculture investments.

Some examples of more effective producer activities are: Nebraska's largest fish farming enterprise, which began in 1989 and has over \$4 million invested in facilities, is approaching 2 million pounds a year production of coho salmon, is vertically integrated (from broodstock management through processes, packaging and national marketing), and employs over 40 people in rural Nebraska. Nebraska now has at least three commercial fish processing operations. Another of the state's larger producers has switched to contract production of trout for processors and other customers, and is giving serious consideration to

opening a fee-fishing operation. Since 1990, a number of fee-fishing and "live-haul" operations have been established and appear to be making profits. At least three new aquaculture ventures have been started in the past few years, and at least four small fish farmers are considering major expansions or renovations of their facilities, based in part on information provided through Cooperative Extension programming.

Among smaller Nebraska producers, most of the profits in aquaculture lay in the transport and stocking of live fish into private waters. Most successful small producers raise a variety of species for direct live sale, a significant percentage of which is done outside the state. Nebraska's fish farmers raise over 20 species of fish, the most important of which are: coho salmon, rainbow trout, channel catfish, largemouth bass, bluegill and other sunfishes, yellow perch, and various species of baitfish. A recent trend among smaller fish farmers has been the production of ornamental fish, particularly koi carp, because of the high price they bring and the recent growth of interest by landscapers and the public in "water gardening." Since 1993, interest in yellow perch aquaculture has increased greatly, both among established and potential fish farmers, because of recent developments in production technology and the high price this foodfish commands in major Midwestern markets.

Recently, the USDA North Central Regional Aquaculture Center (NCRAC) has identified the yellow perch as the top candidate species for major commercial development in the NCR. Nebraska presently has one of the leading yellow perch fingerling producers in the region. Over the past 2 years, a NCRAC-funded field demonstration project has been underway with this fish farmer, to test various new pond production and fingerling-harvesting methods, and to evaluate a formulated diet developed specifically for perch. So far, the new pond culture methods have resulted in much faster growth among some (but not all) fish raised. Funding to continue and expand upon this effort for another 2 years has recently been granted by NCRAC, and an effort will soon be made to secure state or local economic development financial support.

After years of seeming paralysis and disintegration prior to 1990, the Nebraska Fish Farmers Association has been revitalized, to the extent that it has operated a booth for

several years at the Nebraska State Fair, has joined the National Aquaculture Association (a national umbrella group of aquaculture associations), has members that are starting to sell fish at farmer's markets, and has two meetings a year (co-sponsored by the Nebraska Department of Agriculture and Cooperative Extension) that include educational programs. The Nebraska Fish Farmers Association is still not a strong organization; but with better leadership and partnering with key state agencies and Cooperative Extension, the prospects for advancement seem good. Since the initiation of educational programming at the biannual meetings over the past 4 years, attendance has more than tripled (from 9 to 12, to 30 to 45, depending on subject matter).

Aquaculture extension activities are attracting more public attention every year. Since 1990, the number of contacts with people interested in aquaculture has increased from about 1 to 9 thousand a year. Many of these contacts have expressed a strong interest in the business. At least three feed mills in Nebraska are contemplating getting into the production of aquaculture feeds. At the 1994 Nebraska State Fair, about 20,600 people stopped at the Cooperative Extension aquaculture display that was part of the Earthbound program; 432 people obtained and/or requested additional information on aquaculture. The aquaculture Earthbound display at the 1995 Fair was viewed by an estimated 24,000 people, 688 of whom took fact sheets or other informational material on aquaculture. According to a study by Cooperative Extension evaluators, the aquaculture display was ranked highest by sampled visitors in five of seven impact criteria (compared to 10 other Earthbound exhibits), tied for top ranking in a sixth criteria, and was ranked second in the seventh.

The Extension Aquaculture Specialist has made significant progress particularly in encouraging state leaders to take an active role in fostering aquaculture development. The Nebraska Department of Agriculture has made a commitment to help promote aquaculture, and has appointed a State Aquaculture Coordinator as recommended by the Office of the President's Joint Subcommittee on Aquaculture and the National Aquaculture Development Plan. In 1993, the Nebraska State Legislature passed a bill that mandated the creation of an interim Nebraska Aquaculture Board to develop a state aquaculture plan or report for the Legislature. The Board (comprised of two Governor-appointed industry representatives, two

representatives each of the Nebraska Department of Agriculture and the Nebraska Game and Parks Commission, and the Extension Aquaculture Specialist) submitted its report in January 1994.

This report by the interim board contained ten specific recommendations, five of which have already been implemented either by enacted legislation, or by other means. Three particularly important actions were: (1) the creation by law of a permanent Nebraska Aquaculture Board (two Governor-appointed industry representatives, one representative each of the Nebraska Department of Agriculture and the Nebraska Game and Parks Commission, and the Extension Aquaculture Specialist); (2) the passage of a statute assigning aquaculture right of preference in the use of groundwater on a par with other forms of agriculture (i.e., preference #2, behind domestic use, but ahead of commercial or industrial use; and (3) a legislative request for "an Attorney General's opinion as to whether aquaculture would be subject to the provisions of Initiative 300," an amendment to the Nebraska Constitution that all but precludes nontraditional financing for most forms of agriculture.

The Extension Aquaculture Specialist was instrumental in initiating all these actions and expediting the resulting positive outcomes. Perhaps the most important of these was the official opinion rendered by the Attorney General, who ruled that while aquaculture is in fact statutorily defined as agriculture, it does not fall under the provisions of Initiative 300. The potential impact of this ruling is tremendous, because it clears the way for venture capital and other alternative financing mechanisms for aquaculture, which are either precluded or discouraged by Initiative 300. Owing to Nebraska's enormous groundwater resources and its recent rapidly spreading reputation for implementing a "user-friendly" legal environment for development, the state is starting to attract interest in investment by established aquaculture enterprises in other states, including California, Washington and Minnesota.

Statements by a number of chairs and other members of key legislative committees since 1993 have given clear indications of considerable legislative interest in additional information on aquaculture and on how best to foster its development in Nebraska. For the foreseeable future, much attention will be focused on educating Nebraska leadership and

leadership groups regarding the economic potential of aquaculture to the state, particularly as an environmentally clean industry that could be integrated with irrigated agriculture. This has been and will continue to be done, along with extending aquaculture programming and information to more traditional extension audiences, including farmers, ranchers, educators, entrepreneurs and the general public. To facilitate this effort, since 1990, a large number of traditional and non-traditional extension tools, networks and outputs have been developed or produced.

Among the more important of these tools, networks and outputs have been: (1) the development of the "NebAARM Library," which contains over 500 photocopy masters of extension and technical articles of printed information for distribution, and over 50 slide-sets and videotapes for copy or loan, to extension educators, classroom teachers and other clientele; (2) a network of 21 extension educators in Cooperative Extension offices spread across the state in Extension Programming Units, all of whom are equipped with a copy of the NCRAC Aquaculture Handbook and an abridged version of the NebAARM Library, and most of whom have received some inservice education in aquaculture; (3) a network of industry and marketing contacts, agricultural economists with experience in aquaculture, and other aquaculture outreach professionals through NCRAC; (4) well over 35 extension clientele or professional-inservice workshops or major workshop presentations; (5) over 25 radio spots or programs, magazine articles, news releases, fact sheets, neutral testimonies at legislative committee hearings, and legislative briefings; (6) and several electronic media products.

Since 1990, contributions to electronic media products on aquaculture have included: (1) production of a videotape segment for, and participation in, the first nationally broadcast teleconference on aquaculture, titled "Investing in Freshwater Aquaculture"; (2) the editing and production of a major two-part videotape for workshop, classroom and library use, titled "Investing in Freshwater Aquaculture: A Reprise"; (3) collaboration in the scripting and shooting of a NCRAC-funded videotape, titled "Aquaculture Marketing: A Practical Guide for Fish Producers"; and (4) production of a NCRAC-funded techniques-centered videotape on yellow perch aquaculture, titled "Spawning and Artificially Propagating Yellow Perch."

### **Proposed Outreach Programs, 1996-2000**

As part of the recent IANR strategic planning processes, we developed five departmental action plans that will guide our activities in 1995-1999 (Appendix). These action plans were integrated with 1996 Cooperative Extension action plans to form the five directives (listed below) for departmental outreach programming in 1996-2000.

Cooperative Extension in Nebraska and nationwide is in an age of continuous reassessment and change to better focus on critical issues and associated outcomes. As a part of the process, all education action plans were sunset in September 1995, the four-year completion date. In place of the 60-70 outgoing plans, are 14 new plans (Table E-3) that form the overall focus for Nebraska Cooperative Extension for 1996-2000. These 14 plans were developed by extension writing teams using inputs resulting from listening sessions and interactive workshops with a wide variety of individuals (both within UNL and outside), organizations, and agencies. Moreover, extension specialists and educators had opportunity to review draft plans and will be working together in work groups, in partnership with other agencies or groups, to accomplish the desired outcomes. This new approach in extension action planning was taken to reposition the system to better demonstrate outcomes rather than activities, and to better answer supporters and critics who ask what differences Cooperative Extension programs make.

Our department contributes to all 14 plans in various ways, but our greatest focus will be in the *Natural Resources and Environmental Management* plan and, to a lesser degree, the *Integrated Crop Management*, *Integrated Animal Systems Management*, *Youth and Family Responsibility*, *Community and Residential Environment*, and *Agriculture and Natural Resources Policy* plans. The integration of these five Extension action plans with four departmental action plans resulted in five clear thrusts: Table E-4 shows how the Department's plans are integrated with Cooperative Extension's statewide plans: Natural Resources Management, Sustainable Agricultural Production Systems, Environmental Education, Community and Residential Environment, and Natural Resources Policy.

**Table E-3. University of Nebraska Cooperative Extension  
action plans, Fiscal Years 1996-2000.**

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Agriculture and Natural Resources Policy  
Community Policy  
Community and Residential Environment  
Economic Development  
Enhancing Food Safety in the Food Chain  
Health Care in Transition  
Integrated Animal Systems Management  
Integrated Crop Management  
Leadership Development  
Natural Resources and Environmental Management  
Preventive Health and Wellness Education  
Sustainable Families  
Work/Family Policy to Support Families and Communities  
Youth and Family Responsibility

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Table E-4

**RELATIONSHIPS WITH EXTENSION ACTION PLANS**

Extension Action Plan	FFW Action Plan*	Outcome/Comments
<ul style="list-style-type: none"> <li>■Natural Resources and Environmental Management,</li> <li>■Integrated Crop Management,</li> <li>■Agriculture and Natural Resources Policy</li> </ul>	1. Management: environmental quality and ecosystems	Riparian buffer zones. Conserv. biology/biodiversity. HEL and CRP. Partnerships. Timely information/public policy.
<ul style="list-style-type: none"> <li>■Natural Resources and Environmental Management,</li> <li>■Integrated Crop Management,</li> <li>■Integrated Animal Systems Management, ■Community and Residential Environment</li> </ul>	2. Sustainable agricultural systems: ecological principles, economically and environmentally sound.	Integration of biological resources into sustainable agriculture. Agroforestry. Integrated farm project. Aquaculture. Integrated pest management. Alternative approaches. Tree planting, forest stewardship.
<ul style="list-style-type: none"> <li>■Natural Resources and Environmental Management,</li> <li>■Youth and Family Responsibility</li> </ul>	3. Education: students on and off campus	School enrichment (K-12). Internet, multimedia, satellite. PLT. Inservice/short course (extension, teachers, field professionals). 4-H Wildlife Habitat Evaluation Program. Biodiversity, stewardship ethic. Rural-urban understanding. Life skills.
<ul style="list-style-type: none"> <li>■Natural Resources and Environmental Management,</li> <li>■Youth and Family Responsibility, ■Community and Residential Environment</li> </ul>	4. Urban areas: natural resources and environment	Environmental stewardship. Natural resource use, management, and care. Urban integrated pest management. Backyard habitats. Function/beauty of landscapes. Community forestry.

\*Most FFW extension personnel and Nebraska Forest Service professional staff contribute to some aspect of each of these plans; FFW action plans associate individuals with specific actions.

## A. Natural Resources Management

Our goal is to develop outreach programs to enhance environmental quality and ecosystem integrity through improved management of Nebraska's natural resources. Programs will be directed toward both private and public lands by developing partnerships with landowners and public entities. The following issues and programs will be addressed. Those with an asterisk are primarily Nebraska Forest Service programs that are included because they have a significant educational component that contributes to the overall extension education plan.

### Forestry and Wildlife Shortcourses

- \* Windbreak and Woodlot Management Workshops
- \* Tree Care and Planting Workshops
- \* Arborists' School
- \* Volunteer Firefighter Training
- \* Forestry Field Days
- \* Forest Products
- \* Master Tree Steward
- \* Forestry Newsletters (7)
- \* Forest Pest Management

### Sandpit Lake Restoration

### Sandpits, Small Impoundments and Watershed

### Conservation Biology/Biodiversity

### Conservation Reserve Program Education

### Wildlife Food Plots

### Big Game Public Awareness

### Wildlife Damage Handbook Expansion

### Extension Wildlife Award

### NebNet Newsletter

## B. Sustainable Agricultural Production Systems

Our goal is to continue to develop and demonstrate approaches that make agricultural systems economically and environmentally sustainable. We will promote activities that increase environmental stewardship and protect the environment, producers and the public. The following issues and programs will be addressed:

- Integrated Farm Project
- Agricultural Entrepreneurship
- Agroforestry
- Wetland Management Demonstration Area
- Riparian Buffer Establishment
- Bottomland Forest Management Demonstration
- Aquaculture Facility
- Aquaculture Development and Demonstration
- Aquaculture Integration with Land-Based Agriculture
- Integrated Pest Management-Swine Production, Livestock Grazing,  
CRP Lands and Conservation Tillage

## C. Environmental Education

Our goal is to expand curriculum using current technology to meet the needs of traditional and nontraditional students, both on and off campus. We will enrich learning opportunities through partnerships with school teachers, agencies, and others to help integrate factual environmental concepts into the education system. Specific programs include:

- K-12 School Enrichment
- Internet Programs
- \* Project Learning Tree
- Hunter Education Program
- Backyard Wildlife
- Wildlife Diseases
- Camp Enrichment
- Earthbound
- Envirothon
- Water Resources Expos
- 4-H Wildlife Habitat Evaluation Contest
- 4-H Forestry and Wildlife Fair Projects
- 4-H Life Skills Development
- Family Outdoor Activities - Family Camps

#### D. Community and Residential Environment

Our goal is to develop and enhance programs focused on natural resources conservation in urban landscapes. Programs will increase environmental quality and sustainability of resource systems. The following issues and programs will be addressed:

- \* Community Forestry
- \* Tree Care Workshops
- \* Arborist School
- Urban and Backyard Wildlife Management
- Integrated Pest Management-Urban
- Integrated Pest Management-Turfgrass
- Nuisance Wildlife Control Operators Training
- Bellevue Deer Task Force

#### E. Natural Resources Policy

Our goal is to increase public understanding of policy issues and increase involvement in the decision making process. In addition, policy makers will be informed of the impacts of policy decisions in natural resources and sustainable agricultural systems. The following issues will be addressed:

- Conservation Reserve Program
- Endangered Species Issues
- Wetland Issues
- USDA-Animal Damage Control Cooperative Programs
- Interagency Coordination for Urban Wildlife Damage Management
- Aquaculture and Water/Land-Use Policy Issues
- Commercial Aquaculture Development
- \* Forestry Best Management Practices
- Biodiversity Plan for Nebraska

In cooperation with the Nebraska Game & Parks Commission:

- Partners in Flight (Neotropical Migrant Birds)
- Wildlife Diversity Initiative

### **Summary of Resources Needed**

To achieve the five directives stated above and the departmental action plans, we will depend on continued support through existing sources. In addition, new sources of support must be found, especially for new faculty, staff, and operational support.

#### Faculty:

- \* Extension Forester (Riparian Zone emphasis)

#### Staff:

- \* Extension Assistant (Wildlife)
- \* Extension Assistant (Environmental Education)
- \* Computer Resource Assistant (linked with teaching, research, and NFS)

#### Operating:

- \* Additional operating support to enable expanded extension programming.

In addition, when the aquaculture program was initiated and the aquaculture extension specialist was hired, IANR administration committed to the development of an aquaculture demonstration/research facility. Planning for the facility is well underway and \$260,000 has already been committed. Additional funding must be developed that will enable construction of a facility and its staffing with appropriate support personnel.



# **THE NEBRASKA FOREST SERVICE**

## **I. Introduction**

The Nebraska Forest Service (NFS) is the service forestry organization for Nebraska. The NFS provides a variety of technical forestry assistance to private and public landowners and forest industry. In 1967 the Office of State Forester was moved, by state statute, from the Nebraska Game and Parks Commission to the University of Nebraska and has operated within the University since that time.

CSN 1943, Sec. 85-163.02: State Forester; appointment; duties.

There is hereby created within the University of Nebraska the office of State Forester. The State Forester shall be appointed by the Board of Regents, for all forestry education and services of the University of Nebraska and shall have general supervision in the State of Nebraska of 1) all educational work in forestry, including but not limited to demonstrations, publications and mass media information, and 2) service programs relating to forestry and forestation, including but not limited to tree distribution and planting, wildland fire control, development, protection and use of forest resources, and other programs promoting forestry and forestation.

The State Forester is responsible for providing direction and leadership, through the Nebraska Forest Service, for the proper management of our state's forest resource. The NFS's mission is to promote the stewardship of Nebraska's woodlands and related resources and of the community forest resources of the State. The agency works to help ensure that future generations of Nebraskans will be able to enjoy the benefits provided by those wooded acres.

## **II. Nebraska's Forest and Related Resources**

### **FORESTED ACREAGE**

Preliminary figures from the 1994 US Forest Service inventory of Nebraska's forest resource shows that 1,040,000 acres are classed as forest land, of which 930,000 acres are classified as commercial forest land. In addition to the forest land, 1,130,000 acres are classified as nonforest land with trees. Thus, a total of 2,170,000 acres have at least some tree cover and thus a potential need for direct forestry technical assistance.

## **WINDBREAKS**

Nebraska has over 20 million acres of cropland. Nine million acres occur in the western half of the state where wind erosion is a serious concern and field windbreaks are most needed. Throughout the state, there is a significant need for additional living snowfence plantings. Severe winter storms cause serious transportation problems. It is estimated that more than 1300 miles of additional snowfence plantings are needed to protect the areas most susceptible to snow drifting.

An estimated 50,000 farmsteads and ranching headquarters exist in the state, and all would benefit from wind and/or snow protection. Many include feedlots or other livestock facilities that also need protection. Approximately 25% have inadequate protection or no protection at all and are in need of additional tree planting. Also, approximately one-half of all the existing windbreaks around these sites are older than 30 years and are in need of renovation and/or replanting to maintain their usefulness. Thus 75%, or 37,500 farmstead and ranching headquarters, probably have a need for tree planting or other windbreak management assistance.

## **CHRISTMAS TREE INDUSTRY**

Approximately 100 growers currently sell about \$500,000 worth of Nebraska-grown Christmas trees annually. These growers need varying degrees of forestry assistance from planting to marketing. Only a small number of trees are wholesaled outside the state. Most are sold as "choose and cut" trees or are cut by the grower and moved to town for sale.

## **SAWMILLS and SECONDARY PROCESSORS**

More than 100 sawmills are located in the state. Many of these operate only on a part-time basis. The largest 15 to 20 of these mills cut the majority of the approximately 35 million board feet of lumber produced annually. The mills and the loggers that supply them create jobs and add significant diversity to Nebraska's economy. Secondary processing plants (businesses that make products from the boards produced at sawmills) produce a wide variety of products using both wood from Nebraska and wood imported primarily from the western United States.



## **COMMUNITY FORESTS**

There are 535 communities in Nebraska covering more than 300,000 acres. Of these, only Lincoln, Omaha, and Fremont have a full time professional staff to manage public trees. Often a community's tree resources are dominated by just a few species, typically faster growing, short lived and high maintenance trees such as silver maple and Siberian elm. In addition, many communities have a high percentage of trees in poor health. Communities often request guidance in obtaining funding, developing Tree Boards and community plans, inventorying their tree resource and implementing tree planting and other projects.

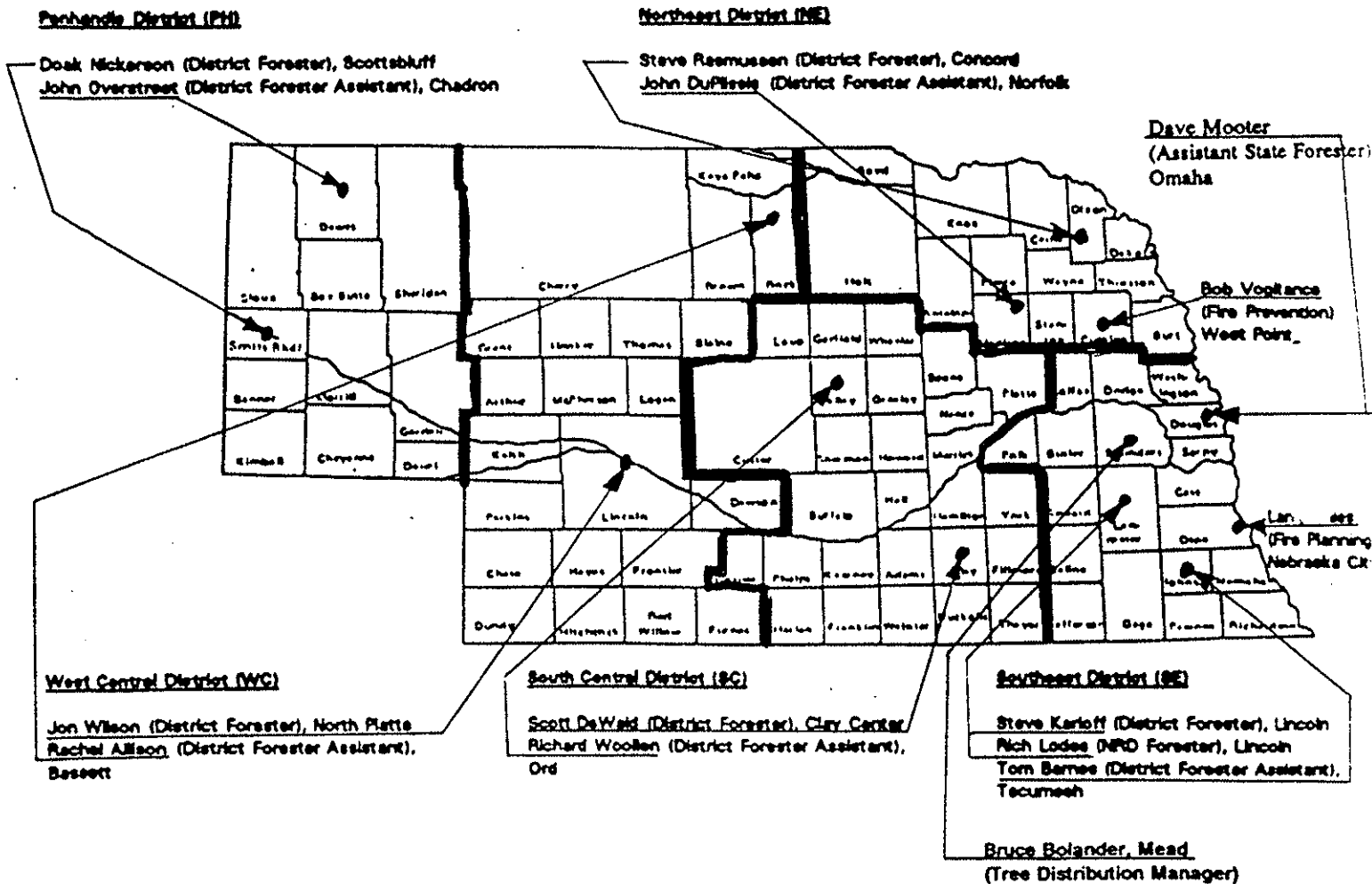
### **III. Nebraska Forest Service Programs**

1. **Private Lands Management**
  - Rural Forestry Assistance (RFA) (7.75 FTE)
  - Nebraska Conservation Trees Program (1.35 FTE)
  - Marketing and Utilization (0.25 FTE)
2. **Public Lands Management**
  - Community Forestry Assistance (3.75 FTE)
  - Vegetation Management for Public Lands (2.75 FTE)
3. **Resource Protection**
  - Forest Pest Management (1.75 FTE)
  - Rural Fire Prevention and Control (7.0 FTE)

All of the program areas provide information and education through workshops, news releases, newsletters, radio tapes, and other media. Each of the five District Forester positions is assigned 0.25 FTE Extension time in support of these activities. The NFS encourages staff to multiply their efforts by sharing ideas with groups of professionals and landowners.

The three main program areas are directed by Assistant State Foresters, who are directed by the State Forester and the Deputy State Forester. NFS Staff locations, with job titles in parentheses, are shown on the following map.

## Nebraska Forest Service Staff Locations



### Lincoln Office Staff:

Gary Hergenrader (State Forester)  
 Tom Wardle (Deputy State Forester)  
 Jeanne Andelt (Administrative Assistant)  
 Dennis Adams (Assistant State Forester)  
 Don Westover (Assistant State Forester)  
 Eric Rasmussen (Fire Training and Excess Property)  
 Bill Lovett (Nebraska Conservation Trees)  
 Mark Harrell (Forest Pest Specialist)  
 Laurie Stepanick (Assistant Pest Specialist)  
 Rich Straight (Vegetation Management)

## Nebraska Forest Service Funding

The agency is funded from a number of sources summarized in Table NFS-1, below. For fiscal year 1995, (October 1, 1994 through September 30, 1995), the percentage of funds from the various sources was as follows: State - 44 %, Federal - 37 %, Cons. Trees - 10 %, other agencies - 4 %, Veg. Mgmt. Contracts - 5 %.

Table NFS-1. Nebraska Forest Service Funding

	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>
State -	\$651,191	\$690,588	\$732,549	\$747,104	\$755,173	\$765,546
USDA FS -	\$391,221	\$634,133	\$691,675	\$755,002	\$728,900	\$655,060
Cons.Tree Prog. -	\$168,845	\$145,050	\$166,150	\$196,127	\$164,230	\$184,475
Other agency -	\$32,012	\$33,135	\$33,135	\$32,283	\$38,655	\$62,647
Contracts - (Veg Mgmt)	\$145,443	\$105,570	\$148,108	\$73,877	\$339,438	\$83,022
Total	\$1,388,712	\$1,608,476	\$1,771,617	\$1,804,393	\$2,026,396	\$1,750,750

## Nebraska Forest Service interactions with the academic areas of the Department.

Only five other state service forestry agencies in the nation (Texas, Colorado, Kansas, North Dakota, and New Hampshire) have a close and direct tie to a University similar to that of the NFS. Despite this uncommon arrangement, for Nebraska it provides many benefits. For example, the NFS has access to the purchasing, personnel, printing, computing, travel services, accounting and other support functions of a large university system. That brings obvious efficiencies that would not be available to a small agency if it were housed as a separate entity. Moreover, the close tie with Cooperative Extension enables the NFS to disseminate resource information to end users via the statewide Extension system.

In addition to these relationships, the staff of the NFS interact with the academic staff in other ways. Academic staff are significant resources, both in a general sense, through seminars and papers, and as specific resources when questions arise. Likewise, NFS staff are used from time to time as guest lecturers and as other resources for the teaching and research activities of the academic staff. It is likely that in the future, NFS staff will play a larger role in classroom teaching as collaborative teaching efforts expand throughout the

Department and the Institute of Agriculture and Natural Resources. The specialized expertise and on-the-ground experience of NFS professional foresters can significantly enhance departmental teaching efforts.

#### **IV. Significant Issues Facing the NFS**

##### **1. Funding**

- National windbreak technical assistance funding has been assigned to the NRCS at the national level. The NFS performs a significant amount of work in support of windbreak planting and management without federal financial support.
- The NFS relies heavily on federal funds which may become less reliable in the future. Over the last several years federal funds have provided about 40% of the support for NFS programs. A greater diversity of funding sources and more stable funding overall would be desirable.
- The NFS is listed as a line item within the budget of IANR which provides some fiscal stability. It also means that vacant positions remain within the NFS instead of being returned to Ag Hall for reallocation, potentially, elsewhere within the Institute. The line item status also means, however, that requests for new operating funds, or new positions, must "compete" with requests from academic units for available funds. The possibilities for new monies (additional staff support or operating funds) are thus seriously constrained.

##### **2. Resource issues**

- Land conversion directly through clearing, and indirectly through unmanaged grazing continues to be a problem. Overgrazing, especially in hardwoods, also contributes to declining woodland quality and reduced outputs of all kinds.
- The Ponderosa Pine timber in the Pine Ridge has historically been cut very lightly. Much of it is more than 100 years old and, while the average quality for lumber logs is low, it is currently very attractive to area mills whose markets have expanded due in part to reductions in cut on the west coast. The present level of harvesting in the Pine Ridge area is much higher than the historical average. Complex issues

combining real opportunities for landowners with long term concerns for the health and productivity of the land must be faced.

- Herbicide drift from aerial applications on cropland with resultant effects on tree health and vigor is a serious problem.
- The lack of management is a feature of most Nebraska woodlands. Only a small percentage of owners actively manage their woodlands for "forest benefits."
- Eastern redcedar acreages are increasing in rangeland areas. While the expanding acreage presents problems for range managers interested in forage production, it also presents some economic opportunities. Controversy will likely increase in the future.
- A number of species including cottonwood and hackberry could support increased levels of harvesting without endangering the acreage of woodland cover for habitat or other values. As landowners face a more complicated business environment, and as rural communities continue to face the reality of declining populations, the importance of the economic development potential of these species may increase. The NFS does not have the resources to address this area.
- There is concern that tree planting in grasslands may be a contributing factor in the decline of some neo-tropical migratory birds. This is a complex issue and the agency must participate in the clarification of the appropriate role of tree planting in the state.
- Water quality issues, including amelioration of agricultural and other non-point sources, and the management of riparian vegetation for a variety of purposes are rapidly increasing in importance. There will likely be significant implications for both the acreage and the management of woodlands.
- Tree sales for conservation plantings have been decreasing across the entire region. The causes are not understood but the decline could have serious consequences for the agency and for the areas (soil protection, wildlife habitat, etc.) that benefit from conservation plantings.
- The state's community forests continue to age and the percentage of tree cover to decline. This problem is reduced in communities that establish active community forestry programs but current levels of technical assistance appear to be inadequate to halt the problem. New approaches may be required.

### 3. Rural Population issues

- Populations are decreasing in most Nebraska counties. In addition to an increased need for economic diversity, this decrease is causing greater difficulty in recruiting and maintaining full rosters of volunteer firefighters. It is also more difficult for Volunteers to find the time to participate in NFS training programs and other activities. The NFS may need to direct resources to help Nebraska's fire districts address this and other problems relating to rural population declines.
- Fewer people will own woodland resources in the future and absentee ownership will increase. While this may mean fewer direct contacts will be needed, it also may mean land managers will face a more complex management environment. The needs for forestry services may shift if the trend to fewer and larger ownerships continues.

### 4. Agency issues

- The instability of some funding sources (decline in tree sales means reduced money for district staff salaries, reduced Vegetation Management contract activity, unreliable federal support) may cause agency downsizing.
- Change in the science involving tree planting and care is nearly continuous. The NFS system for acquiring and communicating new knowledge should be evaluated and changed where needed.
- The agency is responsible for several properties. Our ability to conduct field management activities on these properties is significantly dependent on our Public Lands Vegetation Management crews but outside work for those crews has declined in the recent past. Loss of the Vegetation Management crews could jeopardize our ability to manage the land we are responsible for.

### Nebraska Forest Service Program Descriptions

The NFS promotes Nebraska's forest resource potential through proper management, planning, protection, enhancement, and educational programs. The tree resource of Nebraska makes great contributions to the "Good Life." It is the NFS goal to ensure its continued productivity.

## **PRIVATE LANDS MANAGEMENT PROGRAM**

### **1. Rural Forestry Assistance**

- a. **PROGRAM DESCRIPTION** The Rural Forestry program provides technical forestry assistance to rural landowners to achieve their management objectives. Primary services provided include: assistance in designing windbreaks, wildlife habitat, timber production, and other tree plantings; assistance with windbreak renovation, woodland improvement, harvesting, and pest and disease control.
- b. **RURAL FORESTRY ASSISTANCE PROGRAM GOALS**
  1. Improve the productivity of existing forestland for multi-purpose benefits including soil and water conservation, wildlife habitat, wood products, protection, recreation, and aesthetics.
  2. Increase tree planting for all conservation purposes including watershed protection, farmstead protection, erosion control, livestock protection and snow management.

### **c. RURAL FORESTRY ASSISTANCE, 1990-1995 - ACCOMPLISHMENTS**

(Includes Forest Stewardship, Stewardship Incentives and Forest Resource Management)

<u>Activity</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>
1. Forest Mgmt Plans - Number	189	190	290	450	381	475
Acres	371	2,007	8,554	10,418	12,525	8,683
2. Timber Stand Imp. Acres	0	71	29	396	17	350
3. Reforestation Acres	220	230	403	431	38	783
4. Wildlife Habitat Improvement Acres	123	276	0	439	123	170
5. Watershed Prot. Acres	67	0	0	323	285	36
6. Timber Harvested Acres	269	582	303	4,489	2,628	1,310
MBF	2,019	20	206	4,505	3,347	358
7. Referrals to Consultants Number	18	44	53	45	48	53
8. Forest Landowners Assisted Number	868	673	1,161	898	905	985

d. **FUTURE PROGRAM EMPHASIS**

1. Public awareness: I&E activities promoting tree planting/forest management.
2. Forest Stewardship program: Technical assistance and cost/share assistance.
3. Planning: Develop a long-range strategy for rural forestry.
4. Inter-agency cooperation: Expand partnerships with other natural resource management agencies.

2. Marketing and Utilization

a. **PROGRAM DESCRIPTION** The Marketing and Utilization program provides support to forest industry in the marketing of forest products and the efficient utilization of forest resources. The staff works with sawmills, logging crews and secondary processors.

b. **GOAL**

1. Improve the marketing and utilization of forest products by the forest products industry.

c. **ACCOMPLISHMENTS**

1. Maintained a primary processors directory of all sawmills operating within Nebraska
2. Provided marketing assistance to private business operations that utilize Nebraska's forest land resource
3. Published four issues of "Timber Talk", the forest products industry newsletter
4. Completed a statewide sawmill survey and drain analysis as a part of the 1994 forest inventory being conducted by the USDA Forest Service

d. **FUTURE PROGRAM EMPHASIS**

1. New product development, particularly utilizing low-value species, eg. redcedar, cottonwood, hackberry.



2. Assistance to primary processors to become more efficient and profitable.
3. Publish Timber Talk as a communication link/information exchange for forest industry.
4. Maintain forest industry directories, eg. Primary Processors, Secondary Processors, Timber Buyers, etc.

3. Nebraska Conservation Trees Program

- a. **PROGRAM DESCRIPTION** The Tree Improvement and Conservation Trees program provides improved varieties of seedlings for conservation plantings. Species, varieties, and seed sources adapted to Nebraska's climate and that exhibit desirable traits are selected. The program also establishes and operates seed production orchards to obtain superior seed. The Nebraska Conservation Trees program provides seedlings to rural land owners and other governmental agencies for conservation plantings.
- b. **GOAL**
  1. Provide the highest quality tree/shrub-seedlings for conservation plantings.
- c. **ACCOMPLISHMENTS**
  1. Increased promotional efforts for tree planting through a planned advertising campaign including radio spots and print adds.
  2. Used small data-loggers to monitor the temperature of seedlings through storage and transit and during the installation of black plastic weed barrier.
  3. Measured growth and survival of hackberry and bur oak in progeny tests.

#### Tree Sales history for 1990 - 1995

1990	3,096,850
1991	2,932,800
1992	2,595,400
1993	2,725,675
1994	1,961,275
1995	2,142,075

#### d. FUTURE CONSERVATION TREE PROGRAM EMPHASES

1. Continue providing native and genetically superior species of trees and shrubs.
2. Increase the number of species provided from superior sources.
3. Develop World-Wide-Web pages to provide information, promotion, and sales of Nebraska Conservation Trees.
4. Continue the Tree Planters Roundtable meetings.
5. Increase the number of bare root and containerized species produced at the USFS Bessey Nursery, Halsey, NE for the state of Nebraska.

#### PUBLIC LANDS MANAGEMENT

A growing number of tree care providers, including tree services, nurseries, and lawn care services would benefit from professional training and assistance with tree related problems. In 1979 the Nebraska Arborist Association (NAA) had 86 members. In 1995 there were 260 NAA members. In addition, many practicing arborists are not members of NAA. These businesses need to be kept up to date on modern tree care techniques so they can provide the best possible service to homeowners.

##### 1. Community Forestry Assistance

- a. **PROGRAM DESCRIPTION** The Community Forestry (CF) program's focus is to improve the tree resource in our cities, towns, and villages. Foresters assist in the development and implementation of community forestry plans and a wide variety of projects, cooperate with national

organizations such as the National Arbor Day Foundation, the National Tree Trust grant program, Global ReLeaf, etc. An emphasis is placed on working with green industry partners and assisting communities with grant projects and other activities. The NFS has worked to obtain grant dollars to assist with community forestry planting needs. The agency has been successful in helping enact the Tree Recovery Act (state) and in obtaining Federal ISTEA funds for tree planting within the state.

- b. **COMMUNITY FORESTRY PROGRAM GOALS.** It is the goal of the Community Forestry Program to improve the state's community resource through a program of education and technical assistance. The Community Forestry Program will also serve as grants coordinator for both federal and state programs providing financial assistance for forestry related projects to communities. Heavy emphasis will be placed on projects that achieve both public and professional education.
1. Inventory and evaluate the public tree resource in rural communities.
  2. Organize, train and support tree boards, groups, individuals and businesses responsible for the management of public and private trees.
  3. Provide identification and control recommendations for urban tree pests for private homeowners and communities.
  4. Promote proper tree selection and care.

c. 1995 CFA PROGRAM AREA MAJOR ACCOMPLISHMENTS

<u>Activity</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>
1. Grant projects funded	na	36	56	54	50	58
Dollars granted	na	\$134,892	\$138,466	\$209,401	\$233,284	\$384,296
(3 separate programs)						
2. Trees Planted	na	na	1284	137	2545	1105
3. Communities with						
Programs	na	na	155	160	160	166
4. Communities Assisted	na	na	85	194	75	111
5. Tree City USA's	64	75	85	90	95	*
Growth Awards	na	24	17	22	32	*
6. Community Projects	na	na	na	na	na	104

d. FUTURE COMMUNITY FORESTRY EMPHASIS

1. The Community Forestry Program will continue to work closely with organizations that have similar goals and objectives. Closer linkages will be formed with the Nebraska Statewide Arboretum in order to achieve a greater expansion of program services.
2. The program will continue its history of cooperation with professional organizations including the Nebraska Arborists Association, the International Society of Arboriculture, and the Nebraska Nursery and Landscape Association.
3. The program will strive to make linkages with various Nebraska utility companies with the goal of forming partnerships and offering training that will improve the management of utility corridor trees.

Technical assistance will include:

1. Working directly with city governments.
2. Working with local arborists, nurseries, utility companies, landscape architects, building contractors, and other businesses and individuals directly involved with tree management.
3. Identifying specific problem areas or needs relative to trees.

Educational assistance will include:

1. Developing appropriate materials and activities to support and publicize program efforts.
2. Support for Arbor Day celebrations in Nebraska and promotion of other tree related programs such as Tree City USA, Project Learning Tree, Global ReLeaf, Trees for Nebraska, and Keep Nebraska Beautiful.

Grants and financial assistance will include:

1. Playing an active role in the solicitation and coordination of grant applications from communities.
2. Provide assistance to help communities prepare grant applications for the purpose of funding forestry related projects.

## 2. Public Land Vegetation Management

- a. **PROGRAM DESCRIPTION.** The Vegetation Management (VM) program provides vegetation-related services to public agencies. The program involves activities ranging from planting seedlings for wildlife habitat to assisting with harvesting. Services include both planning assistance and "on-the-ground" activities. NFS Vegetation Management staff work with federal, state, and local public landowners providing land management technical assistance and on the ground services, all on contract basis. Federal and State agencies request a variety of studies, reports and other information on forestry resources and issues. Examples include PL-566 reports and river basin reports for the USDA Natural Resources Conservation Service (NRCS). The Vegetation Management (VM) program provides technical and professional services to a number of public agencies in the State.

**b. VEGETATION MANAGEMENT PROGRAM GOALS**

1. Provide technical assistance to public agencies in the management of existing timberland and the implementation of new tree plantings.
2. Provide the personnel and equipment to implement vegetation management plans as requested when this service is not available at a comparable level through the private sector.
3. Provide personnel and equipment to help manage the properties for which the NFS has responsibility.

**c. 1995 ACCOMPLISHMENTS**

1. Developed and initiated a wildlife habitat mitigation plan on the Big Papillion Creek in Omaha, NE for the US Army Corps of Engineers.
2. Completed the vegetation management plan on the 26 mile MOPAC East Trail for the Lower Platte South Natural Resources District.
3. Obtained a contract with the Army Corps of Engineers to establish wildlife habitat at Hamburg Bend along the Missouri River.
4. Maintained tree and shrub plantings previously established by the VM program at the Lincoln Sanitary Landfill.
5. Planted trees for the fourth year of National Arbor Day Foundation Fuelwood Plantation project.
6. Maintained Horning State Farm near Plattsmouth, NE for forestry research and demonstration projects.
7. Completed activities at Limestone Bluff (NE G&P), Harlan County Lake (Corps of Engineers), Cedar Canyon (FFW), Hastings Research Site (USDA Forest Service), Rock Glen (NE G&P), Country Meadows (local housing Assoc.) and Horning State Farm (UNL & USDA FS) that included planting and

maintenance of tree and shrub plantings, fence repair, cover crop establishment for future grass plantings.

#### Summary of Accomplishments for the Previous 5 Years

<u>Activity</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>
1. Tree Planting    Acres	58.9	58.8	22.7	52	37.1	19.6
Plants	18,860	14,257	12,312	28,588	14,295	9,349
2. Planting Maint. Acres	261.5	212.1	255.3	76	121.9	132.3
3. Wetland Mgmt. Acres	35	53	35	6.1	57	11.5
4. Timber Stand						
Improvement    Acres	103.7	12	68	10	7	0
5. Fence Const. (Habitat						
Protection fencing) Feet	18,724	500	55,300	18,000	34,240	20,060

#### d. FUTURE VEGETATION MANAGEMENT EMPHASES

1. Continue cooperation between the NFS and other public agencies.
2. Expand involvement with the Corps of Engineers and the NE Game & Parks Commission with the Missouri River Mitigation Project.
3. Increase the number of cooperative projects with the NE Game & Parks Commission.
4. Expand the services provided to the Board of Education School Lands and Funds on additional tracts of land, particularly in the area of woodland management.
5. Provide vegetation management assistance for the NFS staff where appropriate.

#### RESOURCE PROTECTION

##### 1. Wildfire Prevention and Control

Wildfires affect Nebraska in many ways. They have an impact on forest land, range and grassland, cropland, water quality, wildlife, and people. In the past six years (1990-1995), an average of 1238 reported wildfires burned more than 42,745 acres annually. During that period some 43 range fires have exceeded 1,000 acres in size.

Debris burning starts more wildfires and burns more acres than other types of people-caused fires. Lightning starts only 7% of all wildfires, but these fires account for 15% of the acreage burned. The distribution of the number of wildfire occurrences is closely correlated with population.

The wildfire suppression force is made up of some 14,000 predominantly volunteer firefighters from about 475 rural fire districts, plus the U.S. Forest Service, Nebraska Game and Parks Commission, and personnel from other agencies.

Over the last six years (1990-1995), wildfires have averaged 34 acres per fire. Fires in the east are smaller, while fires in the west are usually larger. In the Sandhills and southwestern Nebraska, lightning is a major cause of large fires. More recently, the Conservation Reserve Program has extended the threat of large, high intensity fires to eastern Nebraska.

The cost of wildfires amounts to 3 to 4 million dollars annually. (These are direct damage and fire suppression costs and do not include pre-suppression costs such as training and maintenance.) In many small communities, the response to a relatively small wildfire can result in a community left unprotected against structural fires. It is also not uncommon for multiple fires (lightning or railroad caused) to occur, thus stressing a community's resources. Large range fires not only cost hundreds of thousands of dollars to suppress, but they can have a disastrous economic effect on the ranches in the fire's path. Wheat land and other crop fires can also be very costly, as they often damage or destroy expensive harvesting equipment.

- a. PROGRAM DESCRIPTION. The Rural Fire Prevention and Control (RFP&C) program provides assistance to local volunteer fire districts by providing: federal excess property vehicles for use as fire suppression vehicles; parts for, and maintenance of those vehicles; fire district and mutual aid district planning and organization assistance; wildland fire suppression training, and fire prevention programming and the aerial fire suppression program. Data are gathered on a statewide



basis concerning number, size, location, and cause of fires; percent green (predicts fire hazard); and other prevention related information.

b. **RURAL FIRE PREVENTION AND CONTROL PROGRAM GOALS**

1. Develop and maintain local interest and activity in fire prevention.
2. Maintain and improve the volunteer firefighter's knowledge of wildfire suppression techniques and equipment.
3. Increase mutual aid district planning for coordination of control efforts on large/ multiple fires.
4. Maintain the efficiency of the Aerial Fire Suppression Program.
5. Increase fire district planning.
6. Maintain statewide awareness of the wildfire threat.
7. Provide for daily warning when wildfire danger is forecast to be very high or extreme.
8. Work to include all lands into legally established rural fire districts.
9. Establish a western fire presence to help sell our program "statewide" more efficiently. (This could be a new position or a consideration for possible office location and duty changes when refilling a vacancy)
10. Maintain the Federal Excess Property Program.

c. **1995 RFP&C PROGRAM AREA MAJOR ACCOMPLISHMENTS**

1. Established three new local fire prevention programs.
2. Maintenance work was done with 28 previously established prevention programs.
3. Smokey appeared in more than 50 communities.
4. Over \$8000 worth of fire prevention handouts were distributed in Nebraska Communities - cost recovery was 100%.

5. Continued the project producing satellite-derived greenness values as an input to the fire danger rating system.
6. Completed five mutual aid resource directories involving 65 communities.
7. Completed five fire district plans.
8. Program staff participated in more than forty mutual aid district meetings and in 4 firefighter seminars.
9. One hundred fifty firefighters attended three classes sponsored by the Nebraska Forest Service at the annual state fire school.
10. One hundred sixty one fire districts were inventoried for excess property.
11. Eighteen "new" excess property vehicles were acquired, and 18 vehicles were returned from fire districts.
12. Provided assistance to 61 districts in the form of parts and/or labor, which returned over \$9,000 to the program. Twenty-two units were reconditioned in preparation for assignment to fire districts.

<u>Activity</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>
<b>Wildfires</b>						
Number	1,647	1,658	875	573	1,410	1,263
Acres Burned	35,738	41,648	19,771	8,838	46,558	103,924
<b>Federal Excess Property Acquired</b>						
Number of Vehicles	2	1	25	22	1	28
<b>Planning Assistance</b>						
Mutual Aid Districts	4	6	4	3	3	4
Number of Communities	50	72	52	27	38	53
<b>Fire District Plans</b>	1	1	3	6	3	5
<b>Fire Prevention</b>						
New Programs	22	17	2	7	4	3
Maintenance Assists	170	56	26	10	--	28
<b>RCEP Grants</b>						
Number	55	69	61	61	63	61
Amount Granted	\$74,720	\$84,050	\$84,849	\$83,495	\$84,470	\$78,820
<b>Training Assists</b>	48	50	51	56	64	69

d. FUTURE RFP&C EMPHASES

1. Increase emphasis on fire prevention to reduce losses and protect resources.
2. Increase emphasis on fire problems in the wildland-urban interface. Awareness of these problems will provide avenues for additional fire prevention work and a possible source of future federal funding.
3. Increase training for wildfire suppression to address the increase in wildland acres resulting from vegetation planted under the Conservation Reserve Program. This training will take place through the existing agreement with the State Fire Marshal Training Division, at Fire School, and at Mutual Aid meetings and regional fire schools around the state.
4. Upgrade the excess property fleet and extend its future if we are able to acquire newer excess property at a reasonable cost.
5. Continue focus on Fire District and Mutual Aid District planning.

2. Forest Pest Management

- a. PROGRAM DESCRIPTION. Forest insects and diseases cause serious problems in windbreaks, plantations, and native forests in many parts of Nebraska. Some pests, such as pine moths of ponderosa, Austrian, and Scotch pines and Cercospora blight of Rocky Mountain juniper and eastern redcedar, cause problems so severe that they are reducing the number of tree species suitable for planting in some areas. Problems caused by forest pests are so common in Nebraska that they account for as much as 25% of the service requests coming from forest landowners. Approximately one-half of all on-site visits made by NFS staff include

pest diagnoses or some discussion of forest pests related to the woodland or planting area being discussed with the landowner. The Forest Pest Management (FPM) program carries out specific investigations, and detection and evaluation surveys. The program is directed toward gaining a more complete understanding of current and potential forest pest problems in the state, determining the effects of environmental conditions on these pests, and developing management approaches that reduce the pest damage. The FPM Specialist provides support for NFS field staff in all aspects of pest ID and control recommendations.

**b. FOREST PEST MANAGEMENT GOALS**

1. Prepare and provide guidelines to reduce the damage caused by forest pests in Nebraska.
2. Provide technical assistance to forest landowners concerning pest identification and control.
3. Develop and evaluate new procedures for controlling forest pests.
4. Conduct detection and evaluation surveys of important forest pests.

c. 1995 FPM PROGRAM AREA MAJOR ACCOMPLISHMENTS

1. Provided technical assistance in response to approximately 150 requests concerning the identification and control of tree insects and diseases to UNL staff and other clientele by way of field examination of problems, diagnosis of specimens, personal contacts, presentations, and publications. Twenty-two workshops and other programs were conducted.
2. With Bill Lovett (NFS-TD&I) and Mary Ellen Dix (USDA Forest Service, National Agroforestry Center), analyzed and evaluated a ponderosa pine progeny plantation for susceptibility to pine tip moths and determined that geographic source is a host characteristic that appears to be important in determining the level of susceptibility of pines to the tip moths. The identification of susceptible trees in the progeny plantation will allow the plantation to be rogued and made into an improved seed orchard.
3. With the Omaha City Forester, completed the first year of a three-year study of a new soil treatment for iron chlorosis of trees and shrubs. Initial results suggest the soil treatment is beginning to work one year after the application. If successful, this method will allow reliable treatment of chlorotic trees without the damaging effects of trunk injections.

4. Surveyed and evaluated the damage caused by Sphaeropsis (Diplodia) blight in ponderosa pine in the Nebraska Pine Ridge.
5. Continued a cooperative project with the City of Omaha, Forestry Division; and the City of Fremont, Dept. of Parks and Recreation using pheromone trapping and thermal unit accumulation to identify the most effective time to apply control measures for the lilac borer in green ash.
6. In cooperation with Miles, Inc., Kansas City, MO, and Prairie Tree & Lawn, Omaha, NE, evaluated a minimally wounding trunk-injection method for its effectiveness in controlling the gypsy moth, hackberry lace bug, and sycamore lace bug; and for the damage it causes to injected trees. This method will likely become one of the most widely used trunk-injection methods within the next five to 10 years.

<u>Activity</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>
Pest inquiries (samples, phone calls, letters, etc.; approximate)	250	220	225	200	175	170	190
Number of programs conducted	21	19	14	24	20	14	22
Number of people attending the programs (approximate)	550	560	540	670	580	560	610
Number of acres surveyed	400	320	409	400	175,150	175,000	180,000

d. FUTURE FOREST PEST MANAGEMENT EMPHASIS

1. Examine and evaluate the damage and spread of *Sphaeropsis* (*Diplodia*) blight in the Pine Ridge in 1996.
2. Determine the incidence of ash yellows and damage it is causing in green ash in Nebraska as a part of a five-state cooperative project (with ND, SD, KS, and CO).
3. Survey and monitor *Dioryctria* pine moths and other tree pests as conditions require.
4. Evaluate chemical, cultural, and other control methods as necessary to determine their effectiveness under Nebraska's conditions.
5. Assist with the other program areas to improve the detection and evaluation process for forest pests.
6. Improve the awareness of Nebraskans concerning avoidance of pest related problems through proper species selection and location.
7. Continue to provide up-to-date research, advice, and information on tree related pest problems.

**V. Actions taken since the 1989 Review**

Recommendations/Comments from the Review:

1. "The agency is obviously producing contributions to the State well beyond expectations based upon funding and personnel available to it. However, the backlog (6-9 months) of requests is a strong indicator that programs and personnel are overwhelmed."

Action taken: Four new District Forester Assistant positions have been added. All five Districts now have an Assistant position. While backlogs continue, the problem is much less serious than in the past. Note: Four of the Assistant positions are jointly funded with outside entities (60% NFS and 40% cooperator funds) which helps to leverage limited funds and provide a better level of service to Nebraska citizens.

2. "There is an underlying concern that NFS appropriations are supporting an inordinate proportion of the secretarial and other support of the FFW Department Program. The lack of adequate funding (including past Federal support) has caused some feeling that more equitable support would release funds for other NFS needs."

Action taken: Additional funding for support staff has been obtained and, while not complete, progress has been made toward a more equitable distribution of the cost of supplies.

3. "There appear to be inconsistencies in supervisory and/or performance evaluation responsibilities among program leaders and field personnel."

Action Taken: The NFS has reorganized into three divisions each led by an Assistant State Forester. The performance evaluation procedures have been modified to delegate the evaluation and annual work planning responsibilities to the appropriate Assistant State Forester with the State Forester reviewing all faculty level evaluations to ensure that a consistent approach is being used. The Deputy State Forester has been delegated the role of Hiring Official for all of the Managerial/Professional level staff of the NFS. Evaluations are prepared by the immediate supervisor and the Deputy is responsible for reviewing them for consistency.

4. "The developing rapport (and thus confidence building) between industry and agency is highlighted with the new directory of industries. Consideration should, at the appropriate time, be given to developing a price support newsletter or information exchange capability for landowners (producers) as well."

Action taken: No action has been taken in this area. Hardwood sales are relatively scattered and, thus, any data published for a given county or area could frequently be identified as coming from a specific sale. Softwood sales have become quite frequent and, since they occur in a relatively small area of northwestern Nebraska, the sale prices are fairly common knowledge. No publication currently addresses this information need for landowners.



5. "There is a need to better inform the legislature as to the contributions the NFS makes to the economic and other qualities of life for the people of Nebraska. The Legislative video presentation was an excellent start."

Action Taken: No specific action taken in this area. Staff continue to reply promptly to Legislative information requests and the agency sponsors an Arbor Day tree presentation to the members of the Legislature as well as other Officers of the State during years when Arbor Day occurs while the Legislature is in session.

6. "The need to gain more support for the windbreaks program among sister agencies and University departments is apparent."

Action taken: The USDA Forest Service has established the National Agroforestry Center at the University of Nebraska and windbreak activities, along with many other agroforestry activities are strongly supported at that facility. The NFS is facilitating the creation of an NRCS forester position that will serve Nebraska and Colorado.

## NEBRASKA FOREST SERVICE NEEDS

The heavy dependence of the NFS on federal funds to operate its programs was discussed in the Issue section of this chapter. To that end **increased state support** would significantly enhance the stability of the NFS operation: \$100,000 in new support would make a tremendous difference.

A position to establish a **Western Fire presence** is a significant need for the agency. This could be a new position or a redirected position. Redirection would be possible when current positions become vacant.

While not an NFS line, refilling of the **State Extension Forester position** would be of great help to the NFS, especially in regards to coordinating the forestry extension functions carried out now by Lincoln office staff and the District Foresters.

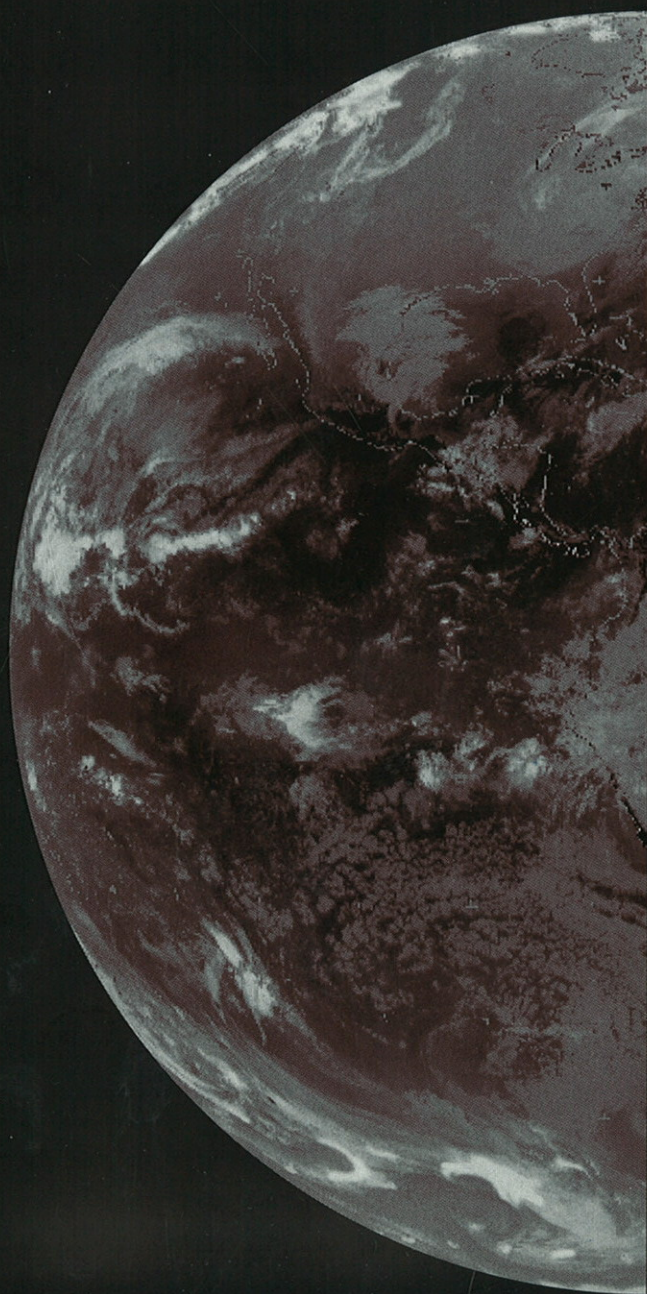
The NFS has some **unmet equipment needs**, particularly computer hardware and software to upgrade our current capabilities. In addition, several equipment items for the Fire Shop would enhance that operation. A total of \$25,000 for new equipment would take care of current needs.





# A STRATEGIC PLAN

for the  
University of Nebraska  
Institute of Agriculture and Natural Resources



INTO  
THE 21<sup>ST</sup>  
CENTURY



University of  
Nebraska-Lincoln  
March 1995





# IANR'S VISION

IANR will be the premier provider of educational, research, and outreach programs essential for shaping Nebraska's future as a leader in the 21st Century in the areas of food, agricultural and agribusiness systems, natural resources and human resources. IANR is dedicated to providing the highest quality programs that are ecologically sound, economically viable, socially responsible and scientifically appropriate.

## INTRODUCTION



**Irv Omtvedt**  
**NU Vice President and**  
**IANR Vice Chancellor**

**W**e anticipate the changes during the next decade which will impact Nebraska food, agricultural and agribusiness industries, the management of natural resources and the quality of life opportunities for our people are expected to exceed those that occurred during the past 50 years. To ensure the programs of the University of Nebraska Institute of Agriculture and Natural Resources (IANR) remain responsive and effective in the future, it is urgent for us to





assess our program priorities and operational procedures to strengthen Nebraska's agricultural and natural resources systems. While doing so, we must also prepare students and clientele to make the necessary adjustments to succeed during a period of rapid change and uncertainty.

The intent of this Strategic Plan is to provide IANR with the program and operational directions to move us aggressively and positively into the 21st Century. The issues, problems and opportunities are becoming increasingly complex. IANR cannot be all things for all people. Setting priorities and establishing collaborative partnerships will be essential.

Feedback received from clientele, faculty, staff, students and administrators at numerous "listening sessions" held on campus and across the state was integrated into this strategic planning process. Additional discussions involving faculty, staff and administrators helped develop a shared vision for the future. This Strategic Plan is consistent with the direction established by the University of Nebraska-Lincoln strategic agenda. Since strategic planning is a dynamic process, we will continue to evaluate, get feedback and make proactive mid-course changes as deemed appropriate. IANR's planning process is further complemented by its selection as one of 12 institutions to participate in the W.K. Kellogg Foundation Food Systems Education initiative, a visioning process for the year 2020.

The Institute of Agriculture and Natural Resources is committed to providing proactive leadership to high-priority, overarching objectives directed at student recruitment/retention/placement, distance education and program balance. Faculty and staff development, diversity and gender equity, communications,

program linkages and operational effectiveness will also be given priority consideration in the operational priorities for IANR.

The three programmatic themes that serve as the core for this Strategic Plan are:

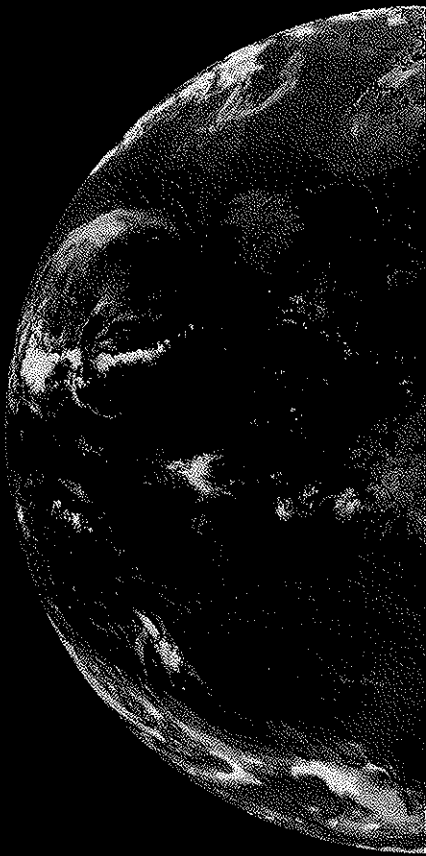
- Enhance economically viable and sustainable food and biomass systems
- Improve natural resources management and promote environmental quality
- Strengthen the quality of life of individuals and families and contribute to community viability.

Long-term action objectives have been identified for each of these program themes, and program action plans will be developed for each of these areas.

Our goal is to meet the needs of Nebraskans and be recognized nationally by clientele and peers as a leader in research and higher education programs relating to agriculture and natural resources. This plan is the compass that will provide that direction. Internal initiatives to reallocate existing resources and to obtain additional funding from external sources to support needed changes will be essential, since sufficient increases in state and federal appropriated funds are unlikely.

This Strategic Plan encourages change and continuous improvement. By working as a team, we can make the commitments needed to move the teaching, research, extension and service programs of IANR toward higher levels of contribution in Nebraska, the Nation and the World. ■

## ASSUMPTIONS



"Food and agriculture will continue to be important to Nebraska's economy."

"Natural resources and environmental concerns will increase."

"Nebraska's population will be more diverse and shift to trade and urban centers."

"IANR will provide proactive program leadership."





## IANR OVERARCHING OBJECTIVES

The following overarching objectives are strategic to IANR's direction. IANR places high priority on providing quality education that is accessible to traditional and non-traditional students. Increased accessibility through distance education is a high priority, as is providing a continual flow of research-based information.

### **Student Programs: Recruitment/Retention/Placement**

- Empower faculty, staff, students, employers and alumni to recruit, retain and place students.
- Update curricula to include preparation for living and working in a rapidly changing society and functioning in a global community.
- Provide state-of-the-art course offerings that meet the needs of both traditional and non-traditional students on and off campus.
- Provide students with increased accessibility to needed student services.
- Collaborate in offering quality programs, including transfer programs from the Nebraska College of Technical Agriculture, community colleges, state colleges and other institutions.

### **Distance Education**

- Utilize the IANR statewide network to facilitate the delivery of University of Nebraska resources to meet clientele needs.
- Collaborate with other institutions to meet distance education needs as appropriate.
- Enhance learning opportunities through distance education in Nebraska.
- Improve the use of telecommunications, information management and data transmission to meet the needs of society.

### **Program Balance**

- Balance programs in response to the changing needs in food, agriculture, agribusiness, natural resources, environment, individuals, families and communities.
- Offer a balance of programs that meet current clientele needs, as well as fundamental research programs that provide a knowledge base for the future.
- Respond in a timely manner and be accountable to clientele needs.
- Refocus IANR's program to give increased impact to urban audiences.



## **CHANGE**

**"The out-migration of Nebraska's trained and educated citizens is a critical issue."**

**"Global concerns such as increased world population, the depletion of fossil fuels such as oil and the loss of farmland will impact Nebraska."**

**"There is increased poverty and stress on families."**

**"Nebraska's rural population is declining."**

**"The average age of Nebraska's population is becoming older."**



## **PROGRAM THEMES**

IANR's program themes and long-term program objectives include generating and disseminating knowledge and providing quality educational programs. These objectives dictate the focus and priority direction for IANR's programs. The action plans that follow for IANR and its units will address the long-term program objectives. These action plans will consider policy, environmental and societal impacts. Collaborative partnerships will be emphasized.

### **ENHANCE ECONOMICALLY VIABLE AND SUSTAINABLE FOOD AND BIOMASS SYSTEMS**

- Develop profitable and sustainable plant and animal systems.
- Enhance the value-added processing of agricultural commodities and waste materials.
- Improve food safety and food quality.
- Improve plant and animal health through integrated pest management and other sustainable practices.
- Contribute to commodity and product marketing and economic development.
- Enhance the understanding of plant and animal biology fundamentals.

### **IMPROVE NATURAL RESOURCES MANAGEMENT AND ENHANCE ENVIRONMENTAL QUALITY**

- Provide a scientific basis for developing land and water use policies and practices of importance to Nebraska.
- Enhance environmental quality and improve the sustainability of resource systems.
- Create education programs that address the integration of resource needs with the carrying capacity of natural resource systems.
- Reduce soil erosion and improve water quality by developing improved management practices.
- Develop ecosystem improvement programs consistent with enhanced biodiversity.
- Provide programs to enhance rural and urban landscapes.

### **STRENGTHEN THE QUALITY OF LIFE OF INDIVIDUALS AND FAMILIES AND CONTRIBUTE TO COMMUNITY VIABILITY**

- Enhance the development of basic lifeskills among Nebraska's children, youth and adults.
- Contribute to improved human nutrition and health.
- Provide programs to enhance the development of new businesses.
- Emphasize leadership development programs.
- Partnership with others to improve the resiliency of families and the viability of communities.

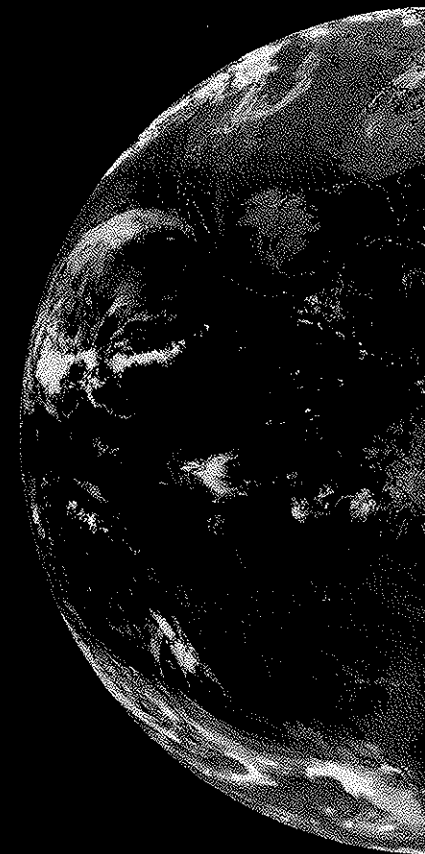
## ASSUMPTIONS

"Distance education's role will be increasingly important."

"Nebraska must compete in the global economy. Value-added exports will increase."

"Appropriated funds will be limited."

"IANR must set priorities and focus programs."







## IANR'S OPERATIONAL PRIORITIES

Assessing the effectiveness of current IANR efforts and identifying ways to improve operational priority areas is a continuous process. IANR's Strategic Plan discussions with clientele, faculty, staff and students suggest that Action Plans for improving IANR's program effectiveness and efficiency should consider the following:

### **Faculty and Staff Development**

- Improve faculty and staff career, personal and professional development opportunities, including retraining for new position needs.
- Provide training on new methods for program delivery.
- Ensure that personnel evaluation processes, rewards and recognition are consistent with IANR's priorities.
- Involve office/service and managerial/professional staff more effectively in program implementation.
- Facilitate and reward teamwork, including interdisciplinary team problem-solving approaches.
- Reduce faculty tasks that do not contribute to program outcomes.

### **Diversity and Gender Equity**

- Implement initiatives to increase participation of under-represented groups by recruiting and retaining students, faculty, staff and administrators from these areas.
- Develop culturally diverse and gender-sensitive support systems for students, faculty, and staff.
- Provide program content that meets the needs of diverse clientele and recognizes evolving gender roles and contributions.

### **Communications and Communicating Program Impacts**

- Give high priority to improving internal and external communications.
- Emphasize program impacts and output as related to program inputs.
- Enhance the public understanding of IANR programs and the roles of agriculture, agribusiness, natural resources and human resources in society.
- Emphasize elementary and secondary school enrichment programs for presenting information on food, agriculture, agribusiness, natural resources and human resources.
- Be responsive and effective in providing essential clientele-oriented services.



## CHANGE

"The number of Nebraska farms is decreasing; the number of larger farms is increasing."

"Further changes in Nebraska's food system structure are anticipated."

"Animal welfare/ rights issues and regulations impacting agriculture are expected to increase."

"New electronic communications technologies will be in more Nebraska homes."





## **Program Linkages**

- Give high priority to strengthened collaborative program linkages with other components of the University of Nebraska and other universities, colleges, community colleges; with international, federal, state and local government agencies; with organizations; and with private businesses.
- Develop collaborative programs within the region with emphasis on contiguous states.

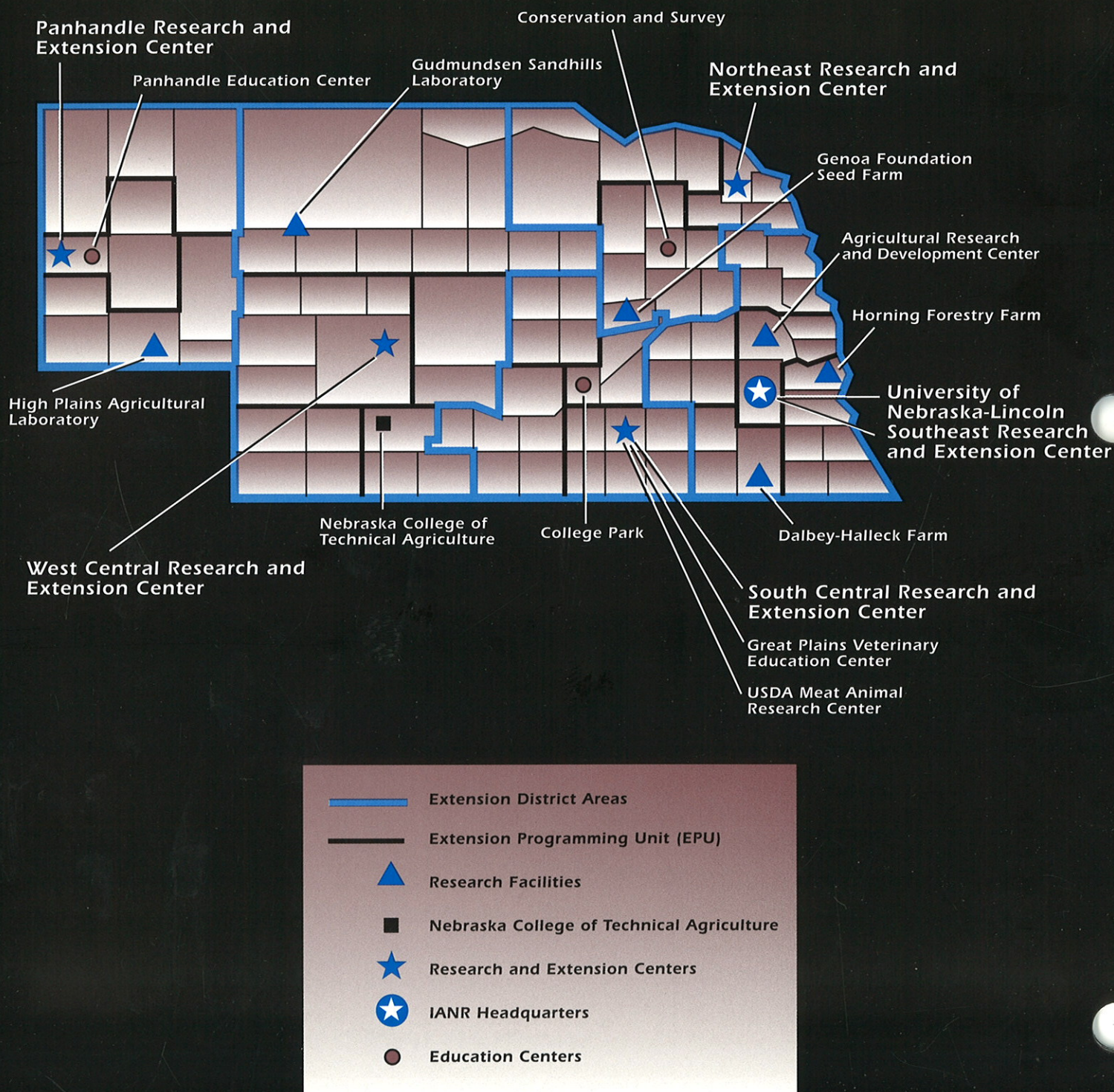
## **Organizational Effectiveness**

- Seek both internal and external input and assess organizational program efficiencies and implement appropriate structural changes.
- Explore alternatives and make changes in procedures, policies and operations to strengthen effectiveness and increase efficiency.



# Institute of Agriculture and Natural Resources

# STATEWIDE NETWORK





# **FFW ACTION PLANS**

**1991-1995**





## Forestry, Fisheries and Wildlife

Action Statement: 1	Develop a teaching, research, extension, and public service thrust emphasizing sustainable agroecosystems and profitability with focuses on agroforestry, aquaculture, and wildlife damage management.
Background Statement:	Sustainable production systems and profitability are high-emphasis areas in the LANR Strategic Plan. Sustainable systems must be profitable as well as resource conserving. Production efficiency is one element of sustainable systems. Integration of resource conserving practices into such systems is another. FFW programs and expertise have much to contribute to this area. The recently developed Center for Semi-Arid Agroforestry and Center for Sustainable Agricultural Systems will greatly facilitate departmental efforts in this endeavor.
Objectives:	<p><u>Agroforestry</u></p> <ol style="list-style-type: none"><li>1. Incorporate agroforestry concepts into undergraduate and graduate coursework.<ol style="list-style-type: none"><li>a. Combine FFW 224 and FFW 310 into a Woody Plant Communities course - <i>Landscape Ecology position</i>.</li><li>b. Develop a 400/800 level course in Agroforestry - <i>Brandle</i></li></ol></li><li>2. Expand research in agroforestry including windbreak ecology and economics, filter strips, buffer zones, and other practices.<ol style="list-style-type: none"><li>a. Develop an interdisciplinary project on windbreaks as components of sustainable agroecosystems - <i>Brandle, et al.</i></li><li>b. Develop research projects focusing on filter strips and other agroforestry practices as wildlife corridors that incorporate concepts of biodiversity and wildlife damage management - <i>Landscape Ecology position, Extension Forester position, Case, Johnson, Hygnstrom</i></li><li>c. Expand evaluation of the use of filter strips for remediation of water quality problems - <i>Hoagland, Peters</i></li></ol></li><li>3. Develop extension and demonstration projects in agroforestry practices.<ol style="list-style-type: none"><li>a. Incorporate agroforestry practices into Forest Stewardship plans - <i>NFS</i></li><li>b. Develop demonstrations/publications on use and protection of woody plant materials for conservation in both rural and urban areas - <i>Extension Forester, NFS, Brandle, Hygnstrom</i></li><li>c. Initiate evaluation of new species for use in agroforestry practices - <i>NFS, Brandle</i></li><li>d. Strengthen collaboration with the Center for Semi-Arid Agroforestry and Center for Sustainable Agricultural Systems - <i>All</i></li></ol></li></ol> <p><u>Aquaculture</u></p> <ol style="list-style-type: none"><li>a. Establish a facility for aquaculture research and demonstrations - <i>Kayes, Peters</i></li><li>b. Enhance working relationships with the network of contacts in EPU's for aquaculture - <i>Kayes</i></li><li>c. Establish an aquaculture resource library at each of the Extension/Research Centers - <i>Kayes</i></li><li>d. Develop an interdisciplinary research team for aquaculture, ie. Ag Economics, Ag Meteorology, Food Science, Conservation and Survey Division - <i>Kayes</i></li><li>e. Solidify linkages with the Department of Agriculture, Department of Economic Development and the Nebraska Game and Parks Commission to assist with the establishment of an aquaculture industry - <i>Kayes</i></li><li>f. Collaborate with Wildlife Damage Extension Specialist to facilitate management of damage problems at aquaculture facilities - <i>Kayes, Hygnstrom</i></li></ol> <p><u>Wildlife Damage Management</u></p> <ol style="list-style-type: none"><li>a. Expand current extension programming that deals with wildlife damage management in traditional agricultural production systems to include damage management in alternative crop systems, agroforestry, aquaculture, and communities - <i>Hygnstrom, Johnson</i></li><li>b. Broaden extension demonstration projects to consider wildlife damage management in urban areas and aquaculture - <i>Hygnstrom, Johnson</i></li><li>c. Expand educational opportunities by adding a lab to FFW 348 and a 400/800 level course on Advanced Topics in Wildlife Damage Management - <i>Hygnstrom</i></li></ol>
Anticipated Results:	Increased understanding and application of resource-conserving practices in the development of integrated sustainable agroecosystems and landscapes.
Resources Committed:	Existing departmental resources will be re-directed to accomplish some of the above objectives.
Resources Needed:	<ol style="list-style-type: none"><li>1. New position in Landscape Ecology (T/R) -- \$100,000</li><li>2. Refill Extension/Research Forester position -- \$100,000</li><li>3. Funds to develop an aquaculture research/demonstration facility -- \$450,000</li><li>4. 0.5 FTE B-line extension assistant for wildlife programming -- \$20,000</li><li>5. Grant funding to support specific aspects of research, extension, and demonstration projects (anticipated from Center for Semi-Arid Agroforestry, EPA, Fish &amp; Wildlife Service, and others).</li></ol>

## Forestry, Fisheries and Wildlife

Action  
Statement  
2

Strengthen FFW's existing educational programs and expand them to better serve Nebraska's citizens.

Background  
Statement:

The past several years have witnessed a much increased interest in and public awareness of natural resource issues and environmental problems. The LANR Strategic Plan has recognized this public concern by giving special emphasis to the effective management of natural resources, the development of sustainable systems, and to the improvement of environmental quality. This heightened interest is reflected in the greatly increased student enrollment in FFW's undergraduate programs and by the growing number of graduate students in the graduate program. The department's existing off-campus short courses and workshops have had capacity enrollments and requests for expanded offerings are coming from several quarters. We believe interest in our educational programs will continue to increase into the foreseeable future and thus feel an obligation to respond to this demand.

Objectives:

1. Enhance the undergraduate program by:
  - a. Reducing the teaching overload on faculty by hiring a permanent instructor for FFW(NR)423/823 - *Landscape Ecology position*
  - b. Improving the teaching facilities for lecture/discussion classes, laboratories, and computer facilities - *Peters, Hoagland*
  - c. Increasing internship opportunities - *Case, Hygnstrom, Kuzelka*
  - d. Developing an Honors program - *Case*
  - e. Completing the FIPSE project - *Case, Peters, Hergenrader*
  - f. Increasing ties with the School of Biological Sciences - *Hoagland, Peters, Kayes*
  - g. Developing a departmental emphasis in Conservation Biology for the Environmental Studies major - *Case, Savidge*
  - h. Considering a departmental name change that more accurately reflects the department's mission and activities.
2. Strengthening the graduate program by:
  - a. Increasing the number of graduate courses per our last CSRS review. Change FFW 460/860 Advanced Limnology and FFW 462/862 Fisheries Biology to graduate only; develop new graduate courses in Conservation Biology, Landscape Ecology, Wildlife Damage, and Agroforestry - *Hoagland, Peters, Hygnstrom, Savidge, Brandle*
  - b. Continue to work toward the establishment of a U.S. Fish and Wildlife Cooperative Research Unit in the department - *All*
  - c. Improve the quantity and quality of graduate student offices and work spaces - *Savidge, Peters, Hoagland, Hergenrader*
  - d. Modify portions of the Service Building to develop a wet laboratory for teaching and research in aquatic biology - *Peters, Hoagland, Kayes*
  - e. Initiate planning for a Ph.D. program in FFW - *All*
  - f. Capitalize on the department's recent successes in obtaining outside grant funds to provide more funding/research opportunities for graduate students - *All*
  - g. Increase graduate assistants stipend levels to make us more competitive for high quality graduate students - *All*
3. Expand educational opportunities for teachers, extension agents, natural resource managers, and other non-traditional students by:
  - a. Offering courses at non-traditional times - *Brandle, Case*
  - b. Continuing the Forestry Short Course - *Extension Forester*
  - c. Developing an Environmental Education summer short course for teachers in collaboration with Teachers College and the School of Biological Sciences - *Case, Hygnstrom, Johnson*
  - d. Developing a Wildlife Ecology short course as a companion to the Forestry Short Course - *Case, Hygnstrom, Johnson*

Anticipated  
Results:

Accomplishing the above objectives will result in attracting additional students into LANR programs, expanding research/graduate study opportunities, increasing faculty success in competing for external funding, providing better employment opportunities for graduates, enhancing LANR's outreach to non-traditional learners, improving coordination of educational programs across departments and colleges, and greatly improving LANR's image in the natural resources area.

Resources  
Committed:

Some of the above objectives can be accomplished with existing faculty resources. Other objectives can only be accomplished with additional resources. Currently \$70,000 is available from outside sources to equip an aquatic biology lab in the Service Building.

Resources  
Needed:

1. New position in Landscape Ecology (T/R) -- \$100,000
2. Refill Extension/Research Forester position -- \$100,000
3. Complete Phase III of renovation of Plant Industry -- \$300,000
4. Complete renovation of Natural Resources classroom -- \$35,000
5. Renovate Natural Resources Hall teaching lab -- \$50,000
6. Modify Service Building for an Aquatic Biology lab -- estimate being developed
7. Renovate Natural Resources Hall basement for graduate student space -- \$50,000
8. Increased state/grant support for graduate student stipends to make them more competitive.

## Forestry, Fisheries and Wildlife

**Action Statement:** Expand Forestry, Fisheries and Wildlife's environmental education program with emphasis on programming for 4-H/Youth and urban audiences.

3

**Background Statement:** The need for increased programming in environmental education directed at 4-H/Youth and urban audiences is clearly recognized in the IANR Strategic Plan. Audiences that are educated on environmental issues and the options that face them are more likely to make appropriate choices when faced with ballot issues, tax questions, and personal decisions that affect their quality of life. Residents of our cities and towns are often unaware of natural resource activities traditionally conducted for rural residents. Urban resources such as wildlife populations, streams, parklands, and the urban forest are often thought to be different from their rural counterparts and programs aimed at rural resources are frequently not made available to urbanites. Urban natural resources are very important in terms of basic resource values and the benefits they provide but also are often significant simply because of the concentrated population that uses them.

- Objectives:**
1. Expand youth programs in environmental education by:
    - a) Developing new school enrichment programs through 4-H and Project Learning Tree - *Extension Forester, Johnson*
    - b) Coordinating environmental education activities with Extension Agent affiliates - *Johnson*
    - c) Continuing work with the Interagency Environmental Education Committee - *Johnson, Peters, Extension Forester*
  2. Deliver programs dealing specifically with natural resources within the urban environment to increase understanding of natural resource issues by developing a coordinated approach to:
    - a) Tree Care Workshops - *Harrell, NFS*
    - b) Arborists School - *Harrell, NFS*
    - c) Directional Pruning Workshops for electric utilities - *NFS*
    - d) Forestry Field Days - *Harrell, NFS*
    - e) Urban wildlife enhancement - *Hygnstrom*
    - f) Family and youth outdoor recreation activities focused on renewable natural resources - *Johnson*
    - g) Wildlife damage management in urban areas - *Hygnstrom*

**Anticipated Results:** Achieving the above objective will address two emphasis areas identified in the IANR Strategic Plan: Programs for urban audiences and school enrichment. An informed audience will make better choices. An increased awareness of natural resource issues affecting residents of both rural and urban areas will result. Increased success will be achieved in reaching urban residents who own or manage rural property. And, a better understanding by urbanites of natural resource issues that affect all Nebraskans, be they urban or rural, may engender increased public support for those programs that are now perceived to be mainly rural. Helping youth understand environmental issues through expanded school enrichment programs will help them better understand complex environmental problems and enable them to make informed choices now and when they become members of our adult society.

**Resources Committed:** Some redirection of existing resources including an adjustment in emphasis for community forestry will be necessary. Some refocus of priorities for all staff involved in environmental education and training programs will be required to insure a coordinated multidisciplinary approach.

- Resources Needed:**
1. Refill Extension/Research Forester position - \$100,000
  2. 0.5 FTE B-Line extension assistant for forestry programming - \$20,000

## Forestry, Fisheries and Wildlife

Action Statement:	Develop a research emphasis on riparian zone and wetland ecology and management that emphasizes conservation biology principles.
Background Statement:	<p>Riparian habitats and wetlands are important features of Nebraska's (and most mid-western) landscapes. These ecosystems provide habitats for migratory birds, terrestrial and aquatic wildlife, woodland-dependent species, provide travel corridors for wildlife, and help maintain biological diversity. These systems also reduce soil erosion and help remove water pollutants. Riparian habitats and wetlands are critical components of sustainable landscapes and provide significant economic benefits. For example, a recent economic analysis of crane-watching near Grand Island indicated that several million dollars annually are added to Grand Island's economy from these activities alone. The economic benefits generated as a consequence of waterfowl production in the Rainwater Basin and Nebraska Sandhills also amounts to many millions of dollars per year. Because of this there are a number of state and federal agencies participating in the Rainwater Basin Joint Venture project, the North American Waterfowl Plan, and the Neotropical Migratory Bird program. At the same time riparian habitats and wetlands are being impacted by a host of human activities: drainage, habitat fragmentation, clearing of bottom-land forests, and other perturbations that are significantly affecting the viability of these systems and the benefits they provide.</p> <p>Conservation Biology encompasses the concept of ecosystem sustainability, ecology of endangered species, maintenance of biological diversity, and population genetics.</p>
Objectives:	<ol style="list-style-type: none"><li>1. Expand research in riparian zone and wetland ecology - <i>Savidge, Peters, Landscape Ecology, Extension Forester</i></li><li>2. Capitalize on current funding opportunities provided by federal agencies to help support these research emphases - <i>All</i></li><li>3. Participate in the development of a North Central regional research project on riparian zone ecology and management - <i>Savidge, Hoagland</i></li><li>4. Strengthen linkages with other agencies to better coordinate activities - i.e., USFWS, EPA, USGS, USFS, Nebraska Game and Parks Commission - <i>All</i></li><li>5. Continue to work toward the establishment of a U.S. Fish and Wildlife Cooperative Research Unit - <i>All</i></li><li>6. Develop demonstration areas on University and cooperating agency properties to demonstrate riparian zone and wetland management principles - <i>Hygnstrom, Hoagland, NFS (Center for Semi-Arid Agroforestry)</i></li><li>7. Establish a departmental GIS workstation to facilitate the use of this tool in the research program - <i>Savidge</i></li></ol>
Anticipated Results:	Information from this research emphasis will demonstrate the significance of riparian and wetland areas as components of sustainable agricultural and natural resource systems and help meet one emphasis area in the IANR Strategic Plan. The department's research efforts will fulfill an information need that state and federal agencies not having their own research are require for proper management. This information will be generated as a result of funding support from these agencies. The establishment of a Co-op unit within the department will greatly enhance the opportunity to compete for outside funding from federal agencies.
Resources Committed:	A GIS workstation for the department is already under development with \$35,000 in funding provided by the U.S. Fish and Wildlife Service. Some faculty have already established research projects in the area and others are being developed. All these efforts are being supported by outside funds (more than \$450,000 thus far).
Resources Needed:	<ol style="list-style-type: none"><li>1. Landscape Ecology position - \$100,000</li><li>2. Continued success in attracting outside grants.</li><li>3. U.S. Fish and Wildlife Service Co-op Unit \$250,000 (Federal)</li></ol>

# **FFW ACTION PLANS**

**1995-1999**



## 1995-99 UNIT PROGRAM ACTION PLAN

Unit Forestry, Fisheries and Wildlife  
Action Plan No. 1  
Date August 31, 1995

### I. ACTION PLAN TITLE:

Enhance Natural Resources Management

### II. ACTION STATEMENT:

Improve the management of Nebraska's natural resources to enhance environmental quality and ecosystem integrity.

### III. BACKGROUND INFORMATION:

Effective natural resources management and improvement of environmental quality is a theme that has carried over from previous versions of the LANR Strategic Plan. FFW has had action plans dealing with these areas in previous planning cycles; the areas remain of very high importance to the state, university, and faculty in FFW. This action plan expresses that interest in specific concrete actions that address environmental quality, ecosystem integrity, and natural resources management. These actions focus on riparian zone management (stewardship, water quality), ecosystem restoration (ecosystem integrity) landscape ecology (ecosystem integrity, sustainability land management), and conservation biology (biodiversity).

### IV. OBJECTIVES:

1. Strengthen research, extension, and teaching programs in natural resources management by focusing on riparian zone ecology, ecosystem restoration, landscape ecology, conservation biology, and surface water quality.
2. Enhance stewardship of private and public lands by developing partnerships with landowners and public entities and providing training workshops, stewardship opportunities, and timely information on management strategies.

### V. ANTICIPATE RESULT(S)/IMPACT(S):

The information delivered from these focus areas will provide the basis for natural resource management decisions that enhance environmental quality and restore ecosystem integrity. It will be useful to individual landowners and agency management personnel.

### VI. ACTION PLAN LEADERSHIP:

FFW research and extension faculty as well as members of the Nebraska Forest Service will have responsibility for this action plan.

### VII. TIME SCHEDULE OF KEY EVENTS:

Some actions are already underway and ongoing; others will begin as resources become available.

### VIII. RESOURCES--COMMITTED, REDIRECTED, NEEDED:

Several faculty have established projects in the action plan area. Thus their time and operating dollars to support (both appropriated and grants) represent commitments to the plan. Other elements of the plan will not be accomplished without these additional specific resources: 1) Riparian Zone Ecologist (Forester) 70E, 30R -- \$125,000; 2) Stream Ecologist 50T, 50R -- \$125,000; 3) Additional computer hardware -- \$30,000; 4) Additional grant funds to support the research.



## Forestry, Fisheries and Wildlife

### Action Plan #1

### Enhance Natural Resources Management

Action Statement      Improve the management of Nebraska's natural resources to enhance environmental quality and ecosystem integrity.

### Actions

- |   | <u>Who will participate</u>   |
|---|---|
| 1. Strengthen research, extension, and teaching programs aimed at natural resources management.   |   |
| a. Increase educational and research efforts in riparian zone ecology and management, including participation in a North Central Regional Research project on riparian zones.             | Case, Hoagland, Jelinski, Peters, Riparian Zone Ecologist (Forester)                                    |
| b. Develop ecosystem restoration methods and approaches specific to the needs of Nebraska's natural resources - including lakes, impoundments streams, wetlands, grasslands, and forests. | Hoagland, Kuzelka, Peters, NFS, Vegetation Mgmt, Conservation Trees, Riparian Zone Ecologist (Forester) |
| c. Continue development of programs in landscape ecology and conservation biology.  | Hygnstrom, Jelinski, Savidge  |
| d. Strengthen emphasis on surface water quality through research on Nebraska streams, lakes, and impoundments.  | Hoagland, Peters, Stream Ecologist  |
| e. Obtain a Fish & Wildlife Cooperative Research Unit.  | Hergenrader   |
| 2. Enhance stewardship of private and public lands by developing partnerships with landowners and public entities.  |   |
| a. Conduct windbreak and woodlot management workshops for landowners.   | Hygnstrom, NFS  |
| b. Expand the Forest Stewardship program to reach more landowners and bring more land under stewardship management practices.   | NFS   |
| c. Conduct training activities for the forest products industry to improve their efficiency of utilization of wood-products resources.  | NFS   |

- |  |               |
|--|---------------|
| d. Develop a handbook of "Best Management Practices" about forest management for use by loggers, landowners, NFS field staff, and others.                                      | Adams, Wardle |
| e. Continue interdisciplinary and interagency efforts that focus on providing timely information on management strategies to policy makers, resource managers, and the public. | All           |

Resources -- Committed, Redirected, Needed:

Some faculty have established projects in the action plan area. Thus their time and operating dollars to support (both appropriated and grants) represent commitments to the plan. Other elements of the plan will not be accomplished without these additional specific resources: 1) Riparian Zone Ecologist (Forester) 70E, 30R -- \$125,000; 2) Stream Ecologist 50T, 50R -- \$125,000; 3) Additional computer hardware -- \$30,000; 4) Additional grant funds to support the research

## 1995-99 UNIT PROGRAM ACTION PLAN

Unit Forestry, Fisheries and Wildlife

Action Plan No. 2

Date August 31, 1995

### I. ACTION PLAN TITLE:

Economically and Environmentally Sustainable Agricultural Production Systems

### II. ACTION STATEMENT:

Continue to develop and demonstrate approaches based on ecological principles that make agricultural production systems economically and environmentally sustainable.

### III. BACKGROUND INFORMATION:

The Department of Forestry, Fisheries and Wildlife has had an active and leading role in agroforestry and sustainable agriculture since 1965. The completion of the Research and Education Building at ARDC provides new opportunities to address the issues concerning economically viable and ecological sustainable food and biomass systems and fits nicely with a major program theme of the LANR Strategic Plan. Sustainable systems are a legacy we must leave to future generations and the objectives outlined in this plan build on Departmental and Institute efforts to succeed in this vital effort.

### IV. OBJECTIVES:

1. Continue facility development at ARDC including the Integrated Farm project, wetland management demonstration, aquaculture demonstration and applied research, and replicated systems to support inter-disciplinary research projects.
2. Continue to develop aquaculture and aquatic natural resources programming.
3. Expand programming in wildlife damage management to include conventional and alternative crop production systems.
4. Emphasize research on biological resources as integrated components of sustainable agricultural production systems.

### V. ANTICIPATED RESULTS/IMPACTS:

Completion of the action items in this action plan will greatly increase our ability to demonstrate to landowners the economic and environmental benefits to be gained from alternative agricultural enterprises, integrated systems, and integrated pest management. Through cooperative efforts with our partners this interdisciplinary effort will help us address issues associated with sustainable agricultural production systems.

### VI. ACTION PLAN LEADERSHIP:

Extension and research faculty in cooperation with faculty in other units (Horticulture, Animal Science, Center for Sustainable Agriculture, ARDC and U.S. Forest Service) will provide the leadership for this action plan.

### VII. TIME SCHEDULE OF KEY EVENTS:

Conversion of one 40 acre field to a system of micro-farms was begun this past summer. A second organic field will be established in 1996. Additional agroforestry plots will be established in 1997 pending continued support of the micro-farm project (with CSAS). Additional sites will be established as resources become available.

### VIII. RESOURCES - COMMITTED, REDIRECTED, NEEDED:

Over the past several years resources from the shelterbelt research have been shifted to support the broader area of agroforestry and sustainable agriculture. Faculty time, operating resources, and grant funds represent a significant commitment to this area, however, additional resources are required: 1) Riparian Zone Ecologist (Forester) 70E, 30R - \$125,000; 2) Ag Research Tech-2, approximately 0.5 FTE (this position would be combined with an existing 0.5 FTE in Horticulture to support the cooperative vegetable project - \$20,000; 3) B-line extension assistant for wildlife programming - \$35,000; 4) \$500-600,000 to develop an aquaculture facility (includes the \$260,000 already committed); 5) B-line technologist to operate the aquaculture facility - \$35,000; 6) operating dollars for the aquaculture facility - \$25,000; 6) Continued success obtaining grant funds to support research.

## Forestry, Fisheries and Wildlife

### Action Plan #2      Economically and Environmentally Sustainable Agricultural Production Systems

Action Statement      Continue to develop and demonstrate approaches based on ecological principles that make agricultural production systems economically and environmentally sustainable.

#### Actions

#### Who will participate

1. Continue to develop facilities at the Agricultural Research and Development Center (ARDC).
  - a. Participate in the Integrated Farm Project (other departments and agencies include Animal Sciences, Horticulture, Center for Sustainable Agricultural Systems, U.S. Forest Service, and ARDC).  
Brandle, Case, Hoagland, Johnson, Kayes
  - b. Cooperate with ARDC to develop a wetland management demonstration area.  
Brandle, Hoagland, Kayes, ARDC, NFS
  - c. Begin development of an aquaculture demonstration and applied research facility.  
Kayes, Peters
  - d. Develop replicated riparian buffer strips to evaluate their efficacy for water quality improvement.  
Brandle, Hoagland, USFS
  - e. Develop replicated systems for windbreak, organic, and biological control studies.  
Brandle, Harrell, Johnson, CSAS, USFS
  - f. Develop and implement a management plan for the bottomland forest at ARDC.  
Brandle, NFS, ARDC
2. Continue to develop aquaculture and aquatic natural resources programming.
  - a. Establish an interdisciplinary/interagency team to develop educational materials on commercial aquaculture and that will focus on providing timely information to policy makers and leaders as well as traditional interest groups.  
Hygnstrom, Kayes
  - b. Emphasize aquaculture as an entrepreneurial enterprise that can be integrated into other sustainable agricultural production systems.  
Kayes
  - c. Establish an interdisciplinary/interagency team to develop and implement an educational program on the management of sandpits and small impoundments.  
Hoagland, Hygnstrom, Kayes, Kuzelka, Peters

3. Expand current programming in wildlife damage management to include conventional and alternative crop production systems.

a. Promote environmentally sound, cost-effective damage control programs for aquaculture facilities, agroforestry, agricultural and urban systems.

Hygnstrom, Johnson,  
Kayes, Extension  
Assistant

b. Develop and demonstrate prevention and control techniques for conservation tillage systems and converted CRP acreage.

Hygnstrom, Extension  
Assistant

c. Establish a Great Plains Center for Wildlife Damage Management in cooperation with the USDA Denver Wildlife Research Center and state research and extension specialists.

Hygnstrom, Johnson

4. Continue to develop research on biological resources as integrated components of sustainable agricultural production systems.

a. Continue development of interdisciplinary research on riparian zone systems, filter strips, and buffer zone management.

Brandle, Case,  
Hoagland, Peters,  
Riparian Zone  
Ecologist (Forester),  
USDA-FS

b. Continue interdisciplinary research on windbreaks and other agroforestry practices that contribute to land stewardship, enhanced agricultural profitability and conservation of biological resources.

Brandle, Case,  
Johnson, NFS,  
Riparian Zone  
Ecologist (Forester)

c. Continue interdisciplinary research on bird, mammal, and invertebrate natural enemies of crop and tree pests in relation to edge habitats and management practices.

Brandle, Case, Harrell,  
Johnson, USDA-FS

Resources – Committed, Redirected, Needed:

Some research and extension projects already exist in this area. The faculty time, operating resources, and grant funds represent a significant commitment to this area. However, to accomplish other action plan items, additional resources are required as follows: 1) Riparian Zone Ecologist (Forester) 70E, 30R – \$125,000; 2) B-line extension assistant for wildlife programming – \$35,000; 3) \$500-600,000 to develop an aquaculture facility (includes the \$260,000 already committed); 4) B-line technologist to operate the aquaculture facility – \$35,000; 5) Operating dollars for the aquaculture facility – \$25,000; 6) Continued success obtaining grant funds to support the research.

## 1995-99 UNIT PROGRAM ACTION PLAN

Unit Forestry, Fisheries and Wildlife  
Action Plan No. 3  
Date August 31, 1995

I. ACTION PLAN TITLE:  
Enhance Student Programs

II. ACTION STATEMENT:  
Improve curriculum to meet needs of students with state-of-the-art courses for graduates and undergraduates, traditional and non-traditional students, both on and off campus.

III. BACKGROUND INFORMATION:  
Student programs is an overarching objective in the IANR Strategic Plan. Our first priority has been, and will continue to be, students. The actions proposed in this plan are designed to meet student needs regardless of the age, residence, or educational objective of the student. Our student programs are intended to meet the needs of all learners and to prepare them to make informed choices when dealing with environmental and natural resources issues. We will meet these needs by developing specific short courses, field biology courses, and courses offered by electronic means.

IV. OBJECTIVES:

1. Develop a revised and expanded set of short courses off campus for teachers (K-12) and field professionals to update their skills.
2. Enhance the undergraduate program by developing field biology classes, courses in stream ecology and management and forest management, and new minors.
3. Expand efforts to recruit non-traditional and students of protected status.
4. Begin development of courses and programs to be offered via the Internet, satellite, CD-ROM, and other electronic media.
5. Enhance the graduate program in FFW by developing a Ph.D. program and adding new courses.

V. ANTICIPATED RESULT(S)/IMPACT(S):  
Completion of the action items will produce a curriculum for students that will prepare them for the challenges offered by an increasingly complex world. Access to departmental courses will be available to off-campus students, greatly increasing advanced education opportunity for learners.

VI. ACTION PLAN LEADERSHIP:  
Leadership will primarily be provided by FFW teaching faculty although others will participate.

VII. TIME SCHEDULE OF KEY EVENTS:  
Curriculum revisions and new course development should be in place at the end of three years, provided necessary resources are available. Other actions (Ph.D. program, etc.) will take longer.

VIII. RESOURCES—COMMITTED, REDIRECTED, NEEDED:  
Faculty time is already committed to this effort. However, significant additional resources must be acquired to complete many of the action items. These include: 1) Stream Ecologist position 50T, 50R — \$125,000; 2) Riparian Zone Ecologist (Forester) 70E, 30R — \$125,000; 3) B-line extension assistant for wildlife — \$35,000; 4) B-line extension assistant for Environmental Ed. — \$35,000; 5) Additional appropriated dollars for teaching operating — \$10,000; 6) Additional appropriated operating dollars for extension — \$15,000; 7) Multi-media teaching equipment — \$50,000; 8) Computer Systems Specialist - B-line — \$35,000.

## Forestry, Fisheries and Wildlife

### Action Plan #3

### Enhance Student Programs

#### Action Statement

Improve curriculum to meet needs of students with state-of-the-art courses for graduates and undergraduates, traditional and nontraditional students, both on and off campus.

#### Actions

#### Who will participate

1. Develop a revised and expanded set of short courses off campus to encourage participation of teachers (K-12) and field professionals to update their skills.
  - a. Develop a field-based short course focused on Nebraska ecosystems that promotes the use of an investigative approach for understanding and studying the environment, and targeted for teachers and university students.

Case, Seibert, teaching faculty
  - b. Restart the Forestry Short Course.

Riparian Zone Ecologist (Forester), NFS
  - c. Develop a Wildlife Shortcourse.

Hygnstrom, Extension Assistant, NFS
2. Enhance the undergraduate program in FFW.
  - a. Develop new classes to introduce field biology.

Brandle, Ernst, Hoagland, Jelinski, Peters
  - b. Evaluate all department courses and prepare appropriate ones for Communications Intensive, Integrative Studies, etc. designations.

Peters, teaching faculty
  - c. Develop a 400/800 level course in stream ecology and management.

Peters, Stream Ecologist position
  - d. Develop additional minors in the departmental curriculum, ie. forestry, conservation biology.

Teaching faculty
  - e. Change FFW 310 Great Plains Forestry to a course that deals with principles of forest management.

Brandle, NFS

3. Expand our efforts to reach students of diverse backgrounds.
  - a. Increase efforts to recruit non-traditional and students of protected status. Hergenrader, Hygnstrom
4. Begin development of courses and programs to be offered off campus via the Internet, satellite, CD-ROM, and other electronic media.
  - a. Develop college-credit courses transmitted by satellite or other electronic means for non-traditional, off-campus and place-bound students Ernst, Kayes, Peters, B-line Computer Systems Specialist
  - b. Develop a multi-media system and strategy for increased use of computers in teaching and extension. Ernst, Hoagland, Hygnstrom, Jelinski, Peters, Savidge, Seibert
5. Enrich learning opportunities through partnerships with school teachers, agencies, and others to help integrate factual, regionally-relevant environmental concepts into the education system.
  - a. Develop and promote K-12 school enrichment experiences, projects, and materials for youth, including interactive CD-ROM simulations and camp experiences that focus on natural resources and the environment, showing the interconnections between people and quality of life. Johnson, Kuzelka, Seibert, Computer Systems Specialist, Extension Assistant
  - b. Produce a Project Learning Tree distance training certification course, using the Internet and the World Wide Web, for teachers and others as an alternative to workshop certification. Seibert, NFS, Extension Assistant
  - c. Work with extension faculty and staff, appropriate agencies, and others in Nebraska and Kansas to jointly complete educational materials and introduce the national 4-H Wildlife Habitat Evaluation project into the two states. Johnson, Seibert, Virchow, Extension Assistant
  - d. Support the ARDC education/outreach program to increase the understanding of rural and urban youth about the interrelationships between agriculture and natural resources management. Brandle



6. Enhance the graduate program in FFW.

- |   |   |
|---|---|
| a. Develop a Ph.D. program in FFW.  | Ernst, Hoagland,<br>Hygnstrom, Jelinski,<br>Kayes |
| b. Develop an outreach course for graduate students to teach them how to create educational materials and programs for the public as well as specialized audiences. | Hoagland, Hygnstrom,<br>Kayes, Peters             |
| c. Develop a 400/800 level course in stream ecology and management.   | Peters, Stream<br>Ecologist position              |

Resources -- Committed, Redirected, Needed:

Faculty time is already committed to this effort. However, significant additional resources must be acquired to complete many of the action items. These include: 1) Stream Ecologist position 50T, 50R -- \$125,000; 2) Riparian Zone Ecologist (Forester) 70E, 30R -- \$125,000; 3) B-line extension assistant for wildlife -- \$35,000; 4) B-line extension assistant for Environmental Ed. -- \$35,000; 5) Additional appropriated dollars for teaching operating -- \$10,000; 6) Additional appropriated operating dollars for extension -- \$15,000; 7) Multi-media teaching equipment -- \$50,000; 8) Computer Systems Specialist - B-line -- \$35,000

## 1995-99 UNIT PROGRAM ACTION PLAN

Unit Forestry, Fisheries and Wildlife  
Action Plan No. 4  
Date August 31, 1995

- I. ACTION PLAN TITLE:  
Natural Resources Programs for Urban Areas
- II. ACTION STATEMENT:  
Develop and enhance programs focused on natural resources and the environment for urban areas.
- III. BACKGROUND INFORMATION:  
The vast majority of Nebraskans live in communities, ranging from quite large to very small. The educational needs of these people are usually different from those typically addressed by IANR programming. Program balance is an overarching objective in the IANR Strategic Plan and there is need to give additional emphasis to programs for urban areas. The Department of Forestry, Fisheries and Wildlife, and the Nebraska Forest Service, because of prior commitments to and activity in the urban area, and well positioned to continue this role. The actions in this plan are broad in scope yet deal with natural resources issues of vital interest to people who live in communities.
- IV. OBJECTIVES:  
Expand collaborative research and outreach projects that focus on natural resources use, management, and protection in urban areas, including Tree Care Workshops, arborists seminars, biological control of tree pests, and training of volunteers for fire prevention, fire planning, and fire suppression.
- V. ANTICIPATE RESULTS(S)/IMPACTS(S):  
Completion of these action items will bring the educational resources of IANR in natural resources to people who live in towns. Their application of the knowledge gained will lead to improved management and stewardship of natural resources in the community environment.
- VI. ACTION PLAN LEADERSHIP:  
The leadership for this plan will primarily come from individuals in the Nebraska Forest Service. Other partners will participate.
- VII. TIME SCHEDULE OF KEY EVENTS:  
Many activities are underway and others will begin as time and financial resources become available.
- VIII. RESOURCES--COMMITTED, REDIRECTED, NEEDED:  
Most all of the resources needed to complete this action plan are in hand. However, significant federal budget cuts could have major negative effects on our ability to complete this plan.

## Forestry, Fisheries and Wildlife

### Action Plan #4

### Natural Resources Programs for Urban Areas.

#### Action Statement

Develop and enhance programs focused on natural resources and the environment for urban areas.

#### Actions

#### Who will participate

1. Expand collaborative research and outreach projects that focus on natural resources use, management, and protection in urban landscapes.
  - a. Continue Tree Care Workshops, arborists school; develop arborists seminars. Harrell, NFS
  - b. Initiate collaborative research projects with local communities and private businesses that focus on biological and other acceptable methods for controlling pests of trees in urban areas. Harrell
  - c. Continue the urban forestry program, including recruitment and training of a network of volunteers. NFS
  - d. Develop a model community for community-forestry projects. Hergenrader, Mooter
  - e. Continue the training of community volunteers in fire prevention, fire planning, and fire suppression. NFS - Fire Control
  - f. Promote groundwater protection in communities. Kuzelka
  - g. Facilitate and improve management of problem wildlife in urban areas by defining and publicizing the roles and responsibilities of federal, state, and municipal wildlife agencies and private industry in urban areas. Hygnstrom

#### Resources – Committed, Redirected, Needed:

Almost all of the resources needed to complete this action plan are in place. However, significant federal budget cuts could have major negative effects on our ability to complete this plan.

# **Environmental Sciences/Natural Resources Programs for the 21st Century at UNL**

**A concept paper by the  
Natural Resources/Environmental Sciences Planning Committee**

**Gary Hergenrader, FFW  
Chair**

**January 30, 1995**

Environmental Sciences/Natural Resources Programs  
for the 21st Century at UNL

Concept Paper

Situation

Nebraska is centrally situated in the Great Plains, an environmentally-sensitive region where the more humid east and more arid west meet. Here, extremes in temperature, solar radiation, precipitation, and evaporation coupled with highly variable wind directions and velocities contribute to a very unpredictable, stressful biological environment. Much of the region is blessed with abundant natural resources including deep, fertile soils and plentiful, high-quality groundwater, most of it contained in the High Plains Regional Aquifer which underlies a large part of the region. The soil and water resources have provided the basis for an intensive, highly-productive agriculture that has become the region's hallmark. Major investments by both the federal and state governments in support of research programs, water developments, rural electrification, road-building, and other infrastructure have enabled the agricultural potential of the natural resources to be realized. Other economic activities based on minerals and petroleum are also significant. The area is well known for its large and varied fossil assemblages that have served as a basis for deciphering past climates and understanding its paleoecology. The human population is concentrated in communities, with relatively few large population centers. However, urbanization continues to be a demographic feature with the largest communities growing at the expense of the smaller ones. The economy is primarily agrarian and a high proportion of individuals are directly or indirectly involved in agricultural enterprises.

Human activities have greatly modified the plains ecosystem. The interaction between the extreme climatic conditions, soils, water, and agricultural systems has resulted in a decline in

natural soil productivity in many areas. Today, productivity is maintained by the application of fertilizers, pesticides, and other external inputs. In some areas, conventional tillage systems and overgrazing have contributed to extensive soil erosion and loss of soil organic matter. There are many examples where inefficient water and nutrient management in dryland and irrigated systems, combined with soil erosion, have degraded the quality of surface and groundwater resources. Water resources have also been impacted by inadequately treated sewage effluents, leachates from landfills, storm-water runoff from urban areas, wash-water from sand, gravel, and limestone mining operations and other human activities. Conversion of natural woodlands, grasslands, and wetlands to other uses has resulted in wildlife habitat fragmentation, habitat simplification, and loss of wetlands, all leading to a significant loss of biological diversity, especially on croplands. Some of the most seriously threatened ecosystems in the world are found in the Great Plains including wetlands, tall grass prairie, short grass prairie, and mid-grass prairie. Conversion of these ecosystems has progressed to such an extent that there are now more than 100 species of plants and animals that are candidates to be listed with Threatened or Endangered status. To be sustainable over the long-term, agriculture, the predominant enterprise in the region, will need to give much greater emphasis to environmental and natural resources concerns. The regulatory environment that is likely to be imposed will require it. Moreover, the Great Plains environment in which we live will not sustain present human quality of life if current negative impacts on the environment from other human-related sources are not mitigated as well.

Moreover, this situation is likely to worsen in the future if the global climate changes. All current climate change prediction models suggest that significant changes are likely for the Great Plains, including Nebraska. Thus, the Great Plains has the dubious distinction of being the most significant region in the U.S. confronted with the combination of 1) being a climatically-sensitive, mostly agriculture-dependent region and

culture, and 2) the near-certain occurrence of increased climatic stresses if climate change occurs. These characteristics clearly demonstrate the uniqueness and fragility of the region relative to others in the U.S.

Business as usual is not satisfactory for the future. Environmental sciences/natural resource programs for the 21st century can no longer be approached separately from agricultural and human systems. Because they are interacting components of the same ecosystem, the whole system must be dealt with in an integrated fashion using an holistic approach. There is an urgent need to focus on how to sustain/conservate the natural resource base, both renewable and non-renewable, and the environment upon which living wild resources, agriculture, people, and communities depend, while at the same time provide economic benefits from natural resources.

Use of natural resources frequently engenders human conflict over access to those resources, their allocation, control, and management. This in turn provokes policy issues regarding resource equity and ethics in use. As one example the direct competition for resource use between agriculture/human activity and wild species needs careful study and thoughtful resolution. Failure to address this issue and other similar issues head-on will likely result in unpopular mandates imposed from outside. We need to ask the question, "What are the consequences of human activities on natural systems," while at the same time addressing the more usual question, "How can we better manage resources to suit society's wants and needs?" Water-related issues such as conjunctive use, power generation, recreation, wildlife needs, irrigation, drinking water and interstate compacts provide the most cogent example of this conflict. Unfortunately, the baseline studies that will allow rational discussion of the questions arising from these issues and provide sound information in making public policy decisions about them are few. This necessitates that natural resource/environmental science programs vigorously pursue developing technologies, information, and

modeling tools to sustain the quantity, quality, and balance of the natural resources and physical environment while at the same time maintaining human use. Citizens of Nebraska and the region will continue to look to the University of Nebraska-Lincoln to provide leadership in finding solutions to these evolving concerns.

The problems referred to above are complex and intertwined. Their solutions will not be the purview of any one discipline but rather will require a focused approach by multi-disciplinary teams that are able to bring the power of their individual disciplines to bear on the problems in a coordinated, integrated fashion. The teams should include not only UNL staff, but also representatives from other state, federal and private entities having an interest or responsibilities in natural resources/environment as partners in this approach. For UNL this will require much greater integration of teaching, research, extension, and service programs that transcend departmental boundaries and the development of new and innovative methods of instruction that will produce broadly-trained but discipline-based students that can collaborate as members of multi-disciplinary teams to implement appropriate strategies for resource policy development and management. It will also require much greater interaction between UNL programs and those of its prospective partners, for example, the Great Plains Initiative, the Great Plains Agricultural Council, the National Biological Survey, U.S. Forest Service research efforts in the Great Plains, the U.S. Geological Survey, Natural Resources Conservation Agency, and others. There is great need to increase public awareness of the role that people, soil, water, climate, geological, and biological resources play in global ecosystem processes. Goals should be expanded beyond the education of traditional college students to other client groups to foster an understanding of the relationships of people to their environments, the importance of biodiversity, and empower the public to make knowledgeable decisions about natural resource and environmental issues. In short, UNL needs to develop a new



paradigm for academic programs in Natural Resources\Environmental Sciences if we are to meet the future needs of the state and region.

### Current Constraints

Although there are several good programs currently in place in UNL departments that deal with various aspects of natural resources/environmental sciences, there is inadequate coordination and interaction between these programs. Current environmental problems, and those likely to arise in the future, require that these programs interact in a more cohesive fashion. Efforts to address major environmental issues are difficult because:

- relevant faculty expertise is spatially separated on east campus, city campus, and the Research and Extension Centers, thus limiting enduring collaboration;
- resources including equipment, research space, geological, botanical, zoological research collections, etc. are currently scattered and perhaps not as effectively used as could be;
- departmental boundaries often become barriers to effective interdepartmental collaborative efforts in teaching, research, extension, and service programs;
- program growth in several units has caused major overcrowding of available space; current space limitations are seriously impeding additional program development;
- budgets are mostly static with little prospect for major new infusions of state dollars to acquire new faculty, staff, and equipment.

The University of Nebraska-Lincoln is now at a major crossroads with respect to how it will address environmental/natural resource issues that are important to the state, region, nation, and world. UNL needs to adopt a new approach that reaches out to other state, federal, and private stakeholders in the natural resources/environment arena and includes them as partners in this

effort. The positive outcomes from this approach will enable UNL and its partners to be more effective in meeting the demands and expectations placed upon Environmental Science/Natural Resources programs as they move into the 21st century. Faculty must take the initiative to develop bold, innovative, imaginative approaches to natural resource/environment teaching, research, extension, and service programs that, while being mindful of the past and tradition, are not constrained by it. And, while the constraints facing UNL outlined above are acknowledged, the approach being advocated here will enable us to first help ourselves and move forward despite those constraints.

Faculty in Biological Sciences, Geography, Geology, and Sociology should be brought together with faculty in Agronomy, Forestry, Fisheries and Wildlife, the Conservation and Survey Division, the Water Center/Environmental Programs Unit, the Center for Grassland Studies, Agricultural Meteorology, the Research and Extension Centers, the Nebraska Statewide Arboretum, and our partners in the U.S. Forest Service, U. S. Geological Survey and the Natural Resources Conservation Service to develop meaningful, effective programs to deal with environmental/natural resource problems with the ultimate goal of maintaining current human quality of life on a sustainable basis. Faculty and staff from these respective areas should come together to develop strategies and options for how they collectively can meet this urgent need.

To accomplish the objectives outlined above, it is important that a new entity be created at UNL where all existing programs in natural resources/environmental sciences be brought together into an integrated, cooperative, focused effort having a common mission. Since both state and federal partners will be involved, one model could be the creation of a School of Natural Resources and Environment (State) co-joined with a Center for Ecosystem Studies, or some similar name (Federal). This arrangement would facilitate disciplinary interaction and synergy in dealing with the challenge of holistic resource management for the 21st

century. The scientific expertise, educational potential, outreach/service, and research capabilities of such an assemblage would be exceptional. It would represent a major stride forward for the University of Nebraska-Lincoln and the partner agencies.

The new entity is envisioned to utilize a multi-disciplinary, multi-agency, integrated, collaborative, ecosystem-based approach to the complex problem of understanding the interactions among agricultural production systems, renewable and non-renewable natural resources, environmental quality, and people in the Great Plains. There are many critical resource issues that need to be dealt with but one immediate focus of the group should be the concept of sustainable systems in agriculture and natural resources. The goal would be to produce the technologies, information, models and educated professionals needed to restore, manage, and sustain the natural resource base upon which plants and animals, agriculture, and people depend.

Nebraska has two model systems that are understudied in the context of the ideas presented here that could be targeted for emphasis: the Sandhills grassland and the Platte River Basin (including the Rainwater Basin). Both systems are essential to the economic and social well-being of Nebraska and the region, and are major natural resources with significant biological diversity impacts. Bits and pieces are known about each, but no concentrated multi- or interdisciplinary effort has been mounted to truly understand either. A coordinated effort to study both could arise from the proposed program that would serve as a model for studying other fragile ecosystems, both in Nebraska and elsewhere. Because of the inherent significance of this model to the nation as a whole, the federal government should have substantial interest in providing some of the support.

No other similar program presently exists anywhere. To develop such a program seems a prudent action for the University of Nebraska-Lincoln to take considering the challenges facing Nebraska and the Great Plains region. The successful

implementation of this plan will require the development of an environmental sciences/natural resources complex to meet program objectives. The complex would provide the necessary space for the laboratories and personnel of the various departments involved in the program. It would include maximizing the efficient use of existing space, some redirection of current space to the program, the renovation of some current program space, and the addition of new space by the construction of a new building.

The benefits of taking this approach are many and the downside is minimal. We believe that an ecosystem-based approach is essential in order to deal with the complex interactions and multiple scales that can no longer be ignored. A systems-based, multi-disciplinary approach will enable us to monitor and manage for ecosystem health, and thereby attain better recognition of the importance of diverse, balanced, healthy ecosystems and their sustainability. Such a cooperative effort will enable UNL to maximize existing resources, bring in new outside resources, develop the tools needed, and educate the managers and scientists needed to meet the challenges of the 21st century.





**DEPARTMENT OF  
FORESTRY, FISHERIES, AND  
WILDLIFE**

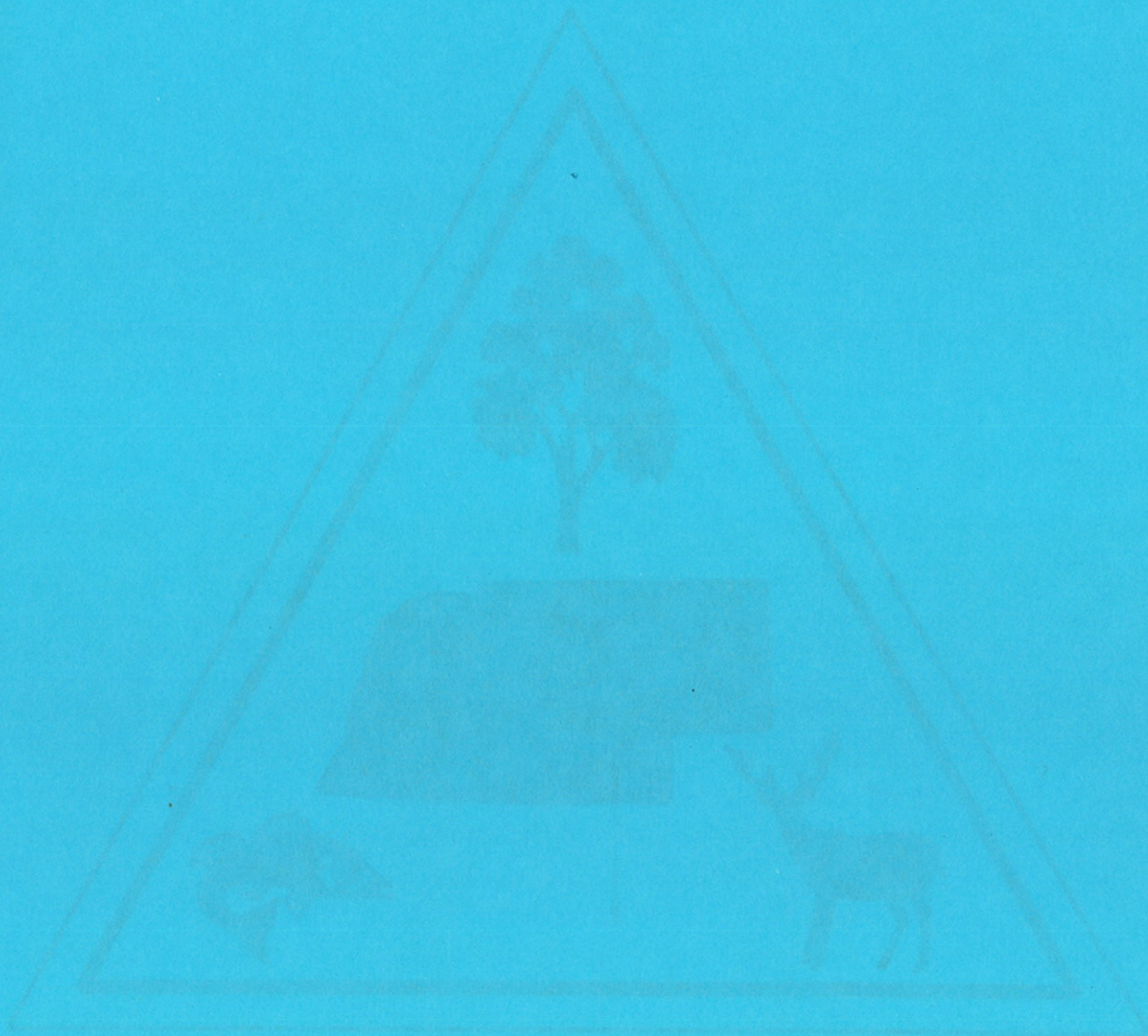


**GRADUATE STUDENT  
HANDBOOK**

1995-96 Edition



DEPARTMENT OF  
FORESTRY, FISHERIES, AND  
WILDLIFE



GRADUATE STUDENT  
HANDBOOK

October, 1995

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## **INTRODUCTION**

Congratulations on your acceptance into the graduate program of the Department of Forestry, Fisheries and Wildlife (FFW) at the University of Nebraska. Your admittance into our program means that we are confident you are capable of the dedication and hard work necessary to achieve a graduate degree. You will find that graduate school places a great deal of emphasis on individual study, thought, and research. The classes you will take during your graduate studies will give you depth in our profession, improve your communication skills, and refine your techniques of scientific inquiry. However, just as important are the extracurricular activities and personal relationships with faculty and fellow graduate students outside the classroom can provide meaningful learning experiences. As a member of the graduate program, you are considered an integral part of the FFW Department. Your graduate program should be uniquely tailored to your aspirations, interests, and talents. Therefore, you are encouraged to work closely with your adviser during the development of your program.

## **PURPOSE**

This manual is provided as a summary of procedures and policies to help you during your graduate program. All graduate students are expected to read the manual closely and retain it for reference as you pursue your degree. This manual is not intended as a replacement for the Graduate Studies Bulletin, which all graduate students should acquire and read before starting their program. A copy of the current Graduate Studies Bulletin may be obtained from the Graduate Studies Office in the Administration Building on City Campus.

## **GRADUATE STUDENT RESPONSIBILITIES AND PRIVILEGES**

Your role as a graduate student should be to enhance your education, further science, and accomplish your career goals. You are a representative of the University of Nebraska-Lincoln (UNL) and the Department of Forestry, Fisheries and Wildlife. You are also well on your way to becoming a colleague in our profession, so your actions and attitudes should reflect this disposition at all times.

As a graduate student you have certain privileges, but also some responsibilities. The commitment necessary to carry out your graduate program will require a great deal of time, individual initiative, and cooperation with your adviser, other graduate students, and other faculty members. You should consult with your adviser for additional details and guidelines concerning your specific program, but in general you have the responsibility to:

- \* be familiar with the information presented in this handbook and in the Graduate Studies Bulletin. NO EXCEPTIONS WILL BE GIVEN TO THIS OBLIGATION.
- \* select a committee with guidance from your adviser.

- \* arrange meetings of your graduate committee - reserve the room, and provide committee members with the time, location and purpose of the meeting.
- \* keep your adviser informed of the status of your program and research. In turn, it is your adviser's responsibility to inform you of your progress.
- \* provide your committee with progress reports as directed by your adviser. **YOU SHOULD MEET WITH YOUR GRADUATE COMMITTEE AT LEAST ONCE PER YEAR.**
- \* prepare a research proposal including the following:
  1. Literature Review
  2. Objectives
  3. Methods
  4. Value to your field of study
  5. Timetable
  6. Facilities, Equipment, and Budget
- \* prepare and present a prospectus seminar no later than the first half of your second semester of residency.
- \* ask your adviser and other graduate students for critical reviews of your proposals, seminars, manuscripts, presentations, and your thesis or dissertation.
- \* perform project related work, regardless of funding source, as defined by your adviser. The amount of time spent in this type of work is limited to an average of 20 hours per week.
- \* attain a minimum grade of B for graduate credit in courses within your major department.
- \* attain a minimum grade of C or Pass for graduate credit in courses in minor, collateral or supporting areas.
- \* prepare manuscript(s) for publication so that results of your work can be shared with the scientific community. Preparation of your thesis or dissertation according to the format outline in this handbook will meet this requirement, but it is likely that these manuscripts will need additional work before being submitted to a journal. Consult your adviser for steps to take in securing a University of Nebraska journal series number, and for procedures necessary before submitting your manuscript(s) for publication.

- \* under most circumstances, share authorship with your adviser on manuscripts, presentations, and posters resulting from your graduate research.
- \* provide your adviser and the Department with hard-bound copies of your thesis or dissertation.
- \* under most circumstances, provide your adviser with diskettes containing thesis files, data files, and programs or access information necessary for data analysis.
- \* leave any property purchased with funds other than your own at the University. This includes items such as photographic slides or prints, computer print-outs, collections of research material, office supplies, etc. Each project leader has the discretion to release such items to you dependent upon previously understood agreements.

As a graduate student in Forestry, Fisheries and Wildlife you have the following privileges:

#### Building Passes

A building pass authorizes you to be in the building after hours and on weekends, and must be presented to security personnel upon request. Building passes are issued by the Department Head, and can be requested through the Head Secretary. A new building pass must be obtained each August.

#### Desk Space

Generally desk space will be provided in your adviser's laboratory or in another appropriate location. Consult with the Graduate Committee Chair before occupying a new desk space.

#### Keys

Keys to student offices, labs, outside doors and other facilities may be obtained with the permission of your major adviser. A "key card" can be requested from the Head Secretary and authorized by the Department Head. Keys are to be obtained at the finance window at Ag. Hall. (The cost will be \$5 - \$25). For security reasons keys are not to be loaned or passed to other persons. When you finish your graduate program, you must return your keys to Ag Finance to claim your deposit.

## **Vacation**

When you go on vacation, you should leave a telephone number and/or address with your adviser and the secretary in the main office so that you can be reached if necessary.

## **Coffee Break**

You are urged to attend the departmental coffee and muffin break at 9:30 each Friday morning in the Plant Industry conference room. This is an excellent opportunity to get to know the faculty and staff. The muffins aren't bad either!

## **Departmental Meetings**

You are welcome to attend departmental meetings. You will be notified of the time, date, and location. Feel free to give agenda items to the head secretary for compilation.

## **Mail**

You will be assigned a mail box that will be used for relaying information as well as for receiving mail, so check it daily. Consult your adviser as to the location of your mail box. Thesis research items (including reprint requests) may be mailed at departmental expense. This mail cannot be used for personal items. Outgoing mail that bears a stamp must be mailed at a U.S. post box.

## **Computers**

Microcomputers are available for your use after you complete proper training. Find out from your adviser or from fellow graduate students what software packages are available, and which are considered most versatile. Short courses are offered at various times during the semester for learning DOS, WORDPERFECT, LOTUS, SMART, DBM2, etc. Your adviser should receive announcements concerning time, location, and registration procedures for these classes. The laser printers located in various laboratories or the main office may be used to print one copy of your thesis or dissertation prior to your oral exam. Other copies needed at this time should be photocopied at your expense. Use of the letter quality printers must be coordinated with your adviser and the appropriate secretaries. After your final exam, and after all corrections have been made, you may use a letter quality printer to print one final copy of your thesis or dissertation. It is then your responsibility to get photocopies made on bond paper to meet graduate school requirements.

## Office Equipment

Typewriters are available for your use in various laboratories and offices. Other equipment necessary for research purposes (paper cutter, hole-punch, etc.) may be used in the mail area.

## FAX Machine

The FAX machine is located in 101 PI mail area. Your adviser should authorize use of the FAX. Check with the Department Head Secretary on the proper use.

## Office Supplies

These are not provided for routine use (classes, progress reports, and thesis preparation) but may be used for research purposes.

## Photocopying

Permission to copy articles for your thesis research must be obtained from your adviser. Copies of non-thesis related scientific literature must be copied at your expense. Consider mailing reprint requests for needed publications.

## Telephone

WATS line usage for thesis research is permitted. Obtain permission from your major professor, and then use his/her phone (each professor pays for his/her own phone).

## Departmental Newsletter

The newsletter "Naturally Speaking" is distributed every other Wednesday. Graduate Students are encouraged to read this publication regularly for information pertaining to them. If you have items of interest: papers presented, trips, weddings, births, etc., give the information to Marcy for the newsletter. We like to know what is going on with you.

## Laboratory Facilities

You are encouraged to make use of the departmental laboratory facilities. However, any equipment and/or chemicals that are borrowed or used from these labs should be properly signed out and returned promptly when you are through with them. Prior to the use of technical equipment, you should contact the faculty member in charge of that equipment and receive proper instruction in its use.

## Photography

Film is available for research use, and may be obtained with your adviser's permission to charge his/her account for the cost of the film. Consult your adviser on the availability of copy stands and 35 mm cameras. Film processing can be done and charged to your adviser's research account (with his/her permission) through IANR Communications & Computing Services on East Campus, or through Photographic Productions in Nebraska Hall on City Campus. The Instructional Design Center in Henzlik Hall offers slide preparation services.

## Tools and Equipment

These are provided for your use, however, note guidelines under responsibilities.

## University Vehicles

Anyone driving a state vehicle must be an employee of the state and should have a valid Nebraska driver's license. University vehicles are for official use only and cannot be used for personal activities. When using state vehicles, you are responsible for locking and securing the vehicle, and for any traffic violations you may incur. Remember that you are a representative of the University, and as such your driving practices reflect on the University. Please be a courteous and safe driver. See your adviser for information on checking out vehicles, filling out the log, vehicle maintenance and proper procedures in case of accidents.

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## Secretaries

Our secretaries are very helpful and will answer your questions and give advice as to the who, what, when, where, why, and how of the Department and the University, or assist you in any other way that they can. They are NOT available to graduate students for typing term papers, thesis drafts, tables, etc. Secretarial services which deal with your adviser's work may be performed with your adviser's approval.

## **ROLE OF THE ADVISER**

Your major adviser's role is to help guide you through your degree program. Methods for accomplishing this will vary with adviser, so communication between student and adviser is paramount. However, you are ultimately responsible for making adequate progress toward your degree and producing high quality research. Major advisers should assist you in the following ways:

- \* by providing advice on research, coursework, and employment opportunities when requested.
- \* by describing the limits of supplies, equipment, and labor to you before the initiation of a project.
- \* by providing supplies, equipment and labor within the limits of available funding.
- \* by staying abreast of your program and research, and informing you of your progress.
- \* by conducting committee meetings.
- \* by providing assistance in the form of critical reviews of proposals, seminars, manuscripts, presentations and your thesis or dissertation.
- \* by accepting final responsibility for research conducted under his/her project.
- \* by defining the amount of time you must devote to non-thesis related work.
- \* by acting as a role model in your scientific endeavors and professional development.

## **DEGREE REQUIREMENTS**

Consult the current Graduate Studies Bulletin for the University's requirements for graduate degrees. (Note: Biometry 801 and 802 may be used as part of the course work constituting a major in FFW.)

### **Master of Science Degree**

The Department of Forestry, Fisheries and Wildlife grants MS degrees primarily under Option I (thesis option). However, Option II and Option III programs are permitted under special circumstances. The choice of option should be determined by the type of education desired. Once admitted to Candidacy (by filing a Memorandum of Courses; See Appendix A-1), you may not change options.



## **Doctor of Philosophy Degree**

A Doctor of Philosophy degree with specialization in Forestry is available as an interdepartmental program in Horticulture and Forestry. The requirements for admission to Candidacy are those of the Graduate College as described in the Graduate Study Bulletin. The doctoral degree is awarded primarily for the attainment of scholarship in a specialized field, and for independent research in a subdivision of this field. **PASSING COURSES AND FULFILLING RESIDENCY REQUIREMENTS, ALTHOUGH NECESSARY, ARE NOT BY THEMSELVES SUFFICIENT TO QUALIFY FOR THIS DEGREE.**

The Department of Forestry, Fisheries and Wildlife requires the following of all Ph.D. and Option I (thesis) graduate students:

### **Seminars**

The Department holds regular seminars and you are expected to attend. These seminars are presented by students and faculty in the Department, by faculty in other departments, and by visiting scholars from other universities or agencies. As a graduate student you will be required to present two seminars. A research prospectus seminar is required of all students and should be presented either late in your first semester or early in your second semester of residency. You are also required to give a presentation of your final research results before your final oral exam. As an Option I (thesis) graduate student you will be required to present two seminars. A research prospectus seminar is required of all Option I students and should be presented ... for your final oral exam. One seminar is required for Option II students during their program. The content of this seminar will be decided upon thorough consultations with your major advisor and your advisory committee, however, it should generally relate to your job/career activities (for example, a seminar describing an ongoing project(s) in your agency or firm which includes your direct involvement.

The Department requires two (2) credits in seminar. At least one (1) of these should be FFW 901. (Note: This requirement can be waived at the discretion of the student's advisory committee.)

Forestry, Fisheries and Wildlife Seminar (FFW 901) will be taught by a different professor each semester and will deal with a topic of their choice. Students will typically review current literature and discuss current research trends in the areas of forestry, fisheries or wildlife research.

## Evaluations

At the end of your first semester, your progress will be reviewed in a meeting with your adviser. At the end of your first calendar year of residence, your progress will be reviewed again. Should your research and/or classwork prove unsatisfactory, you may be asked to terminate your degree program. This decision is made by your major adviser. Ph.D. students will be evaluated for progress both after their first and their second years. You will not be asked to leave without being warned by your adviser that your work is unsatisfactory. If you feel you are evaluated unfairly, refer to the Grievance Procedures on page 24 of this manual.

### Examinations: M.S. Degree (Options I and II)

Comprehensive examinations. A comprehensive examination is required of all students and should cover the student's approved program of study. It should be administered within 10 months of graduation and typically in the semester prior to the one in which the student plans to graduate. The exam will consist of written and oral examinations administered by the major professor as directed by the student's committee. In rare cases the oral or written examination may be waived by a unanimous vote of the student's advisory committee and majority approval of the Departmental Graduate Committee.

A "Request for comprehensive examination" form (Appendix A-4) must be filed by the student with the Chair of the Departmental Graduate Committee at least three weeks prior to the examination. The time and date of the examination will be announced in the Departmental Newsletter and graduate faculty who wish to submit written questions for the written portion of the examination must do so at least one week prior to the date of the written examination. Questions should be submitted directly to the major professor. Use of these questions is at the discretion of the major professor and the student's advisory committee. Graduate faculty may attend the oral examination; active participation in the examination process is at the discretion of the major professor and the student's advisory committee. Arrangements for attendance at the oral comprehensive examination must be made at least one week prior to the examination.

In the event that members of the examining committee are not unanimous regarding passing a Candidate, the student is to be approved as passing their comprehensive examination if a majority of the committee approve. The dissenting member(s) is (are) expected to file a letter of explanation with the Departmental Graduate Committee Chair within 2 weeks of the examination. Another examination may not be held during the same semester or the same summer session in which the student failed.

Final Defense of the Thesis. The final defense of the thesis should be administered during the semester in which the student intends to graduate. The final examination consists of two parts: a seminar on the thesis topic and a formal oral examination. The two parts should be held on the same day but are not required to be held on the same day. The seminar should be (but is not required to be) a part of the Departmental Seminar Series.

The thesis examination of any student for an advanced degree is open to all faculty of the Graduate College. Active participation in the examination process (other than at the seminar) is at the discretion of the major professor and the student's advisory committee.

The date(s) and time(s) of the seminar and of the oral examination should be announced in the Departmental Newsletter at least two weeks prior to the date of the seminar or examination. A copy of your thesis abstract must be submitted to the Departmental Secretary and the Department Seminar Coordinator at least 4 weeks prior to the seminar and examination.

In the event that members of a final oral examining committee are not unanimous regarding passing a Candidate, the student is to be approved for the degree if only one examiner dissents. However, in each case, the dissenting member of the committee will be expected to file a letter of explanation in the Office of Graduate Studies.

If a student fails to pass the final oral examination for an advanced degree, his/her committee must file a report on the failure in the Office of Graduate Studies and indicate what the student must do before taking another examination. Another examination may not be held during the same semester or the same summer session in which the student failed.

#### Examinations: Ph.D. Degree

Qualifying examination. Upon the recommendation of your committee, you may be required to take a qualifying examination during your second semester in residence to determine your proficiency in relevant subject areas. This examination is administered by the supervisory committee.

Comprehensive examination and Admission to Candidacy. When you have substantially completed your classwork, and at least seven months prior to your final oral examination, you are required to take written and oral comprehensive examinations as given by your committee. The comprehensive examinations are not a repetition of course examinations but are an investigation of your breadth of understanding of the field of knowledge of which your special subject is a part.

A "Request for Comprehensive Examination" form (Appendix A-4) must be filed by the student with the Chair of the Departmental Graduate Committee at least three weeks prior to the examination. The time and date of the examination will be announced in the Departmental Newsletter and graduate faculty who wish to submit written questions for the written portion of the examination must do so at least one week prior to the date of the written examination. Questions should be submitted directly to the major professor. Use of these questions is at the discretion of the major professor and the student's advisory committee. Graduate faculty may attend the oral examination; active participation in the examination process is at the discretion of the major professor and the student's advisory committee. Arrangements for attendance at the oral comprehensive examination must be made at least one week prior to the examination. In the event that members of the examining committee are not unanimous regarding passing a Candidate, the student is to be approved as passing their comprehensive examination if a majority of the committee approve. The dissenting member(s) is (are) expected to file a letter of explanation with the Departmental Graduate Committee Chair within two weeks of the examination. Another examination may not be held during the same semester or the same summer session in which the student failed.

The applicant formally becomes a Candidate for the Ed.D. or Ph.D. degree when a report attesting to the passing of the comprehensive examinations and the completion of research tool requirements has been filed in the Office of Graduate Studies (Appendix B-3). Such a report must be filed at least seven months prior to the final oral examination. If the term of Candidacy is extended beyond three years, the Candidate must pass another comprehensive examination. Following admission to Candidacy the student must register in the Office of Graduate Studies during each academic year semester until he/she receives the doctorate. Students not in residence may register for a minimum of one semester hour of credit in dissertation on forms available from the Office of Graduate Studies. Failure to register during each academic year semester will result in termination of Candidacy.

Final Defense of the Dissertation. The final defense of the dissertation should be administered during the semester in which the student intends to graduate. The final examination consists of two parts: a seminar on the dissertation topic and a formal oral examination. The two parts should be held on the same day but are not required to be held on the same day. The seminar should be (but is not required to be) a part of the Departmental Seminar Series.

The date(s) and time(s) of the seminar and of the oral examination should be announced in the Departmental Newsletter at least two weeks prior to the date of the seminar or examination. A copy of your thesis abstract must be submitted to the Departmental Secretary and the Department Seminar Coordinator at least 4 weeks prior to the seminar and examination.

The dissertation examination of any student for an advanced degree is open to all faculty of the Graduate College. Active participation in the examination process (other than at the seminar) is at the discretion of the major professor and the student's advisory committee. The date(s) and time(s) of the seminar and of the oral examination should be announced in the Departmental Newsletter at least two weeks prior to the date of the seminar or examination.

In the event that members of a final oral examining committee are not unanimous regarding passing a Candidate, the student is to be approved for the degree if only one examiner dissents. However, in each case, the dissenting member of the committee will be expected to file a letter of explanation in the Office of Graduate Studies.

If a student fails to pass the final oral examination for an advanced degree, his/her committee must file a report on the failure in the Office of Graduate Studies and indicate what the student must do before taking another examination. Another examination may not be held during the same semester or the same summer session in which the student failed.

#### **Thesis/Dissertation Format**

In order to provide a more career-related experience and to facilitate publication of original research, all theses and dissertations are to be written in publication format according to departmental guidelines. Requirements of the Graduate College concerning bond paper, margins, page numbering, footnotes, etc. need also be met (see Appendix C-1). Consult with your adviser before you begin writing to discuss how to present your data most effectively, and what journal style(s) to follow.

#### **FFW Thesis/Dissertation Outline:**

##### **I. Abstract**

As per Graduate College requirements, not to exceed 350 words in length including the title.

## **II. Introduction**

A brief preface to the entire project. Content is flexible. May include information on the subject of the project, the purpose of the project, project objectives, research philosophy, why you had an interest in the project, etc.

## **III. Literature Review**

An extensive review of literature in the area applicable to your project. Indicate what is known, some of what is not known, and how your project will help fill in some of the gaps. You might conclude with a section that introduces the reader to your project. Project objectives may be included here if they were not contained in the Introduction.

## **IV. Materials and Methods**

If appropriate, an overall description of procedures may be included at this point. This section may not be needed if materials and methods are adequately covered in the articles. Alternatively, this information might be included in an appendix.

## **V. Article I**

This should be a manuscript in journal format. Emphasis is on **FORMAT**, not necessarily a final article. Preliminary trials, speculation, etc. not appropriate for a journal article, may be included here or in an appendix. Sample Chapter Outline:

Abstract

Introduction/Literature Review

Materials and Methods

Results (may be combined with discussion in some journal formats)

Discussion

Conclusions

Literature Cited (if appropriate, this may be incorporated into the final Literature Cited section)

## **VI. Article II, etc.**

Include other articles as appropriate. Each article should be able to stand on its own, so there may be some repetition among articles in certain sections.

## **VII. Conclusions/Overview/Discussion**

Tie together the concepts, conclusions and/or purpose of the project experiments. You might discuss how this research fits into your field or discipline, or into science in general. You might speculate on the implications of your results, and describe what you might have done differently. Include possibilities for future research.

## **VIII. Literature Cited**

If literature cited is listed after the literature review and after each article, this section may not be necessary.

## **IX. Appendices**

As appropriate. This section may include additional details on materials and methods, data, preliminary trials, experimental design and statistical analysis, or other supplemental information. The material included in appendices should provide a more complete record of your work than might be suitable for journal articles. Moreover, this additional information demonstrates the breadth of your work to your readers, and it provides the groundwork for future researchers who plan experiments based on your results.

## **DEPOSITION OF THESIS/DISSERTATION MATERIALS**

In addition to the Graduate College requirements, you will need to provide your adviser and the Department with hard-bound copies of your thesis or dissertation. If your thesis or dissertation was written using a computer, you may be asked to provide your adviser with diskettes containing thesis files, data files, and programs or access information necessary for data analysis. It is also customary to offer soft-bound copies of your thesis or dissertation to each member of your supervisory committee.

## MASTER OF SCIENCE DEGREE PROCEDURES

Check When Completed	Procedure	When To Do
( )	Read general regulations and Master degree sections of the <u>Graduate Studies Bulletin</u> , then secure registration materials. Consult with your adviser and register for coursework.	During pre-registration or during general registration
( )	Select a thesis topic in conjunction with your adviser.	Shortly after beginning your program, preferably in your 1st semester
( )	Prepare an initial research proposal and a tentative Memorandum of Courses. After approval by your adviser, submit these documents to the members of your committee, and organize an initial meeting to discuss your project and classwork.	Prior to completion of more than half of your program requirements
( )	With the aid of your adviser, select at least two other professors to serve as your supervisory committee. At least one member of your committee must be a Graduate Faculty Fellow.	As soon as you know what your project involves and can choose committee members on their ability to advise you
( )	Submit an approved Memorandum of Courses to Graduate College Office for approval (Appendix A-1). The signature of the departmental Graduate Committee Chair must be obtained prior to submission to the Graduate College. [Folder #77 in Blank Forms Drawer]	Prior to completion of more than half of your program requirements
( )	Prepare and present a thesis prospectus for the departmental seminar.	No later than the first half of your second semester
( )	A written one or two page summary of your research plan should be available at least one week prior to your seminar. It will be distributed with the seminar announcement.	Submit to Departmental Seminar Coordinator at least 1 week prior to date of seminar



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| ( ) Formal evaluation of your progress and classwork.  | At the end of your 1st year                                      |
| ( ) File Request for Comprehensive Examination with Departmental Graduate Chair (Appendix A-4)<br>[Folder #78 in Blank Forms Drawer]   | At least 3 weeks prior to examination                            |
| ( ) Complete written and oral comprehensive examinations as given by your committee (see page 9).  | Within 10 months prior to completion of degree requirements      |
| ( ) 1. Complete the Application for Advanced Degree (Appendix A-2) and turn it in at the Office of Registration and Records.<br>[Folder #84 in Blank Forms Drawer]<br>2. If necessary, make corrections on your Memorandum of Courses with a Program Change Form (Appendix A-3). Have it approved by your adviser and submit it to the Graduate College.<br>[Folder #85 in Blank Forms Drawer]<br>3. Pick up deadline sheet from the Graduate College.<br>4. Finish all incompletes on your program (except thesis). | At the beginning of the semester in which you plan to graduate   |
| ( ) Arrange for cap and gown at Nebraska Union Bookstore.  | About 8 weeks before Commencement.                               |
| ( ) Pick up thesis typing and format guidelines from the Graduate Office (Appendix C-1) and consult the thesis format instructions in this handbook (pg. 12).  | Before thesis is ready to be typed                               |
| ( ) File Final Examination Report Form (Appendix A-5) with the Graduate College.<br>[Folder #75 in Blank Forms Drawer]   | At least 4 weeks before the final oral exam.                     |
| ( ) Submit a copy of your thesis abstract to Departmental Secretary and Department Seminar Coordinator for use in Departmental Newsletter. Date and time of seminar and thesis defense to be announced in newsletter.  | At least 4 weeks prior to seminar and defense                    |
| ( ) Submit two (2) copies of your Master's thesis and four (4) copies of your abstract to the Graduate College Office for format approval. Deliver a copy of your thesis and abstract to each person on your committee.  | At least 2 weeks before the final oral exam (One week in summer) |
| ( ) Present a seminar on your research immediately before your final oral exam.  | Before deadlines for the given semester                          |

- ( ) Take final oral exam.
- ( ) Obtain the signed Final Examination Report Form (Appendix A-5) from your committee.
- ( ) Make changes in your thesis as required by your committee or by the Graduate College Office.
- ( ) Have the final copies of your thesis stamped at the Graduate College before going to the Library.
- ( ) Deposit two approved copies of your thesis at Love Library, Room 106. Librarian will sign final exam form. Give your adviser and the Department hard-bound copies of your thesis.
- ( ) Pay binding fee to Cashier in Administration building. Cashier will sign final exam form.
- ( ) File completed form in the Graduate College Office.
- ( ) Settle all outstanding accounts (libraries, campus police, etc.), and return any items borrowed from other departments, from other labs within the department, and from your adviser.
- ( ) Have copies of your thesis hardbound for your advisor and the Department.
- ( ) Return your keys to the Ag Finance Window in Ag Hall and get your refund!
- ( ) Attend Commencement Exercises.
- ( ) Celebrate! Your graduate degree is a major accomplishment in your career.

# DOCTOR OF PHILOSOPHY DEGREE PROCEDURES

Check When Completed	Procedure	When To Do
( )	Read general regulations in "Requirements for the Degree of Doctor of Philosophy" in the <u>Graduate Studies Bulletin</u> , then secure registration materials. Register after consultation with your adviser.	During pre-registration or general registration
( )	Decide upon a research project that will demonstrate technical mastery in your field and advance or modify former knowledge.	Shortly after beginning your program, preferably in your 1st semester
( )	Prepare an initial research proposal and a tentative program of study. Submit these documents to the members of your committee and organize an initial meeting to discuss your project and classwork.	Prior to completion of more than half of your program requirements
( )	Select at least three other professors to serve on your supervisory committee. Your adviser and at least 3 other committee members must be Graduate Faculty Fellows, one of whom must be from outside the Department.	Shortly after beginning your program, preferably in your 1st semester
( )	Obtain and fill out a Recommendation for appointment of a Supervisory Committee for Doctoral Degree Form (Appendix B-1). The area committee is interdepartmental, so consult your adviser as to whose signatures you must obtain. Submit the form to the Graduate College Office. [Folder #80 in Blank Forms Drawer]	Shortly after beginning your program, preferably in your 1st semester
( )	Take qualifying examination (if necessary).	During the 1st year
( )	Submit an approved Program of Study (Appendix B-2a, B-2b) to the Graduate College Office. You are required to take a minimum of 45 hours exclusive of language and/or research tool requirements. [Folder #79 in Blank Forms Drawer]	Prior to completion of more than half of your program requirements
( )	Prepare and present a dissertation prospectus for the departmental seminar. A written one or two page summary of your research plan should be available at least one week prior to your seminar.	No later than the first half of your 2nd semester

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| <p>( ) A written one or two page summary of your research plan should be available at least one week prior to your seminar. It will be distributed with the seminar announcement.</p>  | <p>Submit to Departmental Seminar Coordinator at least 1 week prior to date of seminar</p>    |
| <p>( ) Formal evaluation of your progress and classwork. A committee meeting is strongly suggested.</p>  | <p>At the end of your 1st year</p>  |
| <p>( ) Formal evaluation of your progress and classwork. A committee meeting is strongly suggested.</p>  | <p>At the end of your 2nd year</p>  |
| <p>( ) Complete foreign language or research tool requirement.</p>   | <p>Before or concurrent with comprehensive exams</p>  |
| <p>( ) File Request for Comprehensive Examination with Departmental Graduate Committee Chair.<br/>[Folder #78 in Blank Forms Drawer]</p>   | <p>At least 3 weeks prior to examination</p>  |
| <p>( ) Complete written and oral comprehensive examinations as given by your committee (see page 10).</p>  | <p>When you have substantially completed studies in your program</p>                          |
| <p>( ) Complete Application for Admission to Candidacy Form (Appendix B-3) and submit to the Graduate College Office.<br/>[Folder #89 in Blank Forms Drawer]</p>   | <p>Immediately after comprehensive exams<br/>- at least 7 months prior to final oral exam</p> |
| <p>( ) 1. File Application for Advanced Degree (Appendix A-2) at the Office of Registration and Records.<br/>[Folder #84 in Blank Forms Drawer]<br/>2. Make any corrections needed in your Program of Study with a Program Change Form (Appendix A-3).<br/>[Folder #85 in Blank Forms Drawer]<br/>3. Pick up deadline sheet from the Graduate College Office.<br/>4. Finish all incompletes on your program (except dissertation hours).</p> | <p>At the beginning of the semester in which you plan to graduate</p>                         |

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| ( ) Arrange for a cap, gown and hood at Nebraska Union Bookstore.   | About 8 weeks before Commencement   |
| ( ) Pick up dissertation typing and format guidelines from the Graduate College Office (Appendix C-1), and follow the departmental format instructions in this handbook (see page 12).  | Before dissertation is ready to be typed  |
| ( ) After approval by your adviser, present the dissertation and abstract to the members of your reading committee.   | In sufficient time for review and approval, at least 5 weeks before the final oral exam |
| ( ) Present two (2) copies of the approved dissertation, four (4) copies of the approved abstract, and the Application for the Final Oral Exam (Appendix B-4) to the Graduate College Office for format approval. Present copies of your dissertation to all members of your committee for use at your oral exam.<br>[Folder #90 in Blank Forms Drawer]   | At least 3 weeks prior to the final oral exam   |
| ( ) Submit a copy of your dissertation abstract to Departmental Secretary and Department Seminar Coordinator for use in Departmental Newsletter. Date and time of seminar and dissertation defense to be announced in newsletter.   | At least 4 weeks prior to seminar and defense   |
| ( ) Present a seminar on your project immediately before your final oral exam.  | Before deadlines for the given semester   |
| ( ) Take final oral examination.  |   |
| ( ) Deposit two (2) copies of your dissertation in proper form and three (3) copies of your abstract with the Dean of University Libraries. Deliver the Certificate of Deposit (Appendix B-5), signed by members of the supervisory committee, to the Graduate College Office. Give your adviser and the Department hard-bound copies of your dissertation.<br>[Folder #91 in Blank Forms Drawer] |   |
| ( ) Settle all outstanding accounts (libraries, campus police, etc.)  |   |

- ( ) Return any items borrowed from other departments, from other labs within the Department, and from your adviser.
- ( ) Turn in your keys and get your refund!
- ( ) Attend Commencement Exercises.
- ( ) Celebrate! Your graduate degree is a major accomplishment in your career.

## **OTHER USEFUL INFORMATION**

### **Departmental Graduate Committee**

The Department has a graduate committee which oversees the graduate program. This committee consists of:

Dr. Kyle Hoagland, Chair  
Dr. Dennis Jelinski  
Dr. Ed Peters  
Dr. Julie Savidge  
Graduate student representative

Ms. Karen Nelson is the current graduate student representative. If you have suggestions or questions which you feel the graduate committee should discuss, visit with Karen and she will bring it to the committee. You may also visit with any of the committee members or your advisor.

### **Assistantships**

The Department of Forestry, Fisheries and Wildlife offers one-half time (.49 FTE) Graduate Research Assistantships to both M.S. and Ph.D. students. These assistantships may be funded from state or federal appropriations or from grants received from numerous state, federal or private granting agencies. The source of funding does not affect the administration of the assistantship, in that the amount of time spent on work other than your research (not to exceed 20 hours per week averaged over a 12 month period) will be defined by your adviser.

State funded graduate assistantships are available for both Master's and Doctoral students. Competitive assistantships will be awarded for a maximum of 30 months (M.S.) and 36 months (Ph.D.) beginning either July 1 or January 1. Research programs sometimes take longer than expected, so the availability of funding beyond these designated periods should be discussed with your adviser early in your program.

### **International Students**

Welcome to Nebraska! Your presence here contributes an important cultural dimension to the University of Nebraska and the City of Lincoln. We hope you will be willing to share your customs and experiences with us, and with fellow students from other nations. You are encouraged to contact the Office of International Educational Services, which coordinates services and programs of special interest to international students.

## Graduate Student Organization

All graduate students in the Department of Forestry, Fisheries and Wildlife are automatically members of this departmental organization. One graduate student is elected to represent the others on the departmental Graduate Committee, and is responsible for soliciting and airing the opinions of the graduate students on policies concerning the graduate program, as well as reporting on decisions made by the Graduate Committee. Meetings or social events may occasionally be held by this organization.

## Participation in Professional Meetings

As a member of the scientific community, it is important that you attend and participate in regional, national and international meetings of interest if possible. You are encouraged to give oral and/or poster presentations of your work, and to interact with the people who will be your colleagues in the future. Funding for any or all of the expenses involved in travel and participation in such meetings will be subject to the availability of grant funds obtained by your adviser. Sigma Xi has limited funds available for travel by Ph.D. students. These grants are competitive and applications are available in the spring from your adviser.

## Wildwood Trust

The Wildwood Trust is an endowment administered by the Head of the Department of Forestry, Fisheries and Wildlife. Its goal is to provide support for both the graduate and undergraduate programs of the Department.

Each year the Wildwood Trust provides awards to graduate students to help defray the costs of attending scholarly and professional meetings to present the results of their research in either the oral or poster format. Maximum funding will be \$100 per student and funding will be limited to one grant per student per degree. The funds are not transferable and if the paper is not presented, allocated funds must be returned to the Wildwood Trust.

### Criteria for Awards:

1. The recipient must be a M.S. or Ph.D. student in the Department of Forestry, Fisheries and Wildlife.
2. Preference will be given to support travel to regional or national meetings.
3. Complete, typed application which must include: Name of Applicant, Title of Paper, Copy of the Abstract, Location of Meeting and Dates, Estimated Costs, Endorsement of the Major Adviser, Copy of the Letter of Acceptance of the paper (if possible).



### Deadlines:

Sept. 1, 1995 for meetings between Oct. 1, 1993 to Dec. 31, 1995  
Nov. 13, 1995 for meetings between Jan. 1, 1994 to Mar. 31, 1996  
Feb. 12, 1996 for meetings between Apr. 1, 1994 to June 30, 1996  
Apr. 16, 1996 for meetings between July 1, 1994 to Sept. 30, 1996  
Sept. 1, 1996 for meetings between Oct. 1, 1994 to Dec. 31, 1996

### Fellowships

Various fellowships are available to supplement your graduate research assistantship. See your advisor concerning these awards.

1. The Nebraska Statewide Arboretum presents an Outstanding Graduate Research Award each spring. The award carries a stipend of \$1200. Applications are due in late April.
2. The Agricultural Research Division presents the Widaman Trust Award each spring. The award carries a stipend of \$1200. Applications are due in early May.

### Libraries

Love Memorial Library on City Campus is the University main library and contains a complete catalog of books, periodicals, and serials held by the University. The major emphasis of the collection in Love Library is on humanities, social sciences, business, and education.

C.Y. Thompson Library on East Campus primarily serves the College of Agricultural Sciences and Natural Resources and the College of Home Economics. The major portion of the collection is devoted to agriculture, home economics, speech pathology, entomology, animal sciences, veterinary sciences, forestry, agronomy, plant pathology, water resources, food sciences, nutrition, textiles, human development, child development, marriage and the family, meteorology, horticulture, wildlife, and special education. Study rooms are available for graduate student use on a semester-by-semester basis. These can be very useful, especially when writing your thesis or dissertation. Computer literature searches can also be done, for a fee, to identify publications listed by particular key words or topics.

The Biological Sciences Library is located in Manter Hall on City Campus. The major portion of this collection is devoted to general biology, botany, zoology, endocrinology, cytology, and immunology.

Other branch libraries include Architecture, Chemistry, Engineering, Geology, Mathematics, Music, Physics, Law, and Dentistry.

The new IRIS system at the library is accessible through many of the computers in the Department. Consult your adviser or other graduate students in your lab for the correct procedures.

### Teaching

All graduate students are encouraged to teach or assist in lab or lecture for at least one course as your schedule and professional goals permit. This course does not have to be one your major professor teaches, but should be a meaningful experience to gain appreciation for classroom and laboratory teaching. If you are interested in this type of educational enhancement, please contact your adviser.

### Outside Employment

If you hold an assistantship, it is expected that you will not obtain outside employment. It is not physically possible to do an adequate job on thesis research, classwork and the work associated with your assistantship, in addition to an outside job. Extenuating circumstances should be discussed with your adviser. If you are not on assistantship, you may obtain employment outside of the university, or as hourly help within the university. However, keep in mind that it is your responsibility to execute a complete and concise degree program within a reasonable amount of time.

### Grievance Procedures

You are encouraged to work out any differences with your adviser or committee members through direct communication of the problem(s). If this does not seem to work, then you should see the Chair of the Graduate Committee to discuss the grievance. If need be, the Chair will suggest that the Department Head be included in the discussion. In some cases, problems can be resolved by changing advisers. In all cases, the Chair of the Graduate Committee will serve as an intermediary. Under no circumstances should any complaint leave the Department without the knowledge of the Chair of the Graduate Committee and the Department Head. Grievances involving class instructors or grade disputes should be brought to the attention of the Department Grade Appeals Committee. After following these steps, refer to the General Appeals Procedures in the Graduate Studies Bulletin.

## Buses

Inter-campus shuttle buses run between City Campus and East Campus on a regular schedule during the first and second semesters. Fare may be paid in cash, or bus tokens may be purchased at either Student Union. The Lincoln Transportation System runs city buses throughout the city for a nominal fee. Schedules and fee information are available from the Lincoln Transportation System.

## Suggestions for Writing

Research is not complete until results are written and published. Writing your thesis or dissertation and publishing your research results are not only important parts of your graduate education, but are also the ways that your findings become available and useful to others. Writing is a skill that requires learning and practice. Some of the best writers and researchers have identified several points that help make the writing process easier and more successful (Davis, 1964; Day, 1983; Parsons, 1987). A number of their suggestions are summarized below:

1. Identify the times when you seem to write best (morning, late afternoon, evening).
2. Set aside adequate blocks of time (usually an hour or more) during your most productive time.
3. Find a location conducive to writing (adequate desk space, good lighting, minimal distractions or interruptions).
4. Plan your writing in stages, and plan to complete a certain task in the time you have set aside for writing. Be aware that certain stages of writing will require more time for thought than actual writing, and that it is appropriate to use your allotted time for thinking about what you will write. Completing a given task in each session, even if it represents a small part of the whole manuscript, will help provide the necessary motivation for getting back and doing another part. Examples of stages that you might use in writing a manuscript include:
  - A. Preparation of a general outline of major sections and the major items to be included in each.
  - B. Preparation of a detailed outline indicating what will be said in each section. Prepare subheadings and paragraph topics. Pay particular attention to the sequence of topics. Plan what tables and graphs to use.
  - C. Prepare tables and graphs.

- D. Write drafts of the sections using your outline, tables, and graphs. This doesn't necessarily have to be done in the order in which the sections will appear.
- E. Assemble the sections of the manuscript and edit for duplication, omissions, inconsistencies and errors.
- F. Revise the draft and **MAKE IT YOUR BEST**. In doing this, you might ask fellow graduate students for a review. Then, submit it to your adviser for a review.

Each of these stages may be broken down into as many specific tasks as necessary to fit your blocks of time.

- 5. Reward yourself when you complete a task. This may include a coffee break, physical exercise, or any other activity to relieve the intensity of writing.
- 6. Consult other publications and style manuals for other suggestions on writing. For example:

Davis, D.E. 1964. Easing the path to publication. *BioScience* 14(2): 21-23.

Day, R.A. 1983. How to write and publish a scientific paper. 2nd ed., ISI Press.

Council of Biology Editors Style Manual Committee. 1987. CBE style manual: a guide for authors, editors, and publishers in the biological sciences. 6th ed. rev. and expanded. Bethesda, MD: Council of Biology Editors, Inc.

Parsons, J. April, 1987. Publishing research results: A conversation with Dermot P. Coyne, George Holmes Professor of Horticulture. *Writer's Update*, IANR, University of Nebraska, Lincoln.

### Graduate Faculty

Kathiravetpillai Arumuganathan

Research Assistant Professor; Research Interests - Molecular cytogenetics, preparation of intact metaphase chromosomes and nuclei in suspension; flow karyotyping, sorting and microcloning of plant chromosomes; constructions of chromosome-specific gene libraries for important plants, development of chromosome painting technique for plant chromosomes; determination of nuclear DNA contents by flow cytometry; Office - N322 Beadle Center; Phone 2-9496.

**Ann S. Bleed**

Adjunct Assistant Professor; State Hydrologist; Graduate Faculty Member; Office - Water Resources; 301 Centennial Mall South; Phone 471-0569; Current Activities - Active in interstate negotiations and litigation involving water allocation, water law, interstate water compacts and decrees and endangered species needs. Particular interests include stream flow for fish and wildlife and interrelationship between surface water and ground water.

**James R. Brandle**

Associate Professor; Graduate Faculty Fellow; Office - 02 PI; Phone 2-6626; Research Interests - Shelterbelt ecology and economics, the role of woody plants in sustainable agricultural landscapes, agroforestry production systems under a changing climate.

**Ronald M. Case**

Professor; Graduate Faculty Fellow; Office - 204 NRH; Phone 2-6825; Research Interests - Terrestrial vertebrate ecology, competitive interactions of range rodents and cattle, life history and ecology of native Nebraska fauna.

**Bert M. Cregg**

Adjunct Assistant Professor; Graduate Faculty Member; Office - National Agroforestry Center; Phone 437-5178, Ext. 23; Research Interests - Stress physiology of trees for conservation forestry.

**Stephen G. Ernst**

Associate Professor; Graduate Faculty Fellow; Office - 109D PI; Phone 2-6633; Research Interests - Tissue culture as applied to the genetics of woody plants, genetic structure of natural populations, molecular genetics of woody plants.

**Mark O. Harrell**

Associate Professor; Graduate Faculty Member; Office - 04 PI; Phone 2-6635; Research Interests - Forest entomology and pathology, biology, ecology and control of forest insects and diseases.

**Gary L. Hergenrader**

Professor; Graduate Faculty Fellow; Department Head; Office - 103 PI; Phone 2-1467; Research Interests - Limnology, reservoir and river limnology, eutrophication processes, biology of fishes.

**Kyle D. Hoagland**

Associate Professor; Graduate Faculty Fellow; (Graduate Committee Chair) Office - 12BB PI; Phone 2-8182; Research Interests - Aquatic ecology, water quality, ecology of algal communities, physiology and biochemistry of diatom adhesion to submerged surfaces, impacts of pesticides on aquatic communities, reservoir and lake management.

**Richard S. Holland**

Adjunct Assistant Professor; Graduate Faculty Member; Office - Nebraska Game & Parks Commission; Phone 471-5501; Research Interests - Fisheries ecology and management, stream ecology, limnology.

**Scott E. Hygnstrom**

Associate Professor; Graduate Faculty Member; Office - 202B NRH; Phone 2-6822; Research Interests - Wildlife damage management, wildlife-agriculture interrelationships, species behavior and habitat selection.

**Dennis E. Jelinski**

Assistant Professor; Graduate Faculty Fellow; (Graduate Committee) Office - 107 PI; Phone 2-9684; Research Interests - Landscape ecology, GIS-remote sensing, conservation biology.

**Ron J. Johnson**

Professor; Graduate Faculty Fellow; Office - 202E NRH; Phone 2-6823; Research Interests - Wildlife biology, sustainability in agricultural and urban landscapes, ecology of edge habitats and corridors, ecological and behavioral aspects of wildlife damage.

**Terrence B. Kayes**

Associate Professor; Graduate Faculty Fellow; Office - 12BC PI; Phone 2-8183; Research Interests - Aquaculture and fisheries enhancement, environmental physiology, physiological ecology, endocrinology, and nutritional requirements of fishes.

**Ned B. Klopfenstein**

Adjunct Assistant Professor; Graduate Faculty Member; Office - National Agroforestry Center; Phone 437-5178, Ext. 18; Research Interests - Forest pathology, mechanisms of disease resistance in woody plants, woody plant tissue culture and genetic transformation, environmental and developmental influences on defense gene expression, woody plant symbioses.

**Robert D. Kuzelka**

Associate Professor; Graduate Faculty Member; Office - 103 NRH; Phone 2-7527; Research Interests - Community and regional planning, natural resources policy and planning, land-use planning, groundwater protection, regional planning.

**Edward J. Peters**

Associate Professor; Graduate Faculty Member; (Graduate Committee) Office - 12D PI; Phone 2-6824; Research Interests - Fisheries biology, ecology, distribution and population dynamics of stream fishes, effects of siltation and dewatering on aquatic communities, effects of water management practices on aquatic organisms.

**Willis J. Rietveld**

Adjunct Professor; Graduate Faculty Fellow; Office - National Agroforestry Center; Phone 437-5178, Ext. 27; Research Interests - Tree ecophysiology, woody plant water relations, planting stock quality assessment, transplanting stress.

**Julie A. Savidge**

Associate Professor; Graduate Faculty Fellow; (Graduate Committee) Office - 202D NRH; Phone 2-2043; Research Interests - Biological conservation, factors affecting avian community structure, effects of various stresses including exotic species and habitat modification on wildlife populations, ecology and management of sensitive and endangered species, wildlife enhancement.

**Michele M. Schoeneberger**

Adjunct Assistant Professor; Graduate Faculty Member; Office - National Agroforestry Center; Phone 437-5178, Ext. 21; Research Interests - Forest soils; relationships between woody plant growth and function and below ground factors (plant, microbe & soil); matching tree/shrub to site/soil/function; agroforestry practices (forested bufferways); impacts of atmospheric pollution/change on plant health.

**Carol M. Schumann**

Adjunct Assistant Professor; Office - National Agroforestry Center; Phone 437-5178, Ext. 19; Research Interests - Genetics of woody plants; mechanisms of stress and pest resistance in woody plants; plant defense mechanisms; host/pathogen interactions; molecular genetics of woody plants.

**Tom F. Seibert**

Assistant Professor; Graduate Faculty Member; Office - 202 NRH; Phone 2-8913; Research Interests - Multi-tropic level interactions; biological diversity assessment; landscape analysis; environmental education.

### Emeritus Faculty

Walter T. Bagley

Associate Professor; Phone 466-2491; Research Interests - Tree improvement and windbreak influences.

Howard L. Wieggers

Professor; Phone 467-2102; Research Interests - Farmers/sportsmen relationships.

### Post-Doctoral Fellows

Benjamin Gawne - Aquatic Ecology  
Office - 12C PI; Phone 2-8190

Susan Jensen - Aquatic Ecology  
Office - 12 PI; Phone 2-6648

Ray Lewis - Aquatic Ecology  
Office - 12 PI; Phone 2-6648

Jianwei Zhang -  
Office - National Agroforestry Center; Phone 437-5178

### U.S. Forest Service Faculty

Gerald F. Bratton; Forestry, Conservation, and Agroforestry  
Office - National Agroforestry Center; Phone 437-5178, Ext. 24

Mary Ellen Dix; Forest Entomology  
Office - National Agroforestry Center; Phone 437-5178, Ext. 25

In addition, faculty of the Nebraska Forest Service are also associated with the Department, and are available for consultations and discussions.

### Nebraska Forest Service Faculty

Dennis M. Adams

Assistant State Forester and Forester; Office - 109 PI; Phone 2-5822; Private lands management.



**William R. Lovett**

Associate Forester; Office - 05 PI; Phone 2-6640; Forest genetics and tree improvement.

**David P. Mooter**

Assistant State Forester and Forester; Office - Douglas County Extension office in Omaha; Phone 444-7804; Community and urban forestry

**Eric J. Rasmussen**

Associate Forester; Office - 105 PI; Phone 2-6634; Fire training and planning in rural fire departments.

**Richard T. Straight**

Associate Forester; Office - 109 PI; Phone 2-6637; Vegetation management.

**Tom D. Wardle**

Deputy State Forester and Associate Forester; Office - 109 PI; Phone 2-6636; Agency planning and policy.

**Don Westover**

Assistant State Forester and Forester; Office - 105 PI; Phone 2-6629; Wildfire management and remote sensing.

#### Departmental Office Staff

**Jeanne Andelt**

Administrative Assistant; Office - 101 PI; Phone 2-6625; Grant proposal routing, accounts, cell phones.

**Ann Hajek**

Clerical Assistant III; Office - 101 PI; Phone 2-6624; General department information, location of Plant Industry Department staff, departmental vehicles, mail, UPS, copier help.

**Sandy Lineberry**

Staff Secretary III; Office - 101 PI; Phone 2-6623; General department information, location of Plant Industry Department staff, departmental vehicles, mail, UPS, copier help.

**Connie Paxton**

Clerical Assistant II; Office - 101 PI; Phone 2-8478; Requisitions, quick pay, petty cash, blanket orders, vehicle logs, mail, accounts, expense vouchers, parking permits, Federal Express.

**Linda Schafer**

Staff Secretary II; Office 12 PI; Phone 2-8715; General department information, copier help,

**Michelle Sieber**

Staff Assistant; Office - 101 PI; Phone 2-8876; Accounts, cell phones.

**Diana Smith**

Staff Secretary II; Office - 202 NRH; Phone 2-2188; General Department information, location of Natural Resources Hall staff, mail, copier help.

**Marcy Tintera**

Staff Secretary III; Office - 101 PI; Phone 2-6622; Personnel files; payroll, departmental newsletter, key cards, student building passes, copier help, general department information.





UNIVERSITY OF NEBRASKA-LINCOLN  
APPLICATION FOR DEGREE

A \$25 non-refundable application fee, payable to the University of Nebraska-Lincoln, must accompany your application. This fee applies only to the term marked on this application and is not transferrable to another term.

FOR OFFICE USE ONLY

ID NUMBER \_\_\_\_\_ DATE \_\_\_\_\_

PRINT FULL LEGAL  
NAME (for diploma)

First \_\_\_\_\_ Middle \_\_\_\_\_ Last/Family Name \_\_\_\_\_

MAILING ADDRESS

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ Phone \_\_\_\_\_

HOME TOWN (for commencement program and newspaper announcement)

City \_\_\_\_\_ State/Province \_\_\_\_\_ Country \_\_\_\_\_

DEGREE INFORMATION - PLEASE MARK APPROPRIATE AREAS

GRADUATION DATE

I will graduate in  
☐ May  
☐ August  
☐ December  
Year of 19\_\_\_\_

COLLEGE

AG & NR  
ARCHITECTURE  
ARTS & SCIENCES  
BUS ADM  
ENGR & TECH

TYPE OF DEGREE/CERTIFICATE

☐ OBS in AG SCI  
☐ OBSAS  
☐ OBA  
☐ OBSBA  
☐ OBS  
☐ OBSAE  
☐ OBS in CHEM E  
☐ OBSCE  
☐ OBS in NAT RES  
☐ OBS  
☐ OBSBSE  
☐ OBSCE  
☐ OBSCM  
☐ OBSCS  
☐ OBSIE  
☐ OBSME  
☐ OBA  
☐ OBFA  
☐ OBMus  
☐ OBMED  
☐ OBShrf  
☐ OBJ  
☐ OBA in ED  
☐ OBFA in ED  
☐ OBS in ED  
☐ I also apply for the Nebraska Initial Teaching Certificate.

MAJOR(S)

FINE & PERF ARTS

HUM RES & FAM SCI  
JOURN & MASS COMM  
TEACHERS

MINOR(S)

LAW  
GRADUATE

☐ OJD  
☐ OM ARCH  
☐ OMCRP  
☐ OMM  
☐ OMScT  
☐ OED S  
☐ ODMA  
☐ OMA  
☐ OM ED  
☐ OMPA  
☐ OMST  
☐ O6 Yr Cert  
☐ OED D  
☐ OMAT  
☐ OMFA  
☐ OMPE  
☐ OMS  
☐ OPH D

CURRENT  
ENROLLMENT

Are you currently enrolled at UNL? ☐ Yes ☐ No UNO? ☐ Yes ☐ No  
Are you currently enrolled in correspondence course(s)? ☐ Yes ☐ No  
What course(s)? \_\_\_\_\_  
Are you currently enrolled at another college or university? ☐ Yes ☐ No  
If yes, where? \_\_\_\_\_  
What course(s)? \_\_\_\_\_

GRAD STUDENTS ONLY

Adviser Name \_\_\_\_\_

Previous  
Degrees Received \_\_\_\_\_ degree in 19\_\_\_\_ from \_\_\_\_\_  
Received \_\_\_\_\_ degree in 19\_\_\_\_ from \_\_\_\_\_  
Received \_\_\_\_\_ degree in 19\_\_\_\_ from \_\_\_\_\_

Please report any change in graduation plans to the Records Office, 107 Admin.

**GRADUATE COLLEGE**  
THE UNIVERSITY OF NEBRASKA-LINCOLN

**REQUEST FOR CHANGE OF PROGRAM**

(date) \_\_\_\_\_

To: Graduate Office

Re: \_\_\_\_\_  
(Student's Name) (Student's Soc. Sec. Number)

Please Substitute \_\_\_\_\_  
(Department Name, Course Number, and credit hours)

in the place of \_\_\_\_\_  
(Department Name, Course Number, and credit hours)

on the student's Program of Courses for the  
☐ 6-yr. Certificate  
☐ Masters Degree  
☐ Doctoral Degree

\_\_\_\_\_  
(Adviser)  
GRAD 52002 (2000 7-607)

\_\_\_\_\_  
(Dean for Graduate Studies)

# Request for Comprehensive Examination

(must be filed at least three weeks prior to exam)

Name: \_\_\_\_\_

Advisor: \_\_\_\_\_

Undergraduate major: \_\_\_\_\_

School: \_\_\_\_\_

Graduate committee members:

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

Formal coursework completed for current program:

1. \_\_\_\_\_

7. \_\_\_\_\_

2. \_\_\_\_\_

8. \_\_\_\_\_

3. \_\_\_\_\_

9. \_\_\_\_\_

4. \_\_\_\_\_

10. \_\_\_\_\_

5. \_\_\_\_\_

11. \_\_\_\_\_

6. \_\_\_\_\_

12. \_\_\_\_\_

Thesis topic/title: \_\_\_\_\_

Date of written exam: \_\_\_\_\_

Date of oral exam: \_\_\_\_\_ Time: \_\_\_\_\_

Location: \_\_\_\_\_

Requested: \_\_\_\_\_

*Signature of Advisor*

*Date*

Approved: \_\_\_\_\_

*Graduate Committee Chair*

*Date*

Must be received in Graduate Office at least four weeks before the final oral examination, if required, but in no case later than four weeks before the calendar date for filing final report for degree.

## THE UNIVERSITY OF NEBRASKA-LINCOLN

## GRADUATE COLLEGE

All information **MUST** be typed.

## FINAL EXAMINATION REPORT FOR MASTERS DEGREE

## PART 1

Name \_\_\_\_\_ Social Security No. \_\_\_\_\_  
 Local Address \_\_\_\_\_ Telephone \_\_\_\_\_  
 Permanent Home Address \_\_\_\_\_  
 Degree Desired: MA \_\_\_ MArch \_\_\_ MAT \_\_\_ MBA \_\_\_ MCRP \_\_\_ MEd \_\_\_ MFA \_\_\_ MLS \_\_\_ MM \_\_\_ MPA \_\_\_ MPE \_\_\_ MS \_\_\_ MSct \_\_\_ MST \_\_\_  
 Option \_\_\_\_\_ Major \_\_\_\_\_ Minor \_\_\_\_\_  
 EXPECTED GRADUATION DATE \_\_\_\_\_

## PART 2

WRITTEN COMPREHENSIVE EXAMINATION (when required, the written comprehensive examination must be taken not more than ten months prior to completion of degree requirements. Failures must be reported to the Graduate Office at least one week before the final oral examination, if required, but in no case later than one week before the calendar date for filing final report for degree.)

PASSED Major \_\_\_\_\_ (Date) \_\_\_\_\_ Minor \_\_\_\_\_ (Date) \_\_\_\_\_ TO BE TAKEN Major \_\_\_\_\_ (Date) \_\_\_\_\_ Minor \_\_\_\_\_ (Date) \_\_\_\_\_

WRITTEN COMPREHENSIVE EXAMINATION IN MAJOR AND/OR MINOR WAIVED  
 (check if waived) Major \_\_\_\_\_ Minor \_\_\_\_\_

(A written comprehensive and/or oral examination is required to cover the student's approved program of study. A written comprehensive examination in the minor may be waived if all grades in the minor are B or above.)

## PART 3

FINAL ORAL EXAMINATION DATE \_\_\_\_\_ TIME \_\_\_\_\_ BUILDING/ROOM \_\_\_\_\_

EXAMINING COMMITTEE (Type names of proposed committee members. Three members are required. All members on the examining committee **MUST** be on the Graduate Faculty, and at least one must be a Graduate Faculty Fellow. Signatures of committee members should be affixed after final oral examination.)

_____ (Typed Name, Examining Committee Chair)	Passed _____	_____ (Signature)
_____ (Typed Name)	Passed _____	_____ (Signature)
_____ (Typed Name)	Passed _____	_____ (Signature)
_____ (Typed Name)	Passed _____	_____ (Signature)

DISSENTING VOTES \_\_\_\_\_

FINAL ORAL EXAMINATION WAIVED (check if waived) \_\_\_\_\_

## PART 4

EXAMINATION PROCEDURE APPROVED; INCOMPLETES REMOVED IN COURSES OTHER THAN THESIS.

_____ (Signature, Major Adviser)	Date _____	_____ (Signature, Dept. Chair or Member, Graduate Committee, Minor Dept. When final oral examination is waived signatory must be Member, Graduate Committee.)	Date _____
_____ (Signature, Chair of Graduate Committee, Major Dept.)	Date _____	_____ (Signature, Dean for Graduate Studies)	Date _____

TITLE OF THESIS: \_\_\_\_\_

## PART 5

Approved by Major Adviser \_\_\_\_\_

FINAL COPY OF THESIS APPROVED  
 (When Final Oral Examination is waived)

## PART 6

DEPOSITED IN LIBRARY:

_____ (Signature, Graduate Faculty Fellow, Major Dept. other than Adviser)	Date _____	_____ (Signature, Librarian)	Date _____	_____ (Signature, Cashier)	Date _____
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## PART 7

RECOMMENDED FOR DEGREE \_\_\_\_\_  
 (Signature, Dean for Graduate Studies) \_\_\_\_\_ Date \_\_\_\_\_

Office of Graduate Studies  
University of Nebraska-Lincoln  
**Appointment of Supervisory Committee for the Doctoral Degree**

The Graduate Committee of \_\_\_\_\_  
Doctoral Degree Program - Major \_\_\_\_\_

hereby recommends that a Supervisory Committee be appointed for:

\_\_\_\_\_  
Student Name Student ID Number

\_\_\_\_\_  
Street Address City State Zip

Area of Specialization: \_\_\_\_\_ Minor: \_\_\_\_\_

Degree Sought: D.M.A. \_\_\_\_\_ Ed.D. \_\_\_\_\_ Ph.D. \_\_\_\_\_

Supervisory Committee Members (at least four Fellows required - type or print names)

Professor's Name	Fellow (F) or Member (M)	Campus Address and Zip
_____ Chair	F	_____
_____	F	_____
_____	F	_____
_____	F	_____
_____	F	_____
_____	F	_____
_____ Outside Representative	F	_____

Note: The Supervisory Committee is expected to meet within three weeks following its appointment by the Office of Graduate Studies to discuss and approve the Program of Studies for the student. The Program must be submitted to the Graduate Office with a minimum of 45 hours exclusive of language and/or research tools remaining to be taken. Any deviation from the 45-hour ruling requires a written justification.

Approval of Graduate Committee in student's major area

Signature \_\_\_\_\_ Date \_\_\_\_\_  
Chair, Graduate Committee

Appointment of Supervisory Committee by Office of Graduate Studies

Signature \_\_\_\_\_ Date \_\_\_\_\_  
Dean, Graduate Studies



List credit hours consistently as either semester hours or quarter hours in completing this report. All information must be typed.

Student's Name \_\_\_\_\_ Social Security No. \_\_\_\_\_  
(Last) (First) (Middle)

Previous Degree \_\_\_\_\_ Date \_\_\_\_\_ Institution \_\_\_\_\_  
 \_\_\_\_\_ Date \_\_\_\_\_ Institution \_\_\_\_\_  
 \_\_\_\_\_ Date \_\_\_\_\_ Institution \_\_\_\_\_

The Supervisory Committee recommends the following transfer of credit to the Doctoral program at the University of Nebraska:

[illegible]

The Supervisory Committee accepts the following courses and thesis or dissertation research in which incomplete, pass or letter grade reports have been received:

[illegible]

Credit hours of graduate work at the University of Nebraska in which incomplete, pass, or letter grade reports have been received

The Supervisory Committee approves the following courses and dissertation research that are in progress or to be taken. This portion constitutes at least one-half of the minimum requirements;

[illegible]

Credit hours of graduate work at the University of Nebraska in progress or to be taken.

TOTAL CREDIT HOURS IN PROGRAM OF GRADUATE STUDY

LANGUAGE, RESEARCH TOOL OR COLLATERAL FIELD REQUIREMENTS					
Language or research tools	COLLATERAL FIELD				
	Dept.	Course No.	Title	Cr. Hr.	Grade
(Specify)					
(Specify)					

DISSERTATION AREA

**SUPERVISORY COMMITTEE**

(Chairperson, Ilya I. Natush)

(Typed Name)

(Typed Name)

(Typed Name)

(Typed Name)

(Typed Name)

**READING COMMITTEE** (Two members of Supervisory Committee exclusive of Chairperson(s))

(Type Name)

(Typed Name)

THIS PROGRAM OF STUDY HAS BEEN APPROVED BY THE SUPERVISORY COMMITTEE AT A MEETING ON

12216

Signature: Changjun Chen, Senior Lecturer (continued)

PROGRAM RECEIVED BY GRADUATE OFFICE AND APPROVED AS OF

(1215)

Signature Dean for Graduate Studies

AFTER APPROVAL OF THE PROGRAM SHOWS ABOVE AND PRIOR TO APPLICATION FOR CANDIDACY FOR THE DOCTORAL DEGREE, THE STUDENT MUST PASS A WRITTEN COMPREHENSIVE EXAMINATION ARRANGED BY THE SUPERVISORY COMMITTEE AND COMPILE LANGUAGE RESEARCH TOOL OR COLLATERAL FIELD REQUIREMENTS. RESIDENCY REQUIREMENTS MUST BE MET AS OUTLINED IN CURRENT GRADUATE STUDIES BULLETIN.

GRADUATE COLLEGE  
The University of Nebraska

Application for Admission to Candidacy for the Doctoral Degree

\_\_\_\_\_  
Last Name first

\_\_\_\_\_  
Current Address

\_\_\_\_\_  
Date

I Hereby petition the Graduate Council to be admitted to Candidacy for the Ph. D., Ed. D., or D. M. A. degree.

Major Subject \_\_\_\_\_ Comprehensive Examination taken \_\_\_\_\_

\_\_\_\_\_  
Date

Minor Subject \_\_\_\_\_ Comprehensive Examination taken \_\_\_\_\_

\_\_\_\_\_  
Date

Language and Research Tool Requirement:

(Specify) \_\_\_\_\_ Completed \_\_\_\_\_

\_\_\_\_\_  
Date

(Specify) \_\_\_\_\_ Completed \_\_\_\_\_

\_\_\_\_\_  
Date

Dissertation Subject \_\_\_\_\_

I hold the following degrees:

\_\_\_\_\_ granted by \_\_\_\_\_ 19 \_\_\_\_\_

\_\_\_\_\_ granted by \_\_\_\_\_ 19 \_\_\_\_\_

\_\_\_\_\_  
Signature of Candidate

SUPERVISORY COMMITTEE:

We, the undersigned, certify that the above-named Student has passed the comprehensive written examination and completed the language and/or research tool (if required) for the Doctoral degree. We approve the Dissertation subject (optional). We recommend the student to the Graduate Council for admission to Candidacy for the degree.

\_\_\_\_\_  
Chairperson

\_\_\_\_\_  
Outside Person Signature

We, the undersigned, record our dissenting vote.

Must be received in Graduate Office at least three weeks BEFORE final oral examination or final calendar date of dissertation due in Graduate Office.

Appendix B-4  
THE UNIVERSITY OF NEBRASKA - LINCOLN  
Graduate College

(All information must be TYPED)

APPLICATION FOR FINAL ORAL EXAMINATION OR WAIVER OF EXAMINATION FOR THE DOCTOR'S DEGREE

Student's address for future mailing: \_\_\_\_\_

\_\_\_\_\_ Telephone \_\_\_\_\_

Previous Degrees \_\_\_\_\_ Date \_\_\_\_\_ Institution \_\_\_\_\_

\_\_\_\_\_ Date \_\_\_\_\_ Institution \_\_\_\_\_

\_\_\_\_\_ Date \_\_\_\_\_ Institution \_\_\_\_\_

Name \_\_\_\_\_ Degree \_\_\_\_\_  
Last First MI

Major \_\_\_\_\_ Minor \_\_\_\_\_

Dissertation Title \_\_\_\_\_

Dissertation and Abstract Approved by both Readers

Signature of First Reader \_\_\_\_\_ Date \_\_\_\_\_

Signature of Second Reader \_\_\_\_\_ Date \_\_\_\_\_

Final ORAL Examination \_\_\_\_\_  
Time \_\_\_\_\_ Date \_\_\_\_\_ Place \_\_\_\_\_

ORAL EXAMINATION: Please TYPE in names below for members who have agreed to attend the oral examination. For a waiver of the oral examination, the Chairperson must give a statement of justification, and ALL members of the Supervisory Committee must indicate their approval of the waiver by SIGNATURES below:

STATEMENT FOR WAIVER ONLY: Not needed for an oral examination.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
SIGNATURES of ALL Supervisory Committee members if Oral Examination is WAIVED.

Names TYPED only for an ORAL EXAMINATION

Chairperson \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Outside Member

Signature of Dean for Graduate Studies \_\_\_\_\_ Date \_\_\_\_\_

**THE UNIVERSITY OF NEBRASKA**  
**REPORT ON DOCTORAL DEGREE**

TO THE REGISTRAR:

M ..... has been reported as follows  
 concerning the requirements for the degree of .....  
 Major Field of Study in ..... Completed

Signatures of the  
 Supervisory  
 Committee

Minor Subject

Chairperson

Graduate Faculty Representative

Signature in Minor Department

One ..... Two .....

**DISSENTING VOTE(S)**  
*(Must be accompanied with a written explanation)*

Dissertation title .....

Under the Supervision of .....

Approved reading committee: .....

Chairperson

Date .....

Date .....

Original and first copy deposited in library .....

Librarian

19 .....

Abstract and binding fee paid .....

19 .....

Corporation Secretary

Copyrighting fee paid .....

19 .....

Corporation Secretary

The candidate is therefore to be reported to the Faculty of the Graduate College as having fulfilled all requirements for the above-mentioned degree.

GRADUATE COLLEGE  
INSTRUCTIONS FOR PREPARATION AND SUBMISSION OF  
MASTER'S THESIS AND DOCTORAL DISSERTATION  
REVISED 2/3/86

It is the responsibility of the student to be familiar with the information presented in these instructions, and to know and observe all the regulations and procedures governing the preparation and submission of the thesis or dissertation.

APPROVAL: FINAL ORAL, THESIS, DISSERTATION, AND ABSTRACT

Masters: The Final Examination Report Form (application for oral or for waiver of) must be submitted to the Office of Graduate Studies at least four weeks prior to the date of the oral examination (three weeks in the summer). The Master's thesis in its preliminary form must be approved by the adviser prior to applying for the final oral examination or its waiver.

EFFECTIVE THE SECOND SEMESTER OF 1985-86 THREE COPIES OF AN ABSTRACT OF THE MASTER'S THESIS WILL BE REQUIRED.

The Master's thesis (original and first copy, or approved substitutes as later described) and three copies of the abstract must be presented in final form to the Office of Graduate Studies for approval at least two weeks (one week in summer) prior to the date of the final oral examination. The theses and two copies of the abstract will be stamped and returned to the student. Note, however, that the oral examination committee does have the right and privilege of recommending changes in the thesis at the time of the final oral examination.

Doctoral: The Doctoral dissertation and abstract must be approved by the Reading Committee prior to application for the final oral examination (or waiver). Two copies of the dissertation, four copies of the abstract, and the completed Application for Final Oral Examination (or waiver) must be taken to the Graduate Office for approval at least three weeks PRIOR to the date of the examination. The copies of the dissertation and abstract will be stamped and returned to the student. (One copy of the abstract is kept in the student's file in the Graduate Office.) Note, however, that the Supervisory Committee has the right and privilege of recommending minor changes in the dissertation at the time of the final oral examination. Therefore, prior to the final oral examination, the dissertation should be kept in a form so that changes can be easily made.

TYPING INSTRUCTIONS

The thesis or dissertation and abstract will be typed with the original as a black ribbon copy. All copies submitted must be on at least 20 lb, white, long-grained, 25 percent rag content watermarked bond paper not designed for easy erasure.

The two copies submitted may be copied by the following methods:

1. Photo offset printing (multilith)
2. Xerox (at the discretion of the Office of Graduate Studies)
3. Word processing; Apple; or Computer

No other copy processes may be used without prior permission from the Office of Graduate Studies. Elite or pica type is acceptable, as is "Dotted I".

The thesis or dissertation and abstract must be DOUBLE SPACED.

The MARGINS should be at least one and one-half inches at the left, and one inch on each of the other three sides. If plates or folded tables are included, they must have exactly the same margins as the text, or must be folded to come within them.

Be sure in NUMBERING PAGES to place the number of the page in the UPPER RIGHT-HAND CORNER one inch down from the top of the page and one inch in from the right hand side.

FOOTNOTES are single spaced and placed at the bottom of the page to which they pertain unless special instructions are given by the department concerned.

TITLE PAGE FORMAT should be prepared in form according to the sample "A" (for dissertations) or "B" (for theses) attached.

The ABSTRACT for the DOCTORAL DISSERTATION and the MASTER'S THESIS must not contain more than 350 words in its entirety. This includes the number of words for title, author, etc. It should be typed in form according to the sample "C" attached. DO NOT number the pages of the abstract.

#### NUMBER OF COPIES

The two Library copies of the thesis or dissertation are not to be bound or punched. An additional copy must be filed in the departmental office of the major, and ordinarily one copy is furnished to the major adviser who directed the study. The student should consult his major adviser as to the number of additional copies of the thesis or dissertation which should be prepared and also with regard to the binding of these additional copies.

#### PROCEDURES AFTER THE ORAL

Master's: Following the final oral examination, the signed Final Examination Report Form for the Master's Degree is given to the student to accompany the original and first copy (or two approved substitutes) of the Master's thesis and two copies of the abstract, which are presented in unbound form to the University Library, Room 106, Love Library). The Librarian will sign the form in Part 6 to verify that the approved copies were received. The student then proceeds to the Cashier's Window in the Administration Building to pay the \$15 binding fee (2 copies @\$7.50 each). The Cashier will also sign the Final Report Form in Part 6 to verify that the binding fee has been paid. The Final Examination Report Form for the Master's Degree is then presented to the Office of Graduate Studies.

Doctoral: Following the final oral examination, the student will present to the Library, Room 106, Love Library, these items: two copies of the dissertation; three copies of the abstract; two copies of the Title Sheet--one typed and one with signatures of the Supervisory Committee members; the contract page for microfilming; and the Final Report of Doctoral Degree, signed by those attending the oral examination. (All these forms and others listed below are provided by the Office of Graduate Studies at the time the dissertation is stamped.) The Librarian will sign the Final Report and the student will pay the required fees for binding and microfilming at the Cashier's Window, 110 Administration. The student will then take the Final Report form with proof of payment and the two completed forms Public Relations and Survey of Earned Doctorates to the Graduate Office.

#### PUBLICATION OF THE DISSERTATION

Under the present plan for publication, the entire dissertation, including the names of the committee members, will be microfilmed exactly as submitted and approved by the committee. Copies of these microfilms are procurable by anyone. There will be no opportunity for editorial or other changes in the manuscript after submitted.

One copy of the Doctoral dissertation will be sent by the Library to University Microfilms for the production of the master negative which will be placed on deposit there for storage and servicing. The dissertation manuscript will be returned to the University Library. University Microfilms will produce positives to order at the standard rate. The positives will be available on order to any applicant. University Microfilms will also deposit one positive print in the Library of Congress.

The abstract will be published in Dissertation Abstracts International. This publication is available in the University of Nebraska Library and includes a cumulative index by author and subject.

For the above services, each doctoral student shall pay a required fee of \$50 (\$35.00\* for the abstract fee and \$15 for binding two copies of the dissertation @\$7.50 each). If authorized, University Microfilms will apply for copyright in the name of the author. If copyright is requested, there is an additional charge of \$20. These fees are payable at the Cashier's Window, 110 Admin. Bldg., after the copies have been deposited in Love Library.

The two typewritten copies of the dissertation remain in Love Library; one is kept in storage, and the other is filed for public use. A copy is available for Inter-Library Loan through the University Library. At the request of the student and the department, the University will reserve the option for an author to delay the distribution of film copies of the doctoral dissertation for a one-year period.

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BETWEEN INDEPENDENCE AND CONSTITUTION:  
THE ARTICLES OF CONFEDERATION, 1783-1787

by

Gary D. Olson

A DISSERTATION

Presented to the Faculty of  
The Graduate College in the University of Nebraska  
In Partial Fulfillment of Requirements  
For the Degree of Doctor of Philosophy  
(or appropriate degree)

Major: History or  
Major: Interdepartmental Area of \_\_\_\_\_

(See Attached Listing of Graduate Majors)

Under the Supervision of Professor Jack M. Sosin

Lincoln, Nebraska

December, 1984

(Date should be either month and  
year of oral examination or month  
and year of graduation.)

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BETWEEN INDEPENDENCE AND CONSTITUTION:  
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Gary Duane Olson, Ph.D. or M.A. (or appropriate degree)  
University of Nebraska, 1984 (Year of Graduation)

Adviser: Jack M. Sosin

(Abstract, doubled spaced, not to exceed 350 words should be presented  
in this format.)

XX...  
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PLEASE NOTE: The title of the abstract, the student's name, degree, University  
of Nebraska Lincoln and the year of graduation should all be  
doubled spaced and CENTERED.

# The Science of Scientific Writing

*If the reader is to grasp what the writer means,  
the writer must understand what the reader needs*

George D. Gopen and Judith A. Swan

Science is often hard to read. Most people assume that its difficulties are born out of necessity, out of the extreme complexity of scientific concepts, data and analysis. We argue here that complexity of thought need not lead to impenetrability of expression; we demonstrate a number of rhetorical principles that can produce clarity in communication without oversimplifying scientific issues. The results are substantive, not merely cosmetic: Improving the quality of writing actually improves the quality of thought.

The fundamental purpose of scientific discourse is not the mere presentation of information and thought, but rather its actual communication. It does not matter how pleased an author might be to have converted all the right data into sentences and paragraphs; it matters only whether a large majority of the reading audience accurately perceives what the author had in mind. Therefore, in order to understand how best to improve writing, we would do well to understand better how readers go about reading. Such an understanding has recently become available through work done in the fields of rhetoric, linguistics and cognitive psychology. It has helped to produce a methodology based on the concept of reader expectations.

**Writing with the Reader in Mind: Expectation and Context**  
Readers do not simply read; they interpret. Any piece of prose, no matter how short, may "mean" in 10 (or more) different ways to 10 different readers. This methodology of reader expectations is founded on the recognition that readers make many of their most important interpretive decisions about the substance of prose based on clues they receive from its structure.

This interplay between substance and structure can be demonstrated by something as basic as a simple table. Let us say that in tracking the temperature of a liquid over a period of time, an investigator takes measurements every

three minutes and records a list of temperatures. Those data could be presented by a number of written structures. Here are two possibilities:

$t$  (time) = 15',  $T$  (temperature) = 32°;  $t$  = 0',  $T$  = 25°;  
 $t$  = 6',  $T$  = 29°;  $t$  = 3',  $T$  = 27°;  $t$  = 12',  $T$  = 32°;  $t$  = 9',  $T$  = 31°

time (min)	temperature (°C)
0	25
3	27
6	29
9	31
12	32
15	32

Precisely the same information appears in both formats, yet most readers find the second easier to interpret. It may be that the very familiarity of the tabular structure makes it easier to use. But, more significantly, the structure of the second table provides the reader with an easily perceived context (time) in which the significant piece of information (temperature) can be interpreted. The contextual material appears on the left in a pattern that produces an expectation of regularity; the interesting results appear on the right in a less obvious pattern, the discovery of which is the point of the table.

If the two sides of this simple table are reversed, it becomes much harder to read.

temperature (°C)	time (min)
25	0
27	3
29	6
31	9
32	12
32	15

Since we read from left to right, we prefer the context on the left, where it can more effectively familiarize the reader. We prefer the new, important information on the right, since its job is to intrigue the reader.

Information is interpreted more easily and more uniformly if it is placed where most readers expect to find it. These needs and expectations of readers affect the inter-

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pretation not only of tables and illustrations but also of prose itself. Readers have relatively fixed expectations about where in the structure of prose they will encounter particular items of its substance. If writers can become consciously aware of these locations, they can better control the degrees of recognition and emphasis a reader will give to the various pieces of information being presented. Good writers are intuitively aware of these expectations; that is why their prose has what we call "shape."

This underlying concept of reader expectation is perhaps most immediately evident at the level of the largest units of discourse. (A unit of discourse is defined as anything with a beginning and an end: a clause, a sentence, a section, an article, etc.) A research article, for example, is generally divided into recognizable sections, sometimes labeled Introduction, Experimental Methods, Results and Discussion. When the sections are confused—when too much experimental detail is found in the Results section, or when discussion and results intermingle—readers are often equally confused. In smaller units of discourse the functional divisions are not so explicitly labeled, but readers have definite expectations all the same, and they search for certain information in particular places. If these structural expectations are continually violated, readers are forced to divert energy from understanding the content of a passage to unraveling its structure. As the complexity of the content increases moderately, the possibility of misinterpretation or noninterpretation increases dramatically.

We present here some results of applying this methodology to research reports in the scientific literature. We have taken several passages from research articles (either published or accepted for publication) and have suggested ways of rewriting them by applying principles derived from the study of reader expectations. We have not sought to transform the passages into "plain English" for the use of the general public; we have neither decreased the jargon nor diluted the science. We have striven not for simplification but for clarification.

### Reader Expectations for the Structure of Prose

Here is our first example of scientific prose, in its original form:

The smallest of the URF's (URFA6L), a 207-nucleotide (nt) reading frame overlapping out of phase the  $\text{NH}_2$ -terminal portion of the adenosinetriphosphatase (ATPase) subunit 6 gene has been identified as the animal equivalent of the recently discovered yeast H<sup>+</sup>-ATPase subunit 8 gene. The functional significance of the other URF's has been, on the contrary, elusive. Recently, however, immunoprecipitation experiments with antibodies to purified, rotenone-sensitive NADH-ubiquinone oxidoreductase [hereafter referred to as respiratory chain NADH dehydrogenase or complex I] from bovine heart, as well as enzyme fractionation studies, have indicated that six human URF's (that is, URF1, URF2, URF3, URF4, URF4L, and URF5, hereafter referred to as ND1, ND2, ND3, ND4, ND4L, and ND5) encode subunits of complex I. This is a large complex that also contains many subunits synthesized in the cytoplasm.\*

Ask any ten people why this paragraph is hard to read, and nine are sure to mention the technical vocabulary; sev-

eral will also suggest that it requires specialized background knowledge. Those problems turn out to be only a small part of the difficulty. Here is the passage again, with the difficult words temporarily lifted:

The smallest of the URF's, an [A], has been identified as a [B] subunit 8 gene. The functional significance of the other URF's has been, on the contrary, elusive. Recently, however, [C] experiments, as well as [D] studies, have indicated that six human URF's [1-6] encode subunits of Complex I. This is a large complex that also contains many subunits synthesized in the cytoplasm.

It may now be easier to survive the journey through the prose, but the passage is still difficult. Any number of questions present themselves: What has the first sentence of the passage to do with the last sentence? Does the third sentence contradict what we have been told in the second

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*Information is interpreted more easily and more uniformly if it is placed where most readers expect to find it.*

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sentence? Is the functional significance of URF's still "elusive"? Will this passage lead us to further discussion about URF's, or about Complex I, or both?

Knowing a little about the subject matter does not clear up all the confusion. The intended audience of this passage would probably possess at least two items of essential technical information: first, "URF" stands for "Uninterrupted Reading Frame," which describes a segment of DNA organized in such a way that it could encode a protein, although no such protein product has yet been identified; second, both ATPase and NADH oxidoreductase are enzyme complexes central to energy metabolism. Although this information may provide some sense of comfort, it does little to answer the interpretive questions that need answering. It seems the reader is hindered by more than just the scientific jargon.

To get at the problem, we need to articulate something about how readers go about reading. We proceed to the first of several reader expectations.

### Subject-Verb Separation

Look again at the first sentence of the passage cited above. It is relatively long, 42 words; but that turns out not to be the main cause of its burdensome complexity. Long sentences need not be difficult to read; they are only difficult to write. We have seen sentences of over 100 words that flow

\*The full paragraph includes one more sentence: "Support for such functional identification of the URF products has come from the finding that the purified rotenone-sensitive NADH dehydrogenase from *Neurospora crassa* contains several subunits synthesized within the mitochondria, and from the observation that the stopper mutant of *Neurospora crassa*, whose mtDNA lacks two genes homologous to URF2 and URF3, has no functional complex I." We have omitted this sentence both because the passage is long enough as is and because it raises no additional structural issues.

easily and persuasively toward their clearly demarcated destination. Those well-wrought serpents all had something in common: Their structure presented information to readers in the order the readers needed and expected it.

The first sentence of our example passage does just the opposite: it burdens and obstructs the reader, because of an all-too-common structural defect. Note that the grammatical subject ("the smallest") is separated from its verb ("has been identified") by 23 words, more than half the sentence.

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*Beginning with the exciting material and ending with a lack of luster often leaves us disappointed and destroys our sense of momentum.*

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Readers expect a grammatical subject to be followed immediately by the verb. Anything of length that intervenes between subject and verb is read as an interruption, and therefore as something of lesser importance.

The reader's expectation stems from a pressing need for syntactic resolution, fulfilled only by the arrival of the verb. Without the verb, we do not know what the subject is doing, or what the sentence is all about. As a result, the reader focuses attention on the arrival of the verb and resists recognizing anything in the interrupting material as being of primary importance. The longer the interruption lasts, the more likely it becomes that the "interruptive" material actually contains important information; but its structural location will continue to brand it as merely interruptive. Unfortunately, the reader will not discover its true value until too late—until the sentence has ended without having produced anything of much value outside of that subject-verb interruption.

In this first sentence of the paragraph, the relative importance of the intervening material is difficult to evaluate. The material might conceivably be quite significant, in which case the writer should have positioned it to reveal that importance. Here is one way to incorporate it into the sentence structure:

The smallest of the URF's is URFA6L, a 207-nucleotide (nt) reading frame overlapping out of phase the NH<sub>2</sub>-terminal portion of the adenosinetriphosphatase (ATPase) subunit 6 gene; it has been identified as the animal equivalent of the recently discovered yeast H<sup>+</sup>-ATPase subunit 8 gene.

On the other hand, the intervening material might be a mere aside that diverts attention from more important ideas; in that case the writer should have deleted it, allowing the prose to drive more directly toward its significant point:

The smallest of the URF's (URFA6L) has been identified as the animal equivalent of the recently discovered yeast H<sup>+</sup>-ATPase subunit 8 gene.

Only the author could tell us which of these revisions more accurately reflects his intentions.

These revisions lead us to a second set of reader expectations. Each unit of discourse, no matter what the size, is expected to serve a single function, to make a single point. In the case of a sentence, the point is expected to appear in a specific place reserved for emphasis.

### The Stress Position

It is a linguistic commonplace that readers naturally emphasize the material that arrives at the end of a sentence. We refer to that location as a "stress position." If a writer is consciously aware of this tendency, she can arrange for the emphatic information to appear at the moment the reader is naturally exerting the greatest reading emphasis. As a result, the chances greatly increase that reader and writer will perceive the same material as being worthy of primary emphasis. The very structure of the sentence thus helps persuade the reader of the relative values of the sentence's contents.

The inclination to direct more energy to that which arrives last in a sentence seems to correspond to the way we work at tasks through time. We tend to take something like a "mental breath" as we begin to read each new sentence, thereby summoning the tension with which we pay attention to the unfolding of the syntax. As we recognize that the sentence is drawing toward its conclusion, we begin to exhale that mental breath. The exhalation produces a sense of emphasis. Moreover, we delight in being rewarded at the end of a labor with something that makes the ongoing effort worthwhile. Beginning with the exciting material and ending with a lack of luster often leaves us disappointed and destroys our sense of momentum. We do not start with the strawberry shortcake and work our way up to the broccoli.

When the writer puts the emphatic material of a sentence in any place other than the stress position, one of two things can happen; both are bad. First, the reader might find the stress position occupied by material that clearly is not worthy of emphasis. In this case, the reader must discern, without any additional structural clue, what else in the sentence may be the most likely candidate for emphasis. There are no secondary structural indications to fall back upon. In sentences that are long, dense or sophisticated, chances soar that the reader will not interpret the prose precisely as the writer intended. The second possibility is even worse: The reader may find the stress position occupied by something that does appear capable of receiving emphasis, even though the writer did not intend to give it any stress. In that case, the reader is highly likely to emphasize this imposter material, and the writer will have lost an important opportunity to influence the reader's interpretive process.

The stress position can change in size from sentence to sentence. Sometimes it consists of a single word; sometimes it extends to several lines. The definitive factor is this: The stress position coincides with the moment of syntactic closure. A reader has reached the beginning of the stress position when she knows there is nothing left in the clause or sentence but the material presently being read. Thus a whole list, numbered and indented, can occupy the stress position of a sentence if it has been clearly announced as being all that remains of that sentence. Each member of that list, in turn, may have its own internal stress position, since each member may produce its own syntactic closure.

Within a sentence, secondary stress positions can be

formed by the appearance of a properly used colon or semicolon; by grammatical convention, the material preceding these punctuation marks must be able to stand by itself as a complete sentence. Thus, sentences can be extended effortlessly to dozens of words, as long as there is a medial syntactic closure for every piece of new, stress-worthy information along the way. One of our revisions of the initial sentence can serve as an example:

The smallest of the URF's is URFA6L, a 207-nucleotide (nt) reading frame overlapping out of phase the NH<sub>2</sub>-terminal portion of the adenosinetriphosphatase (ATPase) subunit 6 gene; it has been identified as the animal equivalent of the recently discovered yeast H<sup>+</sup>-ATPase subunit 8 gene.

By using a semicolon, we created a second stress position to accommodate a second piece of information that seemed to require emphasis.

We now have three rhetorical principles based on reader expectations: First, grammatical subjects should be followed as soon as possible by their verbs; second, every unit of discourse, no matter the size, should serve a single function or make a single point; and, third, information intended to be emphasized should appear at points of syntactic closure. Using these principles, we can begin to unravel the problems of our example prose.

Note the subject-verb separation in the 62-word third sentence of the original passage:

Recently, however, immunoprecipitation experiments with antibodies to purified, rotenone-sensitive NADH-ubiquinone oxido-reductase [hereafter referred to as respiratory chain NADH dehydrogenase or complex I] from bovine heart, as well as enzyme fractionation studies, have indicated that six human URF's (that is, URF1, URF2, URF3, URF4, URF4L, and URF5, hereafter referred to as ND1, ND2, ND3, ND4, ND4L, and ND5) encode subunits of complex I.

After encountering the subject ("experiments"), the reader must wade through 27 words (including three hyphenated compound words, a parenthetical interruption and an "as well as" phrase) before alighting on the highly uninformative and disappointingly anticlimactic verb ("have indicated"). Without a moment to recover, the reader is handed a "that" clause in which the new subject ("six human URF's") is separated from its verb ("encode") by yet another 20 words.

If we applied the three principles we have developed to the rest of the sentences of the example, we could generate a great many revised versions of each. These revisions might differ significantly from one another in the way their structures indicate to the reader the various weights and balances to be given to the information. Had the author placed all stress-worthy material in stress positions, we as a reading community would have been far more likely to interpret these sentences uniformly.

We couch this discussion in terms of "likelihood" because we believe that meaning is not inherent in discourse by itself; "meaning" requires the combined participation of text and reader. All sentences are infinitely interpretable, given an infinite number of interpreters. As communities of readers, however, we tend to work out tacit agreements as to what kinds of meaning are most likely to be extracted

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*We cannot succeed in making even a single sentence mean one and only one thing; we can only increase the odds that a large majority of readers will tend to interpret our discourse according to our intentions.*

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from certain articulations. We cannot succeed in making even a single sentence mean one and only one thing; we can only increase the odds that a large majority of readers will tend to interpret our discourse according to our intentions. Such success will follow from authors becoming more consciously aware of the various reader expectations presented here.

Here is one set of revisionary decisions we made for the example:

The smallest of the URF's, URFA6L, has been identified as the animal equivalent of the recently discovered yeast H<sup>+</sup>-ATPase subunit 8 gene; but the functional significance of other URF's has been more elusive. Recently, however, several human URF's have been shown to encode subunits of rotenone-sensitive NADH-ubiquinone oxido-reductase. This is a large complex that also contains many subunits synthesized in the cytoplasm; it will be referred to hereafter as respiratory chain NADH dehydrogenase or complex I. Six subunits of Complex I were shown by enzyme fractionation studies and immunoprecipitation experiments to be encoded by six human URF's (URF1, URF2, URF3, URF4, URF4L, and URF5); these URF's will be referred to subsequently as ND1, ND2, ND3, ND4, ND4L, and ND5.

Sheer length was neither the problem nor the solution. The revised version is not noticeably shorter than the original; nevertheless, it is significantly easier to interpret. We have indeed deleted certain words, but not on the basis of wordiness or excess length. (See especially the last sentence of our revision.)

When is a sentence too long? The creators of readability formulas would have us believe there exists some fixed number of words (the favorite is 29) past which a sentence is too hard to read. We disagree. We have seen 10-word sentences that are virtually impenetrable and, as we mentioned above, 100-word sentences that flow effortlessly to their points of resolution. In place of the word-limit concept, we offer the following definition: A sentence is too long when it has more viable candidates for stress positions than there are stress positions available. Without the stress position's locational clue that its material is intended to be emphasized, readers are left too much to their own devices in deciding just what else in a sentence might be considered important.

In revising the example passage, we made certain decisions about what to omit and what to emphasize. We put

subjects and verbs together to lessen the reader's syntactic burdens; we put the material we believed worthy of emphasis in stress positions; and we discarded material for which we could not discern significant connections. In doing so, we have produced a clearer passage—but not one that necessarily reflects the author's intentions; it reflects only our interpretation of the author's intentions. The more problematic the structure, the less likely it becomes that a grand majority of readers will perceive the discourse in exactly the way the author intended.

It is probable that many of our readers—and perhaps even the authors—will disagree with some of our choices. If so, that disagreement underscores our point: The origi-

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## *The information that begins a sentence establishes for the reader a perspective for viewing the sentence as a unit.*

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nal failed to communicate its ideas and their connections clearly. If we happened to have interpreted the passage as you did, then we can make a different point: No one should have to work as hard as we did to unearth the content of a single passage of this length.

### **The Topic Position**

To summarize the principles connected with the stress position, we have the proverbial wisdom, "Save the best for last." To summarize the principles connected with the other end of the sentence, which we will call the topic position, we have its proverbial contradiction, "First things first." In the stress position the reader needs and expects closure and fulfillment; in the topic position the reader needs and expects perspective and context. With so much of reading comprehension affected by what shows up in the topic position, it behooves a writer to control what appears at the beginning of sentences with great care.

The information that begins a sentence establishes for the reader a perspective for viewing the sentence as a unit: Readers expect a unit of discourse to be a story about whoever shows up first. "Bees disperse pollen" and "Pollen is dispersed by bees" are two different but equally respectable sentences about the same facts. The first tells us something about bees; the second tells us something about pollen. The passivity of the second sentence does not by itself impair its quality; in fact, "Pollen is dispersed by bees" is the superior sentence if it appears in a paragraph that intends to tell us a continuing story about pollen. Pollen's story at that moment is a passive one.

Readers also expect the material occupying the topic position to provide them with linkage (looking backward) and context (looking forward). The information in the topic position prepares the reader for upcoming material by connecting it backward to the previous discussion. Although linkage and context can derive from several sources, they stem primarily from material that the reader has already encountered within this particular piece of discourse. We refer to this familiar, previously introduced ma-

terial as "old information." Conversely, material making its first appearance in a discourse is "new information." When new information is important enough to receive emphasis, it functions best in the stress position.

When old information consistently arrives in the topic position, it helps readers to construct the logical flow of the argument: It focuses attention on one particular strand of the discussion, both harkening backward and leaning forward. In contrast, if the topic position is constantly occupied by material that fails to establish linkage and context, readers will have difficulty perceiving both the connection to the previous sentence and the projected role of the new sentence in the development of the paragraph as a whole.

Here is a second example of scientific prose that we shall attempt to improve in subsequent discussion:

Large earthquakes along a given fault segment do not occur at random intervals because it takes time to accumulate the strain energy for the rupture. The rates at which tectonic plates move and accumulate strain at their boundaries are approximately uniform. Therefore, in first approximation, one may expect that large ruptures of the same fault segment will occur at approximately constant time intervals. If subsequent mainshocks have different amounts of slip across the fault, then the recurrence time may vary, and the basic idea of periodic mainshocks must be modified. For great plate boundary ruptures the length and slip often vary by a factor of 2. Along the southern segment of the San Andreas fault the recurrence interval is 145 years with variations of several decades. The smaller the standard deviation of the average recurrence interval, the more specific could be the long term prediction of a future mainshock.

This is the kind of passage that in subtle ways can make readers feel badly about themselves. The individual sentences give the impression of being intelligently fashioned: They are not especially long or convoluted; their vocabulary is appropriately professional but not beyond the ken of educated general readers; and they are free of grammatical and dictional errors. On first reading, however, many of us arrive at the paragraph's end without a clear sense of where we have been or where we are going. When that happens, we tend to berate ourselves for not having paid close enough attention. In reality, the fault lies not with us, but with the author.

We can distill the problem by looking closely at the information in each sentence's topic position:

Large earthquakes  
The rates  
Therefore... one  
subsequent mainshocks  
great plate boundary ruptures  
the southern segment of the San Andreas fault  
the smaller the standard deviation...

Much of this information is making its first appearance in this paragraph—in precisely the spot where the reader looks for old, familiar information. As a result, the focus of the story constantly shifts. Given just the material in the topic positions, no two readers would be likely to construct exactly the same story for the paragraph as a whole.

If we try to piece together the relationship of each sen-



tence to its neighbors, we notice that certain bits of old information keep reappearing. We hear a good deal about the recurrence time between earthquakes: The first sentence introduces the concept of nonrandom intervals between earthquakes; the second sentence tells us that recurrence rates due to the movement of tectonic plates are more or less uniform; the third sentence adds that the recurrence rate of major earthquakes should also be somewhat predictable; the fourth sentence adds that recurrence rates vary with some conditions; the fifth sentence adds information about one particular variation; the sixth sentence adds a recurrence-rate example from California; and the last sentence tells us something about how recurrence rates can be described statistically. This refrain of "recurrence intervals" constitutes the major string of old information in the paragraph. Unfortunately, it rarely appears at the beginning of sentences, where it would help us maintain our focus on its continuing story.

In reading, as in most experiences, we appreciate the opportunity to become familiar with a new environment before having to function in it. Writing that continually begins sentences with new information and ends with old information forbids both the sense of comfort and orientation at the start and the sense of fulfilling arrival at the end. It misleads the reader as to whose story is being told; it burdens the reader with new information that must be carried further into the sentence before it can be connected to the discussion; and it creates ambiguity as to which material the writer intended the reader to emphasize. All of these distractions require that readers expend a disproportionate amount of energy to unravel the structure of the prose, leaving less energy available for perceiving content.

We can begin to revise the example by ensuring the following for each sentence:

1. The backward-linking old information appears in the topic position.
2. The person, thing or concept whose story it is appears in the topic position.
3. The new, emphasis-worthy information appears in the stress position.

Once again, if our decisions concerning the relative values of specific information differ from yours, we can all blame the author, who failed to make his intentions apparent. Here first is a list of what we perceived to be the new, emphatic material in each sentence:

time to accumulate strain energy along a fault  
approximately uniform  
large ruptures of the same fault  
different amounts of slip  
vary by a factor of 2  
variations of several decades  
predictions of future mainshock

Now, based on these assumptions about what deserves stress, here is our proposed revision:

Large earthquakes along a given fault segment do not occur at random intervals because it takes time to accumulate the strain energy for the rupture. The rates at which tectonic plates move and accumulate strain at their boundaries are roughly uniform. Therefore, nearly constant time intervals (at first approximation) would be expected between large ruptures of the same fault segment. [However?], the recurrence time may vary; the basic idea of periodic mainshocks may need to be modified

if subsequent mainshocks have different amounts of slip across the fault. [Indeed?], the length and slip of great plate boundary ruptures often vary by a factor of 2. [For example?], the recurrence interval along the southern segment of the San Andreas fault is 145 years with variations of several decades. The smaller the standard deviation of the average recurrence interval, the more specific could be the long term prediction of a future mainshock.

Many problems that had existed in the original have now surfaced for the first time. Is the reason earthquakes do not occur at random intervals stated in the first sentence or in the second? Are the suggested choices of "however," "indeed," and "for example" the right ones to express the connections at those points? (All these connections were left unarticulated in the original paragraph.) If "for example" is an inaccurate transitional phrase, then exactly how does the San Andreas fault example connect to ruptures that "vary by a factor of 2"? Is the author arguing that recurrence rates must vary because fault movements often vary? Or is the author preparing us for a discussion of how in spite of such variance we might still be able to predict earthquakes? This last question remains unanswered because the final sentence leaves behind earthquakes that recur at variable intervals and switches instead to earthquakes that recur regularly. Given that this is the first paragraph of the article, which type of earthquake

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## *In our experience, the misplacement of old and new information turns out to be the No. 1 problem in American professional writing today.*

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will the article most likely proceed to discuss? In sum, we are now aware of how much the paragraph had not communicated to us on first reading. We can see that most of our difficulty was owing not to any deficiency in our reading skills but rather to the author's lack of comprehension of our structural needs as readers.

In our experience, the misplacement of old and new information turns out to be the No. 1 problem in American professional writing today. The source of the problem is not hard to discover: Most writers produce prose linearly (from left to right) and through time. As they begin to formulate a sentence, often their primary anxiety is to capture the important new thought before it escapes. Quite naturally they rush to record that new information on paper, after which they can produce at their leisure the contextualizing material that links back to the previous discourse. Writers who do this consistently are attending more to their own need for unburdening themselves of their information than to the reader's need for receiving the material. The methodology of reader expectations articulates the reader's needs explicitly, thereby making writers consciously aware of structural problems and ways to solve them.

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*Put in the topic position the old information that links backward; put in the stress position the new information you want the reader to emphasize.*

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A note of clarification: Many people hearing this structural advice tend to oversimplify it to the following rule: "Put the old information in the topic position and the new information in the stress position." No such rule is possible. Since by definition all information is either old or new, the space between the topic position and the stress position must also be filled with old and new information. Therefore the principle (not rule) should be stated as follows: "Put in the topic position the old information that links backward; put in the stress position the new information you want the reader to emphasize."

#### Perceiving Logical Gaps

When old information does not appear at all in a sentence, whether in the topic position or elsewhere, readers are left to construct the logical linkage by themselves. Often this happens when the connections are so clear in the writer's mind that they seem unnecessary to state; at those moments, writers underestimate the difficulties and ambiguities inherent in the reading process. Our third example attempts to demonstrate how paying attention to the placement of old and new information can reveal where a writer has neglected to articulate essential connections.

The enthalpy of hydrogen bond formation between the nucleoside bases 2'deoxyguanosine (dG) and 2'deoxycytidine (dC) has been determined by direct measurement. dG and dC were derivatized at the 5' and 3' hydroxyls with triisopropylsilyl groups to obtain solubility of the nucleosides in non-aqueous solvents and to prevent the ribose hydroxyls from forming hydrogen bonds. From isoperibolic titration measurements, the enthalpy of dC:dG base pair formation is  $-6.65 \pm 0.32$  kcal/mol.

Although part of the difficulty of reading this passage may stem from its abundance of specialized technical terms, a great deal more of the difficulty can be attributed to its structural problems. These problems are now familiar: We are not sure at all times whose story is being told; in the first sentence the subject and verb are widely separated; the second sentence has only one stress position but two or three pieces of information that are probably worthy of emphasis—"solubility... solvents," "prevent... from forming hydrogen bonds" and perhaps "triisopropylsilyl groups." These perceptions suggest the following revision tactics:

1. Invert the first sentence, so that (a) the subject-verb-complement connection is unbroken, and (b) "dG" and "dC" are introduced in the stress position as new and interesting information. (Note that inverting the sentence requires stating who made the measurement; since the au-

thors performed the first direct measurement, recognizing their agency in the topic position may well be appropriate.)

2. Since "dG" and "dC" become the old information in the second sentence, keep them up front in the topic position.

3. Since "triisopropylsilyl groups" is new and important information here, create for it a stress position.

4. "Triisopropylsilyl groups" then becomes the old information of the clause in which its effects are described; place it in the topic position of this clause.

5. Alert the reader to expect the arrival of two distinct effects by using the flag word "both." "Both" notifies the reader that two pieces of new information will arrive in a single stress position.

Here is a partial revision based on these decisions:

We have directly measured the enthalpy of hydrogen bond formation between the nucleoside bases 2'deoxyguanosine (dG) and 2'deoxycytidine (dC). dG and dC were derivatized at the 5' and 3' hydroxyls with triisopropylsilyl groups; these groups serve both to solubilize the nucleosides in non-aqueous solvents and to prevent the ribose hydroxyls from forming hydrogen bonds. From isoperibolic titration measurements, the enthalpy of dC:dG base pair formation is  $-6.65 \pm 0.32$  kcal/mol.

The outlines of the experiment are now becoming visible, but there is still a major logical gap. After reading the second sentence, we expect to hear more about the two effects that were important enough to merit placement in its stress position. Our expectations are frustrated, however, when those effects are not mentioned in the next sentence: "From isoperibolic titration measurements, the enthalpy of dC:dG base pair formation is  $-6.65 \pm 0.32$  kcal/mol." The authors have neglected to explain the relationship between the derivatization they performed (in the second sentence) and the measurements they made (in the third sentence). Ironically, that is the point they most wished to make here.

At this juncture, particularly astute readers who are chemists might draw upon their specialized knowledge, silently supplying the missing connection. Other readers are left in the dark. Here is one version of what we think the authors meant to say, with two additional sentences supplied from a knowledge of nucleic acid chemistry:

We have directly measured the enthalpy of hydrogen bond formation between the nucleoside bases 2'deoxyguanosine (dG) and 2'deoxycytidine (dC). dG and dC were derivatized at the 5' and 3' hydroxyls with triisopropylsilyl groups; these groups serve both to solubilize the nucleosides in non-aqueous solvents and to prevent the ribose hydroxyls from forming hydrogen bonds. Consequently, when the derivatized nucleosides are dissolved in non-aqueous solvents, hydrogen bonds form almost exclusively between the bases. Since the inter-base hydrogen bonds are the only bonds to form upon mixing, their enthalpy of formation can be determined directly by measuring the enthalpy of mixing. From our isoperibolic titration measurements, the enthalpy of dG:dC base pair formation is  $-6.65 \pm 0.32$  kcal/mol.

Each sentence now proceeds logically from its predecessor. We never have to wander too far into a sentence without being told where we are and what former strands of

discourse are being continued. And the "measurements" of the last sentence has now become old information, reaching back to the "measured directly" of the preceding sentence. (It also fulfills the promise of the "we have directly measured" with which the paragraph began.) By following our knowledge of reader expectations, we have been able to spot discontinuities, to suggest strategies for bridging gaps, and to rearrange the structure of the prose, thereby increasing the accessibility of the scientific content.

#### Locating the Action

Our final example adds another major reader expectation to the list.

Transcription of the 5S RNA genes in the egg extract is TFIIIA-dependent. This is surprising, because the concentration of TFIIIA is the same as in the oocyte nuclear extract. The other transcription factors and RNA polymerase III are presumed to be in excess over available TFIIIA, because tRNA genes are transcribed in the egg extract. The addition of egg extract to the oocyte nuclear extract has two effects on transcription efficiency. First, there is a general inhibition of transcription that can be alleviated in part by supplementation with high concentrations of RNA polymerase III. Second, egg extract destabilizes transcription complexes formed with oocyte but not somatic 5S RNA genes.

The barriers to comprehension in this passage are so many that it may appear difficult to know where to start revising. Fortunately, it does not matter where we start, since attending to any one structural problem eventually leads us to all the others.

We can spot one source of difficulty by looking at the topic positions of the sentences: We cannot tell whose story the passage is. The story's focus (that is, the occupant of the topic position) changes in every sentence. If we search for repeated old information in hope of settling on a good candidate for several of the topic positions, we find all too much of it: egg extract, TFIIIA, oocyte extract, RNA polymerase III, 5S RNA, and transcription. All of these reappear at various points, but none announces itself clearly as our primary focus. It appears that the passage is trying to tell several stories simultaneously, allowing none to dominate.

We are unable to decide among these stories because the author has not told us what to do with all this information. We know who the players are, but we are ignorant of the actions they are presumed to perform. This violates yet another important reader expectation: Readers expect the action of a sentence to be articulated by the verb.

Here is a list of the verbs in the example paragraph:

is  
is... is  
are presumed to be  
are transcribed  
has  
is... can be alleviated  
destabilizes

The list gives us too few clues as to what actions actually take place in the passage. If the actions are not to be found in the verbs, then we as readers have no secondary structural clues for where to locate them. Each of us has to

make a personal interpretive guess: the writer no longer controls the reader's interpretive act.

Worse still, in this passage the important actions never

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*As critical scientific readers, we would like to concentrate our energy on whether the experiments prove the hypotheses.*

---

appear. Based on our best understanding of this material, the verbs that connect these players are "limit" and "inhibit." If we express those actions as verbs and place the most frequently occurring information—"egg extract" and "TFIIIA"—in the topic position whenever possible,\* we can generate the following revision:

In the egg extract, the availability of TFIIIA limits transcription of the 5S RNA genes. This is surprising because the same concentration of TFIIIA does not limit transcription in the oocyte nuclear extract. In the egg extract, transcription is not limited by RNA polymerase or other factors because transcription of tRNA genes indicates that these factors are in excess over available TFIIIA. When added to the nuclear extract, the egg extract affected the efficiency of transcription in two ways. First, it inhibited transcription generally; this inhibition could be alleviated in part by supplementing the mixture with high concentrations of RNA polymerase III. Second, the egg extract destabilized transcription complexes formed by oocyte but not by somatic 5S genes.

As a story about "egg extract," this passage still leaves something to be desired. But at least now we can recognize that the author has not explained the connection between "limit" and "inhibit." This unarticulated connection seems to us to contain both of her hypotheses: First, that the limitation on transcription is caused by an inhibitor of TFIIIA present in the egg extract; and, second, that the action of that inhibitor can be detected by adding the egg extract to the oocyte extract and examining the effects on transcription. As critical scientific readers, we would like to concentrate our energy on whether the experiments prove the hypotheses. We cannot begin to do so if we are left in doubt as to what those hypotheses might be—and if we are using most of our energy to discern the structure of the prose rather than its substance.

#### Writing and the Scientific Process

We began this article by arguing that complex thoughts expressed in impenetrable prose can be rendered accessible and clear without minimizing any of their complexity. Our

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\*We have chosen these two pieces of old information as the controlling contexts for the passage. That choice was neither arbitrary nor born of logical necessity; it was simply an act of interpretation. All readers make exactly that kind of choice in the reading of every sentence. The fewer the structural clues to interpretation given by the author, the more variable the resulting interpretations will tend to be.

examples of scientific writing have ranged from the merely cloudy to the virtually opaque; yet all of them could be made significantly more comprehensible by observing the following structural principles:

1. Follow a grammatical subject as soon as possible with its verb.
2. Place in the stress position the "new information" you want the reader to emphasize.
3. Place the person or thing whose "story" a sentence is telling at the beginning of the sentence, in the topic position.
4. Place appropriate "old information" (material already stated in the discourse) in the topic position for linkage backward and contextualization forward.
5. Articulate the action of every clause or sentence in its verb.
6. In general, provide context for your reader before asking that reader to consider anything new.
7. In general, try to ensure that the relative emphases of the substance coincide with the relative expectations for emphasis raised by the structure.

None of these reader-expectation principles should be

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*It may seem obvious that a scientific document is incomplete without the interpretation of the writer; it may not be so obvious that the document cannot "exist" without the interpretation of each reader.*

---

considered "rules." Slavish adherence to them will succeed no better than has slavish adherence to avoiding split infinitives or to using the active voice instead of the passive. There can be no fixed algorithm for good writing, for two reasons. First, too many reader expectations are functioning at any given moment for structural decisions to remain clear and easily activated. Second, any reader expectation can be violated to good effect. Our best stylists turn out to be our most skillful violators; but in order to carry this off, they must fulfill expectations most of the time, causing the violations to be perceived as exceptional moments, worthy of note.

A writer's personal style is the sum of all the structural choices that person tends to make when facing the challenges of creating discourse. Writers who fail to put new information in the stress position of many sentences in one document are likely to repeat that unhelpful structural pattern in all other documents. But for the very reason that writers tend to be consistent in making such choices, they can learn to improve their writing style; they can permanently reverse those habitual structural decisions that mislead or burden readers.

We have argued that the substance of thought and the

expression of thought are so inextricably intertwined that changes in either will affect the quality of the other. Note that only the first of our examples (the paragraph about URF's) could be revised on the basis of the methodology to reveal a nearly finished passage. In all the other examples, revision revealed existing conceptual gaps and other problems that had been submerged in the originals by dysfunctional structures. Filling the gaps required the addition of extra material. In revising each of these examples, we arrived at a point where we could proceed no further without either supplying connections between ideas or eliminating some existing material altogether. (Writers who use reader-expectation principles on their own prose will not have to conjecture or infer; they know what the prose is intended to convey.) Having begun by analyzing the structure of the prose, we were led eventually to reinvestigate the substance of the science.

The substance of science comprises more than the discovery and recording of data; it extends crucially to include the act of interpretation. It may seem obvious that a scientific document is incomplete without the interpretation of the writer; it may not be so obvious that the document cannot "exist" without the interpretation of each reader. In other words, writers cannot "merely" record data, even if they try. In any recording or articulation, no matter how haphazard or confused, each word resides in one or more distinct structural locations. The resulting structure, even more than the meanings of individual words, significantly influences the reader during the act of interpretation. The question then becomes whether the structure created by the writer (intentionally or not) helps or hinders the reader in the process of interpreting the scientific writing.

The writing principles we have suggested here make conscious for the writer some of the interpretive clues readers derive from structures. Armed with this awareness, the writer can achieve far greater control (although never complete control) of the reader's interpretive process. As a concomitant function, the principles simultaneously offer the writer a fresh re-entry to the thought process that produced the science. In real and important ways, the structure of the prose becomes the structure of the scientific argument. Improving either one will improve the other.

*The methodology described in this article originated in the linguistic work of Joseph M. Williams of the University of Chicago, Gregory G. Colomb of the Georgia Institute of Technology and George D. Gopen. Some of the materials presented here were discussed and developed in faculty writing workshops held at the Duke University Medical School.*

#### Bibliography

- Williams, Joseph M. 1986. *Style: Ten Lessons in Clarity and Grace*. Scott, Foresman, & Co.
- Colomb, Gregory G., and Joseph M. Williams. 1985. Perceiving structure in professional prose: a multiply determined experience. In *Writing in Non-Academic Settings*, eds. Lee Odell and Dixie Goswami. Guilford Press, pp. 87-126.
- Gopen, George D. 1987. Let the buyer in ordinary course of business beware: suggestions for revising the language of the Uniform Commercial Code. *University of Chicago Law Review* 54:1176-1214.
- Gopen, George D. 1990. *The Common Sense of Writing: Teaching Writing from the Reader's Perspective*. To be published.





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PRESENT RANK: Forester  
(Equivalent Rank = Professor)

DATE OF RANK: July 1, 1995 TENURE: N/A

APPOINTMENT:

75% Nebraska Forest Service  
25% Renewable Resources Extension Act

EDUCATION:

B.S. 1968 Iowa State University  
M.S. 1977 University of Nebraska

PROFESSIONAL EXPERIENCE:

7/92 - present Asst. State Forester,  
University of Nebraska  
8/77 - 7/92 District & Extension Forester,  
University of Nebraska  
1/76 - 8/77 Regional Fire & Community Forestry  
Planner, UNL  
7/74 - 1/76 Forestry Project Planner, UNL  
2/73 - 7/74 Forestry Field Manager, UNL

PROFESSIONAL LEADERSHIP ASSIGNMENTS: (last 5 years)

Program Leader - NFS Rural Forestry Program  
State Coordinator - Nebraska Forest Stewardship  
Program  
Forestry Coordinator - Renewable Resources Extension  
Act (RREA) Grant  
Forestry Superintendent - Nebraska State Fair 4-H  
Projects  
Northern Great Plains Section Representative -  
Western Stewardship Committee  
Member - 1996 National Envirothon Planning  
Committee  
Program Chair - 1994 National Walnut Council  
Conference

PROFESSIONAL ACTIVITIES: (last 5 years)

Society of American Foresters  
Walnut Council (National and Nebraska Chapter)  
Nebraska Christmas Tree Growers Association  
Nebraska Arborists Association  
Nebraska Nut Growers Association  
Nebraska Statewide Arboretum  
National Arbor Day Foundation  
Oklahoma Red Cedar Association

CURRENT TEACHING ASSIGNMENT:

N/A

CURRENT ADVISING:

N/A

GRANTS AND CONTRACTS: (last 5 years)

N/A

CURRENT RESEARCH EMPHASIS

N/A

PUBLICATIONS: (last 5 years)

Periodical Features

Dennis M. Adams. Protect Your Home With Trees.  
Omaha World Herald feature. July 22, 1991.  
Dennis M. Adams. Christmas Trees as an Alternative  
Crop. Farming Magazine. Sept./Oct., 1991.  
Dennis M. Adams. Woodland Resources. Nebraskaland  
Mag. Chapter 5. January/February, 1993

Circulars

Dennis M. Adams. Nebraska Forest Products  
Manufacturers - Primary Processors. Nebraska  
Forest Service publication. 18 pgs. 1988 with  
annual supplements..  
Dennis M. Adams, Tom Osterman, Ray Sowers, et al.  
Wood Products Trade Directory for Arizona,  
Colorado, South Dakota, Kansas, Nebraska, New  
Mexico and Wyoming. 107 pgs. 1990.  
Dennis M. Adams. Nebraska Christmas Tree Directory.  
8-12 pgs. Annual Publication. 1982 - present.  
Dennis M. Adams. Nebraska Timber Buyers. Directory.  
7 pgs. 1991.  
Dennis M. Adams. Stewardship Forest - The Sign You  
Care. CC 365. 2 pgs. 1992.

Newsletters

Dennis M. Adams. Timber Talk. Nebraska Forest  
Industry Newsletter. 10 pgs. Quarterly. 1978 to  
present.  
Dennis M. Adams. Growing Green. Forestry newsletter  
for Southeast Nebraska. 4-6 pgs. Bimonthly. 1977  
to 1992.  
Dennis M. Adams. Nebraska Chapter of Walnut Council  
Newsletter. 4-6 pgs. 1990 to 1993.

## Brochures/Fact Sheets

- Dennis M. Adams. Nebraska Christmas Tree Species/Variety Evaluation. Annual fact sheet. 1-3 pgs. 1988 to 1992.
- Dennis M. Adams. NRD Tree Planting Programs. Annual fact sheet. 1 pg. 1978 to 1992.
- Dennis M. Adams, Mark O. Harrell, Alex R. Martin, Tom D. Wardle. Chemical Weed Control in First Year Tree Plantings. Information brochure. 1 pg. 1990.
- Dennis M. Adams. Nebraska Consultant Foresters Directory. 1 pg. Revised 1995.
- Dennis M. Adams. Nebraska Fuelwood Specifications. Information Fact Sheet. 1 pg. Revised 1992.
- Dennis M. Adams. Nebraska Christmas Tree Growers Statistical Summary. Annual Fact Sheet. 1 pg. 1983-present.

## Other Publications

- Dennis M. Adams. Western Forest Stewardship. Nebraska section of regional report. 2 pgs. 1991.
- Dennis M. Adams. Nebraska Forest Stewardship Coordinating Committee Member Notebook. Reference notebook. Approximately 100 pgs. 1991.
- Dennis M. Adams. Nebraska Forest Stewardship Management Plan Cover. Standard cover for landowner forest stewardship management plans. 2 pgs. 1991.
- Dennis M. Adams. Moisture Content In-Use Study Report. 2 pgs. 1993.
- Dennis M. Adams. Anipet Field Trial Report. 2 Pgs. 1994.
- Dennis M. Adams. 1994 National Walnut Council Annual Conference Notebook. Informal Proceedings. Approximately 100 pgs. 1994.
- Dennis M. Adams. Nebraska Forest Stewardship Plan. 14 pgs. 1991. Revised 1994.
- Dennis M. Adams. "Scribner Tree and Log Scale Card". 1995.
- Dennis M. Adams. Nebraska Stewardship Incentives Program Handbook. Short Reference 1-NE (SIP). 75 pgs. 1992. Revised 1995.



NAME: K. Arumuganathan (Aru)

PRESENT RANK: Research Assistant Professor;  
Manager

DATE OF RANK: 15 October 1992

TENURE: No

APPOINTMENT: 1.0 FTE Manager,  
Flow Cytometry Core Research Facility

EDUCATION:

B.S. 1975 University of Colombo  
M.S. 1983 University of Wales  
Ph.D. 1988 Ohio University

PROFESSIONAL EXPERIENCE:

1992-present Research Assistant Professor and  
Manager, University of Nebraska  
center for Biotechnology Flow  
cytometry Core Research  
Facility.  
1990-1992 Post-doctoral Associate II,  
Cornell University.  
1988-1990 Post-doctoral Associate I,  
Cornell University.  
1986-1998 Research Associate, Ohio  
University.  
1983-1986 Teaching Associate, Ohio  
University  
1981-1983 British Council Scholar,  
University College of Wales, UK  
1975-1981 Assistant Lecturer, University of  
Jaffna, Sri Lanka.  
1975-1981 Assistant Lecturer, University of  
Colombo, Sri Lanka.  
1973-1974 Student Biochemistry Instructor,  
Faculty of Medicine, University  
of Colombo, Sri Lanka.

PROFESSIONAL SOCIETIES

International Society for Plant Molecular Biology  
International Society of Analytical Cytology  
American Association for the Advancement of  
Science  
Sigma XI  
New York Academy of Sciences

HONORS AND AWARDS

British council Scholar ,1981-1983  
Who's Who in Science and Engineering, 1992,  
1993, 1994, 1995

PROFESSIONAL ACTIVITIES (Last 5 years)

Presented a poster at International Society of Analytical  
Cytology Congress XVIII, Italy, 1996  
Presented two posters at 4th International Conference  
On The Plant Genome "PLANT GENOME  
IV", 1996.  
Presented two posters at 4th International Conference  
On The Plant Genome "PLANT GENOME  
III", 1995  
Completed the BECTON DICKINSON  
IMMUNOCYTOMETRY SYSTEMS Training  
course on FACScan, 1995 and 1996.  
Completed the BECTON DICKINSON  
IMMUNOCYTOMETRY SYSTEMS Training  
course on FACS Vantage, 1995 and 1996  
Presented a poster at Second International Conference  
On The Plant Genome "PLANT GENOME  
II", 1994.  
Presented a paper and a poster at 4th International  
Congress of Plant Molecular Biology, The  
Netherlands , 1994.  
Attended International Society of Analytical Cytology  
Congress XVII, New York, 1994.  
Presented a poster International Society of Analytical  
Cytology Congress XVI, Colorado, 1993.  
Presented a paper and a poster at 3rd International  
Congress of Plant Molecular Biology,  
Arizona, 1991  
Served as a reviewer of manuscripts for publication in  
the following journals: Cytometry, New  
Zealand Journal of Botany, American Society  
of Horticultural Science, Applied and  
environmental Microbiology, Crop Science  
and BioTechniques.  
Served as a reviewer of grant proposals submitted in to  
USDA-NRI - Plant Genome program 1992,  
1993, 1994, 1995, 1996.

CURRENT TEACHING ASSIGNMENT

BS902, fall, every year

CURRENT ADVISING:

1 Postdoctoral Associate

GRANTS AND CONTRACTS (Last 5 years)

1993-1995: USDA National Research Initiative  
Competitive Grant Program-Genome Program  
(\$160,083). " Chromosome-specific libraries  
of tomato". (Co/PI: Elizabeth D. Earle,  
Cornell University)

- 1994- 1996: National Science Foundation Academic Research Infrastructure Program \$256,170). "Acquisition of an Advanced Flow cytometer". (Co/PI; Donald P. Weeks, Director, UNL Center for Biotechnology).
- 1994-1995: University of Nebraska Center for Biotechnology - Mini-Grant (Seed Money) Research Grants Program (\$12,000). "Genomic libraries from monocot chromosomes". (Co/PIs: Shawn Kaeppler, Heidi Kaeppler).
- 1995-1997: USDA National Research Initiative Competitive Grant Program-Genome Program (\$145,000). "Chromosome-specific libraries Maize Genome Research". (Co/PIs: Shawn Kaeppler, Heidi Kaeppler).
- 1995-1996 International Plant Genetics Resources Institute(\$5000). "Estimation of nuclear DNA content of bamboos and rattans". (Co/PI: Dr. Prakash P. Kumar, National University of Singapore, Singapore).

#### CURRENT RESEARCH EMPHASIS:

Project: Chromosome-specific libraries for genome research

The objectives of this project are to: 1) generate chromosome specific libraries for each of the chromosomes of important plant and animal species, 2) to assess the percentage of enrichment for a specific chromosome, 3) develop procedures to use the libraries for chromosome painting, and, 4) determine the quality of DNA from sorted chromosomes for large fragment cloning.

#### PUBLICATIONS (last 5 years):

##### Journal Articles:

- Arumuganathan K, Dale PJ, Cooper JP. (1991). Vernalization in *Lolium temulentum* L.: Responses of *In vitro* Cultures of Mature and Immature Embryos, Shoot Apices and Callus. *Annals of Botany* 67: 173-179.
- Arumuganathan K, Slattery JP, Tanksley SD, Earle ED. (1991). Preparation and flow cytometric analysis of metaphase chromosomes of tomato. *Theoretical and Applied Genetics* 82: 101-111.
- Arumuganathan K, Earle ED. (1991). Estimation of nuclear DNA amounts of plants by flow cytometry. *Plant Molecular Biology Reporter* 9 (3): 229-241
- Arumuganathan K, Earle ED. (1991). Nuclear DNA content of some important plant species. *Plant Molecular Biology Reporter* 9 (3): 208-219
- Dickson EE, Arumuganathan K, Kresovich S, Doyle JJ (1992). Nuclear DNA content variation within the Rosaceae. *American Journal of Botany* 79 (9): 1081-1086.
- Arumuganathan K, Martin GB, Telenius H, Tanksley SD, Earle ED (1994). Chromosome 2-specific DNA clones from sorted chromosomes of tomato. *Molecular and General Genetics* 242: 551-558.
- Martinez CP, Arumuganathan K, Kikuchi H, Earle ED. (1994) Nuclear DNA content of ten rice species as determined by flow cytometry. *Japanese Journal of Genetics* 69: 513-523.
- Lee Jai-Heon, Arumuganathan K, Kaeppler SM, Kaeppler HF, Papa CM. (1996). Cell synchronization and isolation of metaphase chromosomes from maize root tips for flow cytometric analysis and sorting. (in press, *Genome*)
- Hultquist SJ, Vogel KP, Lee DJ, Arumuganathan K, Kaeppler SM. (1996). Chloroplast DNA and nuclear DNA content variation among cultivars of Switchgrass, *Panicum virgatum* L. (In press, *Crop Science*)
- Hultquist SJ, Vogel KP, Kaeppler SM, Arumuganathan K, Lee DJ. (1996). Nuclear DNA content and chloroplast DNA polymorphisms among accessions of *Panicum virgatum* L. from remnant midwestern prairies. (In press, *Crop Science*)

#### Refereed Symposium Proceedings:

- Arumuganathan K, Conia J, Slattery JP, Jackson PJ, Tanksley SD, Earle ED. (1990). Preparation, flow cytometric analysis and sorting of metaphase chromosomes of tomato. *Cytometry supp.* 4: 34.
- Dickson EE, Arumuganathan K, Doyle JJ, Kresovich S. (1991). Nuclear DNA contents of *Malus* section *Chloromeles* and other genera within the Rosaceae as revealed by flow cytometry. *American Journal of Botany* 78 (6): 180.
- Arumuganathan K, Martin GB, Slattery JP, Tanksley SD, Earle ED. (1991). Bivariate flow karyotyping of tomato chromosomes. *Cytometry supp.* 5: 81
- Arumuganathan K, Martin G, Slattery JP, Tanksley SD, Earle ED. (1991). Flow karyotyping, sorting and micro-cloning of tomato chromosomes. In: Program and abstracts: abstract 1716. 3rd Int. Cong. Plant Molec. Biol., Tucson, Arizona, Oct. 1991 abstract # 1716.

- Arumuganathan K, Martin GB, Telenius H, Tanksley SD, Earle ED. (1993). Chromosome 2-specific DNA clones from flow-sorted chromosomes of tomato. *Cytometry* supp. 6: 71.
- Arumuganathan K (1994). Chromosome-specific libraries from flow sorted plant chromosomes. Abstract P150. In: Program and Abstract Guide Plant Genome II - The Second International Conference on the Plant Genome, 24-27 January 1994, San Diego, California.
- Kaeppler SM, Arumuganathan K, Verzani A, Kaeppler HF. (1994). Sorting maize chromosomes using flow cytometry. Maize genetic cooperation, Abstracts.
- Arumuganathan K, Kaeppler SM, Xu Jie, Tanksley SD, Earle ED. (1994). Chromosome-specific libraries from flow sorted plant chromosomes. 4th International Congress of Plant Molecular Biology 19-24 June 1994, Amsterdam, The Netherlands Abstract #72.
- Kaeppler SM, Arumuganathan K, Bevins MA, Kaeppler HF. (1994). Isolation of specific maize chromosomes. *Agron. Abstract* p. 212.
- Kaeppler SM, Kaeppler HF, Arumuganathan K, Papa C, Bevins M, Pedersen J (1995). Library Construction from specific monocot chromosomes using flow cytometry and optical trapping: A progress report. Abstract. In: Program and Abstract Guide Plant Genome III - The Third International Conference on the Plant Genome, 15-20 January 1995, San Diego, California.
- Kaeppler SM, Lee J, Arumuganathan K, Kaeppler HF, Papa C. (1995). Progress in maize chromosome sorting: Synchronization of root-tip meristem and preliminary flow karyotype development. *Agron. Abstract* p176.
- Kaeppler HF, Lee JH, Kaeppler SM, Arumuganathan K, Pedersen JF. (1995). Isolation of metaphase chromosomes from synchronized root tip meristematic cells. *Agron. Abstract* p173.
- Vogel KP, Elmore SJ, Lee DE, Arumuganathan K, Kaeppler SM. (1995). Classification of switchgrass germplasm using flow cytometry. *Agron. Abstract* p184.
- Arumuganathan K, Lee JH, Kaeppler HF, Kaeppler SM. (1996). Cell synchronization and metaphase chromosome isolation from rice and other cereals for flow karyotyping and sorting. Abstract 87 In: Final program & Abstract Guide, Plant Genome IV - The International Conference on the Status of Plant Genome Research. 14-18 January 1996, San Diego, California.
- Lee JH, Arumuganathan K, Kaeppler SM, Papa CM, Kaeppler HF. (1996). Flow karyotyping and chromosome sorting in maize. Abstract 99 In: Final program & Abstract Guide, Plant Genome IV - The International Conference on the Status of Plant Genome Research, 14-18 January 1996.
- Arumuganathan K, Lee JH, Kaeppler SM, Papa CM. (1996). Flow cytometric analysis and sorting of metaphase chromosomes isolated from root tips of maize. Accepted: XVIII Congress of the International Society for Analytical Cytology, Palacongressi Rimini, Italy 13-18 April 1996.

NAME: James R. Brandle

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Courtesy Appointment in Agronomy

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EDUCATION:

B.S. (Botany)	1966	Univ. Tennessee
M.S. (Forestry)	1970	Univ. Missouri
Ph.D. (Forestry)	1974	Univ. Missouri

PROFESSIONAL EXPERIENCE:

1981 - present	Associate Professor, UNL
Apr to Oct 1990	Visiting Scholar, PFRA, Ag. Canada Shelterbelt Centre, Indian Head, Sask.
Jan to Jun 1981	Acting Head and State Forester, UNL
1975 - 1981	Assistant Professor, UNL
1974 - 1975	Post-doctoral fellow Utah State Univ.

PROFESSIONAL LEADERSHIP ASSIGNMENTS:

Chair, Faculty Advisory Council, CASNR, 1995-96

PROFESSIONAL ACTIVITIES: (last 5 years)

Participated in and presented volunteer and invited papers at meetings of the American Society of Agronomy, Association for Temperate Agroforestry, International Windbreak Symposium, Plant Growth Regulator Society, GPAC - Forestry Committee, Nebraska Academy Science and others.

Taught at 13 Windbreak Technology Training Sessions sponsored by NRCS. Each of these sessions has reached an average of 30 to 35 practicing professional in resource conservation.

Over the last five years I have been actively involved in an interdisciplinary team focused on the role of woody plants in sustainable agriculture. Cooperators are located here at UNL, at Iowa State Univ., and with the US Forest Service in Lincoln, Ft. Collins, CO and Laramie, WY.

CURRENT TEACHING ASSIGNMENT:

FFW 310 Great Plains Forestry, every spring  
until 1996 (to be revised)  
FFW 417/817 Agroforestry, every fall beginning 1995  
FFW/HORT 849 Woody Plant Growth and Devel. every  
other fall, with E. Paparozzi of Hort.  
FFW 901 Seminar, once every two years

CURRENT ADVISING:

Undergraduate students = 16

Graduate students

M.S. = 2

Ph.D = 2; Co-advise = 3

Graduate Committees: M.S. = 6; Ph.D. = 5

GRANTS AND CONTRACTS:

Impact of tree windbreaks on distribution of insect pests and their natural enemies in sustainable agricultural systems. Wright, Dix, R. Johnson, Brandle, Harrell, & Hodges, USDA-ACE, \$99,500, final report due 2/29/96.

Influences of riparian vegetation on wildlife and fisheries populations in the Central Platte River. Peters, Case, Brandle, & Holland, US Fish & Wildlife Service, \$112,200, final report due 6/30/96.

Microclimate impacts of shelterbelts in agroforestry systems. Takle, ISU; Schmidt, USFS; Brandle, UNL; & Litvinia, Russia, USDA-CSRS-NRI, \$295,016 (UNL subcontract, \$82,443), 9/15/93 - 9/14/96. (Renewal submitted 11/95)

Assessment of climate change on a mixed agricultural landscape on the North American Great Plains. Brandle, Easterling, UNL; Takle, ISU; Schmidt, Schoeneberger, USFS; & Litvinia, Russia, DOE - NIGEC, Great Plains Regional Center, \$286,050 (ISU subcontract, \$81,380), 7/1/93 - 6/30/96. (Renewal submitted 11/95)

Efficiency of alternative single to multi-strata riparian buffer designs for NPS abatement in agroecosystems. Dosskey, Hoagland, Brandle, Schoeneberger, & Wardle, USFS - National Agroforestry Center, \$57,000, 8/1/93 - 11/15/96.

Information and Education: Demonstration of riparian buffer establishment and NPS pollution abatement in an agricultural watershed. Dosskey, Hoagland, Brandle, Schoeneberger, & Franti, Nebraska Dept. Environmental Quality, \$150,400, 9/1/95 - 9/30/00.

Assessment of micro environment conditions related to use of landscape fabric mulch for protecting newly planted trees in semi-arid environments. Brandle, Harrell, & Stepanek, USFS - National Agroforestry Center, \$24,000, 7/1/94 - 12/31/96.

Integrated crop/livestock research for sustainable systems in Nebraska. Francis, Klopfenstein, & Brandle, USDA-CSREES Special Grant, \$366,538, 4/1/92 - 3/30/97.

Journal Articles

Boes, T. K., J.R. Brandle, and W. R. Lovett. 1991.  
Characterization of flowering phenology and seed yield in a *Pinus sylvestris* clonal seed orchard.  
Canadian Journal of Forest Research 21:1721-1729.

- Brandle, J. R., B. B. Johnson, and T. Akeson. 1992. Field Windbreaks: Are They Economical? *Journal of Production Agriculture* 5:393-398.
- Gebre, G. Michael, M.R. Kuhns, and J.R. Brandle. 1994. Organic solute accumulation and dehydration tolerance in three water-stressed *Populus deltoides* clones. *Tree Physiol.* 14:575-587.
- Johnson, R.J., M.M. Beck, and J.R. Brandle. 1994. Windbreaks for people: The Wildlife Connection. *J. Soil and Water Conservation.* 49(6): 546-550.
- Dix, M.E., R.J. Johnson, M.O. Harrell, R.M. Case, R.J. Wright, L. Hodges, J.R. Brandle, M.M. Schoeneberger, N.J. Sunderman, R.L. Fitzmaurice, L.J. Young, and K.G. Hubbard. 1995. Influence of trees on abundance of natural enemies of insect pests: A review. *Agroforestry Systems* 29: 303-311.
- Zhang, H., J.R. Brandle, G.E. Meyer, and L. Hodges. 1995. A model to evaluate windbreak protection efficiency. *Agroforestry Systems* 29:191-200.
- Easterling, W.E., X.Chen, C. Hays, J.R. Brandle, and H. Zhang, 1996. Improving the validation of model-simulated crop yield response to climate change: An application of the EPIC model. *Climate Research (in press)*
- Zhang, H. and J.R. Brandle, 1996. Effect of field windbreaks on biomass and grain accumulation of corn: A modeling approach, *Agron. J. (in press)*.
- Zhang, H., J.R. Brandle, G.E. Meyer, L. Hodges. 1996. The relationship between open windspeed and windspeed reduction in shelter: A re-evaluation. *Agroforestry Systems (in press)*.
- Dix, M.E. L. Hodges, J.R. Brandle, R.J. Wright and M.O. Harrell. 1996. Effects of shelterbelts on the aerial distribution of insect pests in muskmelon. *J. Sustainable Agriculture (in press)*.

#### Other refereed publications

- Brandle, J. R. 1991. Shelterbelts: A buffer to climate change on the plains. In: Wall, G.(ed) *Symposium on the Impacts of Climate Change and Variability on the Great Plains*. Dept. of Geography Publication Series, Occasional Paper #12, University of Waterloo, pages 231-234.
- Brandle, J. R., T. D. Wardle, and G. F. Bratton. 1992. Opportunities to increase tree planting in shelterbelts and the potential impacts on carbon storage and conservation. In: Sampson, R. N. and D. Hair (editors). *Forests and Global Change, Vol. 1: Opportunities for Increasing Forest Cover*. Pages 157-176.
- Brandle, J.R., L. Hodges, and J. Stuthman. 1995. Windbreaks and specialty crops for greater profits. *USDA-Forest Service Gen. Tech. Rpt., RM-GTR-261* pages 81-91.
- Bratton, G.F., P.R. Schaefer, and J.R. Brandle. 1995. Conservation forestry for sustainable Great Plains Ecosystems. In: Johnson, S.R. and A. Bouzaher (eds.) *Conservation of Great Plains Ecosystems: Current Science, Future Options*. Pages 211-227. Kluwer Academic Publishers, The Netherlands.

#### Proceedings (1995 only)

- Schmidt, R.A., E.S. Takle, J.R. Brandle, and I.V. Litvina, 1995: Static pressure at the ground under atmospheric flow across a windbreak. 11th Symposium on Boundary Layers and Turbulence, Amer. Meteor. Soc., Charlotte, NC, March 27-31, 1995, pages 517-520.
- Schmidt, R.A. R.L. Jairell, E.S. Takle, J.R. Brandle, and I.V. Litvina, 1995. Windbreak shelter as a function of wind direction. 9th Symposium on Meteorological Observations and Instrumentation, Amer. Meteor. Soc., Charlotte, NC, March 27-31, 1995, pages 269-274.
- Prueger, J., T. Sauer, E.S. Takle, I.V. Litvina, R.A. Schmidt, J.R. Brandle, and J.L. Hatfield, 1995. Windbreak shelter effects on surface energy balance components. 9th Symposium on Meteorological Observations and Instrumentation, Amer. Meteor. Soc., Charlotte, NC, March 27-31, 1995, pages 478-481.
- Alkhalil, A., I.V. Litvina, R.A. Schmidt, J.R. Brandle, and E.S. Takle, 1995. Determination of shelterbelt porosity parameters from measurements and a model. 11th Symposium on Boundary Layers and Turbulence, Amer. Meteor. Soc., Charlotte, NC, March 27-31, 1995, pages 511-512.
- Brandle, J.R. and M.L. Marsh, 1996. The economic impact of field shelterbelts in the Northern Great Plains. *Proceedings of the 4th N. American Agroforestry Conf., Boise, ID (in press)*.

#### Related extension publications

- Brandle, J. and S. Finch. 1991. *How Windbreaks Work*. University of Nebraska, EC-91-1763.
- Bochner, P., J. Brandle, and S. Finch. 1991. *Windbreak Establishment*. University of Nebraska, EC-91-1764.
- Johnson, R., M. Beck, and J. Brandle. 1992. *Windbreaks and Wildlife*. University of Nebraska, EC-91-1771.
- Quam, V., J. Gardner, J. Brandle, and T. Boes. 1992. *Windbreaks in Sustainable Agricultural systems*. University of Nebraska, EC-91-1772.
- Wight, B. T. Boes, and J. Brandle. 1993. *Windbreaks for Rural Living*. University of Nebraska, EC-91-1767.
- Quam, V. L. Johnson, B. Wight, and J. Brandle. 1994. *Windbreaks for Livestock Operations*. University of Nebraska, EC-94-1776.

NAME: Ronald M. Case

PRESENT RANK: Professor

DATE OF RANK: 1 July 1981    TENURE: Yes

APPOINTMENT: .75 Teaching  
.25 Research

GRADUATE FACULTY: Fellow

EDUCATION:

A.B. 1962 Ripon College  
M.S. 1964 University of Illinois  
Ph.D. 1971 Kansas State University

PROFESSIONAL EXPERIENCE:

1981-present Professor, University of Nebraska  
1975-1981 Associate Professor, University of Nebraska  
1972-1975 Assistant Professor, University of Nebraska  
1971-1972 Instructor, University of Missouri

HONORS AND AWARDS:

Member of Gamma Sigma Delta since 1975  
Elected to Fellow of the Center for Great Plains Studies, 1982  
College of Agriculture's recipient of NACTA Meritorious Teaching Certificate, 1985  
Recognition Award for Contributions to Students (from UNL Parents Association, January 1990, 1992, 1993, and 1994)  
L.K. Crowe Outstanding Adviser Award (CASNR, August 1991)  
NACTA Teacher Fellow Award (June 1992)  
Outstanding Academic Advising Award, Student Foundation/Builders Award (1993)  
Recognition at Chancellor's Leadership reception for Outstanding Student Organization Advisors (1993)  
Received Gamma Sigma Delta Teaching Award of Merit (1994)

PROFESSIONAL LEADERSHIP ASSIGNMENTS:

Elected Eastern Section Vice-President, Nebraska Division Izaak Walton League of America (have held this position since 1989)  
Policy Advisory Committee Member for the Center for Grassland Studies (1994 & 95)

PROFESSIONAL ACTIVITIES:

Participated in NACTA National meeting, River Falls, WI, 1992.  
Made presentation to 2nd National Conference in Rewarding Teaching, Lincoln, 1994  
Participated in North Central Region Teaching Symposium (chaired 2 sessions on active learning), Lincoln, 1994

Participated in Nebraska Academy of Sciences (annual), Lincoln

Participated in 1st Annual Wildlife Society Meeting, Albuquerque, NM 1994

Participated in 56th Midwest Fish & Wildlife Conference, Indianapolis, IN 1994

Presented one poster and co-author of 10 papers presented at professional meetings

CURRENT TEACHING ASSIGNMENT:

Natural Resources 100, spring and fall, alternate years  
FFW 350, fall, every year  
FFW 404, spring and fall, rotating basis  
FFW 450/850, spring, every year  
FFW 901, rotating basis

CURRENT ADVISING:

42 undergraduates  
1 M.S. (committee member of 9 other students)  
5 Ph.D. — not major advisor

GRANTS AND CONTRACTS:

UN-L NUPAGE, Coordination and Implementation of Natural Resource Majors - \$49,000 (1990) with Drs. Waller, Moser, McAllister, and Martin.  
UN-L NUPAGE, Earth in Crisis - \$27,200 (1990) with Drs. Kay, Lewis, and Williams.  
USDA-APHIS, Selection of Research Areas in Nebraska for Field Evaluation of Lethal Methods of Pocket Gopher Control - \$1,280 (1990)  
U.S. Fish & Wildlife Service, Influence of Vegetation on Wildlife and Fisheries Populations in the Central Platte River - \$82,500 (1992) with Drs. Brandle, Holland, and Peters  
U.S. Fish & Wildlife Service, Influences of Riparian Vegetation on Wildlife and Fisheries Populations in the Central Platte River - \$29,700 (1993) with Dr. Brandle, Holland, and Peters.  
Analysis of Landscape and Biodiversity in the Central Platte River Valley, Nebraska - \$68,000 (1994) with Dr. Dennis Jelinski.  
UNL Research Council, The effects of plains pocket gophers (*Geomys bursarius*) on forage quality of two varieties of alfalfa. (1995) \$2,550.

CURRENT RESEARCH EMPHASIS:

Wildlife and Sustainable Agroecosystems.  
The primary objectives are to: 1) Examine the riparian habitat adjacent to the Central Platte as a corridor for mammal dispersal and suitability of this habitat for neotropical migrant birds; 2) Develop a cultural means of controlling damage caused by pocket gophers to alfalfa.

## PUBLICATIONS:

### Journal Articles:

- Hines, T.D. and R.M. Case. 1991. Diet, home range, movements, and activity periods of swift fox in Nebraska. *Prairie Naturalist* 23(3):131-138.
- Gubanyi, J.A., R.M. Case, and G. Wingfield. 1992. Diet and nesting of barn owls breeding in Western Nebraska. *American Midland Naturalist* 127:224-232.
- Dix, M.E., R.J. Johnson, M.O. Harrell, R.M. Case, R.J. Wright, L. Hodges, J.R. Brandle, M.M. Schoeneberger, N.J. Sunderman, R. L. Fitzmaurice, L.J. Young, and K.G. Hubbard. 1994. Influences of trees on abundance of natural enemies of insect pests: a review. *Agroforestry Systems* 29:303-311.

### Symposium or Proceedings:

- Dix, M.E., R.J. Johnson, M.O. Harrell, R.M. Case, R.J. Wright, L. Hodges, J.R. Brandle, M.M. Schoeneberger, N.J. Sunderman, R.L. Fitzmaurice, L.J. Young, and K.G. Hubbard. 1994. Influences of trees on abundance of insect pests. *Proc. International Agroforestry Symposium* 3:19-22. (Ames, IA)
- Dix, M.E., L. Hodges, M.O. Harrell, R.J. Johnson, J.R. Brandle, M.M. Schoeneberger, R.M. Case, R.J. Wright, K.G. Hubbard, and L.J. Young. 1994. Research of the Nebraska Agroforestry Team. *Proc. Society of American Foresters National Convention*, pp. 253-257. (Indianapolis, IN)

### Chapters in Books:

- Case, R.M. and B.A. Jasch. 1994. Pocket gophers. Pages B17-B29 In: S.E. Hygnstrom, R.M. Timm, and G.E. Larson (eds.) *Prevention and Control of Wildlife Damage*. Great Plains Agricultural Council and the University of Nebraska - Lincoln.

### Extension:

- Andelt, W.F. and R.M. Case. 1991 (revised). Managing pocket gophers in Colorado. Colorado State University, Cooperative Ext. Pub. No. 6.515. 4pp.

### Miscellaneous:

- Case, R.M. 1990. County wildlife inventory. An appendix to the historical and ecological resources survey of 1990. Printed by Lincoln City - Lancaster County Planning Department.
- Hines, T.D. and R.M. Case. 1991. Diet, home range, movements, and activity periods of swift fox in Nebraska. *Prairie Naturalist* 23(3):131-138. NARD Journal Series No. 9263.
- Hygnstrom, S.E., R.M. Case, and R.J. Johnson. (eds). 1991. Tenth Great Plains Wildlife Damage Control Workshop Proceedings. Lincoln, NE 179 pp.

- Gubanyi, J.A., R.M. Case, and G. Wingfield. 1992. Diet and nesting of barn owls breeding in Western Nebraska. *American Midland Naturalist* 127:224-232. NARD Journal Series No. 7038.
- Hygnstrom, S.E., R.M. Case, and R.J. Johnson. 1992. Tenth Great Plains Wildlife Damage Workshop - Conference Report. *Great Plains Research* 2:109-113.
- Case, R.M. 1993. Book review: Wild animals and American environmental ethics. *Great Plains Research* 3:370-371.
- Case, R.M. 1994. Why bird numbers are dwindling. *Nebraska Bird Review* 62:116-117.
- Case, R.M. 1995. Book review: Watching Kansas Wildlife: A guide to 101 sites. *Great Plains Research* 5:174-175.
- Gubanyi, J.A., R.M. Case, and R.A. Lock. 1995. Silent masters of the night. *Nebraskaland* 73:16-21.

NAME: Scott J. DeWald

PRESENT RANK: Associate Forester

DATE OF RANK: 1 July 1988

TENURE: NA

APPOINTMENT:

Cooperative Extension Service, 25%  
Nebraska Forest Service, 75%

EDUCATION:

B.A. 1976 Doane College, Crete, NE  
M.F. 1978 Duke University, Durham, NC

PROFESSIONAL EXPERIENCE:

1988-present UNL Department of Forestry, Fisheries & Wildlife District Associate Forester and Extension Forester of the South Central District  
1980-1988 UNL Department of Forestry, Fisheries, and Wildlife District Assistant Forester and Extension Forester of the South Central District  
1978-1980 UNL Department of Forestry, Fisheries, and Wildlife Instructor and Extension Forester of the South Central District

PROFESSIONAL SOCIETIES:

National Society of American Foresters  
Great Plains Chapter of American Foresters  
American Forestry Association  
National Walnut Council  
National and State Nut Growers Association

HONORS AND AWARDS:

"Outstanding Public Service" Recognition Award, City of Grand Island, Tornado Disaster, 1980  
"Best New Program - Project Learning Tree", National Award, 1990

PROFESSIONAL LEADERSHIP ASSIGNMENTS: (last 5 years)

Secretary/Treasurer, Nebraska Tree Farm Committee 1991-1994  
Co-coordinator, Project Learning Tree Program  
Board of Directors, Nebraska Christmas Tree Growers Association, 1991  
President, Nebraska Chapter of the National Walnut Council, 1996  
Department Representative on County Conservation Review Group for Farm Service Agencies in South Central Nebraska

PROFESSIONAL ACTIVITIES: (last 5 years)

Faculty Senate - 1991-1994  
Presentation on the Nebraska Tree Farm Program at Governor's Forestry Conference - 1993  
Presentation at Nebraska Christmas Tree Growers Conferences - 1994  
Presentation at National Walnut Council Meeting, Nebraska City - 1994  
Presentation at Missouri State Chapter Walnut Council Meeting, Kansas City, MO - 1994  
Presentation at Project Learning Tree National Conference - 1995  
Team Member of South Central Community Forestry Working Group - 1995-96  
Served as team member of Biodiversity Demonstration Project, Nature Conservancy, 1995-96

GRANTS AND CONTRACTS: (last 5 years)

U. S. Forestry Service Grant - Project Learning Tree (\$2000) 1991-92  
Math & Science Cadre Grant - (\$1500) 1991

CURRENT RESEARCH /DEMONSTRATION PROJECT EMPHASIS:

Project Number LWT/63-286-06401, Team member of demonstration on "Management Biological Diversity in Agricultural Landscape" Project  
Nature Conservancy - The primary objective of this project is to demonstrate economically viable crop and livestock production that foster biological diversity. It seeks to demonstrate that farmers can maintain profitability while following practices designed to encourage biodiversity to reduce negative environmental impacts.

PUBLICATIONS: (Last 5 years)

Extension Publications

DeWald, S.J. 1991. Tree Identification Guide. Brochure. Nebraska Arborists School, 20pp.  
DeWald, S.J. 1991. Windbreaks are important. Brochure. 2 pp.  
DeWald, S.J. 1991. Guidelines for community forestry program-Little Blue NRD. 2pp.  
DeWald, S.J. 1992 Guidelines for community forestry program-Upper Big Blue NRD. 2pp.  
DeWald, S.J., C. Shapiro, S. Rasmussen. 1995. Landscape Fertilizer NebGuide. 4pp.

Service Publications

DeWald, S.J., 1991. Windbreak appraisal. Educational information for farm real estate. Ag Econ 453/853. 14pp.



- DeWald, S.J., 1991, Black Walnut Planation Model. 16 pp.
- DeWald, S.J., 1992, Christmas Tree Industry in the United States. 12 pp.
- Harrell, M., S. DeWald, R. Straight, L. Stepanek, 1993. Request to E. I. DuPont DeNemours and Co., Inc., For a Change in the Label of the Herbicide "Oust". 172pp.
- DeWald, S.J., 1992. Estimation of Assembly and Delivery Costs: Chadron State College Wood Boiler Study. 22pp.
- Dewald, S.J., 1994. Pruning Black Walnuts for Profit, National Walnut Council Conference, 2pp.

Miscellaneous

- DeWald, S.J. 1991-1993. Tree Farm Newsletter. 4 pp.  
Sent Biannual to Tree Farmers in Nebraska.
- DeWald, S.J. 1991-1994. Flatlands Forester Newsletter. 4 pp. (Quarterly to South Central)
- DeWald, S.J. 1991-1994. The Twig Newsletter. 4 pp.  
Environmental education newsletter for Project Learning Tree, twice per year.
- DeWald, S.J. 1991-1995 Tree Resource  
Inventory/Assessment for each of 20 South Central Communities during this five-year period.

NAME: Stephen G. Ernst

PRESENT RANK: Associate Professor

DATE OF RANK: 1 July 1991 TENURE: Yes

APPOINTMENT: 75% Research 25% Teaching

GRADUATE FACULTY: Fellow

EDUCATION:

B.S. (Forest Biology)	1979	Colo State Univ
M.S. (Forest Genetics)	1981	Colo State Univ
Ph.D. (Forest Genetics)	1985	Mich State Univ

PROFESSIONAL EXPERIENCE:

1991 - present	Associate Professor, UNL
Jan-Aug 1995	Visiting Prof, Univ Colo
1985 - 1991	Assistant Professor, UNL

PROFESSIONAL LEADERSHIP ASSIGNMENTS:

Chair, Task Force on Info Tech and Teaching, CASNR,  
1996

PROFESSIONAL ACTIVITIES: (last 5 years)

New research program to determine the role of polyamines, and specifically S-adenosylmethionine decarboxylase, in plant development. Goal is to better understand the role of these compounds in controlling important events in plant development, such as root and floral meristem formation.

Control of orientation of plant cell division and elongation using a novel cell line we isolated.

Population genetics of *Fragilaria capucina* in a N-S transect through the Great Plains.

Obtained proficiency in use of tools of information technology for delivery of teaching/learning programs via internet. Have helped to restructure two courses to utilize such tools.

CURRENT TEACHING ASSIGNMENT:

FFWL/NRES 423/823--Integrated Resources Management (with Jelinski)

FFWL/NRES 811--Plant Tissue Culture (with Read)

FFW 901 Seminar, once every three years

CURRENT ADVISING:

Undergraduate students--16

Graduate students--1 PhD

Graduate Committees--2 MS; 8 PhD

GRANTS AND CONTRACTS: (last 5 years)

Impacts of global climate change on phytoplankton productivity in lakes along a thermal gradient (with Dr. Kyle Hoagland). USDOE Natl. Institute For Global Environmental Change. Funding period: 1 July 1993 to 31 July 1996; \$205,000.

Vegetative micropropagation of mature Douglas-fir (with Dr. Paul Read). USDA Forest Service. Funding period: 1 Sept. 1992 to 31 Dec 1995; \$50,000.

Cotyledonary-based multiplication using seed of selected Douglas-fir genotypes for conifer defense gene studies (with Dr. Paul Read). USDA Forest Service. Funding period: 1 Sept. 1992 to 31 Dec 1995; \$25,000.

An experimental system for studying changes in orientation of cell division and polarity of cell elongation (with Dr. Scott Nissen). UNL Center for Biotechnology. Funding period: 1 July 1992 to 30 June 1994; \$24,000.

Molecular characterization of shoot induction competence events in *Populus deltoides*. USDA Competitive Grant Program, Agreement No. 90-37290-5669. Funding period: 15 September 1990 to 30 July 1993; \$125,000.

Genetic basis for variation in freshwater phytoplankton productivity related to water temperature (with Drs. Kyle Hoagland and Dean DeNicola). US Department of Energy. Funding period: 1 July 1991 to 30 June 1992; \$66,968.

Interdisciplinary fluorescent microscope work station (with Dr. Kyle Hoagland). UN Center for Biotechnology. 1992. \$18,000.

Investigation of the relationship between cell cycle arrest and differentiation in plant cell cultures (with Dr. Patricia Herman). UN Center for Biotechnology. Funding Period: 1 July 1990 to 30 June 1991; \$15,000.

PUBLICATIONS: (last 5 years)

Coleman, G.D., and S.G. Ernst. 1991. Protein differences among *Populus deltoides* internodal stem explants determined for shoot regeneration or callus growth. *Plant Science* 75: 83-92.

Coleman, G.D., T.H.H. Chen, S.G. Ernst and L. Fuchigami. 1991. Photoperiod control of poplar bark storage protein accumulation. *Plant Physiol.* 96: 686-692.

Alvarez, R.C., S.J. Nissen and S.G. Ernst. 1994. Selection, enrichment and initial characterization of an elongated cell culture of tobacco. *Plant Science* 103:73-79.

- Kim, K-N., and S.G. Ernst. 1994. Effects of inhibitors on phenocritical events of *in vitro* shoot organogenesis in tobacco thin cell layers. *Plant Science* 103:59-66.
- Hoagland, K.D., S.G. Ernst, S.I. Jensen, R.J. Lewis, V.I. Miller and D.M. DeNicola. 1995. Genetic variation in *Fragilaria capucina* clones along a latitudinal gradient across North America: a baseline for detecting global climate change. *Diatom Res.* (in press).
- Lewis, R.J., S.I. Jensen, D.M. DeNicola, V.I. Miller, K.D. Hoagland and S.G. Ernst. 1996. Genetic variation in the diatom *Fragilaria capucina* along a latitudinal gradient across North America. *Plant Systematics and Evolution* (accepted).

Book Chapters (\* = refereed)

- Ernst, S.G., and G.D. Coleman. 1991. The transition between shoot regeneration competence and callus determination in internodal stem explants of *Populus deltoides*. In: *Woody Plant Biotechnology*, M.R. Ahuja, ed., Plenum Publishing Corp., pp. 23-29.
- Ernst, S.G. 1993. *In vitro* culture of pure species non-aspen poplars. In: *Micropropagation of woody plants*, M.R. Ahuja, ed., Kluwer Academic Publishers, pp 195-207.
- Ernst, S.G. 1994. Model systems for studying adventitious root formation. In: *Biology of Adventitious Root Formation*, B.E. Haissig and T.D. Davis, eds., Plenum Publ., pp. 77-86.

NAME: Mark O. Harrell

PRESENT RANK: Assoc. Professor/ Assoc. Forester

DATE OF RANK: July 1, 1987

TENURE: NA

APPOINTMENT: .25 Research .75 Nebr. For. Serv.

GRADUATE FACULTY: Member

EDUCATION:

PhD. 1980 University of Wisconsin  
M.S. 1978 University of Wisconsin  
B.S. 1975 College of William and Mary

PROFESSIONAL EXPERIENCE:

1987-present Assoc. Professor/ Assoc. Forester,  
University of Nebraska  
1980-1987 Asst. Professor/ Asst. Forester,  
University of Nebraska

PROFESSIONAL SOCIETIES:

Entomological Society of America  
Nebraska Academy of Sciences  
Kansas Entomological Society  
International Society of Arboriculture  
Nebraska Arborists Association  
Sigma Xi

HONORS AND AWARDS:

Honorary Life Membership, Nebraska Arborists  
Association, 1989, for service to the Association

PROFESSIONAL ACTIVITIES:

NCR-98 Committee, "Insect pests of landscape plants"  
Great Plains Tree Pest Workshop, Chairman 1995-96  
Gypsy Moth Advisory Comm., Nebr. Dep. of Agric.  
Pesticide Advisory Committee, IANR, UNL  
Community Forestry Advisory Board, City of Lincoln

GRANTS AND CONTRACTS: (last 5 years)

North Central Regional Administrative Council for the  
Sustainable Agriculture Research and Education  
Program - \$99,500 (1992) with R. Wright, M. Dix.,  
J. Brandle, L. Hodges, and R. Johnson  
National Arbor Day Foundation, IPM in an apple and  
cherry orchard - \$12,900 (1993) with J. Ackland  
Jones

International Society of Arboriculture Research Trust,  
Vegetable oils as carriers for trunk-injectable  
arboricultural pesticides - \$2,500 (1993) with  
William Lovett and Milford Hanna

Nebraska Soybean Development, Utilization &  
Marketing Board, Oil carriers for tree trunk  
injectable pesticides - \$3,260 (1993) with William  
Lovett and Milford Hanna

USDA Forest Service, Assessment of microenvironment  
conditions related to use of landscape fabric mulch  
for protecting newly planted trees in semi-arid  
environments - \$24,000 (1994) with James Brandle  
and Laurie Stepanek

USDA Forest Service, Ash yellows in the Great Plains:  
Determination of incidence and damage - \$15,000  
(1996) with J. Walla (NDSU), J. Ball (SDSU), N.  
Tisserat (KSU), and W. Jacobi (CSU)

CURRENT RESEARCH EMPHASIS:

Project Number: NEB-26-025. Biological and tree-  
injection methods for controlling tree pests  
The goal of the project is to develop methods for  
controlling *Dioryctria* borers of pines and other  
stem-boring insect pests of trees that eliminate or  
reduce the risks of injury from pesticides to humans,  
animals, and plants.

PUBLICATIONS: (last 5 years)

Journal Articles:

Harrell, M. O. 1993. Influence of host species on  
infestation and damage by *Dioryctria* borers  
(Lepidoptera: Pyralidae) of pines in the central  
Great Plains. *Environmental Entomology* 22:781-  
783. Journal series number: 10121  
Harrell, M. O., and P. A. Pierce. 1994. Effects of  
trunk-injected abamectin on elm leaf beetle  
(Coleoptera: Chrysomelidae) defoliation and larval  
survival. *J. Arboriculture*. 20:1-3. Journal series  
number: 10193.  
Dix, M. E., R. J. Johnson, M. O. Harrell, R. M. Case,  
R. J. Wright, L. Hodges, J. R. Brandle, M. M.  
Schoenberger, N. J. Sunderman, R. L. Fitzmaurice,  
L. J. Young, and K. G. Hubbard. 1995.  
Influences of trees on abundance of natural enemies  
of insect pests: a review. *Agroforestry Systems* 29:  
303-311. Journal series number: 10549.

#### Proceedings:

- Harrell, M. O. 1991. Role of host susceptibility and site influences on damage caused by pine borers. in Dix, M. E. and M. O. Harrell, eds., *Insects of Windbreaks and Related Plantings: Distribution, Importance, and Management*. Conf. Proc., Dec. 6, 1988, Louisville, KY, Gen. Tech. Rep. RM-204, Fort Collins, CO: USDA For. Serv., Rocky Mtn. For. & Range Exp. Sta., pp. 39-41.
- Dix, M. E. and M. O. Harrell. 1991. Opportunities for managing borers in windbreak trees with attractants. in Dix, M. E. and M. O. Harrell, eds., *Insects of Windbreaks and Related Plantings: Distribution, Importance, and Management*. Conf. Proc., Dec. 6, 1988, Louisville, KY, Gen. Tech. Rep. RM-204, USDA For. Serv., Rocky Mtn. For. & Range Exp. Sta., pp. 42-47.
- Harrell, M. O. 1992. Treatments for pin oak and silver maple chlorosis in Nebraska. in Kielbaso, J. J., ed., *Proc. Second Symp. on Systemic Chemical Treatments in Tree Culture*, Oct. 1987, East Lansing, MI, pp. 61-66.
- Harrell, M. O., M. E. Dix, and P. C. Quimby. 1993. Bibliography of biological control of forest insects, diseases, weeds, and vertebrate pests in the Great Plains. in *Proc. 44th Ann. Mtng., Great Plains Agricultural Council Forestry Committee*, July 13-16, 1992, Bismarck, ND, 45:171-233.
- Dix, Klopfenstein, Rietveld, Harrell, and Walla. 1994. Biodiversity can enhance biological control of pests in the Great Plains agricultural ecosystem. *Proc. Annual Meeting of the Great Plains Agricultural Council*, June 7-9, 1994, Bismarck, ND.
- Hodges, Dix, Brandle, Wright, and Harrell. 1994. Effects of shelterbelts on insect pests in muskmelon. *Proc. Nebraska Fruit and Vegetable Growers Conf.*, Feb. 16-17, 1994, Columbus, NE, pp. 19-28.

#### Extension Publications:

- Harrell, M. O. and F. P. Baxendale. 1992. Gypsy moth. Univ. Nebr. Coop. Ext. NebFact NF92-82, 2 pp.
- Wilson, J. S. and M. O. Harrell. 1992. Environmental stress and tree health. Univ. Nebr. Coop. Ext. NebGuide G91-1036-A, 4 pp.
- Mooter, D. P., M. O. Harrell, and L. J. Stepanek. 1994. Care of newly planted trees. Univ. Nebr. Coop. Ext. NebGuide G94-1195-A, 2 pp.
- Stepanek, L. J., M. O. Harrell, and D. S. Wysong. 1994. Anthracnose diseases of shade trees. Univ. Nebr. Coop. Ext. NebGuide G94-1200-A, 4 pp.
- Wysong, D. S., M. O. Harrell, and D. H. Steinegger. 1994. Iron chlorosis of trees and shrubs. Univ. Nebr. Coop. Ext. NebGuide G94-1218, 4 pp.

#### Service Publications:

- Harrell, M. O. 1991. Zimmerman pine moth control in the Omaha area. Univ. Nebr. Forest Pests of Nebraska Leaflet No. 21, 1 pp.
- Harrell, M. O. 1991. Zimmerman pine moth control in central and western Nebraska. Univ. Nebr. Forest Pests of Nebraska Leaflet No. 22, 1 pp.
- Harrell, M. O. 1991. Spider mites of conifers. Univ. Nebr. Forest Pests of Nebraska Leaflet No. 24, 2 pp.
- Harrell, M. O. 1992. Gypsy moths in Nebraska. Univ. Nebr. Forest Pests of Nebraska Leaflet No. 25, 2 pp.
- Harrell, M. O. 1992. Spray date reminders for the control of insects and diseases of evergreens. Univ. Nebr. Forest Pests of Nebraska Leaflet No. 18, 2 pp.
- Harrell, M. O. 1992. Spray date reminders for the control of insect pests of deciduous trees. Univ. Nebr. Forest Pests of Nebraska Leaflet No. 19, 2 pp.
- Harrell, M. O. 1992. Spray date reminders for the control of diseases of deciduous trees. Univ. Nebr. Forest Pests of Nebraska Leaflet No. 20, 2 pp.
- Harrell, M. and L. Stepanek. 1993. Pine tussock moth in the Pine Ridge. Nebr. Forest Pest Condition Report, 4 pp.
- Harrell, M. 1994. Pine tussock moth and Sphaeropsis (Diplodia) blight in the Pine Ridge. Nebr. Forest Pest Survey Report, 4 pp.
- Harrell, M. 1995. Sphaeropsis (Diplodia) blight in the Nebraska Pine Ridge. Nebr. Forest Pest Survey Report, 3 pp.

#### Technical Paper:

- Lovett, W. R., M. O. Harrell, M. E. Dix, and L. J. Stepanek. 1995. Tip moth (*Rhyacionia* spp.) infestation in ten sources of ponderosa pine from Nebraska and South Dakota. USDA For. Serv. Gen. Tech. Rep. RM-261, pp. 2-5.

#### Edited publication:

- Dix, M. E. and M. O. Harrell, eds. 1991. *Insects of Windbreaks and Related Plantings: Distribution, Importance, and Management*. Conf. Proc., Dec. 6, 1988, Louisville, KY, USDA For. Serv., Gen. Tech. Rep. RM-204, 50 p.

NAME: Gary L. Hergenrader

PRESENT RANK: Professor, Head and State Forester

DATE OF RANK: June 1, 1981      TENURE: Yes

APPOINTMENT: 50% Nebraska Forest Service;  
17% Teaching; 16% Extension; 17% Research

GRADUATE FACULTY: Fellow; January, 1971

EDUCATION:

Post-doctoral	1967	University of Wisconsin-Madison; Limnology
Ph.D.	1967	University of Wisconsin-Madison; Zoology
M.S.	1963	University of Wisconsin-Madison; Zoology
B.S.	1961	University of Nebraska-Lincoln; General Agriculture (with distinction)

PROFESSIONAL EXPERIENCE:

Professor; Courtesy appointment; School of Life Sciences; University of Nebraska; 1981-present  
Professor; Courtesy appointment; Department of Forestry, Fisheries, & Wildlife; University of Nebraska; 1977-1981  
Professor; Courtesy appointment; Department of Poultry & Wildlife Sciences; University of Nebraska; 1976-1977  
Professor; School of Life Sciences; University of Nebraska; 1976-1981  
Associate Professor & Interim Director; School of Life Sciences; University of Nebraska; 1974-1975  
Associate Professor & Section Chairman; Organismic Biology Section, School of Life Sciences; University of Nebraska; 1973-1974  
Associate Professor & Vice Chairman; Department of Zoology; University of Nebraska; 1971-1973  
Associate Professor; Department of Zoology; University of Nebraska; 1971  
Assistant Professor; Department of Zoology; University of Nebraska; 1967-1971  
Assistant Professor; Eagle Lake Biological Station; Chico State College, Chico, CA; 1967  
Post-doctoral Associate; Laboratory of Limnology; University of Wisconsin; 1967  
Research & Project Assistant; Laboratory of Limnology; University of Wisconsin; 1963-1967  
Teaching Assistant; Dept. of Zoology; University of Wisconsin; 1961-1963  
Crew Chief; Roadside Nesting Bird Survey; Nebraska Game & Parks Commission; 1961  
Fishery Biologist Aide (part-time); Nebraska Game & Parks Commission; 1958-1960

HONORS AND AWARDS:

Elevated to status of "Fellow", American Institute of Fishery Research Biologists, the highest rank AIFRB bestows, October 1982  
Citation from American Fisheries Society for directing research that received "Best Student Paper Award" at 106th annual meeting, 1976  
Listed in American Men and Women of Science  
Listed in Who's Who in Nebraska, Bicentennial Edition  
Certified as Fishery Scientist by American Fisheries Society, 1971  
Award of Excellence, Nebraska Chapter, American Fisheries Society, 1990  
Citation from North Central Division, American Fisheries Society for directing the research for the best paper presented by a student, 48th Midwest Fish and Wildlife Conference, 1987

PROFESSIONAL LEADERSHIP ASSIGNMENTS:  
(last 5 years)

National:

Secretary/Treasurer, National Association of University Fisheries and Wildlife Programs  
Research Committee, Chair, National Association of State Foresters  
Research Management Committee, National Association of State Foresters  
Ecosystem Management Committee, (Chair), National Association of State Foresters  
Legislative Committee, National Association of State Foresters  
Endangered Species Committee, National Association of State Foresters  
Forest Health Monitoring Steering Committee, U.S. Forest Service  
Secretary of Agriculture's Forestry Research Advisory Council  
NCA-10 Committee, Head of Forestry Programs  
NCA-23 Committee, Head of Fish & Wildlife Programs  
Board of Trustees, National Arbor Day Foundation  
Chair, Program Committee, 1996 Midwest Fish & Wildlife Conference  
Steering Committee, 1996 Midwest Fish & Wildlife Conference

State:

Lower Platte South NRD Clean Lakes Advisory Committee  
USDA State Conservation Review Group  
IPM Advisory Committee  
Chair, Nebraska Tree Farm Committee  
Co-chair, Bessey Nursery Advisory Committee

University:

Museum Advisory Committee

IANR:

Sampson Fund Committee  
Chair, ad hoc Committee, Natural Resources Program  
IANR Events Steering Committee  
Natural Resources Coordinating Council  
Water Sciences Task Force

PROFESSIONAL SOCIETY MEMBERSHIPS:

Sigma Xi  
American Fisheries Society  
American Society of Limnology and Oceanography  
American Institute of Fishery Research Biologists  
Nebraska Academy of Science  
Council of Western State Foresters  
National Association of State Foresters  
Gamma Sigma Delta  
Alpha Zeta  
Society of American Foresters  
American Forestry Association  
Nebraska Chapter, American Fisheries Society  
Izaak Walton League of America

PUBLICATIONS:

- Troelstrup, Nels H. Jr. and Gary L. Hergenrader. 1990.  
Effect of hydropower peaking flow fluctuations on  
community structure and feeding guilds on  
invertebrates colonizing artificial substrates in a  
large impounded river. *Hydrobiologia* 199:217-  
228.
- Hergenrader, G.L. 1990. A vision of the future for  
Great Plains conservation forestry, pp. 110-112 in  
Proceedings, 42nd Annual Meeting, Forestry  
Committee, GPAC. Great Plains Agricultural  
Council Publication #132.
- Hamilton, S., R.Ashley, T.Dupree, G.Hergenrader,  
B.Miles, C.Noquez, J.Sargent, and O.White.  
1990. Global Warming and Forestry in the United  
States. A report by the Global Warming  
Committee, National Association of State Foresters,  
Washington, DC.
- Hergenrader, Gary L. 1993. The Reforestation of the  
Sandhills, pp 64-65 in "A Walk in the Woods,"  
published by the Nebraska Game and Parks  
Commission, Lincoln.
- Hamilton, S., M.Buck, T.Dupree, G.Hergenrader,  
B.Miles, C.Noquez, G.Thiede, M.Brown, and  
M.Matuszewski. 1993. Reauthorization of the  
Endangered Species Act. A position statement  
from the Endangered Species Committee, National  
Association of State Foresters, Washington, DC.
- Hergenrader, G., M.Buck, M.Brown, O.White,  
K.Cottingham, G.Rose, M.Matuszewski, B.Miles,  
J.Sledge, and J.Brown. 1994. Ecosystem  
Management on Non-Federal Forestlands. A  
position statement from the Ecosystem  
Management Committee, National Association of  
State Foresters, Washington, DC.
- Popp, A., K.D. Hoagland, and G.L. Hergenrader.  
(accepted) Zooplankton community response to  
reservoir aging. *Hydrobiologia*.

NAME: Kyle D. Hoagland

PRESENT RANK: Associate Professor

DATE: 1 July 1990      TENURE: Yes

APPOINTMENT: .75 Research      .25 Teaching

GRADUATE FACULTY: Fellow

EDUCATION:

B.S.      1973      Michigan State University  
M.S.      1975      Eastern Michigan University  
Ph.D.      1981      University of Nebraska

PROFESSIONAL EXPERIENCE:

1990-      Associate Professor, University of  
                 Nebraska  
1987-94      International Editorial Board,  
                 *Biofouling*; Associate Editor, *Journal*  
                 *of Phycology* (1990 to 1994)  
1985-      Limnology Instructor, Cedar Point  
                 Biological Station, UNL  
1983-90      Associate Professor of Biology  
                 (tenured 1988), Department of  
                 Biology, Texas Christian University  
1982-83      Visiting Assistant Professor of  
                 Botany, Department of Botany,  
                 Louisiana State University  
1981-82      Postdoctoral Research Associate,  
                 Department of Botany and Plant  
                 Pathology, University of Maine

PROFESSIONAL SOCIETIES:

American Association for the Advancement of Science  
American Society for Limnology and Oceanography  
Societas Internationalis Limnologiae  
North American Benthological Society  
Ecological Society of America  
Phycological Society of America  
Society for Environmental Toxicology and Chemistry  
International Society for Diatom Research  
Sigma Xi

PROFESSIONAL LEADERSHIP ASSIGNMENTS: (last  
five years)

Chair, Natural Resources and Environmental Programs  
Ad Hoc Committee (university-wide)  
Chair, FFW Graduate Committee (4 yr)

CURRENT TEACHING ASSIGNMENT:

Limnology (FFW 459/859), spring every other year,  
summer (on campus or at Cedar Point) alternate years

Advanced Limnology (FFW 860) every other fall  
Graduate Seminar (FFW 901), rotational basis (ca. every  
3.5 yr)  
FFW Seminar (FFW 404/804) fall every other year

CURRENT ADVISING:

10	undergraduates
9	M.S.
1	Ph.D.
3	Postdocs

GRANTS AND CONTRACTS: (last five years)

1994-96 Nebraska Department of Environmental Quality  
(with J. Brandle, M. Dosskey - project leader,  
Michele Schoeneberger and T. Franti).  
Demonstration of riparian buffer establishment  
and NPS abatement in an agricultural  
watershed. \$150,400  
1994-96 Nebraska Department of Environmental Quality  
(with John Holz). Demonstration and evaluation  
of aluminum sulfate as a restoration technique  
in a Nebraska sandpit lake. \$155,792  
1994-96 National Water Research Institute. Effects of  
atrazine metabolites on freshwater algae.  
\$70,438  
1994-96 U.S. Environmental Protection Agency.  
Chronic effects of atrazine background levels  
on Platte River algae. \$47,316  
1993-96 Office of Naval Research (with M.R. Gretz).  
Diatom attachment at aquatic interfaces:  
molecular interactions, mechanisms and  
physiology of adhesion. \$565,541 (includes  
\$67,905 of ASSERT fellowship funding)  
1990-93 Office of Naval Research. (with M.R. Gretz)  
Biochemistry of the fouling marine diatom  
adhesives and the effects of substrate  
preconditioning on adhesion. \$328,661  
1993-95 U.S. Fish & Wildlife Service. Effects of  
insecticides on benthic macroinvertebrates in  
Nebraska wetlands. \$42,805  
1994-95 U.S. Geological Survey (Section 104) (with  
head PI B. Siegfried and S. Nissen).  
Mechanisms of atrazine selective toxicity in  
freshwater algae. \$16,130  
1993-96 U.S. Fish & Wildlife Service and the Nebraska  
Game & Parks Commission. The efficacy of  
organic matter addition to the Missouri River to  
increase secondary production. \$141,197  
1993-94 University of Nebraska, Layman Trust Award.  
Restoration of Nebraska sand-pit lakes: a new  
chemical approach. \$14,620  
1994-96 Department of Energy, NIGEC (Great Plains  
Regional Center) (with S.G. Ernst). Impacts of  
global climate change on phytoplankton  
productivity in lakes along a thermal gradient.  
\$123,070



- 1992-93 U.S. Fish & Wildlife Service. Experimental studies on the Platte River ecosystem. \$50,000
- 1992-94 U.S. Geological Survey (Section 104). Synergistic and chronic effects of agricultural pesticides on benthic algal communities in Nebraska streams. \$42,375
- 1992-93 Nebraska Department of Environmental Quality (EPA Region VII Clean Lakes Program). Water quality monitoring in Fremont borrow-pit lakes prior to restoration efforts. \$8,340
- 1992-95 Nebraska Department of Environmental Quality (EPA Region VII NPS Program). Evaluation of riparian buffer strips and resulting water quality in the Loseke-Taylor Creek watershed. \$78,226
- 1992-95 U.S. Army Corps of Engineers. Changes in the benthic macroinvertebrates, zooplankton, and phytoplankton of Pawnee reservoir over the past two decades. \$48,751
- 1992-94 North Central Regional Aquaculture Center (USDA). (with Terrence Kayes) Characterization of aquaculture effluents from four types of production systems. \$30,000
- 1991-92 Department of Energy, NIGEC. (with S. Ernest and D. DeNicola) Genetic basis for variation in freshwater phytoplankton productivity related to water temperature. \$66,968
- 1991-93 University of Nebraska Water Center. (with B.D. Siegfried) Effects of alachlor and bifenthrin on non-target aquatic communities in Nebraska streams. Water Quality Graduate Assistantship. \$28,300
- 1989 Texas Water Resources Institute. (with R.W. Drenner) Freshwater community response to mixtures of agricultural pesticides: synergistic effects of atrazine and bifenthrin. \$24,959
- 1988-91 Nebraska Game and Parks Commission. Feeding ecology of gizzard shad at Lake McConaughy. \$28,000

#### CURRENT RESEARCH EMPHASIS:

- Project Number: 26-019. Primary water quality determinants of attached algal communities in Nebraska.
- Current objectives include research in the following areas: (a) Adhesion, chemistry, and morphology of diatom mucilages; (b) Succession, distribution, and structure of attached algal communities; (c) Water quality; impact of pesticides and riparian buffer strips on aquatic communities; and (d) Effects of global climate change on freshwater ecosystems.

#### PUBLICATIONS: (last five years)

- Lewis, R.J., S.I. Jensen, D.M. DeNicola, V.I. Miller, K.D. Hoagland and S.G. Ernst. (accepted). Genetic variation in the diatom *Fragilaria capucina* along a latitudinal gradient across North America. *Plant Systematics and Evolution*.
- DeNicola, D.M. and K.D. Hoagland. (accepted). Effects of solar spectral irradiance (visible to UV) on a prairie stream epilithic community. *Journal of the North American Benthological Society*
- Joern, A. and K.D. Hoagland. (in press). *In defense of whole community bioassays for risk assessment. Environmental Toxicology and Chemistry*.
- Holz, J.C. and K.D. Hoagland. (in review). *Experimental microcosm study of the effects of phosphorus reduction on plankton community structure. Canadian Journal of Fisheries and Aquatic Sciences*.
- Langan, M.M. and K.D. Hoagland. (in press). *Growth responses of Typha latifolia and Scirpus acutus to atrazine contamination. Bulletin of Environmental Contamination and Toxicology*.
- Spawn, R.L., K.D. Hoagland and B.D. Siegfried. (accepted). *Effects of alachlor on an algal community from a midwestern agricultural stream. Environmental Toxicology and Chemistry*.
- Popp, A., K.D. Hoagland and G.L. Hergenrader. (accepted). *Zooplankton community response to reservoir aging. Hydrobiologia*.
- Hoagland, K.D., J.P. Carder and R. L. Spawn. (in press). Effects of organic toxic substances. In: Stevenson, R.J., M.L. Bothwell and R.L. Lowe (Eds.), *Benthic Algal Ecology in Freshwater Ecosystems*. Academic Press. Chap. 14.
- Hoagland, K.D., S.G. Ernst, S.I. Jensen, R.J. Lewis, V.I. Miller and D.M. DeNicola. 1996. Genetic variation in *Fragilaria capucina* clones along a latitudinal gradient across North America: a baseline for detecting global climate change. 13th International Diatom Symposium 1994. pp. 385-392.
- Johnson, L.M., K.D. Hoagland and M.R. Gretz. 1995. Effects of bromide and iodide on stalk secretion in the biofouling diatom *Achnanthes longipes* (Bacillariophyceae). *Journal of Phycology* 31:401-412.
- Popp, A. and K.D. Hoagland. 1994. Changes in benthic community composition in response to reservoir aging. *Hydrobiologia* 306:159-171.
- Hoagland, K.D., J.R. Rosowski, M.R. Gretz and S.C. Roemer. 1993. Diatom extracellular polymeric substances: function, fine structure, chemistry, and physiology. *Journal of Phycology*. 29:537-566.

- Hoagland, K.D., R.W. Drenner, J.D. Smith and D.R. Cross. 1993. Freshwater community responses to mixtures of agricultural pesticides: Effects of atrazine and bifenthrin. *Environmental Toxicology and Chemistry* 12:627-637.
- Peterson, C.G., T.L. Dudley, K.D. Hoagland and L.M. Johnson. 1993. Infection, growth, and community-level consequences of a diatom pathogen in a Sonoran Desert stream. *Journal of Phycology* 29:442-452.
- Drenner, R.W., K.D. Hoagland, J.D. Smith, W.J. Barcellona, P.C. Johnson, M.A. Palmeri and J.C. Hobson. 1993. Experimental microcosm study of the effects of sediment-bound bifenthrin on gizzard shad and plankton. *Environmental Toxicology and Chemistry* 12:1297-1306.
- DeNicola, D.M., K.D. Hoagland and S.C. Roemer. 1992. Influences of canopy cover and spectral irradiance and periphyton assemblages in a prairie stream. *Journal of the North American Benthological Society* 11:391-404.

NAME: Scott E. Hygnstrom

PRESENT RANK: Associate Professor

DATE OF RANK: July 1, 1994      TENURE: Yes

APPOINTMENT: .70 Extension .30 Teaching

GRADUATE FACULTY: Member

EDUCATION:

B.S.	1980	University of Wisconsin-River Falls
M.S.	1983	University of Wisconsin-Stevens Point
Ph.D.	1988	University of Wisconsin-Madison

PROFESSIONAL EXPERIENCE:

1994-present	Associate Professor, Extension Wildlife Damage Specialist, University of Nebraska-Lincoln
1988-1994	Assistant Professor, Extension Wildlife Damage Specialist, University of Nebraska-Lincoln
1987	Staff Lecturer, University of Wisconsin-River Falls
1983-1986	Wildlife Damage Program Coordinator, Wisconsin DNR

PROFESSIONAL SOCIETIES:

American Society of Mammalogists  
Human Dimensions in Wildlife Study Group  
National Animal Damage Control Association  
Nebraska Academy of Sciences  
Nebraska Cooperative Extension Association  
The Society for Conservation Biology  
The Wildlife Society (Parent Chapter, CMPS and Nebraska Chapter)

HONORS AND AWARDS:

1990	TWS, Certified Wildlife Biologist
1991	UNL-IANR, Team Effort Award UNCE Excellence in Team Programming
1992	TWS, Professional Development
1993	CASE, Award of Merit ASAE, Blue Ribbon Award
1994	UNCE Excellence in Team Programming NCEA, Outstanding New Specialist Award
1995	ASA, Certificate of Excellence ASHS, Educational Aids Award Berryman Institute for Wildlife Damage Management--Member
1996	UNCE, Excellence in Team Programming

PROFESSIONAL LEADERSHIP ASSIGNMENTS: (last 5 years)

Chair-elect, The Wildlife Society-Wildlife Damage Management Working Group, 1994-1996.  
Regional Director, National Animal Damage Control Association, 1993-1997.  
Chair, Great Plains Agricultural Council-Wildlife Committee, 1991-1993.  
President-elect, Nebraska Cooperative Extension Association-Specialist Section, 1995-1996.  
Representative, 1992-1994.  
President, The Wildlife Society-Nebraska Chapter, 1993-1995. Representative, 1991-1993.

PROFESSIONAL ACTIVITIES: (last 5 years)

IANR interdisciplinary teams:  
CRP Conversion Team  
EE--Living Wild Resources  
Extension Swine Workgroup  
Turfgrass Science Team  
Urban Pest Management Team

CURRENT TEACHING ASSIGNMENT:

FFW 348,                      spring, every year  
FFW 448/848,                spring, every year

CURRENT ADVISING:

15 undergraduates  
2 M.S.  
1 Ph.D.

GRANTS AND CONTRACTS: (last 5 years)

White-tailed deer vulnerability and movements in the Missouri River valley.  
USFWS, NGPC, PBA, SCI  
\$52,000      1995-1998  
Seasonal habitat use of white-tailed deer at Gifford Point-Fontenelle Forest.  
FF, NGPC, PMR-NRD, SC, GP  
\$46,000      1995-1997  
Ecology of elk in the Pine Ridge, Nebraska.  
NGPC, USFS, RMEF  
\$127,365      1995-1997  
Activities and impacts of white-tailed deer at DeSoto National Wildlife Refuge.  
USFWS, NGPC, PBA, NBA  
\$43,000      1990-1993  
Black-footed ferret displays for five conservation education and captive ferret facilities.  
USFWS, USFS, NGPC, NPF  
\$26,500      1991-1996  
Science is "deer" to us.  
NRA  
\$10,000      1993-1994

Revision of the handbook, "Prevention and Control of  
Wildlife Damage."  
USDA-APHIS-ADC  
\$70,000 1991-1994

#### CURRENT RESEARCH EMPHASIS:

Project Number NEB-26-016. Integrated Pest  
Management-Vertebrates in Nebraska.  
Impacts of wildlife damage and development of  
techniques to reduce damage to tolerable levels.

#### PUBLICATIONS: (last 5 years)

##### Journal Articles:

- Virchow, D. R., W. L. Kramer, S. E. Hygnstrom, C. S.  
Brown, and A. M. Barnes. 1992. First evidence  
of plague (*Yersinia pestis*) in Nebraska is found in  
Panhandle predators. Transactions of the  
Nebraska Academy of Sciences 19:49-55.
- Lovaglio, M. J., K. C. VerCauteren, E. M. Anderson,  
and S. E. Hygnstrom. 1994. A comparison of  
electronic versus hand-held compasses for radio-  
telemetry studies. Wildlife Society Bulletin  
22:662-667.
- VerCauteren, K. C. and S. E. Hygnstrom. 1994.  
Movements of white-tailed deer in the eastern  
Great Plains relative to environmental conditions-  
a review. Great Plains Research 4:117-132.
- Ekstein, J. D. and S. E. Hygnstrom. 1995. Fate of  
wetlands associated with the tri-county irrigation  
canal in Southcentral Nebraska. Great Plains  
Research 5: (accepted).
- Hygnstrom, S. E. 1995. House mouse damage to  
insulation. International Biodeterioration and  
Degradation 33: (accepted).

##### Refereed Symposium or Workshop Proceedings:

- \_\_\_\_ and S. R. Craven. 1991. Raptor damage and  
nuisance problems in the United States. Pages  
161-167 in Proceedings of the Midwest Raptor  
Management Symposium and Workshop.
- Craven, S. R., D. J. Decker, S. E. Hygnstrom, and W.  
F. Siemer. 1992. Survey use and landowner  
tolerance in wildlife damage management. North  
American Wildlife and Natural Resources Conf.  
57:75-88.

##### Non-Refereed Symposium Proceedings:

- Hygnstrom, S. E. 1991. The role of rodents in disease  
transmission. Proceedings of the George A.  
Young Swine Conference 32:155-159.

Ferraro, D. M. and S. E. Hygnstrom. 1993. Public  
perceptions of wildlife encounters in the Omaha,  
Nebraska metropolitan area. Great Plains  
Wildlife Damage Control Workshop Proceedings  
11:68-78.

VerCauteren, K. C. and S. E. Hygnstrom. 1993.  
White-tailed deer home range characteristics and  
impacts relative to field corn damage. Great  
Plains Wildlife Damage Control Workshop  
Proceedings 11:218-219.

Virchow, D. R. and S. E. Hygnstrom. 1993. Response  
of a mixed-grass prairie in western Nebraska to  
livestock exclusion and prairie dog control.  
Great Plains Wildlife Damage Control Workshop  
Proceedings 11:220-221.

Hygnstrom, S. E. 1994. Efficacy of five burrow  
fumigants for managing black-tailed prairie dogs.  
Vertebrate Pest Conf. 16:80-82.

\_\_\_\_, K. C. VerCauteren, and T. R. Schmaderer.  
1994. Biological management (control) of  
vertebrate pests—advances in the last quarter  
century. Vertebrate Pest Conference 16:293-300.

\_\_\_\_ and \_\_\_\_\_. 1995. Vertebrate pest management in  
grain storage facilities. National Stored Grain  
Pest Management Conference 4:147-163.

\_\_\_\_\_. 1996. Plastic visual barriers were ineffective at  
reducing recolonization rates of prairie dogs.  
Great Plains Wildlife Damage Control Workshop  
Proceedings 12:74-76.

##### Edited Publications:

- \_\_\_\_, R. M. Case, and R. J. Johnson. 1991.  
Proceedings of the Tenth Great Plains Wildlife  
Damage Control Workshop. UNCE. 179pp.
- \_\_\_\_, R. M. Timm, and G. E. Larson. 1994.  
Prevention and Control of Wildlife Damage.  
UNCE. 863 pp.

##### Book Chapters:

- \_\_\_\_. 1991. Controlling rats and mice in swine  
facilities. Pages 71-83 in D. G. Levis, ed.  
Farrowing and Nursery Management Home Study  
Course. UNCE.
- \_\_\_\_. 1993. Deer on the move. Pages 38-51 in A.  
Hofacker, ed. A Guide to Deer Behavior and  
Hunting Techniques. Krause Publications, Iola,  
Wisconsin.
- Craven, S. R. and S. E. Hygnstrom. 1994. Deer.  
Pages D25-40 in S. E. Hygnstrom, R. M. Timm,  
and G. E. Larson, eds. Prevention and Control  
of Wildlife Damage. UNCE.
- Hygnstrom, S. E. 1994. Black bears. Pages C5-16 in  
S. E. Hygnstrom, R. M. Timm, and G. E.  
Larson, eds. Prevention and Control of Wildlife  
Damage. UNCE.

- \_\_\_\_\_ and S. R. Craven. 1994. Hawks and owls. Pages E53-62 in S. E. Hygnstrom, R. M. Timm, and G. E. Larson, eds. Prevention and Control of Wildlife Damage. UNCE.
- \_\_\_\_\_ and D. R. Virchow. 1994. Prairie dogs. Pages B85-96 in S. E. Hygnstrom, R. M. Timm, and G. E. Larson, eds. Prevention and Control of Wildlife Damage. UNCE.

Extension NebGuides:

- \_\_\_\_\_ and \_\_\_\_\_. 1992. Controlling house mice. NebGuide G92-1105A. UNCE. 4pp.
- \_\_\_\_\_ and \_\_\_\_\_. 1992. Controlling rats. NebGuide G92-1106A. UNCE. 4pp.
- Virchow, D. R. and S. E. Hygnstrom. 1992. Thirteen-lined ground squirrels in Nebraska-controlling damage. NebGuide G92-1110A. UNCE. 4pp.
- Hygnstrom, S. E. and D. R. Virchow. 1994. Controlling house mice. Ag Facts AF-42. Kansas State University Cooperative Extension Service. Manhattan. 4pp.
- \_\_\_\_\_ and \_\_\_\_\_. 1994. Controlling rats. Ag Facts AF-43. Kansas State University Cooperative Extension Service. Manhattan. 4pp.
- Virchow, D. R. and S. E. Hygnstrom. 1994. Bait stations for controlling rats and mice. NebGuide G94-1215-A. UNCE. 4pp.
- Hygnstrom, S. E. and D. R. Virchow. 1995. Prevention and control of rabbit damage. NebGuide G95-1258-A. UNCE. 4pp.
- Virchow, D. R., S. E. Hygnstrom, and W. L. Kramer. 1995. Wildlife and disease—public health concerns. NebGuide G95-1259-A. UNCE. 4pp.

Extension Bulletins/Circulars:

- Hygnstrom, S. E. and W. L. Baxter. 1991. Deer damage control in Nebraska. EC 91-1773. UNCE. 6pp.
- \_\_\_\_\_. 1992. Integrated pest management-vertebrates. Pages 66-71 in R. E. Gaussoin and F. P. Baxendale, eds. Integrated Management Guide for Nebraska Turfgrass. EC92-1557-S. UNCE.

NAME: Dennis E. Jelinski

PRESENT RANK: Assistant Professor

DATE OF RANK: 1 April 1993 TENURE: No

APPOINTMENT: 40% Research 60% Teaching

GRADUATE FACULTY: Fellow

EDUCATION:

B.S. 1980 Brandon University (Canada)  
M.S. 1984 University of Calgary (Canada)  
Ph.D. 1990 Simon Fraser University (Canada)

PROFESSIONAL EXPERIENCE:

1990 - 91 Visiting Prof., Indiana University  
1991-1993 Research Asst. Prof., SUNY-Buffalo  
1993 - present Assistant Professor, UNL

PROFESSIONAL LEADERSHIP ASSIGNMENTS:

Science Team - NASA Boreal Ecosystem-Atmosphere  
Study (BOREAS) since 1993  
Member, EPA Platte River Ecological Risk Assessment  
since 1993  
Senior Co-leader, National Center for Geographic  
Information and Analysis (NCGIA) Research  
Initiative on GIS and Global Change Research,  
1991-1993

PROFESSIONAL SOCIETIES:

American Institute of Biological Sciences  
Ecological Society of America  
British Ecological Society  
International Association of Landscape Ecologists  
The Wildlife Society  
Society of Conservation Biologists  
National Association of Biology Teachers

PROFESSIONAL ACTIVITIES: (last 5 years)

- A. Determine the extent of habitat fragmentation in the central Platte River region.
- B. Ascertain the levels of biodiversity in landscapes of varying heterogeneity.
- C. Study of the surface dynamics governing landscape-scale interactions between the Normalized Difference Vegetation Index and climate
- D. Establish the effects of patch structure on the fluxes of energy and CO<sub>2</sub> for contrasting boreal forest landscapes.
- E. Establish the effects of areal aggregation on the sensitivity of the results of spatial analyses.

CURRENT TEACHING ASSIGNMENT:

FFWL/NRES 101-Natural Resource, occasionally  
FFW 224 - Ecology of Woody Plant Communities  
FFWL/NRES 423/823-Integrated Resources  
Management (with Ernst)  
FFW 810 -Landscape Ecology  
FFW 901 - Seminar, once every three years

CURRENT ADVISING:

Undergraduate students-15  
Graduate students-2 PhD, 5 MS  
Postdoctoral Fellow - 1 (shared)  
Graduate Committees-6 MS; 7 PhD

GRANTS AND CONTRACTS: (last 5 years)

- Jelinski, D. E. 1995. Development of landscape-scale bio-hydrological criteria for ecological risk assessment in the Central Platte River region, Nebraska. U. S. Environmental Protection Agency. \$191,798 (2 years).
- Jelinski, D. E. 1995. Large-scale inventory of black-tailed prairie dog colonies. US Forest Service. \$36,540 (2 years).
- Jelinski, D. E. and J. Merchant. 1995. Nebraska Gap Biodiversity Program (Phase 1). US Biological Service. \$100,000 (3 years).
- Jelinski, D. E. and S. Narumalani. 1995. Distribution and hydrologic characteristics of backwaters of the Central Platte River Nebraska. U. S. Fish and Wildlife Service. \$61,202 (2 years).
- Jelinski, D. E. 1995. An assessment of native grass communities in the Conservation Reserve Program, Sandhills region, Nebraska. Sampson Range and Pasture Management Endowment, University of Nebraska-Lincoln. \$9810 (1 year).
- Hoagland, K. D., and Jelinski, D. E. 1995. Effects of global warming on productivity in aquatic ecosystems. National Institute for Global Environmental Change (US DoE). \$10,000 (1 year).
- Jelinski, D. E. and R. Case. 1994. Characterization of landscape structure and effects on biodiversity in the Central Platte River, Nebraska. U. S. Fish and Wildlife Service. \$124,804 (2 years).
- Jelinski, D. E., and P. J. Currier. 1994. Spatial and floristic structure of wet meadow habitat in the central Platte River corridor, Nebraska. U. S. Environmental Protection Agency. \$50,000 (2 years).
- Jelinski, D.E. 1993. Surface energy and water balances of forest and wetland subsystems in the Boreal Forest: surface-atmosphere links and ecological controls. NASA - BOREAS. \$231,800 (4 years).
- Jelinski, D. E. 1994. Analysis of Variability in NDVI for North American Vegetation Formations. Research Grant-in-Aid, Research Council, University of Nebraska-Lincoln. \$3000 (1 year).

- Jelinski, D. 1993. A proposal to the Water Sciences Center for a Global Positioning System. University of Nebraska. \$3,150 (1 year).
- Jelinski, D.E. 1991. Climate and North American Plant Formations: Analysis Between the Water Balance and Satellite-Derived Vegetation Patterns. National Institute for Global Environmental Change (US Department of Energy). \$86,500 (2 years).

PUBLICATIONS: (last 5 years)

- Jelinski, D. E., and J. Merchant. 1996. Conservation of biodiversity in native rangelands: the role of GAP analysis. In D. W. Uresk, *Conserving Biodiversity in Native Rangelands*, U.S.D.A. Forest Service, Rocky Mountain Forest and Range Experiment Station, General Technical Report, In press.
- Jelinski, D. E. and J. Wu. 1995. The modifiable areal unit problem and implications for landscape ecology. In press, *Landscape Ecology*.
- Williams, E. and D. E. Jelinski. 1995. On using the NOAA AVHRR "Experimental Calibrated Biweekly Global Vegetation Index". In press, *Photogrammetric Engineering and Remote Sensing*.
- Zhou, Yinchun, S. Narumalani and D. E. Jelinski. 1995. Improving remote sensing-derived land use/land cover classification with the aid of spatial information. *Auto-Carto 12*: 363-371.
- Narumalani, S., D. E. Jelinski, Y. Zhou, and D. Smith. 1995. Analyzing landscape patterns using remote sensing-derived land cover classifications for the central Platte River valley, Nebraska. *Proceedings, American Society of Photogrammetric Engineering and Remote Sensing*, Volume 2: 93-101. Charlotte, NC.
- Weber, C. R., B. Battenfield, and D. E. Jelinski. 1995. A case study for hypermedia cartography: radial growth in trembling aspen in Waterton Lakes National Park. *Auto-Carto 12*:32-40.
- Carleton, A.M., D. Travis, D. Arnold, R. Brinegar, D.E. Jelinski, and D. Easterling. 1994. Climatic-scale vegetation-cloud interactions during drought using satellite data. *International Journal of Climatology* 14:593-623.
- Jelinski, D.E. 1993. Patterns of environmental heterogeneity, heterozygosity and growth of trembling aspen in a Cordilleran landscape. *Arctic and Alpine Research*. 25:183-188.
- Jelinski, D.E., and W.M. Cheliak. 1992. Genetic diversity and spatial subdivision of trembling aspen in a heterogeneous landscape. *American Journal of Botany* 79:728-736.
- Jelinski, D.E., and L.J. Fisher. 1991. Spatial variability in the nutrient composition of trembling aspen: clone-to-clone differences and implications for cervids. *Oecologia* 88:116-124.
- Jelinski, D.E. 1991. On the use of chi-square analyses in resource utilization studies. *Canadian Journal of Forest Research* 21:58-65.

Book Chapters (refereed)

- Jelinski, D.E., M. Goodchild, L. Steyaert. 1994. Multiple roles for GIS in global change research: towards a research agenda. In W. K. Michener, J. Brunt and S. Stafford, editors *Environmental Information Management and Analysis: Ecosystem to Global Scales*, London:Taylor-Francis.
- Wu, J. and D. E. Jelinski. 1995. Pattern and Scale in Ecology: The Modifiable Areal Unit Problem. In *Lectures in Modern Ecology*. University of Inner Mongolia Press, Huhhot, China.





NAME: Ron J. Johnson

PRESENT RANK: Professor

DATE OF RANK: 8 March 1996

TENURE: Yes

APPOINTMENT: .69 Extension .31 Research

GRADUATE FACULTY: Fellow

EDUCATION:

B.S. June 1968 The Ohio State University  
M.S. March 1973 The Ohio State University  
Ph.D. May 1979 Cornell University

PROFESSIONAL EXPERIENCE:

1993-present Professor & Extension Wildlife  
Specialist, University of Nebraska.  
(Associate Professor: 1985-1993;  
Assistant Professor: 1979-1985)  
Summers 1974 Instructor, School of Natural Resources,  
and 1975 The Ohio State University  
Summer 1965 Reelfoot National Wildlife Refuge,  
Samburg, Tennessee. (Intern)  
Summer 1966 Chincoteague NWR, Chincoteague,  
Virginia. (Intern)

PROFESSIONAL SOCIETIES:

Sigma Xi  
Gamma Sigma Delta  
Epsilon Sigma Phi  
The Wildlife Society (National, CMPS Regional Section,  
& Nebraska Chapter)  
Society of Conservation Biology  
Soil and Water Conservation Society  
National Animal Damage Control Association  
Association of Field Ornithologists  
The Wilson Ornithological Society  
Nebraska Ornithologists Union  
Nebraska Academy of Sciences  
Nebraska Cooperative Extension Association and  
Specialist Section

HONORS AND AWARDS:

Graduated with distinction in wildlife management (1968)  
and received \$900 research scholarship.  
Towers Honorary, 1968, The Ohio State University.  
Outstanding Teaching Associate, Biology Department,  
The Ohio State University, 1975.  
Awarded Research Travel Grant (\$270), September  
1983, by University of Nebraska, Research  
Council.

Excellence in Extension Programming Award  
(co-winner), November 1983. Cooperative  
Extension Service, University of Nebraska.  
Who's Who in the Midwest, 20th (1985) and 21st (1987)  
Editions and Who's Who of Emerging Leaders  
in America, First Edition (1987).

Award of Excellence for publication Who's Who in  
Great Plains Songbirds (EC 84-1757) from  
Agricultural Communicators in Education,  
Washington, D.C. (June, 1985).

Certified Wildlife Biologist, 1989. The Wildlife Society.  
Distinguished Service Award, 1989. Nebraska  
Cooperative Extension Association.

Best Poster Award for poster presentation, (K. Kessler &  
R. J. Johnson co-recipients), 53rd Midwest  
Fish and Wildlife Conference, Dec 91

Directed research receiving student recognition (6  
citations, 6 graduate students):

Outstanding Student Award for paper  
presentation, (K. Kessler), Great  
Plains Wildlife Damage Control  
Workshop, Apr 91

Nebraska Statewide Arboretum Graduate  
Student Research Award, Two  
recipients (K. Poague, 1992; N.  
Sunderman, 1993)

Best science paper for paper presentation, (A.  
Koehler), 44th Midwest Fish and  
Wildlife Conference, December 1982.

Widaman Trust Distinguished Graduate  
Assistant Stipends, Two graduate  
student recipients (A. Koehler, 1982;  
B. Holm 1984)

PROFESSIONAL LEADERSHIP ASSIGNMENTS:  
(Last 5 years)

Major Committees:

Chair. UNL Institutional Animal Care and Use  
Committee (IACUC) (1989-1995; Chair 1995)

Co-coordinator (w/ Jim King) of IANR Earthbound  
Team (1994-95; participation since initiation in  
1993)

IANR Natural Resources Strategic Planning Comm.  
(1994)

CES Action Plan Writing Team: Natural Resources and  
Environmental Management (1995)

IANR Ethical Dilemmas Committee (1994-1996)

FFW Promotion and Tenure Committee (1994, 1995)

FFW Graduate Committee (1984 - 1994)

Chair, FFW Extension Wildlife Awards Committee  
(1980 - present)

Manuscript and grant reviews: 11 Journals/sources

Symposia: Tenth Great Plains Wildlife Damage Control  
Workshop - (with S. Hygnstrom and R. Case).

Planning/hosting committee and co-editor of 179-page  
proceedings. 250 participants from 22 states and 2  
provinces. (April 15-18, 1991).

#### Major Invited Presentations:

- 1993 National Urban Forestry School, Urban Wildlife (March, 8 states participated)
- 1992 Great Plains Agricultural Council, Forestry Committee Annual Meeting, Bismarck, North Dakota. (Regional)
- 1991 EPA's Endangered Species Protection Program, Conference on issues and concerns, Kansas City (March). (Regional)

#### Visiting Scholars Hosted:

- 1994 Dr. Louis B. Best, Department of Animal Ecology, Iowa State University.
- 1993 Dr. John E. Ikerd, University of Missouri - Columbia)
- 1992 Dr. Jorn Pagh Berthelsen, National Environmental Research Institute, Ronde, Denmark.

#### CURRENT EXTENSION PROGRAMS:

Primary overall focus: sustainability (natural biological systems and living wild resources), and enhancement of human opportunity through family outdoor activities, life-skills development for youth, and education on wildlife conflict issues (e.g. Endangered Species Protection Program, wetlands issues, farm bill issues).

The goals of sustainability and enhancement of human opportunity are incorporated into three objective areas, environmental awareness education, wildlife in managed landscapes, and public policy issues.

Action Plans/Teams Sunset September 30, 1995:

- Environmental Education: Living Wild Resources (No. 229) (Team coordinator; 1992-95)
- Management of Pesticides to Protect Nebraska Water Resources priority initiative team (1992-95).
- Nebraska residential Waste Management priority issue team (1992-95)
- CRP Priority Initiative Team (1993 -95).

Action Plans Initiated October 1, 1995, (14 total, Nebraska). Primary participation will be in:

- Natural Resources and Environmental Management
- Youth and Family Responsibility
- Living Wild Resources Team is expected to continue, with primary contributions to these plans.

CURRENT ADVISING: 1 M.S. (2 finished Dec. 95)

#### GRANTS AND CONTRACTS: (last 5 years)

- U. S. Forest Service, Challenge Cost-share Program, (with M. E. Dix, J. R. Brandle, M. O. Harrell, R. J. Wright, L. Hodges). Assessment of the dynamics and roles of insect pests and their natural enemies in agroforestry systems (\$10,000- USFS & UNL split) (1991)
- USDA Agriculture in Concert with the Environment (ACE) Program grant. Nine-person team. \$99,500. Impact of Tree Windbreaks on Distribution of Insect Pests and Their Natural Enemies in Sustainable Agricultural Systems. Expires Feb 96.

#### CURRENT RESEARCH EMPHASIS:

Research Division Project: Wildlife Damage Management for Sustainable Systems (Number NEB-26-014). Expires 1996. New project in preparation

Focus: Sustainability in agricultural and urban landscapes, Ecology of edge habitats and corridors; Ecological and behavioral aspects of wildlife damage.

#### RESEARCH PUBLICATIONS (last 5 years)

##### Refereed Journal Articles

- Steinegger, D. H., D. A. Agüero, R. J. Johnson, and K. M. Eskridge. 1991. Monofilament lines fail to protect grapes from bird damage. *HortScience* 26:924. (Journal Series: 9294)
- Agüero, D. A., R. J. Johnson, and K. M. Eskridge. 1991. Monofilament lines repel house sparrows from feeding sites. *Wildlife Society Bulletin* 19:416-422. (Journal Series: 9329)
- Pochop, P. A. and R. J. Johnson. 1993. Pentagon milk-carton nest box. *J. Field Ornithol.* 64:239-243. (Journal Series: 9901).
- Pochop, P. A., R. J. Johnson and K. M. Eskridge. 1993. House Sparrow response to monofilament lines at nest boxes and adjacent feeding sites. *Wilson Bull.* 105:504-513. (Journal Series: 10012)
- Johnson, R. J. 1994. Sustainability and pest management. *Phytoparasitica* 22:3-7. (Journal Series 10453). Invited.
- Kessler, K. K., R. J. Johnson, K. M. Eskridge. 1994. Monofilament lines and a hoop device for bird management at backyard feeders. *Wildl. Soc. Bull.* 22:461-470. (Journal Series 10202).
- Johnson, R. J., M. M. Beck, and J. R. Brandle. 1994. Windbreaks for people: the wildlife connection. *J. Soil and Water Conserv.* 49:546-550. (Journal Series 10376). Invited

Dix, M. E., R. J. Johnson, M. O. Harrell, R. M. Case, R. J. Wright, L. Hodges, J. R. Brandle, M. M. Schoeneberger, N. J. Sunderman, R. L. Fitzmaurice, L. J. Young, and K. G. Hubbard. 1995. Influences of trees on abundance of natural enemies of insect pests: A review. *Agroforestry Systems* 29:303-311. (Journal Series 10549).

Johnson, R. J., R. M. Case, and M. M. Beck. Biodeterioration of the biosphere: where does wildlife damage management stand? *International Biodeterioration & Biodegradation* (In press).

Patent received for bird management device, No. 5,295,455 (status: in marketing process)

#### Symposium Proceedings:

Hafer, D. J., S. E. Hygnstrom, R. J. Johnson, and D. M. Ferraro. 1993. The nature and timing of wildlife damage events in Nebraska: a five-year review of requests to three extension wildlife personnel. *Proc. Great Plains Wildl. Damage Control Workshop* 11:109-110.

M. E. Dix, R. J. Johnson, M. O. Harrell, R. M. Case, R. J. Wright, L. Hodges, J. R. Brandle, M. M. Schoeneberger, N. J. Sunderman, R. L. Fitzmaurice, L. J. Young, and K. G. Hubbard. 1994. Influences of trees on abundance of insect pests. *Proc. International Agroforestry Symposium* 3:19-22. (Ames, Iowa)

M. E. Dix, L. Hodges, M. O. Harrell, R. J. Johnson, J. R. Brandle, M. M. Schoeneberger, R. M. Case, R. J. Wright, K. G. Hubbard, and L. J. Young. 1994. Research of the Nebraska Agroforestry Team. *Proc. Society of American Foresters National Convention*, pp 253-257. (Indianapolis, Indiana).

Fitzmaurice, R. L., R. J. Johnson, J. R. Brandle, R. M. Case, and L. J. Young. 1994. Role of birds & stream corridors in sustainable agricultural systems. *Proc. 1994 Nebraska Fruit & Vegetable Growers Conference*, pp 9-11. (Columbus, Nebraska)

Sunderman, N. J., R. J. Johnson, J. R. Brandle, R. M. Case, M. O. Harrell, L. J. Young, M. E. Dix, L. Hodges, and R. J. Wright. 1994. Role of birds in sustainable agriculture. *Proc. 1994 Nebraska Fruit & Vegetable Growers Conference*, pp 13-15. (Columbus, Nebraska)

M. E. Dix, R. J. Johnson, M. O. Harrell, R. M. Case, L. Hodges, R. J. Wright, J. Irwin, M. M. Schoeneberger, J. R. Brandle, R. L. Fitzmaurice, N. J. Sunderman, L. J. Young, and K. G. Hubbard. 1994. Shelterbelts as insect habitat. *Proc. Nebraska Fruit & Vegetable Growers Conference*, p17. (Columbus, Nebraska).

Eskridge, K. M., Y. Yang, and R. J. Johnson. Analysis of Bird Repellent Experiments in the Presence of Treatment Interference. *Proc. Joint Statistical Meetings*. In Press (Aug 13-19, 1995, Orlando FL).

#### Chapters in Books:

Johnson, R. J. and J. F. Glahn. 1994. Starlings. Pages E109-120. *In: S. E. Hygnstrom, R. M. Timm, and G. E. Larson, eds., Prevention and Control of Wildlife Damage*. Nebr. Coop. Ext. Div., Institute of Agric. and Nat. Resources, Univ. of Nebraska-Lincoln; USDA/APHIS Animal Damage Control; and Great Plains Agric. Council Wildl. Resources Comm. Lincoln, Nebraska.

Johnson, R. J. 1994. Crows. Pages E33-40. *In: S. E. Hygnstrom, R. M. Timm, and G. E. Larson, eds., Prevention and Control of Wildlife Damage*. Nebr. Coop. Ext. Div., Institute of Agric. and Nat. Resources, Univ. of Nebraska-Lincoln; USDA/APHIS Animal Damage Control; and Great Plains Agric. Council Wildl. Resources Comm. Lincoln, Nebraska.

#### Published Research Abstracts: 14

#### EXTENSION PUBLICATIONS: (last 5 years)

Johnson, R. J., M. M. Beck, and J. R. Brandle. 1991. Windbreaks and Wildlife. EC 91-1771-B. 8pp. (Used nationwide)

Johnson, R. J., and J. F. Glahn. 1992. Starling management in agriculture. *Regional Publication NCR 451*. 7pp. (Reviewed/approved in National Cost Share program: 24 states participating).

Hygnstrom, S. E., R. M. Case, and R. J. Johnson. 1992. Tenth Great Plains wildlife damage control workshop. *Great Plains Research* 2:109-113.

Johnson, R. J. and C. Wolfe. 1994 (Revised). Backyard wildlife III, planting for habitat. *NebGuide* G84-671-A.

Glahn, J. F., R. J. Johnson, and L. E. Germer. 1995. Bird management at swine facilities. *Pork Industry Handbook PIH-134*. Purdue University Cooperative Extension Service, West Lafayette, Indiana. 6pp. (RJJ invited by Purdue Univ., reviewed & used nationally)

Johnson, R. J., D. H. Steinegger, A. Greving. 1995. Backyards for Wildlife and Family Enjoyment. HE Form 449, University of Nebraska Cooperative Extension, Lincoln. 12pp.

Johnson, R. J., D. H. Steinegger, A. Greving. 1995. Leader Guide: Backyards for Wildlife and Family Enjoyment. HE Form 450., University of Nebraska Cooperative Extension, Lincoln. 3pp.

NAME: Steve L. Karloff  
PRESENT RANK: Assist Forester  
DATE OF RANK: April, 1993  
TENURE: No  
APPOINTMENT: 75% NE Forest Service  
25% Extension

EDUCATION:

B.S. 1983 University of Missouri-Columbia;  
Forest Management  
M.S. 1991 University of Nebraska-Lincoln;  
Agronomy with emphasis on Range  
Management and a minor in  
Educational Administration

PROFESSIONAL EXPERIENCE:

District/Extension Forester, University of Nebraska-  
Department of Forestry, Fisheries & Wildlife,  
1993 to present.  
District Forester Assistant, University of Nebraska-  
Department of Forestry, Fisheries & Wildlife,  
1988 to 1993.  
Assistant Project Operations Manager, University of  
Nebraska-Department of Forestry, Fisheries &  
Wildlife, 1985 to 1988.  
Conservation Assistant II, University of Nebraska-  
Department of Forestry, Fisheries, & Wildlife,  
1984 to 1985.  
Assistant Resource Forester, Missouri Department of  
Conservation, 1983.

MEMBERSHIPS IN PROFESSIONAL  
ORGANIZATIONS:

National Walnut Council  
National Arbor Day Foundation

HONORS AND AWARDS:

Batting Champion, Millard Pony League, 1971.

PROFESSIONAL LEADERSHIP ASSIGNMENTS: (last  
5 years)

Chairman of Prairie Pines and Rogers Farm Property  
Management Committee, 1995 to present.

PROFESSIONAL ACTIVITIES: (last 5 years)

Attended Riparian Bio-Engineering Workshop in  
Nebraska City, Nebraska, 1995.  
Redcedar Management Workshop for landowners and  
agency individuals in Steele City, Nebraska, 1995.

Presentation at Regional Windbreak Tech Course in  
Lincoln; Topic: "Site Preparation and Tree  
Planting"; attended by Field Technicians from a  
three-state area; 1994 & 1995.

Attended "Trees, People, and the Law" conference in  
Nebraska City, Nebraska, May, 1995.

TNADF Stream/Riparian Restoration Project  
Committee - purpose of which is to design and  
orchestrate a conservation plan for the Arbor  
Day Foundation Farm property, 1995.

Presentation at U.S. Forest Service, New Reforestation  
Technology Workshop at Halsey, Nebraska,  
New Computer Program for Developing  
Management Plans, 1994.

Attended Agroforestry Symposium In Fort Collins,  
Colorado, 1994.

Attended Riparian Forest Management Conference in  
Kansas City, 1993.

CURRENT TEACHING ASSIGNMENT:

None

CURRENT ADVISING:

None

GRANTS AND CONTRACTS: (last 5 years)

None

CURRENT RESEARCH EMPHASIS:

None

PUBLICATIONS: (last 5 years)

Newsletters:

Editor of Growing Green Newsletter three times a year.  
This newsletter covers up-to-date information  
on both rural and community forestry topics.  
Individual issues I have edited the past five  
years:

July/August, 1991  
January/February, 1992; July/August, 1992;  
November/December, 1992  
March/April, 1993; July/August, 1993;  
November/December, 1993  
March/April, 1994; July/August, 1994;  
November/December, 1994  
March/April, 1995; July/August, 1995;  
November/December, 1995

**NAME:** Terrence B. Kayes

**PRESENT RANK:** Associate Professor

**DATE OF RANK:** 1 September 1990 **TENURE:** No

**APPOINTMENT:** .75 Cooperative Extension  
.25 Research

**GRADUATE FACULTY:** Fellow

**EDUCATION:**

B.A.	1968	Chico State College
M.A.	1972	California State University at Chico
Ph.D.	1978	University of Wisconsin-Madison

**PROFESSIONAL EXPERIENCE:**

1990-present	Associate Professor, University of Nebraska-Lincoln
1987-1990	Assistant Director/Associate Scientist, Aquaculture Program, Department of Food Science, University of Wisconsin-Madison
1979-1987	Assistant Director/Assistant Scientist, Aquaculture Program, Department of Food Science, University of Wisconsin-Madison
1979-1980	Acting Director, Aquaculture Program, Department of Food Science, University of Wisconsin-Madison
1979-1980	Acting Coordinator, University of Wisconsin Sea Grant Aquaculture Subprogram, University of Wisconsin Sea Grant Institute
1978-1979	Project Biologist/Project Associate, Aquaculture Research Laboratory, Department of Food Science, University of Wisconsin-Madison

**PROFESSIONAL SOCIETIES:**

American Fisheries Society  
American Society of Zoologists  
World Aquaculture Society  
National Aquaculture Association  
United States Trout Farmers Association  
American Association for the Advancement of Science  
Sigma Xi  
Nebraska Cooperative Extension Association

**HONORS AND AWARDS:**

Admitted to Phi Kappa Phi, 1968  
Admitted to Sigma Xi, 1978  
Citation of the American Fisheries Society for the Best Poster Paper at the 1991 Annual Meeting

**PROFESSIONAL LEADERSHIP ASSIGNMENTS:** (last 5 years)

Represented Fish Culture Section of American Fisheries Society (and Cooperative Extension on ad hoc basis) on three-member Conference Steering Committee responsible for organizing "AQUACULTURE 92," a triennial international meeting and trade exposition (which for the first time held extension workshops and an international extension roundtable and sessions) sponsored by several aquaculture professional societies and industry associations, 1989-1992. Chaired USDA North Central Regional Aquaculture Center (NCRAC) Yellow Perch Work Group, 1989-93. Serving as Nebraska representative to USDA NCRAC Technical Committee, 1990-present. Serving on three-member Extension Executive Subcommittee of USDA NCRAC Technical Committee, 1991-present. Chairing USDA NCRAC Walleye Work Group, 1995-present. Serving as statutorily designated Cooperative Extension representative to five-member Nebraska Aquaculture Board, which reports to the Nebraska State Legislature, 1993-present.

**PROFESSIONAL ACTIVITIES:** (last 5 years)

Active in Fish Culture and Bioengineering Sections of American Fisheries Society, and World Aquaculture Society. See "PROFESSIONAL LEADERSHIP ASSIGNMENTS" and "Conference (Refereed) Abstracts."

**CURRENT ADVISING:**

1 M.S. Candidate  
1 Ph.D. -- not major advisor

**GRANTS AND CONTRACTS:** (last 5 years)

NOAA University of Wisconsin Sea Grant Institute, Assessment of low-level gas supersaturation as stressors in lake and rainbow trout. (9/1/88-8/30/92) \$440,448 with J.A. Malison.\*  
USDA NCRAC, Culture technology of walleye. (5/1/89-8/31/92) \$39,806.\*  
USDA NCRAC, Advancement of yellow perch aquaculture. (5/1/89-8/31/92) \$74,408.\*  
USDA NCRAC, Advancing hybrid striped bass culture in the North Central Region. (5/1/89-8/31/93) \$68,988.\*  
USDA NCRAC, Advancement of yellow perch aquaculture. (9/1/91-8/31/93) \$10,223.  
USDA NCRAC, Aquaculture technology of walleye. (9/1/92-8/31/93) \$15,222.  
NOAA University of Wisconsin Sea Grant Institute, Control of growth, sex and reproduction in Great Lakes coolwater fishes by genetic and endocrine manipulation. (9/1/89-8/31/94) \$669,988 with J.A. Malison.\*  
USDA NCRAC, Culture technology of salmonids. (9/1/92-8/31/94) \$25,925.  
USDA NCRAC, Characterization of aquaculture effluents from four types of production systems. (9/1/92-8/31/94) \$30,000 with K.D. Hoagland.  
USDA NCRAC, Cultural technology of walleye. (9/1/93-8/31/95) \$34,000.  
USDA NCRAC, Advancement of yellow perch aquaculture. (9/1/93-8/31/95) \$30,000.

NOAA\UNL High Plains Climate Center, Use of climate data to evaluate key fish species for aquaculture development in the High Plains Region. (5/1/94-4/30/96) \$24,837.  
 USDA NCRAC, Culture technology of salmonids. (9/1/94-8/31/96) \$40,000.  
 USDA NCRAC, Culture technology of centrarchids (sunfish). (9/1/94-8/31/96) \$8,000.  
 USDA NCRAC, Advancement of and a market study for walleye aquaculture. (9/1/95-8/31/1997) \$43,572.  
 USDA NCRAC, Advancement of yellow perch aquaculture. (9/1/95-8/31/97) \$36,000.  
 USDA NCRAC, Culture technology of hybrid striped bass. (9/1/95-8/31/97) \$10,000.

\*Funded at University of Wisconsin-Madison.

#### CURRENT RESEARCH EMPHASIS:

Project Number: Neb-26-020. Evaluation of environmental factors and fish species for aquaculture development in Nebraska, 1992-1997.  
 The main goals of this project are to develop and evaluate a temperature-based strategy of species selection for aquaculture development in Nebraska, and to improve on the technology of producing fry and early fingerlings of one target coolwater species, the walleye, in ponds.

#### PUBLICATIONS: (last 5 years)

##### Journal Articles:

Malison, J.A., T.B. Kayes, J.A. Held, and C.H. Amundson. 1990. Comparative survival, growth and reproductive development of juvenile walleye, sauger and their hybrids reared under intensive culture conditions. *Progressive Fish-Culturist* 52:73-82.  
 Kim, K.I., T.B. Kayes, and C.H. Amundson. 1991. Purified diet development and re-evaluation of the dietary protein requirement of fingerling rainbow trout (*Oncorhynchus mykiss*). *Aquaculture* 96:57-67.  
 Kebus, M.J., M.T. Collins, M.S. Brownfield, C.H. Amundson, T.B. Kayes, and J.A. Malison. 1992. Measurement of resting and stress-elevated serum cortisol in rainbow trout *Oncorhynchus mykiss* in experimental net-pens. *Journal of the World Aquaculture Society* 23:83-88.  
 Kebus, M.J., M.T. Collins, M.S. Brownfield, C.H. Amundson, T.B. Kayes, and J.A. Malison. 1992. Effects of rearing density on the stress response and growth of rainbow trout. *Journal of Aquatic Animal Health* 4:1-6.  
 Kim, K.I., T.B. Kayes, and C.H. Amundson. 1992. Requirements for sulfur amino acids and utilization of D-methionine by rainbow trout (*Oncorhynchus mykiss*). *Aquaculture* 101:95-103.  
 Kim, K.I., T.B. Kayes, and C.H. Amundson. 1992. Requirements for lysine and arginine by rainbow trout (*Oncorhynchus mykiss*). *Aquaculture* 106:333-344.  
 Kim, K.I., T.W. Grimshaw, T.B. Kayes, and C.H. Amundson. 1992. Effect of fasting or feeding diets containing different levels of protein or amino acids on the activities of the liver amino-acid degrading enzymes and amino acid oxidation in rainbow trout (*Oncorhynchus mykiss*). *Aquaculture* 107:89-105.

Malison, J.A., T.B. Kayes, J.A. Held, T.P. Barry, and C.H. Amundson. 1993. Manipulation of ploidy in yellow perch (*Perca flavescens*) by heat shock, hydrostatic pressure shock, and spermatozoa inactivation. *Aquaculture* 110:229-242.  
 Malison, J.A., L.S. Procarione, J.A. Held, T.B. Kayes, and C.H. Amundson. 1993. The influence of triploidy and heat and hydrostatic pressure shocks on the growth and reproductive development of juvenile yellow perch (*Perca flavescens*). *Aquaculture* 116:121-133.  
 Barry, T.P., A.F. Lapp, T.B. Kayes, and J.A. Malison. 1993. Validation of an ELISA for measuring cortisol in fish and comparison of stress responses of rainbow trout (*Oncorhynchus mykiss*) and lake trout (*Salvelinus namaycush*). *Aquaculture* 117:351-363.  
 Kohler, C.C., R.J. Sheehan, C. Habicht, J.A. Malison, and T.B. Kayes. 1994. Habituation to captivity and controlled spawning of white bass. *Transaction of the American Fisheries Society* 123:964-974. *Journal Series* #10830.  
 Malison, J.A., L.S. Procarione, T.P. Barry, A.R. Kapuscinski, and T.B. Kayes. 1995. Endocrine and gonadal changes during the annual reproductive cycle of the freshwater teleost, *Stizostedion vitreum*. *Fish Physiology and Biochemistry* 13:473-484. *Journal Series* #10829.

##### Book Chapter:

Heidinger, R.C., and T.B. Kayes. 1992. Yellow perch. *Culture of Nonsalmonid Freshwater Fishes* (edited by R.R. Stickney), CRC Press, Boca Raton, Florida, p. 215-229.

##### Conference (Refereed) Abstracts:

Barry, T.P., T.B. Kayes, J.A. Malison, and C.H. Amundson. 1991. Validation of a highly sensitive microplate enzyme-linked immunoassay (ELISA) for measuring serum cortisol in fish, and a comparison of primary physiological stress responses in rainbow trout (*Oncorhynchus mykiss*) and lake trout (*Salvelinus namaycush*). *Journal of the World Aquaculture Society* 22:14A. (Contributed.)  
 Malison, J.A., J.A. Held, L.S. Procarione, T.B. Kayes, and C.H. Amundson. 1991. The influence on juvenile growth of heat and hydrostatic pressure shocks used to induce triploidy in yellow perch. 1991 Annual Meeting of the American Fisheries Society (9/8-12/91, San Antonio, Texas), Abstract No. 13.6, p. 40. (Contributed.)  
 Malison, J.A., J.A. Held, L.S. Procarione, T.B. Kayes, and C.H. Amundson. 1991. The influence of heat and hydrostatic pressure shocks used to induce triploidy on the growth of juvenile walleye. 1991 Annual Meeting of the American Fisheries Society (9/8-12/91, San Antonio, Texas), Abstract No. 16F.4, p. 63. (Received "Citation of the American Fisheries Society for the Best Poster Paper presented at the 1991 Annual Meeting.") (Contributed.)  
 Kohler, C.C., R.J. Sheehan, C. Habicht, J.A. Malison, and T.B. Kayes. 1992. Acclimatization to captivity and out-of-season spawning of white bass. *AQUACULTURE '92* (5/21-25/92, Orlando, Florida), Abstract No. 230, p. 133-134. (Contributed.)  
 Malison, J.A., L.S. Procarione, A.R. Kapuscinski, and T.B. Kayes. 1992. Endocrine and gonadal changes during the annual reproductive cycle of walleye (*Stizostedion vitreum*). *AQUACULTURE '92* (5/21-25/92, Orlando, Florida), Abstract No. 272, p. 152-153. (Contributed.)

- Kohler, C.C., R.J. Sheehan, C. Habicht, V. Sanchez, J.A. Malison, and T.B. Kayes. 1992. Collection, acclimation to captivity, and out-of-season spawning of white bass, *Marone chrysops*. 1992 Annual Meeting of the American Fisheries Society (9/14-17/92, Rapid City, South Dakota). Abstract No. 11.7, p. 46. (Contributed.)
- Barry, T.P., T.B. Kayes, T.E. Kuczynski, A.F. Lapp, L.S. Procarione, and J.A. Malison. 1993. Effects of high rearing density and low-level gas supersaturation on the growth and stress responses of lake trout (*Salvelinus namaycush*). 1993 Annual Meeting of the American Fisheries Society (8/29-9/2/93, Portland, Oregon), Session 4.2, p. 187-188. (Contributed.)
- Kohler, C.C., R.J. Sheehan, C. Habicht, V. Sanchez, J.A. Malison, and T.B. Kayes. 1993. Development of white bass broodstock and spawning protocol. 1993 Meeting of the U.S. Chapter of the World Aquaculture Society and the South Atlantic Regional Aquaculture Conference Planning Committee (1/27-30/93, Hilton Head Island, South Carolina), p. 31-32. (Invited.)
- Malison, J.A., T.B. Kayes, L.S. Procarione, J.F. Hansen, and J.A. Held. 1994. Induction of out-of-season spawning in walleye (*Stizostedion vitreum*). 1994 Annual Meeting of the World Aquaculture Society (1/11-18/94, New Orleans, Louisiana), p. 233. Contributed.)
- Bielik, I., and T.B. Kayes. 1995. Effects of aeration, fertilization and sac-fry stocking rate on the large-scale production of fingerling walleye, *Stizostedion vitreum*, in earthen ponds. AQUACULTURE '95 (2/1-4/95, San Diego, California), Abstract No. 279, p. 149-150. (Contributed.)

NAME: Robert D. Kuzelka

PRESENT RANK: Associate Professor

DATE OF RANK: 9 May 1989    TENURE: N/A

APPOINTMENT: .30 Teaching (FFW)  
.70 Scholarly Service (WC/EP)

GRADUATE FACULTY: Member

EDUCATION:

B Arch 1962    University of Nebraska  
MScCRP    1965    University of Texas at  
                 Austin

PROFESSIONAL EXPERIENCE:

1993-present    Courtesy Appointment in UNL  
                 Department of Community  
                 Regional Planning  
1991-present    Consultant on groundwater  
                 programs to the Groundwater  
                 Foundation, Lincoln, Nebraska  
1989-present    Assistant to the Director, UNL  
                 Water Center/Environmental  
                 Programs  
1989-1992    Assistant to the Director, UNL  
                 Conservation and Survey  
                 Division (CSD)  
1988-present    Associate Professor, UNL  
                 Department of Forestry Fisheries  
                 and Wildlife  
1979-1989    Water Resources Planner, CSD  
                 1969-1979 Comprehensive  
                 Planning Coordinator, Nebraska  
                 State Office of Planning and  
                 Programming  
1969    Director of Planning, Model City  
                 Agency, Tulsa, Oklahoma  
1965    Design Architect, Shepley  
                 Bulfinch Richardson and Abbott,  
                 Boston, Massachusetts

PROFESSIONAL SOCIETIES:

American Institute of Certified Planners  
American Planning Association  
Nebraska Planning and Zoning Association  
Soil and Water Conservation Society  
American Water Works Association  
Water Environment Federation

HONORS AND AWARDS:

Fulbright Postgraduate Fellowship (1 1/2 years),  
University of Sydney, Australia

President's Award for Outstanding Professional  
Service from the Nebraska Planning and  
Zoning Association

Member, The Honor Society of Agriculture Gamma  
Sigma Delta

Designated by the Governor of Nebraska as a "Soil  
and Water Conservation Steward"

Designated by The Groundwater Foundation,  
Lincoln, Nebraska as a "Groundwater  
Guardian"

PROFESSIONAL LEADERSHIP ASSIGNMENTS:  
(last 5 years)

Appointed by Nebraska Governor to the Wyuka  
Cemetery Board in 1985 and reappointed in  
1991.

Appointed by the City of Lincoln Street Planning  
Advisory Committee in 1988, reappointed in  
1991 and 1994, elected as chair in 1995.

Appointed to the Offutt AFB (Bellevue, NE)  
Installation Restoration Advisory Board in 1995

PROFESSIONAL ACTIVITIES: (last year)

Chaired and presented on a panel on Native  
American water rights at 1995 Western Planner  
Conference.

Chaired and presented at a session on land use  
regulation and groundwater protection at 1995  
Annual Planning Congress of the American  
Planning Association.

Co-chair for annual Nebraska water conference  
(1991-1996)

Organizer for annual University of Nebraska water  
policy retreat (1991-1996)

Invited major guest speaker at 10th Annual Ground  
Water Protection Seminar of the Texas Natural  
Resource Conservation Commission (1995)

Invited guest speaker at groundwater protection  
conference of the New York State Water  
Quality Coordinators Committee (1995)

Invited facilitator at workshop on source water  
protection at legislative conference of the  
National Association of County Officials, 1996

CURRENT TEACHING ASSIGNMENT:

NRES/GEOG 281, spring, every year  
FFWL/NRES 323, spring, every year  
FFWL 415/815, spring, every year

CURRENT ADVISING:

24 undergraduates  
1 M.S.



GRANTS AND CONTRACTS: (last 5 years)

NATO - Sponsored Advanced Research Workshop  
on Nitrate Contamination (\$80,000) 1990  
The Groundwater Foundation, consultation on  
groundwater programs, (\$20,000 annually)  
1992 -present  
Nebraska Water History Project (\$55,300) 1993

CURRENT RESEARCH EMPHASIS:

History, operations and future of Nebraska's 23  
unique natural resources districts.  
Evaluation of community involvement in and  
impacts from the international  
Groundwater Guardian program of The  
Groundwater Foundation, Lincoln,  
Nebraska.

SELECTED PUBLICATIONS: (last 5 years)

Co-author "The States and Natural Hazards,"  
Council of State Governments, Lexington,  
KY: 1979.  
Co-author on "The Groundwater Atlas for  
Nebraska," Conservation and Survey  
Division, UNL: 1986.  
Co-editor Nitrate contamination: Exposure,  
Consequence, and Control, Springer-  
Verlag, Heidelberg, F. R. Germany:  
1991.  
Co-author "Socio-Economic Assessment Study of  
the Cedar River Basin, Nebraska,  
Conservation and Survey Division, UNL:  
1992.  
Project Manager and Contributing Author Flat  
Water: A History of Nebraska and Its  
Water, Conservation and Survey Division,  
UNL: 1993.  
Co-editor Proceedings of the Research Symposium  
on Environmental and Natural Resources  
of the Niobrara River Basin, Nebraska,  
Water Center/Environmental Programs,  
UNL: 1994.

NAME: Richard Lodes  
PRESENT RANK: Associate Forester  
DATE OF RANK: 1991 TENURE: N/A  
APPOINTMENT: 100% Nebraska Forest Service  
GRADUATE FACULTY: N/A

EDUCATION:

B.S. 1975 University of Missouri-Columbia;  
Forest Management  
M.S. 1986 University of Nebraska-Lincoln;  
Agronomy with emphasis on  
Rangeland Management and minor in  
Life Sciences

PROFESSIONAL EXPERIENCE:

NRD Forester: Dept. of Forestry, Fisheries & Wildlife;  
University of Nebraska; November, 1978 to  
present.  
District Forester Assistant; Dept. of Forestry, Fisheries &  
Wildlife; University of Nebraska; September, 1975  
to November, 1978.  
Fire Inventory and Equipment Manager; Dept. of Forestry,  
Fisheries & Wildlife; University of Nebraska;  
September, 1975 to September, 1975.  
Independent Contractor for Timber Stand Improvement;  
May, 1975 to September, 1975.

PROFESSIONAL SOCIETIES:

The Wildlife Society (NE Chapter)  
Society of American Foresters  
National Walnut Council

HONORS AND AWARDS: None

PROFESSIONAL LEADERSHIP ASSIGNMENTS: (last  
5 years)

PROFESSIONAL ACTIVITIES: (last 5 years)

Regularly attend International Eye Openers.  
Attend seminars in the University on pertinent subjects.  
Attended the Great Plains Society of American Foresters  
meeting in Ft. Leavenworth, Kansas, September,  
1995.  
Attended the Great Plains Agriculture Council - Forestry  
Committee meeting in Manhattan, Kansas,  
concerning riparian zones in agricultural areas,  
June, 1994.  
Attended the Nebraska Arborist Association meeting to  
hear Alex Shigo in Omaha, Nebraska, January,  
1993.

Attended Sixth National Urban Forestry Conference in  
Minneapolis, Minnesota, September, 1993.  
Nebraska Arborist Association Meeting in Omaha,  
Nebraska, January, 1992.  
Attended the National Trails Symposium in Missoula,  
Montana, September, 1992.

CURRENT TEACHING ASSIGNMENTS: N/A

CURRENT ADVISING: N/A

GRANTS AND CONTRACTS: (last 5 years) N/A

CURRENT RESEARCH EMPHASIS: N/A

PUBLICATIONS: (last 5 years)

Chapters:

Lodes, R., & J. Wilson. 1990. Rewrote chapter on  
"Forested Rangeland" in the Nebraska State Forest  
Resources Plan. Four pages.

Newsletters and Articles:

The two foresters in southeast Nebraska produce a  
newsletter (Growing Green). The foresters share  
editing the newsletter by alternating issues.  
Articles within the newsletter include both rural  
and community forestry subjects. I edited the  
following issues: May/June and Sept./Oct. -  
1992; Jan./Feb., May/June, and Sept./Oct. - 1993;  
and Jan./Feb., May/June, and Sept./Oct. - 1994;  
Jan./Feb., May/June, and Sept./Oct. - 1995.

Growing Green Newsletter. Mar./Apr., 1991. "Forestry  
Short Course", one-quarter page.

Farming Magazine. May/June, 1991. "Windbreak  
Renovation", one page.

Omaha World Herald "Conservation Notebook." Aug.,  
1991. "More Trees and Less Grass", one page.

Growing Green Newsletter. Sep./Oct., 1991. "Nebraska  
Conservation Trees" and "Stewardship is Coming",  
one-quarter page each.

Growing Green Newsletter. May/June, 1992. "Stewardship  
Incentives Program" and "Weed Control in New  
Tree Plantings", one-quarter page each.

Growing Green Newsletter. July/Aug., 1992. "NRD  
Source of Assistance for Tree Planting Projects",  
one-quarter page.

Growing Green Newsletter. Sept./Oct., 1992.  
"Hackberries, Red maple, and Other Problems",  
"A Disaster or an Opportunity?", "Giving Trees  
the Ax", "CRP Easement Requirements Changed",  
"Walnut Hulling Operating Again in 1992", and  
"The Panty Hose Phenomenon",

Growing Green Newsletter. Oct./Nov., 1992. "Evaluation  
of Trees" and "NRD Community Forestry  
Program", one-quarter page each.

Growing Green Newsletter. Jan./Feb., 1993. "SIP Summary for 1992", "Roots", "Tree Species for Wet Sites", and "Same Face; New Tittle", one-quarter page each.

Growing Green Newsletter. May/June, 1993. "Farewell and Thanks"; "CRP Update"; and "Stewardship Improvement Summary", one-quarter page each.

Growing Green Newsletter. July/Aug., 1993. "NRD Community Forestry Program Summary" and "User Survey", one-quarter page each.

Growing Green Newsletter. Sept./Oct., 1993. "Results of User Survey"; "Forestry Field Days"; and "Throw Out the Old Nebguide", one-quarter page each.

Growing Green Newsletter. Jan./Feb., 1994. "Tree Care Workshops", "1994 Allocation for Stewardship Incentives Program" and "Trees Still Available", one-quarter page each.

Growing Green Newsletter. May/June, 1994. "Tree City USA Awards", "New Practice for Conservation Reserve Program", "Austrees", and "Summary for 1994 of Stewardship Incentives Program", one-quarter page each.

Growing Green Newsletter. Sept./Oct., 1994. "Infected Nursery Stock in Nebraska", "Sell Walnuts for \$\$" and "It's a Great Year to Collect Seeds", one-quarter page each.

Growing Green Newsletter. Jan./Feb., 1995. "Tree Care Workshops", "Welcome New Forester" and "Trees Still Available", one-quarter page each.

Growing Green Newsletter. May/June, 1995. "How to Increase Your Homeowners Insurance without Even Trying", one-quarter page.

Growing Green Newsletter. Sept./Oct., 1995. "Another CRP Sign Up", "Field Windbreaks Increase Yields", "Forestry Field Days", and "Sell Walnuts for \$\$", one-quarter page each.

#### News Releases:

News article concerning Autumn Colors -Lincoln Journal.

News article concerning Nebraska Tree sales - Lincoln Journal.

News article concerning the NRD Community Forestry Cost Share Program - Lincoln Journal.

News article concerning care of mature trees - Lincoln Journal.

**NAME:** William R. Lovett

**PRESENT ACADEMIC RANK:** Associate Forester

**DATE OF RANK:** July 1981      **Tenure:** July 1982

**APPOINTMENT:** 100% Nebraska Forest Service

**EDUCATION:**

M.S.      1975      University of Illinois  
Major: Forestry (Genetics)

B.S.      1969      University of Illinois  
Major: Forest Management

**PROFESSIONAL EXPERIENCE:**

1977-present      Tree Improvement Forester,  
University of Nebraska  
1975-1977      Extension Forester,  
University of Nebraska  
1972-1974      Graduate Research Asst.,  
University of Illinois  
1970-1972      Radar Data Processing Center Repairman,  
U. S. Army  
1969-1970      Silviculturist, Texas Forest Service

**Honors and Awards:**

Member Gamma Sigma Delta 1974

Member Xi Gamma Iota 1974

**Professional Leadership Assignments:** (last 5 years)

Committee member for the formation of the Plains and  
Prairie Forestry Association 1995-96  
Program Committee, Western Forest and Conservation  
Nursery Association 1995  
Newsletter Editor, Great Plains Agricultural Council,  
Forestry Committee 1995  
Chair, Great Plains Agricultural Council, Forestry  
Committee 1993-94  
Chair-elect, Great Plains Agricultural Council, Forestry  
Committee 1992-93  
Secretary/Treasurer, Great Plains Agricultural Council,  
Forestry Committee 1991-92

**Professional Activities:**

Attended the Great Plains Agricultural Council Forestry  
Committee Meeting in Billings, Montana, June, 1995.  
Attended and Participated in the annual meeting of the  
Great Plains Tree Improvement Committee, Lincoln,  
Nebraska, May, 1995.  
Attended and Moderated sessions at the Western Forest and  
Conservation Nursery Association Meeting, Kearney,  
Nebraska, August, 1995.

Attended and Participated in the annual meeting of the  
NRCS State Plant Materials Committee Meeting,  
December, 1994.

Attended and presided as chairperson at the Great Plains  
Agricultural Council Forestry Committee Meeting in  
Manhattan, Kansas, June, 1994.

Attended the Agroforestry and Sustainable Systems  
Symposium, Fort Collins, Colorado, August, 1994.

Attended and participated in the Great Plains Agricultural  
Council Forestry Committee Meeting in Lubbock,  
Texas, July, 1993. I am currently Chairperson of the  
Committee.

Attended and participated in the Great Plains Agricultural  
Council Forestry Committee Meeting in Bismarck,  
North Dakota, July, 1992. I was the Secretary of the  
Committee from June, 1991 to July, 1992. I am  
currently Vice-Chairperson.

Attended The Third International Windbreak and  
Agroforestry Symposium, and the GPAC Forestry  
Committee Meeting in Ridgetown Ontario, Canada,  
June, 1991.

**ACTIVE GRANTS RELATED TO PUBLIC SERVICE  
ACTIVITIES:** (last 5 years)

Practicality of Vegetable Oils as Carriers for Trunk-  
Injectable Arboricultural Pesticides. International  
Society of Arboriculture Research Trust. \$2500. June  
1, 1993 to September 30, 1994. Dr. Mark Harrell,  
William Lovett, Dr. Milford Hanna.

Oil Carriers for Trunk-Injectable Arboricultural Pesticides.  
Nebraska Soybean Development, Utilization, and  
Marketing Board. \$3260. July 1, 1993 to June 30,  
1994. Dr. Mark Harrell, William Lovett, Dr. Milford  
Hanna.

**PUBLICATIONS, FIVE YEAR RECORD:**

**Journal Articles:**

Teresa K. Boes, J.R. Brandle, W.R. Lovett. 1991.  
Characterization of Flowering Phenology and Seed  
Yield in a *Pinus sylvestris* Clonal Seed Orchard In  
Nebraska. Canadian Journal of Forestry Research  
21:1721-1729.

**Proceedings:**

William R. Lovett. 1994. Nebraska Black Walnut  
Improvement Program. In proceedings of the 25th  
Anniversary Meeting of the Walnut Council.  
Nebraska City, Nebraska, July 31 - August 3, 1994.

William R. Lovett, Mark O. Harrell, Mary Ellen Dix,  
Laurie J. Stepnek. 1994. Tip Moth (*Rhyacionia*  
spp.) Infestation in Ten Sources of Ponderosa Pine  
(*Pinus ponderosa*) from Nebraska and South Dakota.  
In proceedings of Agroforestry and Sustainable  
Systems Symposium. Fort Collins, Colorado, August  
7-10, 1994.

#### Journal Abstracts:

- M. Harrell, W. Lovett, M.E. Dix. 1992. Variation In The Susceptibility Of Ponderosa Pines To Pine Tip Moth. 102nd Annual Proceedings, Nebraska Academy of Science, April 10-11, 1992, Nebraska Wesleyan University.

#### Newsletters:

- William R. Lovett. 1992. Progeny Test Results Used to Identify *Cercospora* Blight Resistant Seed Sources of Eastern Redcedar. IUFRO Windbreak Newsletter. Summer, 1992.
- William R. Lovett. 1993. Chairman's Comments. Great Plains Forestry, Vol. 21, No 2. Newsletter of the Great Plains Agricultural Council Forestry Committee.
- Bill Lovett. 1993. Chairperson Comments, Great Plains Forestry, Vol. 21, No 3. Newsletter of the Great Plains Agricultural Council Forestry Committee.
- Bill Lovett. 1994. Chairperson Comments, Great Plains Forestry, Vol. 22, No 1. Newsletter of the Great Plains Agricultural Council Forestry Committee.
- Bill Lovett. 1994. Ponderosa Pine Seed Collection, Great Plains Forestry, Vol. 22, No 1. Newsletter of the Great Plains Agricultural Council Forestry Committee.
- Bill Lovett. 1994. Chairperson Comments, Great Plains Forestry, Vol. 22, No 2. Newsletter of the Great Plains Agricultural Council Forestry Committee.
- Bill Lovett. 1994. Ponderosa pine tip Moth Susceptibility, Great Plains Forestry, Vol. 22, No 2. Newsletter of the Great Plains Agricultural Council Forestry Committee.
- Bill Lovett. 1994. Results of Tree Planters' Survey, Great Plains Forestry, Vol. 22, No 3. Newsletter of the Great Plains Agricultural Council Forestry Committee.
- Bill Lovett. 1995. Internet Information, Great Plains Forestry, Vol. 23, No. 1. Newsletter of the Great Plains Agricultural Council Forestry Committee.
- Bessey Bulletin, Bessey Nursery Advisory Committee, published three times a year. First issue Fall, 1989 - 1995.

#### EDITING PUBLICATIONS RELATED TO PUBLIC SERVICE

##### Newsletters:

- Great Plains Forestry, Great Plains Agricultural Council - Forestry Committee.

NAME: David P. Mooter

PRESENT RANK: Forester

DATE OF RANK: 1 July 1992

APPOINTMENT: 1.0 Nebraska Forest Service

EDUCATION:

B.B.A. 1968 Nichols College  
M.P.A. 1984 University of Nebraska at Omaha

PROFESSIONAL EXPERIENCE:

1992 - present Assistant State Forester and  
Community Forester, UNL-Nebraska  
Forest Service  
1978 - 1992 Community Forester, UNL-Nebraska  
Forest Service  
1973 - 1978 Staff Forester, Ohio Division of  
Forestry  
1968 - 1973 Service Forester, Ohio Division of  
Forestry

PROFESSIONAL SOCIETIES:

International Society of Arboriculture (National and  
Midwestern Chapter)  
Nebraska Arborists Association  
Society of American Foresters

PROFESSIONAL LEADERSHIP ASSIGNMENTS: (last  
5 years)

Serve on the international Certification Board of  
Directors for the International Society of  
Arboriculture. Serve as Certification liaison for  
the Midwestern Chapter-International Society of  
Arboriculture.  
Serve as director for the Nebraska Arborists  
Association - Annual Arborists School.  
Coordinated Nebraska Community Forestry Conferences  
at North Platte and South Sioux City.  
Served on the Arbor Day Institute, National Urban  
Forestry School Advisory Committee.  
Served on the Council of Western State Foresters Urban  
and Community Forestry Committee (chair of the  
committee)  
Coordinate the Tree City USA program for Nebraska.  
Since 1990 the number of Tree City USA  
certifications in Nebraska has risen from 64 to 97  
communities.

Coordinate UNL-NFS landscape/tree planting grant  
activity since 1991. This includes the National  
Small Business Administration Tree Planting  
Grants, America the Beautiful Grants, Community  
Forestry Assistance Grants, Tree Recovery  
Program, and Community Enhancement Program.  
These grant and reimbursement programs  
combined to provide a total of more than 1.4  
million dollars of cost share assistance to Nebraska  
communities for projects totalling over 3 million  
dollars in total costs.

Worked directly with state Senator David Bernard-  
Stevens to develop the Nebraska Tree Recovery  
Act which led to the availability of \$250,000.00 of  
state cost share funds to help pay for tree removal  
and replacement in communities that had been  
seriously affected by winter and summer storms.

Developed working relationships between the Nebraska  
Arborists Association, Nebraska Nursery and  
Landscape Association and the UNL-Nebraska  
Forest Service. This linkage now serves as a line  
of communication to seek solutions to common  
problems and take advantage of opportunities.

Worked with KETV television in Omaha to develop  
Celebrate Trees, an annual cost share program for  
tree planting with local groups funded by the  
Papio/Missouri River Natural Resources District.

Have taken on the responsibility of administering the  
Vegetation Management section of the UNL-NFS.  
This section provides land management services to  
other government agencies such as the US Army  
Corps of Engineers, Natural Resources Districts,  
and the Nebraska Game and Parks Commission.  
Part of my duties involve the management of  
UNL-NFS lands (Cedar Canyon State Forest,  
Horning State Farm, Prairie Pines and Rogers  
Farm, and Mead).

PROFESSIONAL ACTIVITIES: (last five years)

Certification Liaison Training for the International  
Society of Arboriculture, Savoy, IL.  
American Forestry Association National Urban and  
Community Forestry Conferences at St. Louis,  
MO and Los Angeles, CA.  
International Society of Arboriculture National  
Conferences at Oakland CA, Bismarck, ND, and  
Hilton Head, SC.  
Grant Writing Workshops and Lincoln, NE (sponsored  
by UNL) and Denver, CO (sponsored by USDA  
Forest Service).  
Tree Physiology Workshop presented by Dr. Alex Shigo,  
Omaha, NE.

PUBLICATIONS: (last 5 years)

Brochures, Booklets or Fact Sheets:

- 1995 - Revision of Tree City USA application package
- 1995 - Grant package and application sheets for Tree Recovery Program
- 1995 - Recommended specifications for planting and initial care of trees (developed for grant sites)
- 1995 - Revision of the Nebraska Supplement to the ISA Tree Appraisal Guide, (co-author with Chip Doolittle, Neal Jennings, John Mulhall, Phil Pierce, Jim Siffing, and Kim Todd)
- 1993 - Care of Newly Planted Trees, NebGuide, (co-author with Dr. Mark Harrell, Laurie Stepanek)
- 1993 - Nebraska Supplement to the ISA Tree Appraisal Guide, (co-author with Chip Doolittle, Neal Jennings, John Mulhall, Phil Pierce, Jim Siffing, and Kim Todd)
- 1993 - Directory of Nebraska Tree Services
- 1993 - Tree Appraisal, NebFact
- 1992 - How to Become a Tree City USA, Tree City Bulletin, National Arbor Day Foundation (co-author with Tom Schmidt, Kris Irwin)
- 1992 - Trees of Nebraska, Extension EC 92-1774-X, University of Nebraska (co-author with Michael Kuhns)
- 1991 - Tree Injuries - Prevention and Care, NebGuide (co-author with Mike Kuhns)
- 1991 - How to Plant Landscape Trees, NebGuide (co-author with Tom Schmidt)
- 5/90 - Revision of planting and maintenance specifications for landscape grant projects and Community Forestry Program towns.

Quarterly:

- \* COMMUNITREE Newsletter (co-author and editor with Kris Irwin and ended in 1992)
- \* Regular article in the Douglas County Extension Insider Newsletter
- \* Tree Town News (author and editor and now published only as needed)

Miscellaneous:

11/92 - Inside/Outside Newsletter, article on western Nebraska tree mortality

OUTSIDE ACTIVITIES:

Ackerman Elementary School:

Ackerman Elementary PTO board (Fund Raising Chair)  
Ackerman Elementary Implementation Team

St. Wenceslaus Church and School:

St. Wenceslaus Home and School committee  
Welcoming Ministry  
Helping Hands Committee  
Liturgy Committee

NAME: H. Doak Nickerson

PRESENT RANK: Associate Forester

DATE OF RANK: July 1, 1992

TENURE: No

APPOINTMENT: .75 Nebraska Forest Service  
.25 Extension

GRADUATE FACULTY: No

EDUCATION:

B.S.F. 1976 University of Missouri-Columbia  
M.A. 1987 Chadron State College

PROFESSIONAL EXPERIENCE:

1992-Present District & Extension Forester  
(Associate Forester) University of  
Nebraska-Lincoln  
1982-1992 District & Extension Forester  
(Assistant Forester) University of  
Nebraska-Lincoln  
1981-1982 District & Extension Forester  
(Instructor Forester) University of  
Nebraska-Lincoln  
1979-1981 Natural Resources District Forester  
(Instructor Forester) Lower Loup  
Natural Resources District &  
University of Nebraska-Lincoln  
1977-1979 Assistant Division Forester  
Edward Hines Lumber Company,  
South Dakota  
1976 Forestry Technician  
Umatilla National Forest, Oregon

PROFESSIONAL SOCIETIES:

Society of American Foresters  
Nebraska Christmas Tree Grower's Association  
American Forestry Association  
Nebraska Arborist's Association  
International Society of Arboriculture  
Nebraska Statewide Arboretum  
Nebraska Tree Farm System

HONORS & AWARDS:

Delegate & Fellow - 7th American Forest Congress,  
Pinchot Institute for Conservation and American Forest  
Foundation, 1996  
Outstanding Volunteer Service Award, Wildcat Hills  
Nature Center, 1995  
Certificate of Appreciation-Stewardship, South Platte  
Natural Resources District, 1992  
Superior Windbreak Instructor Award, Soil Conservation  
Service, 1990

Certificate of Recognition-Windbreak Renovation, Great  
Plains Agricultural Council, 1989  
Group Study Exchange Delegate-England, Rotary  
International, 1988

Certificate of Appreciation-Tree Planting, Platte Valley  
Council of Camp Fire, 1986

Honor Award, Soil Conservation Society of America,  
1986

Certificate of Recognition-Range Shortcourse, Society for  
Range Management, 1984

Certificate of Appreciation, Society of American  
Foresters, 1983

PROFESSIONAL LEADERSHIP ASSIGNMENTS:

Chairman, Recycling Board-Panhandle Research &  
Extension Center, 1995-96

Chairman, Great Plains Society of American Foresters  
(Kansas/Nebraska), 1995

Secretary-Treasurer, Nebraska Tree Farm System, 1994-  
95.

Chair-Elect, Great Plains Society of American Foresters  
(Kansas/Nebraska), 1994

Secretary-Treasurer, Great Plains Society of American  
Foresters (Kansas/Nebraska), 1993

PROFESSIONAL ACTIVITIES:

Served as invited speaker on "Forest Stewardship  
Practices of Ponderosa Pine Timber Type,"  
Wildlife Society Meeting (Central Mountains &  
Great Plains Sections), 1995

Keynote speaker and forest tour narrator addressing  
"Forest Resources of the Pine Ridge,"  
Nebraska Natural Resource  
Commission Annual Conference, 1995

Served on the West Advisory Group for Applied  
Agroforestry, Agroforestry & Sustainable  
Systems Symposium, 1994

Coordinator of forest management tour of Pine Ridge  
timber harvesting activities, Nebraska  
Department of Agriculture Director (Larry  
Sitzman), 1994

Lecturer and panel discussion member addressing  
"Forest Stewardship Program-Nebraska," U.S.  
Forest Service Region 2 Leadership Workshop,  
1993

Served as invited speaker on "Wildlife Habitat vs.  
Production Agriculture," Wyoming Game &  
Fish Board of Commissioners Meeting, 1993

Landowner assistance efforts accounted for 350 rural and  
community forestry assists and 10 professional  
Forest Stewardship Management Plans written  
(over 5,000 acres forestland), 1993

CURRENT TEACHING ASSIGNMENT:

N/A



#### CURRENT ADVISING:

N/A

#### GRANTS AND CONTRACTS:

Nebraska Board of Educational Lands & Funds, Timber  
Sale Administration of Coffee & Cemetery  
Tracts- \$15,000-\$20,000 (1995-96)  
Pinchot Institute for Conservation, Small Woodland  
Owners/NIPF's Scholarship, 7th American  
Forest Congress - \$725 (1996)  
American Forest Foundation, Tree Farmer Fellowship,  
7th American Forest Congress - \$325 (1996)  
American Forest Foundation, Tree Farm Grant - \$465  
(1996)  
American Forest Foundation, Tree Farm Grant - \$962  
(1995)  
U.S. Forest Service, Field Windbreak System for  
Dryland Crops - \$2,500 (1994)  
Devil's Tower Forest Products, Pope & Talbot, Inc.,  
Cabela's, Inc.; National Association of State  
Forester's Meeting Sponsorship - \$1,200 (1994)  
U.S. Forest Service, Field Windbreak System for  
Dryland Crops - \$4,000 (1993)  
U.S. Forest Service, Harrison Living Snowfence  
Project - \$979 (1993)

#### CURRENT RESEARCH EMPHASIS:

N/A

#### PUBLICATIONS:

##### Symposium or Proceedings:

Nickerson, D. "Application, Use and  
Design/Establishment/Maintenance of Livestock  
Windbreaks." 1994. Nebraska Range  
Shortcourse Handbook. Chadron State College,  
Chadron, Nebraska. 6pp.  
Nickerson, D. "Great Plains Forestry." 1992. Nebraska  
Range Shortcourse Handbook. Chadron State  
College, Chadron, Nebraska. 6pp.  
Nickerson, D. "Windbreak Installation & Maintenance  
Options" and "Hand Planting Techniques."  
1992. USDA-SCS National Windbreak  
Technology Course Handbook, pp. 16-1  
through 16-45. Sterling, Colorado.  
Nickerson, D. "Application of Windbreak &  
Agroforestry Technology to a Nebraska Farm:  
A Case in Point." 1991. 3rd International  
Windbreak & Agroforestry Symposium, pp.  
201-203. Ridgeway, Ontario, Canada.

Nickerson, D. "Windbreak Design Options," "Overview  
of Windbreak Installation & Maintenance  
Options" and "Hand Planting Techniques."  
1991. USDA-SCS National Windbreak  
Technology Course Handbook, pp. 16-1  
through 16-45. Moses Lake, Washington.

##### Extension Publications:

Nickerson, D. and J. Brandle. 1992. "Living  
Snowfence: New Look at an Old Problem."  
Extension Circular (in press). 4pp.

##### Service Publications:

Nickerson, D. Rev. 1991. "Landscape Trees for Western  
Nebraska." District pub. 2pp.  
Nickerson, D. 1991. "Proper Landscape Tree Planting."  
District pub. 2pp.  
Nickerson, D. 1993. "Site Preparation Guide for  
Western Nebraska Tree Plantings." District  
pub. (in press). 4pp.

##### Miscellaneous:

Nickerson, D. 1993. "Western Forest." NEBRASKAland  
magazine titled "Walk in the Woods," pp. 72-  
83.

NAME: Edward J. Peters

PRESENT RANK: Associate Professor

DATE OF RANK: July 1, 1980 TENURE: YES

APPOINTMENT: Teaching .75 Research .25

GRADUATE FACULTY: Member

EDUCATION:

B.S. 1967 Wisconsin State University,  
Stevens Point

M.S. 1970 Brigham Young University,  
Provo, Utah

Ph.D. 1974 Brigham Young University,  
Provo, Utah

PROFESSIONAL EXPERIENCE:

University of Nebraska, Assistant Professor, 1975 - 1980

Mount Mercy College, Assistant Professor, 1974 - 1975

Mount Mercy College, Instructor, 1972 - 1974

Brigham Young University, Instructor, 1971 - 1972

PROFESSIONAL SOCIETIES:

American Fisheries Society

American Society of Ichthyologists and Herpetologists

North American Benthological Society

Wisconsin Academy of Science, Arts and Letters

Nebraska Academy of Science

HONORS AND AWARDS:

Society of Sigma Xi Associate Member 1970 - 1982;

Elected to full membership 1982; Elected Chapter

Associate Secretary - April 1984; Chapter President  
- April 1989-1990

Gamma Sigma Delta Elected 1982

Center for Great Plains Studies Elected Fellow 1982

Distinguished Teaching Award 1993

PROFESSIONAL LEADERSHIP ASSIGNMENTS:

Nebraska Chapter AFS President

Nebraska Chapter Sigma Xi, President 1989-90

PROFESSIONAL ACTIVITIES: (1995)

Attended, participated as a "research needs" discussion  
panelist and co-authored three papers at the 1995  
Platte River basin ecosystem symposium, Kearney,  
Nebraska.

Attended EPA Ecosystem Restoration and Protection  
Workshop, Lincoln, Nebraska.

Presented stream survey and habitat evaluation summary at  
NRCS Riparian Habitat Restoration workshop,  
Nebraska City, Nebraska.

Attended and chaired a session at the 1995 Great Plains  
Limnology Conference, Chadron, Nebraska.

Attended and presented summary of sturgeon research at  
MICRA paddlefish and sturgeon study coordination  
meeting, Niobrara, Nebraska.

Attended and co-authored three papers at the 57th Midwest  
Fish and Wildlife Conference, Detroit, Michigan.

Attended CASNR teaching workshop: Group discussion  
facilitator.

Attended computer class: Freelance Graphics  
Departmental coordinator for the Biology Careers  
workshop in Forestry, Fisheries and Wildlife

CURRENT TEACHING ASSIGNMENT:

NR 100, Introduction to Natural Resources; spring and  
fall, alternate years.

AG/NR 103, Food Agriculture and Natural Resources  
Systems; taught recitation section fall semesters  
1994, 1995

FFW 404/804, Wildlife Seminar, responsibility rotates  
among three faculty

FFW 423/823, Integrated Resources Management, taught  
spring semester 1991-1993

FFW 461/861, Fisheries Science, fall

FFW 462/862, Fisheries Biology, spring, alternates with  
FFW 491/891

FFW 491/891, Ichthyology, spring, alternates with FFW  
462/862

FFW 901, Graduate Seminar; responsibility rotates among  
graduate faculty

CURRENT ADVISING:

Undergraduate 41

M.S. 4

Ph-D 2 (co-advised)

GRANTS AND CONTRACTS:

Platte River Fisheries Study, U. S. Army Corps of  
Engineers, \$40,000 (1988-1990)

Studies of Channel Catfish in the lower Platte River,  
Nebraska Game and Parks Commission, \$196,140  
(1988-1991)

Distribution and abundance of fishes in the central Platte  
River, U.S. Fish and Wildlife Service, \$22,300  
(1991-1992)

Biological and economic analyses of fish communities in  
the Platte River, (1992-1993)

Nebraska Game and Parks Commission, \$176,264

Central Platte Natural Resources District, \$10,000

Lower Platte North Natural Resources District, \$10,000

Lower Platte South Natural Resources District, \$10,000

Papio/ Missouri Natural Resources District, \$10,000

Development of an aquatic mesocosm facility, U.S. Fish and Wildlife Service, \$50,000 (1992-1993)

Influences of vegetation on wildlife and fisheries populations in the central Platte River, U.S. Fish and Wildlife Service, \$80,000 (1992-1994)

Critical thermal maxima of selected fishes in the Platte River, U.S. Fish and Wildlife Service, \$33,550 (1993-1995)

Measuring the health of Nebraska's Fisheries, Nebraska Department of Environmental Quality, \$156,235, (1994- present)

Population structure and food habit analyses of alewife, rainbow trout and other selected fishes in Lake Ogallala, Nebraska Game and Parks Commission, \$133,500.00, (1994- present)

Population structure, habitat use and biology of the pallid sturgeon (*Scaphirhynchus albus*) and shovelnose sturgeon (*S. platyrhynchus*) in the lower Platte River, Nebraska, U.S. Fish and Wildlife Service, \$54,700.00, (1995 - 1997)

#### CURRENT RESEARCH EMPHASIS:

Water quality and water quantity criteria for Nebraska fishes, Project Number 26-017

#### PUBLICATIONS:

##### Journal Articles

Kaminski, M.T., E.J. Peters and R.S. Holland 1991. Pectoral spine embedding to facilitate sectioning for age analysis of young channel catfish. Transactions of the Nebraska Academy of Sciences, XVIII:99-100. (Journal Series No. 9117)

Holland, R.S. and E.J. Peters. 1992. Differential catch by hoop nets of three different mesh sizes in the lower Platte River. North American Journal of Fisheries Management, 12:237-243. (Journal Series No. 9292)

Holland R.S. and E.J. Peters. 1992. Age and Growth of channel catfish in the lower Platte River, Nebraska. Transactions of the Nebraska Academy of Science, XIX:33-42. (Journal Series No. 10076)

Michl, G.T. and E.J. Peters. 1993. New distributional record of the Topeka Shiner in Nebraska. The Prairie Naturalist, 25(1):51-54. (Journal Series No. 9927)

Yu, S.L., E.J. Peters and W.W. Stroup. 1995. Application of logistic regression to develop habitat suitability criteria for sand shiner, *Notropis stramineus*. Rivers 5(1):22-34. (Journal Series No. 10053)

Symposium proceedings (a paper was presented for each paper published)

Fessell, B.P., E.J. Peters and R.S. Holland. 1995. Critical thermal maxima of three Platte River fish species relative to water temperature regimes. Proceedings of the 1995 Platte River basin ecosystem symposium, p. 36-47.

McBride, M.J. and E.J. Peters. 1995. Benthic macroinvertebrate communities associated with forested and open riparian areas along the central Platte River. Proceedings of the 1995 Platte River basin ecosystem symposium, p. 11-35.

Messaad, I.A., E.J. Peters, D.G. Rogers and K.W. Lee. 1995. A SEM study of atrazine effects on red shiner (*Cyprinella lutrensis*) p.1012-1013 In: Baily, G.W., M.H. Ellisman, R.A. Hennigar and N.J. Zaluzec (editors). Proceedings of Microscopy and Microanalysis 1995. Jones and Begell Publishing, New York, NY.

Yu, S.L. and E.J. Peters. 1995. Habitat use by fish in the Platte River, Nebraska. Proceedings of the 1995 Platte River basin ecosystem symposium, p. 145-152.

##### Miscellaneous Reports

Peters, E.J. and R.S. Holland. 1990. Characterization of fish populations associated with different types of bank habitats in the lower Platte River, Nebraska. Final Report, U.S. Army Corps of engineers, Contract number DACW45-88-C-0253, 59p.

Peters, E.J., R.S. Holland and B.C. Chapman. 1992. Studies of the channel catfish (*Ictalurus punctatus*) in the lower Platte River, Nebraska. Final Report, Federal Aid Project No. F-78-R. 39p.

Holland, R.S. and E.J. Peters 1994. Biological and economic analyses of the fish communities in the Platte River: Creel survey of fishing pressure along the lower Platte River. Final Report to The Nebraska Game and Parks Commission, Federal Aid in Fish Restoration Project No. F-78-R: Job III-1.

Peters, E. J. and R.S. Holland. 1994. Biological and economic analyses of the fish communities in the Platte River: Modifications and tests of habitat suitability criteria for fishes of the Platte River. Final Report to The Nebraska Game and Parks Commission, Federal Aid in Fish Restoration Project No. F-78-R: Job III-2.

Abstracts (a paper was presented for each of 23 abstracts published 1990-1995)

NAME: Eric J. Rasmussen

PRESENT RANK: Associate Professor

DATE OF RANK: July 1992     TENURE: N/A

APPOINTMENT: Nebr. Forest Service, 100%

EDUCATION:

B.S. 1963 University of Nebraska  
16 Hours Grad Level Study in Soil Chemistry

PROFESSIONAL EXPERIENCE:

1992-present	Assoc. Forester NFS/UNL
1984-1992	Ass't Forester NFS/UNL
1979-1984	Instr. Forester NFS/UNL
1973-1979	Fire Training Mgr NFS/UNL
1967-1973	Lab Supervisor, Agronomy, UNL
1963-1967	Soil Scientist, Nebr. Dept. of Roads

PROFESSIONAL SOCIETIES:

National Fire Protection Assoc.  
Nebr. State Volunteer Firefighters Assoc.  
Nebr. Fire Chiefs Assoc.  
Nebr. Soc. of Fire Service Instructors  
Phi Mu Alpha Sinfonia

PROFESSIONAL LEADERSHIP ASSIGNMENTS: (last 5 years)

Chair: Computer and Fire Equipment Specification  
Guidelines Committee for NSVFA. 1992-96  
Chief Training Officer. SE Rural Fire District. 1991-96.  
Advisory Committee Member for SE Community  
College Fire Protection Program. 1991-96

PROFESSIONAL ACTIVITIES: (last 5 years)

Attended NWCG National Wildfire Training Officer  
Conference. 1993 and 1995  
High Angle Rope Rescue Instr. Certification 1995

CURRENT TEACHING ASSIGNMENT:

N/A

CURRENT ADVISING:

N/A

GRANTS AND CONTRACTS: (last 5 years)

N/A

CURRENT RESEARCH EMPHASIS

N/A

PUBLICATIONS: (last 5 years)

NSVFA Fire Apparatus Spec. Guideline. 1994  
Rural Water Silver Curriculum. 1993  
Wildland Fire Suppression Curriculum for Nebr. Fire  
Training Division. 1995

NAME: Steven D. Rasmussen

PRESENT RANK: Associate Forester

DATE OF RANK: 1989

TENURE: N/A

APPOINTMENT: 75% NFS, 25% Extension

EDUCATION:

MS in Agronomy, 1988 - University of Nebraska at Lincoln

BS in Forest Management, 1981 - University of Missouri at Columbia

PROFESSIONAL EXPERIENCE:

1984-Present	District/Extension Forester, Nebraska Forest Service
1982-1984	Lower Loup NRD Forester, Nebraska Forest Service
1981-1982	Engineering Technician, Black Hills National Forest

MEMBERSHIP IN PROFESSIONAL SOCIETIES:

Society of American Foresters  
National Association of Forest Resource Extension Professionals  
National Walnut Council  
American Forestry Association

PROFESSIONAL LEADERSHIP ASSIGNMENTS: (last 5 years)

Society of American Forester, Great Plains Chapter - Chair, 1993  
National Walnut Council, Nebraska Chapter - President, 1994 and 1995

PROFESSIONAL ACTIVITIES: (last 5 years)

Attended the National Extension Foresters Conference meeting in Portsmouth, NH, October 23-26, 1995  
Coordinated a tri-state Mid-Missouri River Foresters meeting in northeast Nebraska, October 11-13, 1995  
Provided support and presented information at the National Association of State Foresters meeting in Nebraska City, NE, September 25-29, 1994  
Attended and presented material at the National Walnut Council meeting in Nebraska City, NE, July 31-August 3, 1994  
Attended the USDA sponsored Small Community Forestry Regional Workshop in Spearfish, SD, July 13-15, 1994

Attended and presented material at the USDA sponsored Changes and Choices: Rural Communities in Transition Regional Conference in Ithaca, NY, May 31 - June 4, 1994

Attended and presented material at the Sixth National Urban Forestry Conference in Minneapolis, MN, September 14-18, 1993

Attended the USDA sponsored Regional Plant Health Care Training Workshop in St. Louis, MO, April 1-2, 1992

Attended and presented information at the GPAC/SAF sponsored Regional Windbreak Renovation Workshop in Hutchinson, KS, October 23-25, 1991

Attended and presented material at the Third International Windbreak Symposium in Ridgeway, Ontario, Canada, June 2-7, 1991

CURRENT TEACHING ASSIGNMENT: N/A

CURRENT ADVISING: N/A

GRANTS AND CONTRACTS: (last 5 years)

USFS Agroforestry Center - Santee Sioux Tribe Outdoor Barn Demonstration, \$19,200 (1995)  
Nebraska Forest Service - CEP Grant for the Northeast Arboretum, \$640 (1995)  
USFS Agroforestry Center - Winnebago Tribe Agroforestry Demonstration, \$6,000 (1994)  
Nebraska Statewide Arboretum - Educational Grant for the Northeast Arboretum, \$300 (1994)

CURRENT RESEARCH EMPHASIS: N/A

PUBLICATIONS: (last 5 years)

Symposium or Proceedings:

Rasmussen, S.D. 1995. "Marketing" Tree Plantings in the Great Plains. 3 pages for inclusion in the workbook collection for the NRCS Windbreak Technology Course, Lincoln, NE.  
Rasmussen, S.D. 1994. "Natural Stand Management" in collection of papers of the 25th Anniversary of the National Walnut Council meeting, Nebraska City, NE.  
Rasmussen, S.D. 1994. Establishing Shelterbelts in Nebraska. Pages 55-60 in Proceedings of the annual Nebraska Fruit and Vegetable Growers Conference, Columbus, NE.  
Rasmussen, S.D. 1993. The Master Tree Steward Program in Nebraska. Pages 168-169 in Proceedings of the Sixth National Urban Forest Conference, Minneapolis, MN.

Rasmussen, S.D. 1991. Density and Regeneration Comparisons Between Renovated and Control Sections in a 50 Year Old Windbreak. Pages 127-128 in Proceedings of the Third International Windbreak Symposium, Ridgetown College, Canada.

Rasmussen, S.D. 1991. "No Need to Renovate - Management is the Answer!" Pages 42-50 in Proceedings of GPAC Forestry Committee/Society of American Forestry Windbreak Renovation Workshop, Hutchinson, KS.

Extension Publications:

DeWald, S.J., S.D. Rasmussen, and C.A. Shapiro, 1995. Determining the Need to Fertilize Landscape Trees and Shrubs, G95-1246-A.

Miscellaneous: (Magazine Articles, Brochures or Fact Sheets)

Rasmussen, S.D. 1995. "Windbreak Designing by Natural Resource Professionals," 2 page Information Sheet.

Rasmussen, S.D. 1995. "Plant Trees for Conservation" in Farming Magazine.

Rasmussen, S.D. 1995. "Proper Site Preparation - Key to a Successful Tree Planting," 2 page brochure.

Rasmussen, S.D. 1995. "Projects and Programs to Help Promote Tree Planting and Tree Awareness in Your Community," 2 page Information Sheet.

Rasmussen, S.D., 1992. "Renovation is an Investment," cover article in High Plains Journal.

Rasmussen, S.D. 1991. "Keep Your Windbreak Healthy" in Farming Magazine.

Rasmussen, S.D. 1991. "Are You Wondering What to do with the 1990 Farm Bill . . . Think Trees on CRP!," 2 page Information Sheet.

Authored Community Forestry Assessments (average 15-24 page length) for 13 different northeast Nebraska communities since 1991.

**NAME:** Julie A. Savidge

**PRESENT RANK:** Associate Professor

**DATE:** 1 July 1993

**TENURE:** Yes

**APPOINTMENT:** .60 Teaching .40 Research

**GRADUATE FACULTY:** Fellow

**EDUCATION:**

B.S. 1975 Colorado State University  
M.S. 1977 University of California  
Ph.D. 1986 University of Illinois

**PROFESSIONAL EXPERIENCE:**

1993-present Associate Professor, University of  
Nebraska-Lincoln  
1987-1993 Assistant Professor, University of  
Nebraska-Lincoln  
1982-1987 Wildlife Biologist III, Division of  
Aquatic and Wildlife Resources, Guam

**HONORS AND AWARDS:**

Phi Beta Kappa since 1975  
Excellency in Teaching Award, University of Illinois,  
1982  
Fellow of the Center for Great Plains Studies, UNL, 1992  
Recognition Award for Contributions to Students, UNL,  
1993

**PROFESSIONAL LEADERSHIP ASSIGNMENTS:** (last 5  
years)

Chair(1994), Vice-Chair(1993), Secretary(1992), NC 203  
Avian Species in Diverted Farmland.  
Honorary Membership and Special Recognition Service  
Award Committee, The Wildlife Society, 1994-  
present.

**PROFESSIONAL ACTIVITIES:** (last 5 years)

Program Committee for 18th Annual Center for Great  
Plains Studies Symposium, 1992-3  
Faculty Development Leave August 1995-January 1996  
Participated in a course offered at Concordia College on  
Tropical Ecology and Marine Biology in Belize and  
offered a comparable course at UNL  
15 published abstracts from professional presentations  
(some co-authored)  
6 invited presentations at universities or professional  
meetings  
9 presentations at professional meetings with no published  
abstracts (some co-presented)  
Attended 10 teaching workshops or symposia  
Attended 2 multi-media workshops, one of which was 3  
days

**CURRENT TEACHING ASSIGNMENT:**

FFW 211, fall, every year  
FFW 311, fall, every year  
FFW 858, fall, every other year  
FFW 901, rotating basis

**CURRENT ADVISING:**

29 undergraduates  
3 M.S.  
3 Ph.D.

**RESEARCH GRANTS AND CONTRACTS:** (last 5 years)

Effects of CRP on Wildlife in Nebraska, J. A. Savidge,  
Nebraska Game and Parks, \$4,700. 1989-1991  
Solitary vs. Gregarious Nesting in Burrowing Owls: The  
Role of Predation Risk and Food Availability, J. A. Savidge,  
University of Nebraska-Lincoln Research Council, \$2,500. 1990.  
Assessment of Biodiversity Along the Platte River for a  
Platte River Valley GIS, J. A. Savidge and T. Seibert, U.S. Fish & Wildlife Service, \$13,600.  
1990.  
Assessment of Biodiversity and Indicator Species Groups  
Along the Platte River, J. A. Savidge and T. Seibert, U.S. Fish & Wildlife Service, \$21,000.  
1991.  
Biodiversity of Nebraska Sand Hills Blowouts and  
Wetlands, J. A. Savidge and T. Seibert, U.S. Fish  
& Wildlife Service, \$123,677. 1991-93.  
Avian Species in Diverted Farmland, J. A. Savidge,  
University of Nebraska Agricultural Research  
Division, \$60,000 (\$10,000 each year). 1991-96.  
Environmental Preferences and a Key to Selected Soil-  
Surface Invertebrates of Wet Meadows, T. Seibert  
and J. A. Savidge, U.S. Fish & Wildlife Service,  
\$22,156. 1992-93.  
Conservation Biology of Burrowing Owls Using Genetic  
Analysis of Historical & Currently-fragmented  
Populations, J. A. Savidge and T. Powers, UNL  
Center for Biotechnology, \$12,000. 1992-93.  
Wet Meadow Biodiversity Along the Platte River,  
Nebraska, J. A. Savidge and T. Seibert, U.S. Fish  
& Wildlife Service, \$12,848. 1992-93.  
Migratory and Resident Bird Use of the Lower Platte and  
Missouri Rivers, J. A. Savidge, U.S. Fish &  
Wildlife Service, \$43,230. 1992-93.  
Conservation Biology of Burrowing Owls Using Genetic  
Analysis of Historical & Currently-fragmented  
Populations, J. A. Savidge and T. Powers, UNL  
Center for Biotechnology, \$12,000. 1993-94.  
Migratory and Resident Bird Use of the Lower Platte and  
Missouri Rivers, J. A. Savidge, U.S. Fish &  
Wildlife Service, \$10,780. 1993-95.

The Influence of Landscape Scale on Avian Abundance and Richness in Sandhills Wetlands, J. A. Savidge and T. Seibert, Environmental Protection Agency, \$53,067. 1993-95.

Avian Densities and Grasshopper Sparrow Pairing on Conservation Reserve Program Land, J. Delisle and J. Savidge, Mewaldt-King Student Research Award - Cooper Ornithological Society, \$1000. 1994-1997.

Status of Burrowing Owls and Factors Affecting Their Distribution in Western Nebraska, J. Savidge, U.S. Fish & Wildlife Service Migratory Bird Office, \$10,000. 1995-1997.

Spatial and Temporal Patterns of Wet Meadow Use by Sandhill Cranes Along the Platte River, J. Savidge, U.S. Fish & Wildlife Service, \$50,698. 1995-1997.

#### Research Grants Under \$1000:

Prairie dog reductions in Nebraska, \$750.

Burrowing owl ecology and genetics, 7 grants totaling \$3715.

Wet meadow biodiversity, \$710.

Avian use of CRP land, 3 grants totaling \$1175.

#### TEACHING GRANTS:

Development of a field study course on tropical forest and marine ecology, International Affairs Faculty Affiliate Grant, \$1000.

#### CURRENT RESEARCH EMPHASIS:

Project Number: NEB-26-026. Factors Affecting Wildlife Diversity and the Distribution of Rare Populations in Nebraska.

Project Number: NEB-26-018. Avian Species in Diverted Farmland (project contributes to regional project NC-203).

Research interests: Conservation biology; factors affecting avian community structure; effects of various stresses including exotic species and habitat modification on wildlife populations; ecology and management of sensitive and endangered species.

#### PUBLICATIONS: (last 5 years).

##### Journal Articles:

Savidge, J. A. 1991. Population characteristics of the introduced brown tree snake on Guam. *Biotropica* 23(3):294-300.

Seibert, T. and J. A. Savidge. 1991. Pollination and breeding biology of large-flowered Bellwort, *Uvularia grandiflora*. *Canadian Field Naturalist* 105:392-394.

Savidge, J. A., L. Sileo, and L. M. Siegfried. 1992. Was disease involved in the decimation of Guam's avifauna? *Journal of Wildlife Diseases* 28(2):206-214.

Desmond, M. J., J. A. Savidge, and T. F. Seibert. 1995. Spatial patterns of burrowing owl (*Speotyto cunicularia*) nests within black-tailed prairie dog (*Cynomys ludovicianus*) towns. *Can. J. Zool.* 73:1375-1379.

King, J. and J. A. Savidge. 1995. Effects of the Conservation Reserve Program on selected wildlife in southeast Nebraska. *Wildlife Society Bulletin* 23(3):377-385.

Seibert, T. F., J. G. Sidle, and J. A. Savidge. (in press) Inexpensive aerial videography acquisition, analysis, and reproduction. *Wetlands*.

#### Symposium or Proceedings:

Desmond, M. and J. Savidge. 1991. Burrowing owl ecology and suggestions for minimizing impacts of prairie dog control. *Proc. Tenth Great Plains Wildlife Damage Control Workshop* 10:73.

Savidge, J. A. and T. F. Seibert. 1991. Assessment of biodiversity in wet meadows along the Platte River. *Proc. Nongame Wildlife Workshop, U.S.F.W.S., Golden, Colorado*.

Gubanyi, J. and J. Savidge. 1995. Predation of artificial nests in riparian forest fragments in southeastern Nebraska. *Proc. Platte River Basin Ecosystem Symposium; UNL Coop. Ext., USEPA, and USFWS; Grand Island, Nebraska*.

#### Miscellaneous:

Beck, R. E., Jr. and J. A. Savidge. 1990. Native forest birds of Guam and Rota of the Commonwealth of the Northern Mariana Islands recovery plan. U. S. Fish and Wildlife Service, Portland, Oregon. 96 pp.



**NAME:** Thomas F. Seibert

**PRESENT RANK:** Assistant Professor

**DATE OF RANK:** 1 July 1994 **TENURE:** No

**APPOINTMENT:** .75 Extension .25 NFS

**GRADUATE FACULTY:** Member

**EDUCATION:**

B.S. 1975 Colorado State University  
M.S. 1978 Oregon State University  
Ph.D. 1990 University of Illinois

**PROFESSIONAL EXPERIENCE:**

1994-present Asst. Professor, UNL  
1990-1994 Visiting Asst. Prof. UNL  
1987-1989 PhD Student, Univ. Ill.  
1983-1987 Res. Assoc. Univ. Guam

**HONORS AND AWARDS**

Phi Beta Kappa - 1975  
Six excellence in teaching awards

**PROFESSIONAL SOCIETIES:**

Ecological Society of America  
North American Association for Environmental Educators  
Nebraska Environmental Education Association  
Nebraska Cooperative Extension Association and 4H and Specialist Sections  
National Science Teachers Association

**GRANTS AND CONTRACTS:**

Environmental Protection Agency, The Influence of Landscape Scale on Avian Abundance and Richness I Sandhills Wetlands. (1993-95) \$53,067 with J.A. Savidge.  
U.S. Fish & Wildlife Service, Environmental Preferences and a Key to Selected Soil-Surface Invertebrates of Wet Meadows. (1992-93) \$22,156 with J.A. Savidge.  
U.S. Fish & Wildlife Service, Wet Meadow Biodiversity Along the Platte River, Nebraska. (1992-95) \$12,848 with J.A. Savidge.  
U.S. Fish & Wildlife Service, Assessment of Biodiversity and Indicator Species Groups Along the Platte River (1991) \$21,000 with J.A. Savidge.  
U.S. Fish & Wildlife Service, Biodiversity of Nebraska Sand Hills Blowouts and Wetlands. (1991-95) \$123,677 with J.A. Savidge.

U.S. Fish & Wildlife Service, Assessment of Biodiversity Along the Platte River for a Platte River Valley GIS. (1990) \$13,600 with J.A. Savidge.

**PUBLICATIONS:**

**Journal Articles:**

Seibert, T. F., J. G. Sidle, and J. A. Savidge. (In Press). Inexpensive aerial videography acquisition, analysis, and reproduction. *Wetlands*.  
Seibert, T. F. 1993. A nectar-secreting gall wasp and ant mutualism: selection and counter-selection shaping gall wasp phenology, fecundity and perisistence. *Ecological Entomology* 18: 247-253.  
Seibert, T. F. 1992. Mutualistic interactions of the aphid *Lachnus allegheniensis* (Homoptera: Aphididae) and its tending ant *Formica obscuripes* (Hymenoptera: Formicidae). *Annals of the Entomological Society of America* 85(2): 173-178.  
Seibert, T. F. and J. A. Savidge. 1991. The breeding biology of *Uvularia grandiflora* (Liliaceae). *Canadian Field-Naturalist* 105: 392-394.  
Savidge, J. A. and T. F. Seibert. 1991. Assessment of biodiversity in wet meadows along the Platte River. *Proceedings of the Nongame Wildlife Workshop*, U.S.F.W.S., Golden Colorado.

**Extension:**

Nebraska Youth Environmental Summit  
Wildlife Habitat Evaluation Program  
Project Learning Tree Program Direction  
PLT on-line certification program Project Learning Tree/  
Project Wild Joint Facilitator Training  
5 PLT Workshops  
State Fair Forestry and Plant ID contest Superintendent  
4-H Discovery Days  
Outdoor Classroom Grant program

**Service:**

1990-1996: Chairman and member of Lincoln/Lancaster Ecological Advisory Board-  
Ecological reports on greenspace, impacts of flood control projects on wildlife in area and advice on comprehensive plan update.

**NAME:** Richard T. Straight

**PRESENT RANK:** Associate Forester

**DATE OF RANK:** 1991 **TENURE:** Non-Tenure Track

**APPOINTMENT:** 100% Nebraska Forest Service

**EDUCATION:**

B.S. in Forestry, 1980 Iowa State University

M.S. in Forestry, 1982 Iowa State University

**PROFESSIONAL EXPERIENCE:**

1992-present Vegetation Management Forester,  
Nebraska Forest Service.  
1985-1992 Lower Loup NRD Forester, Nebraska  
Forest Service  
1982-1985 City Forester, City of Fort Dodge,  
Iowa

**PROFESSIONAL SOCIETIES:**

Society of American Foresters (National and Great  
Plains)  
Nebraska Arborist Association  
Xi Sigma Pi Society

**HONORS AND AWARDS:**

Certificate of Appreciation - USDA Nebraska SCS Plant  
Materials Comm., 1991  
Excellence in Team Programming - UNL Cooperative  
Extension, 1992

**PROFESSIONAL LEADERSHIP ASSIGNMENTS:**

President of the Great Plains Society of American  
Foresters, 1990-91

**PROFESSIONAL ACTIVITIES:**(last 5 years)

Attended the Great Plains Society of American Foresters  
Annual Meetings, 1990-95.  
Attended and assisted in hosting the National Walnut  
Council Meeting, 1994.  
Attended the Nebraska Nurseryman's Association Annual  
Meeting, 1993.  
Attended the 2nd Conference on Agroforestry in North  
America, 1991.  
Attended the 3rd International Symposium on  
Windbreaks and Agroforestry, 1991.  
Attended and presented at the Great Plains Ag. Council  
Windbreak Renovation Workshop, 1990.

**GRANTS AND CONTRACTS:**(last 5 years)

US Army Corps of Engineers, Papio Project 1990-92,  
Habitat Establishment and Maintenance, \$139,216.  
North Central RC&D, Cedar Utilization Demonstration  
Project, \$10,500 (1992).  
Nebraska Game & Parks Commission, 1992-95:  
Rainwater Basin Habitat Mgt, \$44,500  
Sac-Wilcox Habitat Mgt, \$11,000  
Harlan County Lake Habitat Mgt, \$41,000  
Salt Valley Lakes Habitat Mgt, \$63,000  
Big Blue River WMA Habitat Mgt, \$11,000  
US Army Corps of Engineers/Harlan Co Lake, 1992-95:  
Habitat and Recreation Area Habitat Mgt, \$10,000  
US Forest Service, 1992-95: Maintenance of Horning  
Farm and Hastings Research Areas, \$32,000  
City of Lincoln, NE, 1992-95: Maintenance of the  
Landfill Windbreak System, \$16,500.  
National Arbor Day Foundation, 1992-95: Fuelwood  
Demonstration Establishment, \$10,800  
US Forest Service, Agroforestry Center, Working Trees  
Demonstration Planting and Maintenance, \$3,500  
(1993-96).  
Army Corps of Engineers, Papillion Creek Wildlife  
Habitat Mitigation, \$60,510 (1995)  
Lower Platte South NRD, East MOPAC Hiker Biker  
Trail Vegetation Mgt Plan and Trail Development,  
\$123,000 (1994)  
US Forest Service, Juniper Thinning, \$2,700 (1995)  
Army Corps of Engineers, Missouri River Habitat  
Establishment, \$152,107 (1995)

**PUBLICATIONS:**(last 5 years)

**Proceedings:**

R.T. Straight: 1990: Why Renovation?. Windbreak  
Renovation Workshop, Great Plains Ag Council,  
Hutchinson, KS

**NAME:** Tom D. Wardle

**PRESENT RANK:** Associate Forester

**DATE OF RANK:** July, 1987 **TENURE:** No

**APPOINTMENT:** 100% Nebraska Forest Service  
(0.5 Administrative appointment)

**EDUCATION:**

**B.S. - 1967:** Colorado State University Forest  
Management

**M.S. - 1983:** University of Nebraska - Lincoln  
Major: Forestry, Fisheries and Wildlife  
Minor: Community and Regional Planning

**PROFESSIONAL EXPERIENCE:**

1987 - present Associate Forester and Deputy State  
Forester - Nebraska Forest Service  
1983 - 1987 Assistant Forester and Deputy State  
Forester - Nebraska Forest Service  
1980 - 1983 Assistant Forester and Program  
Coordinator for State Forest  
Resources Planning - Nebraska Forest  
Service  
1978 - 1980 Instructor Forester and Program  
Coordinator for State Forest  
Resources Planning - Nebraska Forest  
Service  
1976 - 1978 Assistant Forestry Project Planner  
(vegetation management programs)  
promoted to Forestry Project Planner  
- Nebraska Forest Service  
Pre 1978 Positions with the Colorado State  
Forest Service, the USDA Forest  
Service, the Peace Corps and others

**PROFESSIONAL SOCIETIES:**

Society of American Foresters  
Western State Forest Resources Planners Organization

**PROFESSIONAL LEADERSHIP ASSIGNMENTS:** (last  
5 years)

Chair, Western State Forest Resources Planners  
Association, 1992-1993, Acting Chair, 1993 -  
1994  
Co-Chair, National Association of State Foresters 1994  
Annual Meeting, Nebraska City, Nebraska, with  
Jeanne Andelt  
Chair, Extension and Outreach Sub-Committee, Faculty  
Committee on the School of Natural Resources  
and Environmental Programs, Kyle Hoagland  
Committee Chair - 1996

Chair, Departmental Ad Hoc Committee on Trees and  
Grass Issues, 1995 to present  
Member, Nebraska Environmental Trust Fund (lottery  
fund) Technical Advisory Group, reviewing  
natural resource funding requests.

**PROFESSIONAL ACTIVITIES:** (last 5 years)

Primary activities involve assisting the State Forester in  
the administration of the Nebraska Forest  
Service through coordinating the work of the 3  
Assistant State Foresters, acting as hiring official  
for Managerial-Professional staff, serving as  
liaison in a variety of inter-agency activities, and  
helping with the preparation of agency budgets  
and accomplishment reports.

Examples of other activities include:

Presented a paper at the Workshop on Agroforestry  
Potentials in Northern Mexico, Saltillo, Coahuila,  
Mexico, April 1994.  
Assisted with organizing the Governor's Forestry  
Conference, 1993 and 1994.  
Presentations to the Windbreak Technology Shortcourses  
in 1994 and 1995.  
Conducted a tour for USDA Forest Inventory and  
Analysis staff (North Central FIA Unit), October  
16-20, 1995.  
Assisted with numerous presentations and activities  
including Arbor Day tree presentations to the  
State Legislature, Forestry Field Days talks,  
presentations to various school groups and  
similar activities.

**CURRENT TEACHING ASSIGNMENT:** none

I guest lecture, at the request of the Professors, typically  
2 to 4 times each year. In a typical year I will  
also assist with 2 or 3 student projects.

**CURRENT ADVISING:** none

**GRANTS AND CONTRACTS:** (last 5 years)

None as an individual. I am frequently involved in  
working out the details of contracts and  
agreements with other agencies (U.S. Army  
Corps of Engineers, Nebraska Game and Parks  
Commission, Nebraska Board of Educational  
Lands and Funds).

**CURRENT RESEARCH EMPHASIS:** none

**PUBLICATIONS:** (last 5 years)

- Brandle, James R., T.D. Wardle, and G.F. Bratton.  
1990. Shelterbelt Opportunities and Potential Impacts on Global Warming, Proceedings, The North American Conference on Forestry Responses to Climate Change, May 15-17, 1990, 37 pages.
- Harrell, Mark O., A.R. Martin, D.M. Adams, and T.D. Wardle. 1990. Chemical Weed Control in First Year Tree Plantings, flyer.
- Schmidt, Thomas L. and T.D. Wardle. 1991. Great Plains Foresters Field Handbook. Nebraska Forest Service, 140p.
- Fulk, Thomas, et. al., "Effectiveness of Planning Coordination," Vol. 6 of the USDA Forest Service Critique of Land Management Planning, June 1990, 42 pages.
- Wood Products Trade Directory, with Dennis Adams in Nebraska and co-authors from 6 other states, 1989, 107 pages.
- Brandle, James R., T.D. Wardle, and G.F. Bratton. 1992. "Opportunities to Increase Tree Planting in Shelterbelts and the Potential Impact on Carbon Storage and Conservation," in Sampson, R.N. and D. Hair (editors), Forests and Global Change, Volume 1: Opportunities for Increasing Forest Cover, American Forests, pages 157-176.
- Kuhns, Michael R. And D. P. Mooter. 1992. "Trees of Nebraska," Nebraska Cooperative Extension EC92-1774-X, 75 pages, (Editor).
- Western State Forest Resources Planners Association. 1992. "The Western Forest - Major Issues and Solutions," prepared for the Council of Western State Foresters, 18 pages plus map, contributor and editor.
- Nebraska Game and Parks Commission. 1993. "Walk In the Woods," the January/February issue of Nebraskaland Magazine. Two sidebar articles and worked with the issue editor to coordinate input from other Nebraska Forest Service authors.
- National Arbor Day Foundation. 1993. "Trees for Fuelwood: A Step Toward Energy Diversity," James R. Fazio, Editor. 80 pages. Contributor to Chapter 2, Planting and Growing Trees For Fuelwood.
- Marsh, M.L., J.R. Brandle, L. Hodges, G.F. Hayden, T.D. Wardle, R.F. Riefler, B.B. Johnson, W. E. Easterling, Regional Economic Impacts of a System of Field Shelterbelts in Nebraska, in press.

NAME: Donald E. Westover

PRESENT RANK: Forester

DATE OF RANK: July 1991      TENURE: N/A

APPOINTMENT: 100% Nebraska Forest Service (NFS)

EDUCATION:

M.A.	1980	University of Nebraska
M.S.	1975	University of Wisconsin
B.S.	1969	University of Wisconsin

PROFESSIONAL EXPERIENCE:

1979-present	Rural Fire Program Coordinator, FFW, University of Nebraska
1975-1979	Fire Management Coordinator, FFW, University of Nebraska
1973-1975	Graduate Student, University of Wisconsin
1969-1973	Medical Services Specialist, U.S. Air Force
1968	Stage II Survey Team Leader, U.S. Forest Service
1967	GS-4 Forest Lookout, U.S. Forest Service

HONORS AND AWARDS:

National "Smokey Bear Plaque" for Outstanding  
Achievement in Wildfire Prevention, 1978  
Northeastern Fire Supervisors Plaque, 1992  
Western State Fire Managers Plaque for Outstanding  
Service  
Nebraska State Fire School Committee Plaque for  
Service to State Fire School

PROFESSIONAL LEADERSHIP ASSIGNMENTS: (last  
5 years)

Interior West Fire Council Member  
President, Western State Fire Managers  
Dept. Promotion & Tenure Committee  
Dept. Computer Support

PROFESSIONAL ACTIVITIES: (last 5 years)

Helped launch the Fire & Burn Prevention Coalition in  
Nebraska  
Combined road, street & drainage data along with fire  
district boundaries in over 60 Nebraska counties.  
Mutual Aid booklet & maps, officers, meeting dates,  
member districts

Headed a cooperative effort in fire prevention material  
distribution. Well over \$8,000 worth of fire  
prevention handouts were purchased this year by  
the rural fire districts. Cost recovery for the  
program was 100%.

Coordinated over 25 visits where people saw Smokey  
Bear. The State Fair audience is not included in  
these figures.

Worked cooperatively with State Civil Defense Agency  
to keep the aerial fire suppression program  
functioning smoothly.

Satellite Greenness continues to be a useful component of  
the Nebraska Fire Danger Rating System.  
Furthermore, it appears to be destined to be  
incorporated into the National Fire Danger Rating  
System.

Collaborated to accomplish the second joint NFS -  
U.S.F.S. fire prevention project - Smokey Bear  
(Gate Day, Booth, Parade) at Nebraska State  
Fair.

We have been able to upgrade the computer capability of  
the fire section and are also able to share much of  
this equipment with other departmental faculty.

Securing additional grant money has also allowed the fire  
shop to upgrade several key pieces of equipment.

Continued use of GIS has helped to increase the  
departments awareness of the potential for this  
powerful management tool. We have fielded  
requests from several agencies (pipeline company,  
railroad, NRD, NRC, fire departments, as well as  
other fire service agencies) for this geo-based  
information. Interest in GIS has also resulted in  
collaboration with faculty and staff within and  
outside of our department.

Authored an 8 page Fire Control Section User Survey.  
Responses to this document will provide  
important direction to the Fire Program in the  
coming years.

Helped launch the Fire & Burn Prevention Coalition in  
Nebraska.

Worked with Fair Board to secure a free Smokey Bear  
Gate Day (value \$5000).

Combined road, street & drainage data along with fire  
district boundaries in over 60 Nebraska counties -  
thereby greatly improving our GIS Database.

Mutual Aid booklet & maps, officers, meeting dates,  
member districts.

CURRENT TEACHING ASSIGNMENT:

N/A

CURRENT ADVISING:

N/A

**GRANTS AND CONTRACTS: (last 5 years)**

RFPC, \$114,600 - Renewed Annually  
RCFP, \$86,700 - Renewed Annually  
\$9,540, Special Grant from U.S.F.S. for various projects

**CURRENT RESEARCH EMPHASIS**

N/A

**PUBLICATIONS: (last 5 years)**

"Prevention of Railroad Fires in Nebraska", The Art and Science of Fire Management, p. 282-286, Forestry Canada, 1990.  
"Nebraska Community Wildfire Prevention Programs", Proving Public Fire Education Works, p. 109, 111, Tri-Data Corporation, Arlington, VA, 1992.

**NAME:** Jon S. Wilson

**PRESENT RANK:** Associate Forester

**DATE OF RANK:** July 1, 1992      **TENURE:** No

**APPOINTMENT:** 75% Nebraska Forest Service; 25% Extension

**EDUCATION:**

B.S.F. 1971 West Virginia University  
M.F. 1976 Duke University  
M.S. 1986 University of Nevada-Reno

**PROFESSIONAL EXPERIENCE:**

1987-Present District Forester,  
Nebraska Forest Service, UNL  
1985-1986 Forester  
Plumas National Forest  
1978-1981 Range Conservationist,  
Okanogan National Forest  
1976-1978 Resources Forester,  
Siskiyou National Forest  
1971-1973 Forester,  
U.S. Army

**HONORS/AWARDS:**

UNL-Excellence in Team Programming Award, "Water Quality Team- North Central Nebraska (November, 1992)  
Windbreak Award from Soil Conservation Service (August 1990)  
Commendation Award from Nebraska Statewide Arboretum (April, 1990)  
USDA Certificate of Merit \$500 cash award 1986, 1981  
Professional Societies/Memberships:  
Gamma Sigma Delta National Honor Society-1989-Present  
Society for Range Management-1979-Present  
National Walnut Council-1987-Present  
Nebraska Arborists Association-1987-Present  
Washington Farm Forestry Association-1992-Present

**PROFESSIONAL ACTIVITIES:**

Present Paper at National Walnut Council Meeting, Nebraska City, NE 1994  
Organized and Coordinated First, Second, and Eighth Nebraska Community Forestry Conference, North Platte, NE  
Organized and coordinated workshops on windbreak management, trees as alternative crops, red cedar control on rangelands, tree care, tree pruning, field windbreaks, timberland management

**PUBLICATIONS:**

**Journal Articles**

Wilson, Jon S. and Thomas Schmidt. Controlling Eastern Red Cedar on Rangelands. Rangelands. 1990. V. 12, No. 3 pp. 156-158

**Magazine Articles**

Wilson, Jon S., Windbreaks for Livestock: Design Enhances Effectiveness and Longevity. Nebraska Cattleman. February, 1994. pp. 80-84

**Extension Publications**

Wilson, Jon S. Windbreak Design Considerations (In Press) 4p. 1996. UNL Cooperative Extension NebGuide  
Wilson, Jon S. and Mark Harrell. Environmental Stresses and Tree Health. G91-1036-A 4p. 1991 UNL Cooperative Extension NebGuide

**Miscellaneous**

Kuhn, Gary and Jon S. Wilson. Windbreaks, Environmental Plantings, and Woodland. Dundy County Soil Survey 1992. U.S.D.A., Soil Conservation Service  
Wilson, Jon S., The Forester's Log Newsletter Quarterly Publication  
Wilson, Jon S., Prairie Forests Under Stress. Farming. Sept/Oct 1995. P. 13-14.  
Wilson, Jon S., Streamside Protection Will Pay. Farming. Sept/Oct 1994. P. 12-13  
Wilson, Jon S., Christmas Trees--Selection and Care. Farming. Nov/Dec 1993. P. 12-13  
Wilson, Jon S., Dying "Chinese" Elm Mark End of an Era. Farming. Jan/Feb 1993. P. 12-13  
Wilson, Jon S., Windbreak Renovation. Farming March/April 1990. P. 12-13

NAME: Sarah W. Workman

PRESENT RANK: Assistant Professor

DATE OF RANK: 8 February 1986 TENURE: No

APPOINTMENT: .10 Teaching  
.90 Int'l Agroforestry Coordinator

EDUCATION:

B.A.	1978	Agnes Scott College
M.S.	1982	Western Washington Univ.
Ph.D.	1996	University of Georgia

PROFESSIONAL EXPERIENCE:

1996	Assistant Professor, University of Nebraska
1993-1995	EPA Faculty, Western Carolina University (posted overseas, West Africa)
1993	Research Associate, Instituto Nacional da Pesquisas Amazonas and Smithsonian Institution. Manaus, Amazonas, Brazil
1988	Contract Researcher, Savannah River Ecology Laboratory. Aiken, South Carolina
1986	Wildlife/Botanical Technician, Nazinga Game Ranch. Pô, Burkina Faso.
1983-1985	Forestry Extension Technician, <i>Bois de Villages Projet</i> . Dédougou, Burkina Faso.

PROFESSIONAL SOCIETIES:

American Institute of Biological Sciences  
Association of Southeastern Biologists  
Ecological Society of America  
International Society of Tropical Foresters  
Nitrogen Fixing Tree Association  
Organization of Tropical Biology  
Soil Science Society of America  
Women in Natural Resources

HONORS AND AWARDS:

Member of Gamma Sigma Delta

PROFESSIONAL LEADERSHIP ASSIGNMENTS: (last 5 years)

Chair, NGO Advisory Council, On-Farm Productivity Enhancement Program. Dakar, Senegal and Banjul, The Gambia. 1993-1995.

PROFESSIONAL ACTIVITIES: (last 5 years)

Member of International Workshop Planning Committee, Agriculture and Natural Resources: Sustainable Development. Save the Children USA, and Winrock International Institute for Agricultural Development. Banjul, The Gambia. 1994.  
Conducted four training sessions at pre-service and in-service training for Peace Corps Volunteers. Senegal. 1993 and 1994.  
Presented paper at Agriculture and Natural Resources Workshop. Banjul, The Gambia. 1994.  
Presented paper at International Agroforestry Symposium. FAO, FAC, International Centre for Agroforestry Research and *Institut Senegalaise de Recherche Agricoles*. Dakar, Senegal. 1994.  
Attended USAID Natural Resources Management Conference, representing Winrock International Institute for Agricultural Development. Banjul, The Gambia. 1994.  
Attended International Agroforestry Parklands Symposium. International Centre for Agroforestry Research and *Institut Recherche Ecologique*, Burkina Faso. 1993.

CURRENT TEACHING ASSIGNMENT:

Assist with FFW Agroforestry course, Fall

CURRENT ADVISING:

none

GRANTS AND CONTRACTS: (last 5 years)

1996	USDA Forest Service. Development and Implementation of an International Technology Exchange Program for the National Agroforestry Center. \$31,471.
1993	Smithsonian Institution. BDFF project, Manaus, Amazonas, Brazil. With Mesquita and Neely, \$20,000 for litter decomposition and other studies.
1991	School of Forest Resources, University of Georgia. \$1460 for soil and plant tissue analysis.
1991	Odum Foundation Research Award. Institute of Ecology, University of Georgia. \$618 for nutrient analysis by mass spectrophotometry.

CURRENT RESEARCH EMPHASIS:

no research responsibilities



## PUBLICATIONS: (last 5 years)

### Journal Articles:

Workman, S.W., L.R. Boring and O. Diagne. Effects of Soil Phosphorus, inoculation with *Rhizobium*, and arbuscular mycorrhizal fungi on growth and nitrogen fixation by *Acacia* spp. and *Prosopis* spp. seedlings. submitted to Forest Ecol. Managem.

Workman, S.W. and L.R. Boring. Influence of arbuscular mycorrhiza on nitrogen fixation and water relations of *Acacia tortilis* (Forssk.) Hayne seedlings subjected to drought under varied soil phosphorus levels. submitted to Mycorrhiza.

Mesquita, R.C.G., S.W. Workman, and C.L. Neely. Litter decomposition in a *Cecropia*-dominated secondary forest of central Amazonia: Why is it slow? submitted to Plant and Soil.

Imm, D.B., S.W. Workman, and K.W. McLeod. Vegetation composition and recovery following seasonal burns in a scrub oak-pine community, South Carolina. (in preparation).

Workman, S.W. and K.W. McLeod. 1990. Vegetation Communities of the Savannah River Plant Site: Major Community Types. SRO-NERP-19, National Environmental Research Park/Savannah River Ecology Laboratory, Aiken, SC.

### Symposium or Proceedings:

Workman, S.W. (ed.). International Workshop on Agriculture and Natural Resources: Sustainable Development. West African Rural Development Foundation/SCF/Winrock. Dakar, Senegal: 1995.

### Extension Publications:

Composting Techniques and Residue Management. 1993. On-Farm Productivity Enhancement Program, Senegal/Gambia.

### Miscellaneous:

Quarterly and Annual Reports. 1993 & 1994. On-Farm Productivity Enhancement Program. Senegal/Gambia.

