

UtahState
UNIVERSITY



Department of Wildland Resources

NWCCU Academic Department Self-Study

January 2007

I. Summary

A. Description

The Department of Wildland Resources integrates teaching, research, and extension programs in forest, range, and wildlife sciences. The focus is applied ecology in terrestrial ecosystems, with a particular emphasis on solutions for the conservation and sustained use of natural resources on our rapidly changing planet. While most of the Department's activities are directed at the needs of the people of Utah, there are numerous collaborations with individuals and institutions in other states and continents. With a faculty and staff establishment of some 55 personnel, the Department is currently training 166 undergraduates and 105 graduates. The Department benefits from strong collaborations with federal and state agencies, to the extent that three public-funded research units are incorporated into the fabric of the Department: The Utah Fish and Wildlife Research Unit, the National Wildlife Research Center's Predator Field Station, and the Jack H. Berryman Institute. This concentration of research effort represents a "research engine" that is presently generating more than \$ 5.7 million per year in externally funded awards.

The Department of Wildland Resources offers four bachelor's degree programs (Conservation & Restoration Ecology; Forestry; Rangeland Resources; Wildlife Sciences) and four graduate degree programs at master's and doctoral levels (Ecology; Forestry; Range Science; Wildlife Biology). Undergraduate enrollments have been stable since 2002 and are mainly represented by students resident in Utah. By contrast, graduate enrollments have been increasing steadily (64% increase since 2002) and are well represented by out-of-state and international students, with a greater proportion of female students (40%) than among undergraduates (25%).

B. Analysis and assessment

The curricula of the undergraduate programs of the Department of Wildland Resources were extensively revised in 2003 to meet changing market needs and environmental issues. The effectiveness of the degree programs is constantly assessed through various means and

the data are reviewed in annual Department retreats. Furthermore, the Department is currently accredited with the Society for Range Management and the Society of American Foresters, which both have rigorous accreditation criteria. Follow-up surveys show that 76% of employed graduates with recently awarded BS degrees from the Department are employed in positions related to the training they received as undergraduates, while a further 22% are continuing their education. Only 7% of recent BS graduates from the Department, excluding those continuing as full-time students, are unemployed for whatever reason (including maternity). Such information indicates that the Department's undergraduate programs are both relevant and effective. The growing graduate program, with far more students turned down (due to lack of space and funds) than can be accepted, together with the diverse demography of the graduate student body, indicate the graduate programs are indeed world renowned.

The Department's strengths in research can be assessed from the impressive amount of research funds generated through competitive awards. A further indication is the congregation of federal and state researchers that have been positioned in the department by their agencies to capitalize on the atmosphere of discovery and creativity that is nurtured by the faculty and graduate students. The Department is internationally recognized for its expertise in the management of semi-arid rangelands, and is nationally recognized for its expertise in mitigating human-wildlife conflict.

C. Challenges and recommendations

The major challenge facing the Department is its limited operating budget, which is currently only 27% of actual operating expenditures. The shortfall is made up from the overhead / indirect costs levied from research awards, which is not the most strategic use of such funds. It is strongly recommended that departmental operating budgets should be reviewed across the USU campus.

An additional (and related) challenge is the relatively high degree to which the salaries of tenured and tenure-track faculty members are leveraged with congressionally directed funding for the Utah Agricultural Experiment Station and

the Berryman Institute. While an immediate solution is intractable, the Department of Wildland Resources is striving to reduce the problem by redistributing whatever education and general (E&G) funds become released when senior faculty members retire. If new faculty members are hired using external funds then the appointments do not provide eligibility for tenure.

Finally, a significant challenge experienced since early 2006 is the “teething trouble” associated with the transition to the campus-wide “Banner” software package for administration. Although the accounting and student records sub-systems are becoming more user-friendly and reliable, the human resources sub-system is still highly problematic.

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II. Self Study

A. Overview of department

The Department of Forest, Range, and Wildlife Sciences originated in July 2002 when the College of Natural Resources was reorganized. Faculty and staff, currently numbering 55, are largely derived from the former Departments of Fisheries and Wildlife, Forest Resources, Geography and Earth Resources, and Rangeland Resources. Faculty expertise is consequently diverse, but a common theme is applied ecology in terrestrial ecosystems. To take advantage of this diverse expertise and promote crosscutting programs that would integrate the faculty and staff in one new and dynamic academic unit, the department voted for a name change. A faculty sub-committee directed the process, which involved extensive consultation, and in June 2006 the name was officially changed to the Department of Wildland Resources.

The mission of the Department of Wildland Resources is to achieve excellence in integrating forest, range, and wildlife sciences. As researchers, we apply internationally recognized scientific expertise, an interdisciplinary approach, and a collaborative spirit to develop innovative solutions for the conservation and management of the natural resources of our changing planet. As educators, we mentor students at undergraduate and graduate levels, synthesizing established knowledge and cutting-edge research into a dynamic and highly relevant curriculum. As extension specialists, we help the people on the land understand and use research-based knowledge to improve their livelihoods through enlightened stewardship of ecosystem goods and services.

The Department is strongly bolstered by the presence of a dynamic team of federal- and state-funded collaborators in the form of the Utah Cooperative Fish and Wildlife Research Unit (US Geological Survey and Utah Division of Wildlife Resources) and the USDA Predator Research Facility (National Wildlife Research Center). In addition, the Department hosts the Jack H. Berryman Institute, which has a national responsibility for research, teaching, and outreach in the field of wildlife damage management and mitigation of human-wildlife conflict (funded by USDA/APHIS/Wildlife Services).

B. Undergraduate and graduate academic programs

1. Degrees offered

The Department of Wildland Resources offers four Bachelor of Science degrees: Conservation and Restoration Ecology, Forestry, Rangeland Resources, and Wildlife Science. All of these degrees were in existence prior to the formation of the present department except for the Conservation and Restoration Ecology degree. Enrollment data for these degree programs since the department originated in 2002 (Table 1) show that enrollment has remained steady, with the highest number of students in the Wildlife

Sciences undergraduate degree major and Wildlife Biology graduate degree major. PreRangeland Resources, PreForestry, PreFisheries & Wildlife, and Fisheries & Wildlife undergraduate majors are no longer offered. In addition, the Fisheries & Wildlife graduate major has been discontinued. Our graduate enrollment has increased 20% since 2003 with the biggest increase during 2005-2006. These degree programs offer broad educational opportunities for students interested in the analysis and management of forest and rangeland ecosystems and their associated wildlife populations. The department's philosophy on education is to promote a broad interdisciplinary approach to natural resources analysis, management, and science. The Wildland Resources undergraduate curriculum is designed to provide students the basic education and training required for initiation of a career in the profession. Completion of the curriculum allows graduates to be competitive in attaining entry into graduate schools or into entry-level positions in state and federal management agencies.

Table 1. Enrollments by major in the Department of Wildland Resources (fall semester)

Undergraduate	2002	2003	2004	2005	2006
Conservation and Restoration Ecology	--	--	15	20	30
Fisheries & Wildlife	104	57	21	7	2
Forestry	25	16	26	27	25
Rangeland Resources	33	19	14	18	19
Wildlife Sciences	--	11	67	83	90
PreFisheries & Wildlife	2	28	2	--	--
PreForestry	--	7	--	--	--
PreRangeland Resources	--	2	--	--	--
Total Undergraduate	164	140	145	155	166
Graduate					
Ecology	14	23	30	35	45
Forestry	11	11	6	10	6
Range Science	18	19	20	19	17
Wildlife Biology	17	22	33	30	37
Fisheries & Wildlife	4	1	--	--	--
Total Graduate	64	76	89	94	105
TOTAL MAJORS	228	216	234	249	271

The first two years of study in the Department of Wildland Resources are designed to provide students with a sound background in the natural sciences, an introduction to the field of natural resources management, and an introduction to their respective major. The last two years are designed to provide an advanced understanding of natural resource management and science, depth concentration in the major, and experience with the integration of scientific and management concepts across a diversity of disciplines and management scenarios. Students are expected to enroll for 15 or more credits of coursework per semester.

The present Wildland Resources undergraduate curriculum derives from an extensive departmental review that was undertaken in 2003, motivated by concerns expressed by former and current students and by the faculty. The curriculum maintains the former strengths and attempts to correct the weaknesses. This curriculum is centered on a common core of courses that each undergraduate student is required to take (Table 2). This core provides our undergraduates with an excellent foundation in the ecology and management of natural resources, and the tools and techniques necessary to understand, collect, and analyze data from the field or laboratory. Students are required to apply these concepts and techniques in a variety of problem-solving exercises throughout this common program. The institution of a core program common to all Wildland Resources majors has also allowed the development of a stronger sense of cohort identity among undergraduates.

Table 2. Department of Wildland Resources common courses (27 credits)

CRN #	Course Title	Credits
WILD 2000	Introduction to Forest, Range & Wildlife Sciences	1
WILD 3600	Wildland Plant Ecology & Identification	4
WILD 3610	Wildland Animal Ecology & Identification	4
WILD 3700 (CI)	Inventory & Assessment in Natural Resource & Environmental Management	3
WILD 3710	Monitoring and Assessment in Natural Resource and Environmental Management	3
WILD 3800	Wildland Ecosystems	3
WILD 3810	Plant and Animal Populations	3
WILD 3850	Vegetation and Habitat Management	3
WILD 3900	Managing Dynamic Ecological Systems	3

The Department of Wildland Resources offers opportunities for graduate study through MS and PhD degree programs in Ecology, Forestry, Range Science, and Wildlife Biology. The department also offers opportunities to participate in a college-wide Master of Natural Resources (MNR) degree program administered through the College of Natural Resources.

The Wildland Resources graduate curriculum is designed to prepare students for research, extension, and educational careers in professional or academic institutions. We expect graduates of our degree programs to be capable of interpreting and evaluating data collected from research projects of their own design. Wildland Resources students are also expected to develop important attributes associated with professionalism in the field. We stress the importance of clear and sympathetic communication skills, the ability to solve problems systematically, and the ability to assist in the resolution of natural resource conflicts. We encourage our students to approach professional issues from an ethical as well as a pragmatic point of view and foster their desire for lifelong education in the field.

A Wildland Resources baccalaureate is not required for admission into the graduate program. Any deficiencies in coursework background, however, must be corrected. Either a Plan A (thesis) or Plan B (formal report) masters degree is offered. For the current year, the Wildland Resources Department has a total of 105 graduate students with only 6 following the Plan B program. The Departmental Seminar (WILD 6870/7870) is the only specific coursework requirement. All other coursework for graduate students is specific to the student's background, interests, and research project. Graduate-level courses at Utah State University are designated by a numbering system of 6000 or higher. Courses at the 5000 level may be taken by either graduate students or seniors. In addition to all the graduate courses offered in the Wildland Resources Department (Table 3), we also make liberal use of Special Topics (WILD 6900/7900) to offer 4-6 specialized courses and seminars per year, based on faculty and student interest.

Regarding the demographic composition of our student body, approximately 27% of our undergraduates are female. Less than 1% of our undergraduates are international students. Utah is unique in a number of respects that affect the character of students entering the University. The population provides a plentiful supply of young people who come from a cultural background that places a high value on education. However, the generally limited incomes of Utah families, and the restricted tax base within the state, place major financial constraints on public education. Some 43% of our undergraduate students are Utah residents.

Table 3. Wildland Resources graduate level courses

Course Number	Course Title	Semester Credits
WILD 5000	Predator Ecology and Management	3
WILD 5070/6070	Range Wildlife Relations	3
WILD 5100	Wildlife Management Laboratory	3
WILD 5220/7220	Community-based Conservation Partnerships	3
WILD 5300	Wildlife Damage Management Principles	3
WILD 5350	Wildland Soils	3
WILD 5420	Forest and Shade Tree Pathology	3
WILD 5430	Advanced Forest Pathology	2
WILD 5460	Avalanche and Snow Dynamics	2
WILD 5510	Forest Entomology	2
WILD 5650	Urban/Community Forestry	3
WILD 5700	Forest Assessment and Management	3
WILD 5710	Wildland Disturbance: Ecology & Mgmt.	3
WILD 5750/6750	Applied Remote Sensing	3
WILD 5860	Poisonous Range Plants Affecting Livestock	3
WILD 6000	Grazing Systems	2
WILD 6050	Rangeland Fire Ecology and Fire Prescription Development	3
WILD 6070/5070	Range Wildlife Relations	3
WILD 6200	Biogeochemistry of Terrestrial Ecosystems	3
WILD 6240	Graduate Internship/Co-op	1-9

Course Number	Course Title	Semester Credits
WILD 6270	Advanced Silviculture	3
WILD 6350/5350	Wildland Soils	3
WILD 6400	Ecology of Animal Populations	4
WILD 6420	Vegetation Sampling Design	4
WILD 6500	Biometry: Design and Analysis of Ecology Research	4
WILD 6510	Topics in Spatial Ecology	1-3
WILD 6610	Regional Terrestrial Ecosystems	4
WILD 6710/7710	Landscape Ecology	3
WILD 6720/7720	Advanced Conservation Biology	3
WILD 6740	Physical Processes in Remote Sensing	3
WILD 6750/5750	Applied Remote Sensing	3
WILD 6770	Plant Community Ecology	3
WILD 6800/7800	Forest, Range, and Wildlife Sciences Departmental Seminar	1
WILD 6850/7850	Population Ecology	3
WILD 6870	Ecology Seminar	1
WILD 6880/7880	Current Issues in Conservation Genetics and Management	2
WILD 6900	Graduate Special Topics	1-6
WILD 6910	Directed Study	1-6
WILD 6960	Graduate General Ecology	5
WILD 6970	Thesis Research	1-12
WILD 6990	Continuing Graduate Advisement	1-9
WILD 7000	Theory and Applications of Rangeland Ecosystem Management	3
WILD 7030	Plant-Herbivore Interactions	3
WILD 7200	Plant Physiological Ecology	3
WILD 7220/5220	Community-based Conservation Partnerships	3
WILD 7300/5300	Wildlife Damage Management Principles	3
WILD 7400	Plant Population Ecology	3
WILD 7420	Analysis of Ecological Communities	5
WILD 7710/6710	Landscape Ecology	3
WILD 7720/6720	Advanced Conservation Biology	3
WILD 7800/6800	Forest, Range, and Wildlife Sciences Departmental Seminar	1
WILD 7850/6850	Population Ecology	3
WILD 7880/6880	Current Issues in Conservation Genetics and Management	2
WILD 7900	Graduate Special Topics	1-6
WILD 7910	Directed Study	1-6
WILD 7970	Dissertation Research	1-12
WILD 7990	Continuing Graduate Advisement	1-9

Undergraduates electing the Wildland Resources major traditionally come from a rural or small-town background. Many Wildland Resources students are married and have families to support; thus, they are obligated to hold part- or full-time employment throughout the academic year. This imposes major time constraints for carrying full course loads and participation in extra-curricular activities. Even so, a high majority of our undergraduate students are enrolled full-time (Table 4).

Our graduate student population is demographically different from the undergraduate population (Table 4), with much higher proportions of females (41% graduates; 27% undergraduates) and international students (13% graduates; <1% undergraduates). However, minority ethnic groups are poorly represented in both undergraduate and graduate populations (1% graduates; <5% undergraduates) and have reached their lowest level in the past four years. The percentage of full-time students in Wildland Resources has remained stable, or is perhaps showing an upward trend, over the period under review.

Table 4. Student demographics

Undergraduate	2002	2003	2004	2005	2006
% Full-time	81.3%	85.0%	81.4%	85.8%	88.6%
% Female	26.5%	25.7%	24.8%	24.5%	26.5%
% Minority	6.6%	6.4%	6.2%	4.5%	4.2%
% International	3.0%	0.7%	0.0%	0.6%	0.6%
Graduate					
% Full-time	49.2%	30.3%	66.3%	67.0%	27.6%*
% Female	47.5%	39.5%	39.3%	38.3%	41.0%
% Minority	1.6%	0.0%	1.1%	1.1%	1.0%
% International	8.2%	9.2%	11.2%	24.5%	13.3%

***Note:** the USU data provided on full-time graduate students (27.6%) in Wildland Resources is incorrect. The Analysis, Assessment, and Accreditation Office is using 9 credits as the indicator of a full-time student. However, the School of Graduate Studies recently lowered the number of credits necessary for full-time status to receive assistantships and waivers to 6 credits. In addition, once a graduate student has completed all of his/her coursework they are only required to register for 3 credits and still be considered a full-time student.

2. Data

In 2005-06, the Wildland Resources Department awarded 44 degrees. This was a 26% increase from the previous year. The number of undergraduate degrees has remained constant for the last two years. In contrast, the number of graduate degrees, especially at the masters' level, has gradually increased (Table 5).

Table 5. Number of degrees awarded

Degrees	2002-03	2003-04	2004-05	2005-06
Bachelor	27	30	20	20
Masters	8	14	11	19
Doctoral	2	5	4	5
Total Degrees	37	49	35	44

The total student credit hours have increased 36% from a low in 2002 of 1,492 to a high in 2006 of 2,328. The biggest increase (97%) has been at the 1000-level (Table 6) and represents freshmen taking foundation courses.

Table 6. Number of student credit hours (fall semester)

Level	2002	2003	2004	2005	2006
1000	23	345	723	699	684
2000	302	371	319	243	294
3000	245	342	513	499	527
4000	208	90	124	98	85
5000	181	159	26	51	48
6000	380	445	481	323	480
7000	153	260	276	303	210
Total SCH	1492	2012	2462	2216	2328

The admission and retention standards of the Wildland Resources Department operate under an open admission policy. High school graduates are admitted directly to an academic college (including College of Natural Resources) if the college grade point average (GPA), as predicted by American College Testing (ACT) Program scores, equals 2.0 or higher (4.0 scale). High school graduates whose scores are less than 2.0 may be admitted into the General Registration program and provided an opportunity during their first semester of university work to demonstrate they can maintain the Utah State University minimum GPA of 2.0. Transfer students with GPAs of 2.5 or better are admitted directly into the College; with a GPA below 2.5 the Department Head can exercise discretion. The department has the right to refuse transfer of credit from an accredited or non-accredited institution for the purpose of substituting for required courses in the Wildland Resources curriculum if the quality of education in the transfer is suspect or known to be inferior. Possibly because of a change in our advising procedures, our first-year retention rate has increased from 70% in 2002 to 75% in 2004 (Table 7). Now, instead of every faculty member having a few advisees, the Wildland Resources Department has recently assigned four specialized faculty members to advise students, with one advisor for each major. This has made the advising of our students much more efficient and the satisfaction level among undergraduates appears to have increased (based on informal polls; we are awaiting results of exit interviews with our current graduating class). Current information is not available on retention rates since 2004 (Table 7).

Table 7. First-year retention rate (Fall)

Year:	2002	2003	2004
Retention Rate:	70.0%	60.0%	75.0%

Because of low enrollments at the undergraduate level, university-wide recruiting fairs have been held in several locations in Utah, Idaho, and Wyoming. Professional staff and faculty from the College of Natural Resources, including the Wildland Resources Department, have visited several high schools in Utah that offer promise for recruiting students into our natural resource degree programs and in some cases have hosted prospective high school students here on campus. We also are actively involved in regular recruiting visits to the top five or six community colleges in Utah.

3. Analysis and Assessment

The Wildland Resources Department evaluates the effectiveness of its undergraduate programs in three main ways: 1) Capstone courses require each student to become involved in the analysis of a real-world environmental problem. How the students fare in these capstone experiences depends on the effectiveness of the instruction they received in previous courses, and grades are determined in part from faculty-student interviews in which the complete learning experience is evaluated. 2) The Department Head meets informally with graduating seniors at a working luncheon, followed by a formal, anonymous questionnaire. 3) The College conducts 9-month and 5-year surveys of all of our graduates to determine how well our degree programs prepared them for their professional careers. We also periodically conduct interviews with leaders in governmental regulatory and funding agencies to determine how our graduates served their needs. In addition, the department has formulated specific learning objectives with each course. These learning objectives are explicitly outlined in each course syllabus and are summarized for each degree program. To maximize placement of our graduates into career tracks that best match their aspirations and abilities, faculty members work with individual students to determine their professional aspirations, design course work and research, initiate participation in professional meetings, and introduce them to professionals at other universities or natural resource agencies. Learning objectives are tailored to individual students but will likely encompass aspects of experimental design, data analysis, statistics, modeling, and public education. In our graduate programs we educate students to fill positions in other academic institutions, state and federal agencies, and non-governmental environmental organizations. We accept high-achieving students from a diversity of backgrounds and our graduate education programs are specifically tailored to meet the interests and goals of each individual student.

Curricula for the Department's undergraduate programs in Forestry, Rangeland Resources, and Wildlife Science were designed with an awareness of the requirements of the federal government's Office of Personnel Management (OPM). Students graduating with these degrees are qualified for immediate employment in federal agencies. The Department is approached from time to time by federal agencies (e.g. the Bureau of Land Management) to review the curricula of programs at other institutions, or the transcripts

of potential employees, to certify that they meet OPM standards. This level of respect and credibility that the Department enjoys has been earned to some extent from its participation in accreditation reviews conducted by the Society for Range Management and the Society of American Foresters. The Department is current with its accreditation with both these professional societies and some of our faculty members sit on the accreditation committees. The Wildlife Society does not have an accreditation system for academic programs but it does have a rigorous system for the professional certification of individuals, and the Department's undergraduate major in Wildlife Sciences fully equips students to achieve this certification after graduating.

From an assessment perspective, the Wildland Resources Department considers the Employment/Education Survey of Recent Graduates to be one of the more important surveys we conduct because it focuses on one of the university's most important outcome measures - student success in finding jobs and being accepted into graduate programs (Table 8). We purposely wait to survey recent graduates until they have been out of school long enough to have had a reasonable chance to find a job or become enrolled in a graduate program. The department uses the standardized telephone survey instrument that is used by all USU departments each year as we contact our recent graduates. Recent graduates are highly mobile and it can be difficult to locate them but a concerted effort is made to contact as many of our graduates as possible. The last official data from the Analysis, Assessment & Accreditation Office was published in March 2005. During May and June, 2004, USU's Office of Analysis, Assessment and Accreditation worked with our department in conducting a telephone survey for students who received bachelor's degrees from July 1, 2002 to June 30, 2003. The Wildland Resources Department awarded 39 degrees during this time period and 92% of Employment/Education surveys were completed which is a very high rate for a telephone survey. We were able to obtain information concerning the graduate from a variety of sources including the student, a parent, or a spouse. During this time period, when asked if the student was currently continuing his/her education, 22% responded "yes". Graduates continuing their education were asked to name the school they were attending and as would be expected, USU was the most frequently reported choice. Of the students indicating they were not full-time students, 23 already had a full-time job, 2 were unemployed, and 3 gave no response. Although some students may choose to work in areas outside of their discipline, as a general rule, the Wildland Resources students pick majors because they expect to work in that field. As a result, of the 24 students that had full-time jobs, 15 indicated that the job was directly related to their degree, 1 somewhat related, 5 not related, and 3 had no response. In evaluating the effect of state resources used for higher education, the issue of where graduates take full-time jobs is relevant. Students who remain in the State of Utah add human capital to the state's work force and contribute to the tax base of the state. Interestingly, out of our 24 graduated students, 12 were employed in the state of Utah, 11 out-of-state, and 1 had no response. Graduates were asked who their employer was. Graduates from the Wildland Resources Department were most likely to be employed in the public sector. Obtaining numbers on starting salaries for recent graduates is a difficult task. Students or their spouses are often reluctant to provide this information and relatives who may have been contacted as part of the survey may not know. It was anticipated that this part of the survey data would be

less complete than other information collected and the forecast proved to be generally correct. However, a surprising proportion of the survey contacts were willing and able to provide salary data (Table 8), allowing us to identify the starting salary range of recent graduates with full-time jobs; these ranged from a low of \$12,000 to a high of \$39,520. At the conclusion of each academic year, the Wildland Resources Department continues to collect data regarding employment and continued education of our Wildland Resources graduates.

Table 8. Employment/Education Survey of Recent Graduates from the Department of Wildland Resources (for degrees awarded between July 2002 and June 2003)

Completion rate	Number of degrees awarded	Number of completed surveys	Completion rate		
		39	36	92%	
Are you currently continuing your education?	Yes	No	No response	Total	
	8	27	1	36	
If yes, are you a full- or part-time student?	Full-time	Part-time	No response	Total	
	8	0	0	8	
At which institution are you enrolled?		USU	Other	Total	
		5	3	8	
What degree are you studying for?	Masters	Doctoral	Other	Total	
	7	1	0	8	
Are you currently employed?	Yes, full-time	Yes, part-time	No job	No response	Total
	24	0	8	4	36
Is your job related to your USU degree?*	Related	Somewhat related	Not related	No response	Total
	15	1	5	3	24
In which state or country is your job located?*	Utah	Not Utah	No response	Total	
	12	11	1	24	
Who is your employer?*	Private sector	Education (private or public)	Public sector (not education)	Total	
	8	2	14	24	
In your current job, what was your starting salary?*	Lowest	Highest	Median	# Respondents	
	\$12,000	\$39,520	\$26,113	14	
Are you currently looking for a full- or part-time job?*	Yes, full-time	Yes, part-time	Not looking	No response	Total
	0	1	3	1	5

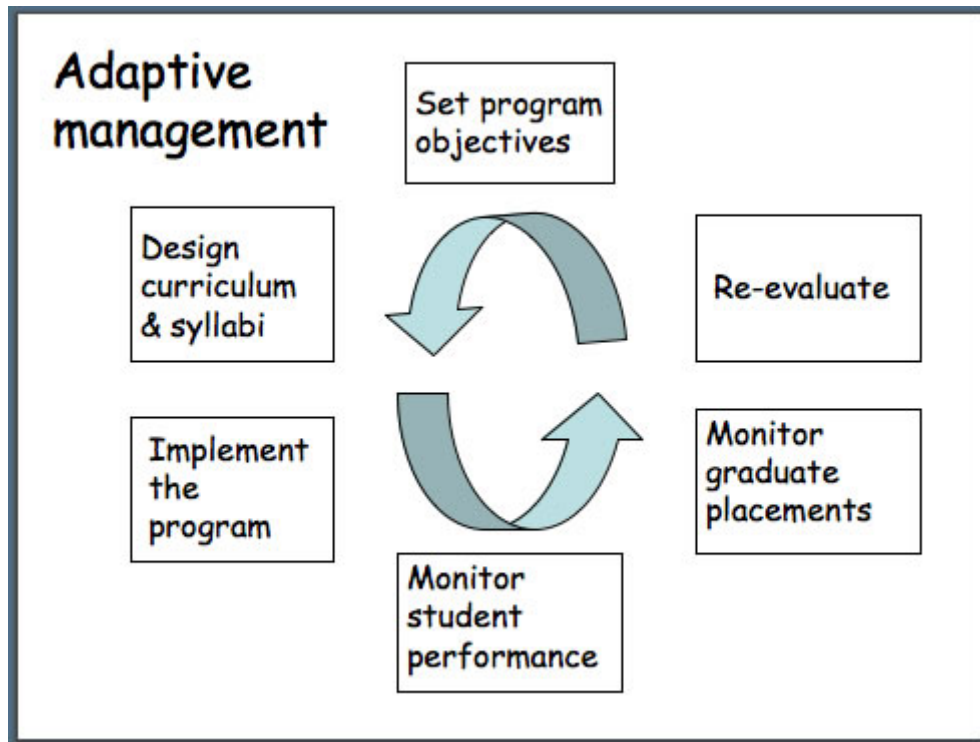
*Respondents with full time jobs

**Respondents without full-time jobs *and* who are not full-time students

The Department continuously revises and improves its academic offerings by applying the principle of *adaptive management*, which is the approach we teach our students to adopt when they become managers of wildland ecosystems. Essentially, this is a process

of learning-by-doing, in which the entire process, from objectives to outcomes, is continually adapted to suit changing conditions which can be environmental, economic, political, etc. The process is outlined in Figure 1.

Figure 1. The Adaptive Management Cycle for an Academic Program



4. Challenges and Recommendations

The Department's undergraduate enrollment is stable and perhaps increasing steadily, but this is because the Wildlife Sciences program is expanding while the Forestry and Rangeland Resources programs are shrinking. Since there is no significant timber industry in Utah, and with the US Forest Service increasing its emphasis on biodiversity conservation and the provision of ecosystem services (like water, recreation, carbon sequestration, etc), there is greater demand for skills associated with wildlife management and conservation. Similarly, the range-based livestock industry is in a steady decline across the western USA and so degrees in rangeland resources are not as much in demand as they were in the past. The Department of Wildland Resources is responding with, for example, the new bachelor's degree in Conservation and Restoration Ecology, but there is a perception among some agency personnel and older alumni that we are neglecting the programs that were traditionally our strongest (i.e. forestry and range science). It will take time and sustained efforts with outreach and marketing to change such perceptions.

The graduate program of the Department of Wildland Resources is internationally recognized and attracts students from far and wide, as evidenced by the demographic difference between the graduate and undergraduate student groups in the Department. However, while the School of Graduate Studies is continually encouraging efforts at graduate student recruitment, enrollments are restricted by the limitation of funds for graduate teaching and research assistantships. Graduate studies in terrestrial ecology involve expensive field research projects and it rests on faculty to find the research funds as well as stipends (and medical insurance) to support their graduate students. If the availability of graduate assistantships were increased this would allow an immediate step up in graduate enrollments; we are continually turning graduate applicants away because we cannot offer them the opportunities they can find at other universities.

C. Faculty

1. Data

The Department of Wildland Resources currently has a full-time, tenure-track (i.e. “core”) faculty of 22, with an additional 8 federal and state collaborators and 2 non-tenure track faculty members. This brings a good balance among the academic ranks and areas of expertise (Table 11). At present the greatest void in faculty expertise is in the area of animal population ecology but we are currently conducting a nationwide search for a suitable individual to fill this need. The number of full-time, tenure-track faculty in the Wildland Resources Department has increased from 19 to 28 from 2002 to 2006 (Table 9). During this time, one faculty member retired, one faculty member began phased retirement, one faculty member resigned, and we added 8 state and federal collaborators (non-salaried). The faculty includes three women and all faculty members have terminal degrees. Full professors account for 54%, associate professors 32%, and assistant professors 14% of the total faculty (Table 10).

Table 9. Number of Full-Time Faculty

Year	2002	2003	2004	2005	2006
Headcount	19	19	20	22	28

Table 10. Ranks of Full-Time Faculty

Headcounts by rank and year	2002	2003	2004	2005	2006
Professor	7	7	8	11	15
Associate Professor	8	8	8	7	9
Assistant Professor	3	4	4	4	4
Lecturer	1	0	0	0	0
% Faculty with Terminal Degrees	100%	100%	100%	100%	100%

Table 11. Faculty of the Department of Wildland Resources (2006)

Ranks	Names	Areas of Expertise
Professors:	John A. Bissonette*	Leader, Utah Cooperative Fish and Wildlife Research Unit, landscape ecology, terrestrial vertebrate ecology
	F. E. "Fee" Busby	Grazing extension specialist; restoration of overgrazed watersheds
	Martyn M. Caldwell	Plant physiological ecology
	Michael R. Conover	Animal behavior, wildlife damage management
	Raymond D. Dueser	Wildlife population ecology
	Johan T. du Toit	Ecology and conservation of large mammals in terrestrial ecosystems
	Thomas C. Edwards, Jr*	Utah Cooperative Fish and Wildlife Research Unit, spatial ecology, habitat modeling, biostatistics
	Michael M. Jaeger*	National Wildlife Research Center, behavioral ecology
	Frederick F. Knowlton*	National Wildlife Research Center, predator ecology, behavior, management
	Michael R. Kuhns	Forestry extension specialist; urban forestry, tree physiology
	James N. Long	Forest ecology, silviculture
	John C. Malechek	Rangeland ecology and management
	Terry A. Messmer	Wildlife extension specialist; wild ungulate and waterfowl management, wetlands ecology, private land management, conservation communication
	Frederick D. Provenza	Range animal production and behavior-based management
	Michael L. Wolfe	Wildlife ecology and management
Research Professor:	Leila M. Shultz	Plant taxonomy and biogeography
Associate Professors:	Frederick A. Baker	Forest pathology, computer applications
	Roger E. Banner	Range extension specialist
	Christopher A. Call	Vegetation management and rangeland ecosystems ecology
	Eric M. Gese*	National Wildlife Research Center, predator behavior and ecology
	Michael J. Jenkins	Disturbance ecology and management; insects, fire, avalanches
	R. Douglas Ramsey	Remote sensing, geographic information systems, landscape ecology, spatial analysis
	Eugene W. Schupp	Plant population ecology and restoration ecology
	John A. Shivik*	National Wildlife Research Center, predator ecology
	Helga van Miegroet	Forest soils and biogeochemistry
Assistant Professors:	Peter B. Adler	Plant community ecology
	Karen H. Beard	Community ecology, ecosystem ecology, conservation biology
	Frank P. Howe*	Avian ecology and management; riparian and shrubsteppe ecology
	Karen E. Mock	Conservation genetics and applied molecular ecology
	Ronald J. Ryel	Plant physiological ecology
Research Assistant Professors:	Mary M. Conner*	Wildlife population ecology
	Shandra Nicole Frey	Berryman Institute, resolution of human-wildlife conflict
	Juan J. Villalba	Ungulate foraging behavior and phytopharmacology

*Federal or state collaborator

2. Research/creative activity and productivity

The Wildland Resources Department currently has a modest publication rate and efforts are being made to improve the production (in quantity and quality) of peer-reviewed publications. In 2002, the department had 65 peer-reviewed publications, 2003 – 75, 2004 – 61, 2005 – 61, and 2006 – 72. Nevertheless, when evaluated in terms of research money brought in, the Department is very successful. In FY 2005-06 externally funded awards generated by the College of Natural Resources amounted to \$9,684,998. Of this, \$ 5,735,400 (59%) was generated by the Wildland Resources Department, making it the most successful department in the College. Considering the grantsmanship of faculty on a university wide basis, the per-capita success of research faculty in the Department of Wildland Resources must be among the highest on campus.

3. Extension/service productivity

The Wildland Resources Department includes of the following extension faculty members:

Dr. Roger Banner, Extension Range Specialist
Dr. Fee Busby, Extension Range/Watershed Specialist
Dr. Nicki Frey, Extension Wildlife Specialist
Dr. Michael Kuhns, Extension Forestry Specialist
Dr. Terry Messmer, Extension Wildlife Specialist

Activity in the field can be (to some extent) assessed from extension face-to-face contacts in 2001-06, which are as follows:

Forestry: 25,692
Wildlife: 18,595
Range: 8,456

Note that indirect contacts (through newsletters, web sites, etc.) would at least triple these numbers.

i. Forestry

The Extension Forestry program educates landowners and other Utahns about the management of Utah's rural and urban/community forests. The program focuses on rural forestry (the Utah Forest Landowner Education Program), urban/community forestry, and forestry at the wildland-urban interface. A recent example of a successful program is the Restoring the West Conference 2006: Aspen Restoration – this conference attracted 175 landowners, professionals, and students from Utah and throughout the West to learn about important and declining aspen forests. Their knowledge, skills, and ability to manage aspen increased (based on evaluations); attendees manage an average of 433,000 acres of forest each. The Extension Forestry program has produced 46 extension/research publications and 7 refereed journal articles in the last five years, and operates an award-winning Web site that receives over 4,500 visitors a month.

Web sites -- <http://extension.usu.edu/forestry>; www.restorethewest.org

ii. Range

The program in Extension Rangeland Management helps managers, agents, land users, and the general public seeks information, expertise and assistance involving public and private rangelands and associated natural resources. Programs include Range Schools, AZ/UT Range-livestock Annual Workshop, the USU Extension/UFBF biennial Rangeland Conference, and BEHAVE (Behavioral Education for Human, Animal, Vegetation, & Ecosystem Management). An example of a successful program is the Utah Range School. Three Utah Range Schools presented in 2006 resulted in a dramatic increase in participants' knowledge of rangeland management. The program also recently produced the booklet Grasses and Grasslike Plants of Utah – a Field Guide. Their Utah Rangelands Web site (see below), an element of the Rangelands West Partnership, serves as a web resource for science based information on the nature, use, and management of rangelands in Utah and beyond.

Web sites -- extension.usu.edu/rangelands; extension.usu.edu/rangeplants

iii. Wildlife

Wildlife Extension at USU involves the efforts of several specialists and staff conducting programs for local communities, elected officials, public and private agency administrators, managers, and biologists, helping to guide their natural resource management and economic decisions. The program helps clientele annually generate over \$15 million in new income and results in over 1.5 million acres of private rangeland being managed for wildlife. Their efforts have renewed stakeholder appreciation for the role of science in decision making, and they provide new technical and financial resources to help landowners adapt to change. This work results in 3-4 peer-viewed publications annually and 8-10 extension publications, newsletters, and web sites.

Web sites -- www.cwm.utahwildlife.org, www.utahwetlands.org, www.wminteractive.org, www.muledeernet.org, www.grazingnet.org, www.wildlifecrossings.info, www.cnr3.usu.edu/cbcp, www.sgrp.usu.edu.

Wildland Resources extension faculty are involved in service through numerous committees and organizations at department, college, university, community, state, national, and international levels. Details of this involvement are available in individual faculty vitas.

4. Analysis and assessment

Performance of faculty members is evaluated annually according to the USU Faculty Policy Code. Performance management involves an annual face-to-face interview between the Department Head and each faculty member, during which an annual performance review form is discussed and all accomplishments, weaknesses, goals and constraints are discussed. Student course/instructor assessment scores are included in this discussion. Additional performance evaluation meetings are held with administrators of USU Extension and the Utah Agricultural Experiment Station, during which the annual performance of relevant faculty members is discussed. Tools to manage the performance

of faculty members include the tenure review process at the Assistant Professor level, promotion from Associate Professor to Full Professor, and adjustment of annual salary increments as and when required and/or possible.

Decisions about replacing faculty members that leave (e.g. through retirement) involve faculty discussions on the disciplines needed in the department to (a) teach the curriculum (b), move the department forward on the research front, and (c) service the needs of the people of Utah. These discussions are typically held at our annual department retreat (August each year) and followed up in department meetings, of which a minimum of two are held per semester.

5. Challenges and recommendations

With respect to challenges, first and foremost is the high degree to which faculty salaries are leveraged within the Department of Wildland Resources. The state, through Education and General (E&G) funds, finances only a portion of our full-time, tenure-track positions; the rest is dependent on federal earmarks or formula funds directed through federal agencies (e.g. USDA/APHIS/WS) or the Utah Agricultural Experiment Station. Whenever retirements occur the Department's present policy is to redistribute as much released E&G funds as possible among the remaining faculty and to reduce the degree of leverage by placing "soft" salary on non-tenured faculty and staff.

Another challenge is to address the lack of minority representation within the faculty, although there has been a recent improvement as regards gender, with three of the 22 full-time, tenure-track faculty being women. The Department is sensitive to the minority problem and does everything possible to attract viable minority candidates during faculty searches.

Finally, the lack of sustained leadership in the Department was a real weakness between 2002 and 2005. There were three interim department heads appointed during that period, which made it very difficult to carry through on long-term goals and objectives. The current substantive department head (Dr. Johan du Toit) was appointed after an international search and assumed office in July 2005. The administration and faculty are now settling into a stable, self-organizing mode of operation based on integration and mission-driven progress.

D. Support services

1. Data

i. Staff

The Wildland Resources Department has one full-time administrative assistant and a 75% Staff Assistant III. Research and extension programs hire a variety of technicians, research assistants, etc (Table 12). In addition, there are from 35 to 105 hourly employees (depending on the time of the year) working on various research projects.

Table 12. Staff of the Department of Wildland Resources (2006)

Rank	Name	Appointment %	Supervisor
Non-exempt			
Research Technician II	Eamonn Leonard	100	Tom Monaco
Research Technician I	Jonathan Edgar	100	Doug Ramsey
Administrative Assistant III	Gaye Griffeth	75	Johan du Toit
Research Technician II	Chris McGinty	100	Doug Ramsey
Exempt			
Postdoctoral Fellow	William Adair	100	Doug Ramsey
Administrative Assistant	Lana Barr	100	Johan du Toit
Extension Specialist	Todd Black	100	Terry Messmer
Project Coordinator	Rhett Boswell	100	Nicole Frey
Specialist	Sheryl Boyack	100	Doug Ramsey
Research Assistant	Kent Braddy	100	Doug Ramsey
Research Associate	Beth Burritt	75	Fred Provenza
Research Associate	Patricia Cramer	100	John Bissonette
Research Associate	Christine Garrard	100	Doug Ramsey
Research Assistant	Sean Hammond	100	Jim Long
Administrative Assistant	Rae Ann Hart	75	Terry Messmer/ Fred Provenza
Senior Research Associate	Doug Johnson	100	Jim Long
Post Doctoral Fellow	Andrew Kulmatiski	100	Ron Ryel
Research Assistant	Lisa Stoner	100	Doug Ramsey
Post Doctoral Fellow	Joshua Leffler	100	Ron Ryel
Associate Director	John Lowry	100	Doug Ramsey
Research Assistant	Sarah Lupis	100	Terry Messmer
Ext Program Associate	Darren McAvoy	100	Mike Kuhns
Project Coordinator	Brian Meisman	100	Jim Long
Managing Editor	Philip Parisi	100	Mike Conover
Extension Research Assoc.	Scott Pratt	100	Tom Edwards
Post Doctoral Fellow	Samuel Rivera	100	Doug Ramsey
Senior Research Associate	Pat Terletzky	100	Jim Long

ii. Operating budgets

The Wildland Resources salary and operating budget comes to the department in a variety of ways: (1) State Education and General (E&G) funds for teaching and educational operations, (2) Ecology Center, (3) University Extension, (4) Agricultural Experiment Station (including both State and Hatch), (5) special-purpose grants from the Office of the Vice President for Research, and (6) Contracts and Grants. Salaries of

faculty, technicians, secretaries, and graduate students may be paid from one to as many as four different sources and/or accounts, depending on job assignment and responsibilities.

It is clear from the budget that the Wildland Resources Department operates heavily on soft money. The state allocation of E&G funds for departmental operations (\$16,577) is very meager for a department with 22 full-time faculty (not including federal collaborators; see Table 11). The cost of telephones, photocopying, computers and their maintenance, paper, teaching assistants, and assorted supplies and expenses exceeds \$60,000 annually. Obviously travel, equipment, student support, and faculty professional development are being heavily subsidized by overhead funds levied from external grants and contracts.

Table 13. Department of Wildland Resources Operating Budget (E&G funds)

Financial year	Salaries & Benefits (\$)	Operating (\$)
2003	626,026	19,077
2004	690,735	16,577
2005	734,481	16,577
2006	763,700	16,577
2007	847,397	16,577

iii. Facilities

Instructional and Office Space

The occupation of the ‘new’ Natural Resources Building in 1983 helped alleviate the crowded conditions that existed previously. However, the College of Natural Resources has subsequently grown to the extent that space for faculty and graduate students has again become a premium commodity. Wildland Resources faculty, staff, and graduate students are now housed in three buildings (Natural Resources, Biology/Natural Resources, and Janet Quinney Lawson Building).

Classroom space is at a premium throughout the University due to recent enrollment growth. Wildland Resources courses are now taught in buildings all across campus. Many of these classrooms are not designed to accommodate recent pedagogical developments, especially those associated with small-group dynamics and/or the electronic delivery of teaching material.

Conference rooms and seminar space exist as shared resources among CNR departments and programs. This space is scheduled efficiently through the CNR Dean’s Office and individual departments. However, conference room space is often lacking. A conference room is available in the Quinney Library, but is underutilized because of a library policy prohibiting food and beverages (specifically coffee) in that room.

Research laboratory space is inadequate in size and/or function for many of our biophysical scientists. Research laboratory space is usually too small and unsuited to the function.

Each graduate student is provided with a desk in shared office space. For the first time in recent history, we were able to provide desk space for all students at the start of the 2005-06 academic year. In the past, some students waited for periods up to several months until space was made available by departing students. Some students are still being housed in research labs.

Equipment Availability

The department inventory includes an extensive list of equipment ranging from pH meters to camper trailers. Most research equipment is maintained for and by individual projects. Generally, equipment from one project is available to other projects when it is not being used; faculty cooperation allows this process to work remarkably well.

The department owns and operates one vehicle for general department use, a 1999 Dodge Caravan. Another 40 vehicles are maintained by research projects in the department. The USU Motor Pool does almost all of the servicing and maintenance of departmental and research vehicles.

The department maintains an inventory of audio-visual equipment including slide projectors, two LCD projectors, two laptops, and extension cords. This equipment is available to departmental faculty, staff, and students on a check-out basis. Additional equipment is available through Classroom and Multi-media Services.

Library

Two of the most important education support facilities on campus are the Quinney Natural Resources Research Library (established October 1992) and the University's new Merrill-Cazier Library. Although the Quinney and Merrill Libraries are independent of each other, there is a close working relationship between the two. They work cooperatively on collection development, cataloging, and circulation operations. The holdings of both libraries appear in the online public access catalog. Faculty and students have access to library materials from all over the world first through electronic access to library catalogs, then through electronic and print databases, and finally in full-text form through interlibrary loan. The Interlibrary Loan office is housed in the Merrill-Cazier library with a staff dedicated to providing remote materials from students and faculty requests.

2. Analysis and assessment

Performance of staff members is evaluated according to the USU Policy Manual and guidelines provided by the Office of Human Resources. Since most staff members (all except two administrative assistants) are employed on specific projects, their tenure is

largely determined by the success of the projects and so there is a strong vested interest in meeting or exceeding the expectations of their supervisors. Decisions about the allocation of operating funds are largely made by the Department Head in consultation with his Administrative Assistant, and an annual report on the Department's finances is presented at the Department's retreat each August.

3. Challenges and recommendations

It is this "Support Services" section of this report that displays the most significant barriers to realizing the Department's full potential. With an actual annual operating expense of about \$ 60,000 but an E&G operating budget of only \$ 16,577, it is clear that the Department depends on its "research engine" to meet its responsibilities in the delivery of academic services to enrolled students. This diversion of research overhead funds to meet departmental operating costs is not the most strategic use of such funds, which could be better used to further strengthen the research arm of the department. A strong recommendation is that E&G operating budgets be reviewed across all departments on campus so that shortfalls, such as in Wildland Resources, can hopefully be redressed.

The conversion by USU to the "Banner" software package for the administration of finances and records has been a severe handicap to the Department since early 2006. The down-time involved in getting administrative staff trained, and in debugging and adapting the system, has greatly reduced administrative efficiency. The Department has had to maintain a parallel accounting system to simply keep track of expenditures and balances on accounts, and the daily need to correct centrally generated errors imposes a severe drain on the time and morale of the Department's administrative staff. As administrative personnel across campus get more proficient with Banner it does seem that efficiency is picking up in the areas of accounting and student records, although the human resources sub-system is still very problematic.

The Department of Wildland Resources is comparatively large in terms of faculty and the limited availability of support staff to service the needs of all those faculty members is a constraint. The Department is currently beginning the process of hiring another half-time staff member with funds anticipated from the phased retirement of a senior faculty member.

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