A Self-Study Report Prepared for the Committee on Accreditation
Society of American Foresters

February 28, 2013
SELF-STUDY REPORT

SUBMITTED TO THE SOCIETY OF AMERICAN FORESTERS

FOR RE-ACCREDITATION OF THE FORESTRY PROGRAM
LEADING TO A BACHELOR OF SCIENCE DEGREE
AT NORTHERN ARIZONA UNIVERSITY

Dates of Team Visit:
April 2-4, 2013
PREFACE

The Bachelor of Science in Forestry (BSF) program was initiated at Northern Arizona University in 1958, and first became accredited by the Society of American Foresters (SAF) in 1968. It has maintained a continuous record of accreditation by the SAF ever since.

The last SAF accreditation review took place in 2003, with the team visit taking place on April 8-11. The result was re-accreditation through 2013. With this self-study document, we respectfully request your review of our BSF program and consideration for re-accreditation.
# TABLE OF CONTENTS

## VOLUME 1

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREFACE</td>
<td>1</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>2</td>
</tr>
<tr>
<td>Standard I: Forestry Program Mission, Goals, and Objectives</td>
<td>4</td>
</tr>
<tr>
<td>Standard II: Curriculum</td>
<td>9</td>
</tr>
<tr>
<td>Standard III: Forestry Program Organization and Administration</td>
<td>21</td>
</tr>
<tr>
<td>Standard IV: Faculty</td>
<td>30</td>
</tr>
<tr>
<td>Standard V: Students</td>
<td>36</td>
</tr>
<tr>
<td>Standard VI: Parent Institution Support</td>
<td>45</td>
</tr>
<tr>
<td>APPENDICES</td>
<td>54</td>
</tr>
<tr>
<td>APPENDIX A: School of Forestry Advisory Council Members</td>
<td>55</td>
</tr>
<tr>
<td>APPENDIX B: Current Curriculum</td>
<td>58</td>
</tr>
<tr>
<td>CURRENT CURRICULUM</td>
<td>58</td>
</tr>
<tr>
<td>SAF Document A-1 General Education Summary – Required Courses</td>
<td>58</td>
</tr>
<tr>
<td>SAF Document B-1 Forestry Education Summary – Required Courses</td>
<td>58</td>
</tr>
<tr>
<td>SAF Document B-2 Forestry Education Summary – Restricted Electives</td>
<td>58</td>
</tr>
<tr>
<td>Curriculum Progression Plans</td>
<td>58</td>
</tr>
<tr>
<td>School of Forestry Certificates</td>
<td>58</td>
</tr>
<tr>
<td>APPENDIX C: New Curriculum</td>
<td>74</td>
</tr>
<tr>
<td>NEW CURRICULUM</td>
<td>74</td>
</tr>
<tr>
<td>SAF Document A-1 General Education Summary – Required Courses</td>
<td>74</td>
</tr>
<tr>
<td>SAF Document B-1 Forestry Education Summary – Required Courses</td>
<td>74</td>
</tr>
<tr>
<td>Curriculum Progression Plans</td>
<td>74</td>
</tr>
<tr>
<td>School of Forestry Certificates</td>
<td>74</td>
</tr>
<tr>
<td>APPENDIX D: Fall Course Syllabi</td>
<td>91</td>
</tr>
<tr>
<td>APPENDIX D: Spring Course Syllabi</td>
<td>189</td>
</tr>
<tr>
<td>APPENDIX D: New Curriculum Course Syllabi</td>
<td>311</td>
</tr>
</tbody>
</table>
APPENDIX E ....................................................................................................................................... 351
School of Forestry Assessment Plan........................................................................................................ 351
2010 Assessment Report.............................................................................................................................. 351

APPENDIX F ............................................................................................................................................... 368
SAF Document C-1 Background Summary for Faculty Reporting to the Forestry Program Head... 368
SAF Document D- Academic Summary for Faculty Reporting to the Forestry Program Head...... 368

APPENDIX G ........................................................................................................................................ 383
School of Forestry Adjunct Faculty............................................................................................................ 383

APPENDIX H ........................................................................................................................................ 386
SAF Document E- Individual Faculty Information ..................................................................................... 386

APPENDIX I ........................................................................................................................................ 758
School of Forestry Faculty Publications, 2004-Present ......................................................................... 758

APPENDIX J ........................................................................................................................................ 793
SAF Document F-Forestry Graduate Employment Summary ................................................................. 793

APPENDIX K ........................................................................................................................................ 795
SAF Document G - Student Data Summary ............................................................................................... 795

APPENDIX L ........................................................................................................................................ 797
Cline Library Report .................................................................................................................................. 797
Standard I: Forestry Program Mission, Goals, and Objectives

1. **Document how the forestry program’s mission, goals and objectives (1) are consistent with the SAF Standards for Accreditation, (2) reflect the distinction of forestry as an interdisciplinary profession, (3) respond to the needs of the constituencies that the program seeks to serve, (4) reflect sensitivity to the role of professional foresters in meeting diverse and changing social, cultural, economic, and environmental needs and values, (5) maintain the professionalism and ethical behavior necessary to manage and use forest resources and urban forests and trees for the benefit of society. Show where they appear in publicly disseminated materials.**

The School of Forestry’s (SOF) mission statement is provided below. This mission statement is made publicly available through a link on the home page of the SOF’s website (http://nau.edu/cefns/forestry/).

The fundamental educational mission of the School of Forestry is to foster the intellectual and personal development of our students, at both the undergraduate and graduate levels. We intend that our students be, first of all, liberally educated, secondly, good citizens, and finally, skilled professionals and life-long learners, with training in an integrated approach to forest ecosystem management.

The School of Forestry educates students in ecosystem science and management by integrating instruction in biophysical and human systems. In Forestry, we cross traditional boundaries by applying transdisciplinary and multi-objective approaches to ecosystem studies.

Our scholarship mission features this integrative approach to advance knowledge in ecosystem science and management, to bring this new knowledge back to the classroom, and transfer it to the citizens of Arizona, the Southwest, and elsewhere. Our programs leading to the Master of Forestry, Master of Science in Forestry and Doctor of Philosophy in Forestry play a special role in carrying out our scholarship objectives.

Our mission includes the development of educational and research activities which bring views from a variety of cultures to the classroom and to the management of forest ecosystems.
In addition to this mission statement, more specific goals and objectives can be found in a variety of documents, including the most recent official Strategic Plan [link](http://nau.edu/uploadedFiles/Academic/CEFNS/Forestry/Forms/StrategicPlan_2005.pdf) and in the SoF’s assessment plan. Also, in late 2009 the Dean of the College of Engineering, Forestry and Natural Sciences challenged the SOF to consider what it would take to become the top ranked forestry program in the U.S. and to develop a plan to move the school forward towards that goal. Our response was the “Proposal for Becoming the Top Ranked Forestry Program in the United States: A Foundation for Excellence.” While not an official replacement for the SOF’s 2005-2010 strategic plan, it is nevertheless an explicit outline of goals for both the short term and going forward approximately five years. While this is viewed largely as an internal document, it can be made available upon request.

**Consistency with SAF Accreditation Standards**

There is nothing in the SOF’s mission statement, goals and objectives that is known to be inconsistent with the SAF’s stated objectives for its accreditation program or with any of the specific SAF accreditation standards. The SAF accreditation standards are typically an important factor that is considered when any major changes within the SOF, especially changes to the BSF curriculum, are considered. For example, a curriculum mapping exercise conducted in 2011 used the SAF curriculum standard as the primary basis for comparison (i.e., we listed our current required courses and identified the specific elements of Standard II that they each address).

**Reflection of the Distinction of Forestry as an Interdisciplinary Profession**

The interdisciplinary nature of the forestry profession is recognized explicitly in the second paragraph of the SOF’s mission statement. In that paragraph, both the biophysical and human dimension elements of forestry are recognized, and both are well integrated into our curriculum as demonstrated under Standard II. Our distinctive “integrated curriculum” is a very direct reflection of the interdisciplinary nature of the forestry profession. Also, the interdisciplinary nature of the profession is reflected in the range of disciplines represented by our faculty, as demonstrated under Standard IV.

**Responsiveness to Constituencies**

In the context of the SAF’s accreditation of our BSF program, the two most important constituents served by the SOF are our students and the employers of our students. We also strive to serve the needs of the general public and of various forestry-related organizations through the dissemination of information and by other means such as our youth environmental camps. However, these types of service to constituents are not addressed here since they are not directly related to the SAF’s accreditation of our BSF program.

First and foremost, the SOF seeks to serve its students by fulfilling the educational mission described above. We seek to fulfill this mission by offering a well-designed and up-to-date curriculum that prepares our students for professional forestry and related positions, and by delivering that curriculum well. Information on how this is done, including details on the
curriculum, program assessment, student advising, and the hiring, professional development and retention of high quality faculty, is provided in subsequent sections of this document.

The second group of constituents that we serve is the employers of our graduates. We interpret the term employers broadly, but we view our primary employer-constituents as (1) government and tribal agencies engaged in natural resource management and/or environmental protection, (2) forest industries, and (3) non-governmental organizations with a forestry or natural resources-related mission. Because of our physical location in the American Southwest, the SOF tends to serve the needs of the first and third groups more than the forest industry sector, although over the years many graduates have also entered the industry (and forestry consulting) sector.

To be able to respond effectively to the needs of employers, the faculty, staff and administration employ a variety of formal and informal approaches. An example of a formal approach is the creation in 2009 of a SOF Advisory Council (SFAC). The SFAC typically has between 12 and 15 active members (Appendix A). The current members are diverse in terms of their professional experience and their geographic location. This group meets once per year in person, conducts at least one conference call per year, and interacts with the faculty, staff and administrators through a variety of other means. One of the key goals of this group is to provide timely input on the needs of employers.

On a more informal basis, many of the SOF faculty interact frequently with both employers and alumni of the SOF. From the employers, we are able to learn more about their needs. From the alumni, we are able to learn about how well prepared they felt for their first (or subsequent) jobs. The SOF Executive Director and many of the faculty also make an effort to keep up with other sources of information on employer needs, such as employer survey results published in the 2000 Pinchot Institute report on the future of forestry education and the newer “soft skills” report prepared by the APLU1.

Sensitivity to the Role of Professional Foresters in Meeting Diverse and Changing Social, Cultural, Economic, and Environmental Needs and Values

The fourth paragraph of the SOF mission statement explicitly addresses the importance of diversity and its impact on the management of forest ecosystems. The importance of diversity and societal changes are infused throughout the program, from FOR 101, Introduction to Forestry, to several classes taken in the senior year. These concepts are also reinforced through NAU’s Liberal Studies requirements, which include required coursework in the categories of Diversity, Cultural Understanding, and Social and Political Worlds.

The public lands emphasis of our program, and clear need to serve Native American and Hispanic populations dictated by both our geographic location and the strategic goals of the university, also help to instill sensitivity to these needs and values. As described further in

---

Standard V, we have taken a number of steps to recruit and retain students from under-represented groups.

**Maintenance of the Professionalism and Ethical Behavior Necessary to Manage and Use Forest Resources and Urban Forests and Trees for the Benefit of Society:**

The importance of professionalism and ethical behavior is instilled and reinforced in many parts of our program. Although perhaps not as explicit as it could be, it is also strongly implied in the first paragraph of our mission statement.

Both professionalism and ethical behavior are expected of students throughout the program, especially as it relates to the quality of their work and the sanctions imposed for academic dishonesty. Occasional lessons and class discussions are designed to address these issues, and in particular ethical behavior, in ways that apply directly to situations students may find themselves in once they are employed.

**2. Document the process for periodic self-evaluation and revision of the program's mission, goals, and objectives.**

Periodic self-evaluations occur at various levels within the university. They may be in direct response to mandates or they may be the result of informal interactions among faculty, staff, students and other parties associated with the SOF.

One mandate for periodic self-evaluation is the Arizona Board of Regents (ABOR) requirement that academic programs undergo review every seven years. The ABOR policy allows flexibility in this schedule and also in the format of the review for programs, such as our BSF degree, that are also reviewed by external accrediting bodies. In the past, and also in this current case, the process of preparing for SAF re-accreditation has led to a period of reflection and subsequent changes in our program.

At the university level, periodic self-evaluations have also resulted in revisions of our BSF program. The most recent example of this was the re-evaluation of NAU’s Liberal Studies program that took place during 2005 and that resulted in revisions to the university’s Liberal Studies requirements.

In addition to the periodic self-evaluations that are driven by ABOR and the SAF accreditation cycle, self-evaluations and reflection occur through faculty meetings and retreats, the work of the SOF Curriculum Committee, and during SOF Advisory Council meetings. The review of our graduate degree programs that took place in the spring of 2011 also had an impact on our BSF program, perhaps most notably by providing some of the documentation needed to justify hiring two new faculty members who also serve the needs of the BSF program.

An important form of input to our self-evaluations is the feedback we solicit (and occasionally receive on an unsolicited basis) from our students. We seek feedback on
individual courses through structured course evaluations and in some cases through facilitated discussions managed by qualified external facilitators. We also seek feedback from students in the form of on-line exit surveys administered to graduating seniors each spring. More details on this type of program assessment, as well as on the ABOR-mandated program review process, are provided in the relevant sections of Standard III.

Finally, we occasionally seek input from our alumni. We have conducted two surveys in recent years, one to solicit feedback on what were then called focus areas and another that was conducted as part of this self-study to solicit feedback from recent alumni on their post-graduation employment and on their thoughts about how well the program prepared them for their jobs.
Standard II: Curriculum

The School of Forestry has long been recognized for its unique curricular structure. Our “integrated curriculum,” as well as the breakdown between the pre-professional and professional programs, has been in place since 1972. Although it has changed over time to reflect changes in student populations and the profession of forestry itself, the core of this curriculum remains intact.

Although we believe that this structure provides an excellent curricular model, in places within this section we have disaggregated the blocks into the more traditional course-based components, since we believe this is needed for the purposes of this self-study. We have tried to do as accurate a job as possible with this disaggregation, but the effort did require some judgment calls that were difficult to make. For example, does field work in “Semester A” that involves the establishment of plots, measuring trees, and then developing silvicultural prescriptions based on these measurements count as course units in Ecology and Biology or Measurement of Forest Resources? As a result of our curriculum structure, the allocation of units among the different categories and the narratives associated with this standard may seem less precise than in a more standard curriculum.

One significant new development in our curriculum since the previous self-study in 2003 is the incorporation of a requirement to complete a “focus area,” which was later revised slightly and renamed “certificate.” These are very similar to concentrations or specializations that are required by some other forestry programs. In addition, we are in the final stages of a curriculum revision process and will begin implementing the changes in the 2013/2014 academic year. Given the imminent implementation of this new curriculum, we have presented information on both our current curriculum and, where appropriate, on the new curriculum.

1. Complete Documents A-1, B-1, and B-2; complete A-2 if needed. Follow the format as presented.

We have completed these documents for both the current (Forms A-1a and B-1a) and new curriculum (Forms A1-b and B-1b). These can be found in Appendix B for the current curriculum and Appendix C for the new curriculum. We have also included degree progression plans and information on the certificates for the current (2012/2013) and new (for students entering in the Fall of 2013) versions of our curriculum in Appendix B and Appendix C, respectively.

In the introductory section above we introduced a few terms we use in our curriculum, but below we list them again and define them. We also introduce some other terms that are referred to occasionally in the remainder of this self-study.

- Liberal Studies: In addition to its foundation requirements of English Composition and Mathematics (7 credit hours, hereafter abbreviated as “cr”), the
University requires a total of 28 cr of Liberal Studies courses across four distribution blocks (Science and Applied Science, Social and Political Worlds, Aesthetic and Humanistic Inquiry, and Cultural Understanding). Twenty of these 35 cr consist of specific courses required as part of the pre-professional forestry program and the remainder are restricted electives. All forestry students must fulfill these Liberal Studies requirements.

- Pre-Professional Program: The combination of 100- and 200-level forestry courses, certain Liberal Studies courses and CIS 120 (Introduction to Computer Information Systems) required of all forestry students, most of which have to be taken during the freshman and sophomore years. The total credit hour requirement for the pre-professional forestry program is 48, although as mentioned above 20 of these also count towards the Liberal Studies requirement.

- Professional Program: The curriculum that is primarily taken in the junior and senior years. Students have to apply for entrance into the professional program and then generally go through it in a cohort. Students were required to have minimum GPA of 2.5 and a C or better in the pre-professional forestry program to enter this program until the 2012-2013 academic year, after which the minimum GPA was raised to 2.75.

- Integrated Curriculum: This refers to the main parts of the professional program, where the courses are offered in large blocks of time during which material is covered in a multi-disciplinary fashion and often with some degree of team teaching.

- Semester A: The part of the curriculum taught in the fall semester of the junior year (FOR 313, 314, 315 and 316; total of 13 cr).

- Semester B: The part of the curriculum taught in the spring semester of the junior year (FOR 323W, 324W, 325W and 326W; total of 13 cr).

- Semester C: The part of the curriculum taught in the fall semester of the senior year (FOR 413C and 414C; total of 6 cr).

- Semester D: The part of the curriculum taught in the spring semester of the senior year (FOR 423C and 424C; total of 6 cr).

- Forestry Certificates: All students are required to complete one of five certificates, which consist of either 15 or 18 credit hours of courses. The only exception to this is that students may opt to pursue an individualized course of study as a substitute for a certificate with the approval of the Executive Director. The five certificates are (1) Fire Ecology and Management, (2) Forest Health and Ecological Restoration, (3) Human Dimensions, (4) International Forestry and Conservation, and (5) Wildlife Ecology and Management.

Our current curriculum contains many elements common to most forestry programs. We have a curriculum that provides students with a strong basis in biology, forest ecology, and silviculture with a strong second emphasis in forest management. One feature that sets our program aside is our upper division professional program with its cohort structure, team planned and delivered curriculum, and emphasis on integrated forest management. Although students receive a background in the management of each key resource (e.g. timber, recreation, etc.) the integration of this material in the junior year (Semester B) and especially the senior year (Semesters C and
D) provide the students with a comprehensive view of forest management that transcends a more traditional study of individual resources, even going beyond multi-resource to integrated management.

2. Document how oral and written communication skills are reinforced throughout the curriculum.

Written Communication Skills

Our current curriculum meets this requirement through the requirement for two foundational courses in writing during the pre-professional program and through significant reinforcement in several of our forestry courses, especially those in the professional program. The new curriculum makes no significant changes to this overall approach.

The foundational writing courses include ENG 105 (Critical Reading and Writing, 4 cr), which is offered through the Department of English, and FOR 215 (Writing in Forestry, 2 cr). The latter course is offered through the SOF and was developed as a replacement for the more traditional technical writing course offered by the Department of English, which we came to believe was not serving the more forestry-specific needs of our students sufficiently well. We typically hire either a graduate student in English or another qualified instructor to teach FOR 215, and that individual coordinates with some of our faculty to ensure the course addresses our needs.

In addition to the required foundational courses, we reinforce the writing skills of our students through the NAU-wide junior-level writing requirement and by “scaffolding” writing so that assignments and expectations grow over the program. A summary of where writing skills are built and reinforced in our program is provided below:

- Prerequisite/pre-professional courses:
  - ENG 105: Critical Reading & Writing, 4 cr
  - FOR 213: Writing in Forestry, 2 cr
- Professional coursework
  - We have significant writing required in the form of traditional laboratory reports in FOR 211, FOR 313, FOR 314, FOR 315, and FOR 316.
  - Our forest management sequence in the junior year (FOR 323W, FOR 324W, FOR 325W, and FOR 326W) meets the university’s junior level writing requirement of 20 pages of revised writing. We use multiple assignments to meet this requirement including briefing notes, briefing papers, and laboratory reports. In practice this requirement is met solely in FOR 326W, so the “W” designation will be dropped from the other courses in the new curriculum.
  - In FOR 360, two policy-related writing assignments are required and the quality of the writing is a substantial part of the grade.
  - In FOR 414C we require a team-based “Current Conditions” report of 50 to 60 pages as well as additional briefing papers submitted individually.
  - In 424C we require a team-based forest management plan, also of
approximately 50 pages in length.

In addition, the SOF has invested in the part-time employment of a writing tutor for the past several years. The faculty are united in their belief that polished writing skills are crucial to career development and thus the presence of a writing tutor will only serve to enhance those skills. Primarily, assistance is focused on improving the overall quality and clarity of lab reports, research papers, and other forestry-related assignments. Often the instructor of FOR 215 and the writing tutor are the same person.

**Oral Communication Skills**

We require one foundational course in oral communication and reinforce this important skill in using a scaffolding approach similar to that described above for writing.

- **Prerequisite/pre-professional course:**
  - CST 111: Fundamentals of Public Speaking, 3 cr

- **Professional coursework**
  - Students, as members of teams, present at least three talks with professional-level expectations.
  - These presentations occur in FOR 323W-FOR 326W, as well as in FOR 413C-414C, and FOR 423C-424C.
  - Several other courses that are part of one or more certificates require oral presentations, such as FOR 445 (Wilderness Management) and FOR 415 (Forestry in Developing Countries).

Student presentations in some classes are open to the whole forestry faculty and sometimes also to agency personnel who have worked with the class. The most consistent example of agency personnel being involved is in FOR 445, Wilderness Management, where the students work closely with Forest Service personnel on a project in one of the nearby wilderness areas. Those presentations are typically attended by at least 5 to 6 Forest Service personnel.

By the time they graduate, all of our students will have made multiple oral presentations and should be quite proficient in making presentations, including using associated software such as PowerPoint.

3. **For the four areas of study, document how adequate instruction is provided in basic principles, typical applications, and current practices.**

**Ecology and Biology**

All forestry students complete an 8-credit sequence in Biology (BIO 181/181L and 182/182L) and at least 14 credit hours of forestry courses in this subject area. The required forestry courses
that address this subject area most directly include²:

- FOR 212: Trees and Forests of North America, 2 cr
- FOR 220: Introduction to Forest and Range Plants, 2 cr
- FOR 213: Ecology and Management of Forest Soils, 3 cr
- FOR 313: Forest Ecology I, 4 cr
- FOR 314: Forest Ecology II, 3 cr

In addition to the 22 credit hours of coursework listed above, ecology and biology is a significant component of FOR 315 (Silviculture Principles, 3 cr) and FOR 316 (Silviculture Applications, 3 cr). We estimate that between the biology coursework and the forestry coursework, all our students receive a minimum of 30 credit hours of instruction in ecology and biology (see Document B-1 for additional details). Some of the certificates also require significant coursework in ecology and/or biology, especially the Wildlife Ecology and Management and the Forest Health and Ecological Restoration certificates.

Measurement of Forest Resources

All forestry students complete four courses that are entirely or partially focused on the measurement of forest resources, including:

- FOR 211: Forest Measurements, 3 cr.
- FOR 316: Silviculture Applications, 3 cr.
  - Includes field measurements of timber and subsequent determination of stocking
- FOR 413C/FOR 414C: Forest Ecosystem Assessment I and II, 3 cr each
  - Emphasizes multi-resource forest inventory and subsequent processing of field data into a current conditions report

Students receive limited exposure to forest resource measurements in other courses, such as the brief introduction to GIS in the Semester B course sequence. We estimate that all our students receive a minimum of 10 credit hours of instruction in the measurement of forest resources (see Document B-1 for additional details).

Management of Forest Resources

Courses that introduce students to forest management concepts include FOR 101, Introduction to Forestry, and the FOR 315/316 silviculture courses. Management is then addressed in a more direct manner in the Semester B, C and D course sequences. Topics covered in these three course sequences include:

- FOR 323W-326W: Forest Management I-IV, 13 cr (Semester B)

² Please refer to the syllabi in Appendix D for details on the material covered in these courses, both for this and the following three sections.
- Forest management
- Watershed management
- Recreation management
- Wildlife and range management
- Forest operations (stumpage appraisal, harvesting, and roads)
- Collaborative management

- FOR 413C/FOR 414C: Forest Ecosystem Assessment I and II, 3 cr each (Semester C)
  - Development of management goals and resource inventory planning
- FOR 423C and FOR 424C: Forest Ecosystem Planning I and II, 3 cr each (Semester D)
  - Management planning, planning principles

We estimate that all our students receive a minimum of 17.5 credit hours of instruction in the management of forest resources (see Document B-1 for additional details).

**Forest Resource Policy, Economics and Administration**

The primary policy course taken by all forestry students is FOR 360, Natural Resources Policy. This course examines past, present and emerging policies, laws and issues that affect natural resources management in general and forestry in particular. It also covers the fundamentals of the natural resources policy making process. Additional exposure to forest resource policy is gained in Semester D, which includes a major section devoted to the NEPA planning process.

Forest economics is a component of Semester B, and specifically FOR 324W. Although forest resource administration is not the subject of any specific course, significant content on administration is included in Semester B (e.g., coverage of the main public land management agencies and their missions) and FOR 360.

We estimate that all our students receive a minimum of 6.5 credit hours of instruction in the forest resource policy, economics and administration (see Document B-1 for additional details).

**4. Document how adequate field instruction and practice are provided to ensure that graduates have the opportunity to be competent to practice forestry as professionals.**

Several courses involve significant field components, especially FOR 211, Forest Measurements, FOR 313/314, Forest Ecology, FOR 315/316, Silviculture, and FOR 413/414, Forest Ecosystem Assessment. FOR 220, Introduction to Forest and Range Plants, has historically met only in the field after the first week, although the new version of the class to start in the fall of 2014 will combine the lectures previously offered in FOR 212, Trees and Forests of North America, with the labs.

FOR 211 has a lab component, during which the students develop basic field skills such as pacing, map and compass work, and tree measurements. Much of this work takes
place on the NAU Centennial Forest, part of which is located within a 15-20 minute drive from campus.

FOR 220 takes full advantage of the rich biological and ecosystem diversity located within an easy drive of Flagstaff. The earliest labs in this fall semester course involve trips up onto the San Francisco Peaks, where the species found in high-elevation mixed conifer stands are introduced. As the fall progresses, the field trips move to the ponderosa pine and pinyon-juniper forests in the Flagstaff area. Later in the semester field trips move to areas lower in elevation and include drier forest types as well as lower elevation riparian habitats.

The Semester A course sequence includes weekly labs focused on a range of forest ecology and silviculture topics, and includes both “show and tell” type field trips and hands-on labs involving the collection of data and subsequent lab reports. This course makes use of local assets such as the Forest Service’s Fort Valley Experimental Forest, which has many research and demonstration plots that are very useful for teaching ecology and silviculture.

The Semester C course sequence includes extensive collection of multi-resource data in the field, including timber inventory data, stand condition, range condition, fuel loading, and the locations of roads and trails. While a faculty member is present in the field during these labs, the crews are widely dispersed and the students (all seniors) conduct most of this work with very limited faculty oversight. The sites used for this work vary from year to year, and have made use of the NAU Centennial Forest, the Coconino National Forest and the Nature Conservancy’s Hart Prairie Preserve, among others.

5. Document how the forestry curriculum fosters analytical and critical reasoning skills, including systematic problem solving and decision-making for individuals and in a team environment.

Several forestry courses, especially in the junior and senior years, strive to foster analytical and critical reasoning skills. In FOR 360, for example, students were asked to compare and contrast the tactics used by John Muir and Gifford Pinchot as they made their respective cases regarding the proposed dam in the Hetch Hetchy Valley of Yosemite National Park. As part of that same assignment, they were asked to put themselves in the shoes of the president and decide if (and why) they would have or have not approved the building of the dam. The class also involves discussion of current policy issues and the arguments for or against them, and an upcoming written assignment described in the next section will also require use of these skills.

During Semester B, students are exposed to socioeconomic aspects of forest management and some of the associated conflicts, and are challenged to think critically about how to deal with them. In Semester D, which serves as our capstone, students are challenged to work together in teams to develop a management plan for a tract of land that incorporates multiple factors and stakeholders, and therefore requires careful analysis.
In addition to the core forestry courses, NAU’s Liberal Studies curriculum, which all forestry students are required to complete, is designed in part to foster these same types of skills.

6. Document how student awareness of historical and current issues and policies affecting resource management and conservation is established.

We seek to build student awareness of historical and current issues and policies beginning in our students’ first year, during which some of these concepts are introduced in FOR 101, Introduction to Forestry. As can be seen in the syllabus for this course (Appendix D), a substantial component of the class includes topics such as the history of the forestry profession, key individuals in forestry and environmental history, and the importance of some key laws.

Both historical and current issues and policies are addressed in considerably more depth in FOR 360, Natural Resources Policy, which students may take in either their junior or senior years. Much of the first month of this course is devoted to the historical roots of forest and natural resource policy, and includes material such as the early land disposition laws, the rise of the conservation movement, the development of the forest reserves/national forests, and the evolution of forest, natural resource and environmental laws and policies right through to the present day. Assignments given to the students this semester in the class include one on history (requiring the students to investigate the history, tactics used by key individuals, and the present-day implications on the Hetch Hetchy Valley case). Their second written assignment will be to investigate a current issue and to draft a written comment that would be submitted as part of forest planning and/or EIS process or sent directly to a member of Congress.

Current issues and policies also may be addressed in any number of other core curriculum classes, such as in Semester B, where a briefing paper on a current management issue, including the policy-related aspects of the issue, is being required this semester. In Semester B the students are also introduced to material such as the Endangered Species Act. In Semester D, the students receive extensive exposure to the National Environmental Policy Act and this section the course has been taught in recent years by a retired Forest Service employee who has extensive first-hand experience with the NEPA process.

In addition to the exposure our students receive within the core curriculum, they are also very likely to be exposed to historic and current issues within some of their certificate courses. For example, the history of fire policies in the U.S. is covered in FOR 251, Introduction to Wildland Fire, and the Wilderness Act is covered in FOR 445, Wilderness Management.
7. Document that the forestry curriculum provides a variety of educational experiences including lectures, discussion, simulations, computer applications, and individual and group projects in laboratories and field experiences, enabling students to apply the scientific methodologies necessary to attain an array of beneficial forest products, services, and conditions.

The BSF program offers students a diverse array of educational experiences. Many classes are primarily lecture-based, but almost always they also involve discussions, student presentations and other types of projects. Some of our faculty members also regularly employ forms of active student learning, versions of “flipped classrooms,” and other learner-centered pedagogical approaches.

A variety of computer applications are employed in our curriculum, starting with basics such as the Microsoft Office suite (especially Word, PowerPoint and Excel) and progressing to some degree of exposure to software such as ArcGIS and the Forest Vegetation Simulator. The revised curriculum that will be put in place gradually over the next several years will include a greater degree of emphasis on GIS and other forestry-related software. A greater degree of exposure to forestry-related hardware also is planned. Frankly this has been an area within our curriculum that has been in need of improvement for some time.

Group projects are an important part of our curriculum. Such projects are assigned in all four of the professional program semesters. Examples of such projects include silviculture lab assignments in FOR 315/316, the extensive forest assessment work and final presentation in FOR 413/414, and the management plan done in FOR 423C/424C, Forest Ecosystem Planning I and II. Group projects are also a regular part of some of the forestry certificate courses, such as FOR 445, Wilderness Management.

8. Document that any distance-learning component of a program is consistent with the program's stated objectives. Distance learning includes off-campus classroom programs, external degree programs, branch campuses, correspondence courses, and off-campus, electronically-based instruction.

There is no formal distance learning component to the undergraduate program as taken by most of our BSF students. We do offer an on-line version of FOR 101, Introduction to Forestry, which is occasionally taken by a student who plans to transfer into our program, but for the most part this version of the course serves non-majors. We strongly encourage all residential students who have declared forestry as their major to take the in-person version of FOR 101. Students may take other courses required for their degree in a distance format, but this does not include core forestry courses.

We also offer a series of hybrid (distance plus in-person) courses as part of our “401 program,” which serves federal employees involved in wildland fire management. Students in this program may opt to pursue an undergraduate certificate in Fire Ecology and Management, but this is effectively a separate set of courses from those taken by our on-campus BSF students.
9. Describe the extent to which faculty research enriches the curriculum and opportunities available to students to participate in research activities.

As described in Standard IV, most of our faculty are engaged in research and many have been quite productive in this area. This benefits the undergraduate program through the material that our faculty are able to share with our students in the classroom or field, through the undergraduate research opportunities that are provided to our students, and in some cases through employment opportunities available as part of faculty members’ projects. Faculty members have also invited their research collaborators into their classes to present guest lectures.

Information directly from faculty members’ research is shared in many classes, but perhaps is most prominent in Semester A, where local research sites are used to teach about fire and other disturbances, climate change research, and silvicultural treatments. An example is Professor Thomas Kolb’s research at the nearby Taylor Woods and the Gus Pearson Natural Area sites, where his work on using thinning to reduce tree water stress serves as the basis of current field trips in both FOR 313 and FOR 315 (Forest Ecology and Silviculture). Another example is Professor Martha Lee, who discusses her research on the users of the Fossil Creek area on the Coconino National Forest in her lectures on recreation management as part of Semester B.

Many students have benefitted from formal (i.e., credit-bearing) undergraduate research projects undertaken with the guidance of faculty members or by working on research field crews. Some of this work has even resulted in peer-reviewed publications, such as the two listed below in which the undergraduate student is highlighted in bold.


NAU offers some funding to support undergraduate research through a competitive program known as the Hooper Undergraduate Research Awards. Forestry students have been very successful in competing for these funds and have conducted projects on topics as diverse as the role of soil arthropods in belowground litter decomposition with climate change and aspen regeneration and stand dynamics following the Schultz Fire on the Coconino National Forest.

Also, over the years many of our students have had the opportunity to work with the NAU Ecological Restoration Institute (ERI). Many of the students who have worked either with the ERI or SOF faculty have developed their interests in research to the degree that they have gone on to graduate school. Projects have ranged widely, from ecological and biological topics to ones focused on the use of wilderness and recreational areas.
10. Discuss where and how professional ethics are incorporated into the professional curriculum and reinforced by faculty.

The development of professional ethics in a university setting typically begins with the subject of academic integrity, which at NAU is part of the Student Code of Conduct that all students are introduced to via the Student Handbook (http://nau.edu/Student-Life/Student-Handbook/) and various other means, and that is enforced by our faculty. Most course syllabi either contain an explicit policy regarding academic integrity or refer students to the official NAU policy on this subject.

The most significant exposure to forest resource-specific ethics currently is in Semester D, which contains an ethics component that is delivered over a three-week period and that includes a range of exercises, case studies and discussion (see the FOR 423C-424C syllabus for some additional details). Included in this was the use of a commercial product designed to help students assess their own framework and viewpoints as they relate to making ethical decisions.

In FOR 360, Natural Resources Policy, students study Aldo Leopold’s essay *The Land Ethic* and are shown how it has impacted the SAF’s own Code of Ethics. They are also occasionally asked to consider ethical issues as they affect the passage of laws, environmental justice, and other forest resource issues with an ethical dimension.

Students may be exposed to professional and/or personal ethics in a variety of other courses, including Liberal Studies courses and courses in wilderness or wildlife management, which typically include material on the ethics of wilderness use and the treatment of animals, respectively.

11. The New Curriculum

Although not specified in the SAF Guidelines we have added this section to describe the curriculum that has now been approved for implementation beginning with the 2013-2104 academic year. Information on this new curriculum is provided in Appendix C, which includes not only Forms A-1 and B-1, but also a document that summarizes the changes and a new degree progression plan that will be used for student advising.

The changes were the result of a two-year-long process of discussion and review, and were driven primarily by the need to (1) make degree progression easier for our students, especially transfer students, (2) update elements of our curriculum, especially how we handle GIS, (3) separate the capstone work from lecture-type content in the senior year, and (4) address the new realities of a reduced faculty and less credit being given for team teaching.

The changes are for the most part organizational, rather than fundamental changes in the material that is taught. The main exceptions to this are (1) dropping the requirement for CIS 120, Introduction to Computer Information Systems, and adding the requirement for FOR 225, GIS Tools in Forestry.
Examples of the organizational changes including breaking up the current FOR 315/316 silviculture component of Semester A into completely separate courses that will be taught in Semester A and C, and breaking up the courses that were part of Semesters C and D into more discrete units.
Standard III: Forestry Program Organization and Administration

1. Document that the program is administered by a person carrying the equivalent title and authority of administrators of comparable units in the institution. Present an organizational chart of the forestry program, showing its relationship to the institution’s central administration.

The Forestry BSF program is housed in the SOF, which is one of 10 degree-granting academic units within the College of Engineering, Forestry and Natural Sciences (CEFNS). Each of these academic units is headed by an individual of equivalent authority, although the titles of these individuals vary and include Chair (7 units), Director (2 units), and Executive Director (the SOF). The heads of each of the 10 academic units report directly to the Dean of CEFNS and meet with the Dean as a group on a monthly basis.

The current SOF organization is shown in Figure 1. The SOF includes 20 tenure-track/tenured faculty, three research faculty, several part-time instructors, and 32 adjunct faculty. It also includes five full-time staff members, three part-time staff members (not including staff working on research-related grants) and several student workers. Not listed in Figure 1 are employees that are supported directly by research or extension-related grants and that do not provide administrative or student support to the SOF as a whole. Over 100 part-time and/or temporary employees are hired each year to support the administrative, teaching, research and outreach operations of the SOF.

The SOF is administered by the Executive Director. The Executive Director directly supervises most of the administrative staff, as well as all tenured/tenure-track and part-time faculty with the exception of Regents’ Professor Wally Covington. The Executive Director also supervises the research faculty, although in practice they work much more closely with faculty members with whom they collaborate on research or outreach projects. In cooperation with the other full-time faculty, the Executive Director also oversees the appointments of the adjunct faculty.

The SOF relates to the central administration through a chain of command that goes from the Dean of CEFNS, to the Provost & Vice President for Academic Affairs, and finally to the President.
Figure 1. SOF organization chart.
2. Document that high priority is given to quality instruction through faculty appointments, evaluation, and recognition of performance.

Quality instruction is a core expectation of all tenured and tenure-track faculty, as well as all part-time faculty. Teaching experience is listed as a preferred qualification for all advertised faculty positions and is typically evaluated in part through a seminar and/or a teaching demonstration during the campus interview process. Numerous opportunities for the improvement of teaching are available once a faculty member is hired, such as taking an SOF course entitled Teaching Practicum (FOR 693) or participating in the teaching-related faculty development programs that are offered by the University several times per year (see Standard VI, Section 3 for more details about this program).

Faculty member’s teaching evaluations are included in the files provided to the SOF’s Annual Review Committee (ARC) and Faculty Status Committee (FSC) each fall. In the case of the ARC, the teaching evaluations are considered when making a recommendation on the faculty member’s annual performance rating. In the case of the FSC, teaching evaluations are considered in the cases of promotion and tenure decisions and for retention recommendations for non-tenured and non-tenure-track faculty.

There are two teaching awards presented each year, including one that is awarded by the faculty and another that is awarded by the student chapter of Xi Sigma Pi. In addition, teaching-related performance was one factor considered when recommending faculty members during the fall of 2012 as part of a NAU-wide program to recognize and reward “exemplary performers.”

3. Document that the forestry program has adequate staff resources with competencies needed to support the students, faculty, and administration.

The SOF has a small but highly effective central support staff consisting of five full-time positions that are supported primarily by state funds, including:

- Administrative Associate
- Business Manager, Senior
- Centennial Forest Manager
- Manager, Information Technology
- Student Services Coordinator

All of the staff positions listed above are filled through competitive searches that include advertised vacancy announcements with specific minimum and preferred qualifications that are appropriate for the position.

In addition, the School supports several other full- or part-time staff positions through a variety of primarily “soft money” funding sources and that may be filled either through competitive searches or waivers of recruitment. These include:
- Diversity Coordinator
- Equipment and Vehicle Manager (part-time and generally filled by a student since budget cuts in 2008/2009)
- Fire Program Coordinator
- Research Associates/Postdoctoral Scholars
- Writing Tutor

A cadre of student workers also supports the general administration of the SOF. They provide standard office support, support to the Business Manager, and staff the IT Help Desk. Usually there are between four and six student workers providing these services.

Several staff positions have been lost in the past five years as a result of state budget cuts to the University. These include:

- Equipment and Vehicle Manager (used to be a full-time position supported with state funds)
- Office Specialist
- Systems Analyst, Senior

Some of the staff support that has been lost over the past five years has been made up for by greater support from other units on campus (e.g., Information Technology Services has centralized some types of support), by increasing the number and/or hours allocated for student workers, and by shifting some responsibilities to soft money-supported positions. The SOF, however, has continued to experience a gradual erosion of support that began prior to the previous accreditation review and has affected some aspects of its operations. Managing shared spaces and equipment, for example, have become more difficult without a full-time and relatively permanent Equipment and Vehicle Manager.

4. Present the published procedure for evaluating and accepting students and for transferring credit to fulfill the general and professional education requirements in the forestry curriculum at the bachelor's or accredited master's level. Document that transfer courses, advance placement courses, and courses accepted for students in an accredited master’s degree program are equal to or exceed the content and standards of the accepting institution’s courses. In accordance with the Family Educational Right to Privacy Act (Buckley Amendment), visiting team members may ask to review files for students to assess compliance in this area.

Admissions requirements for undergraduate freshman students and transfer students are available on the NAU Undergraduate Admissions website (http://nau.edu/admissions/). In the case of international undergraduate students, of which there is seldom more than one or two at any one time, there is a separate website available (http://international.nau.edu/international_admissions/). Key details from these websites are presented below.
Admission of Freshman Students:

Potential freshman will be offered admission if they have a 3.0 or higher core GPA\(^3\) and have no deficiencies in the required college preparatory courses. Applicants will be considered for admission if they have a 2.5 core GPA and have no more than one deficiency in any two areas in the college preparatory courses. If applicants have a combination of a math and lab science deficiency, they are not admissible.

Admission of Transfer Students:

Transfer students are considered as high school graduates who have enrolled at a college, university or any other school since graduating from high school and have earned at least 12 college credits.

Transfer students will be offered admission if they have earned a minimum of 35 credits and the AGEC or the California IGETC\(^4\) with a cumulative GPA of 2.5; or earned an associate’s degree with a cumulative GPA of 2.0. They will be considered for admission if they have a 2.0 or higher GPA (on a 4.0 scale) in at least 24 transferable academic college credits. Transfer students with fewer than 24 transferable academic units, need to submit transcripts of all college work and their high school records.

Exceptions that Apply to Freshman or Transfer Students:

Students with non-traditional backgrounds may be considered for admission under a different set of requirements, including the following options:

- For students who will be 22 years of age or older when they begin classes at NAU, their overall high school GPA or a combination of high school and any college work will be used for evaluation.
- Students who have earned a GED with the requisite minimum score will be admitted.
- Students who have completed an associate’s or higher level degree from a regionally accredited post secondary institution with a minimum 2.0 GPA (A= 4.0) if they are an Arizona resident and a minimum GPA of 2.5 if they are not an Arizona resident will be admitted.
- Students who have completed the AGEC with a minimum 2.5 GPA if they are an Arizona resident and 2.5 GPA if they are a nonresident will be admitted.
- Home schooled students will be admitted if they provide a high school transcript and ACT or SAT composite test scores. ACT scores of at least 22 (Arizona resident) or 24 (non-resident) or an SAT score of at least 1040 (Arizona resident) or 1110 (non-resident) are required.

---

\(^3\) GPA is based on a 4.0 scale and is calculated using only the 16 core courses listed under course requirements on the Undergraduate Admissions website.

\(^4\) AGEC: Arizona General Education Curriculum  IGETC: Inter-segmental General Education Transfer Curriculum.
Admission of International Students:

For international students, the academic criteria listed below apply. There is also a requirement to provide proof of financial support.

1. Applicants must submit official transcripts for all secondary and college/university education. All transcripts/marksheets must be submitted in English. A minimum GPA of 2.5 out of 4.0 is required both for freshmen and transfer students.

2. English proficiency: Applicants from countries where English is not the official language must have test scores submitted directly from a testing agency. Options and minimum scores required for admission include:

   - TOEFL: 525 PBT, 70 IBT, or 195 CBT.
   - IELTS: 6.0 band or higher.
   - ACT English Sub Score: 21 or higher.
   - SAT Verbal Score: 510 or higher.

   Students from countries where English is the official language may submit proof of sufficient English coursework as specified in the admissions guidelines. Also, students who fail to demonstrate sufficient proficiency in English may be admitted but required to take an English placement test upon arriving and, if deemed necessary, enroll in NAU’s program in intensive English.

Acceptance of Transfer and Advance Placement Courses:

The Undergraduate Admissions and Orientation Office evaluates transcripts to determine the number of transfer credits accepted and how those units will count toward satisfying Northern Arizona University’s Liberal Studies requirements. Academic departments evaluate transcripts to determine how any transfer courses may count toward students’ major and minor requirements. In the SOF this is done by the Student Services Coordinator, although the Executive Director or faculty members may be consulted in some cases.

Articulation agreements have been developed for many in-state and out-of-state colleges, along with course equivalency guides. These guides have been developed by comparison of NAU course content with the courses of those other institutions. In some cases, SOF faculty members have been involved in helping to make equivalency determinations. Most courses for which equivalency determinations have been made are for general education courses, and these are made by articulation agreement coordinators, often in consultation with faculty members from relevant NAU academic units. More detail on the acceptance of transfer courses can be found at: http://www4.nau.edu/aio/transfer_credit_policy.htm.

Students who took a College Entrance Exam Board Advanced Placement course in their secondary school and received a score of 4 or 5 on it receive credit as well as advanced placement. For some exams, students can receive credit with a score of 3. More details on the
acceptance of advanced placement courses can be found at: 

5. Document that policies and processes for both short- and long-term planning of academic programs detail how periodic reviews and updates are conducted.

Arizona Board of Regents policy (ABOR 2-208) requires review of all academic programs every seven years. Exceptions may be made, however, for externally accredited programs, which generally can be reviewed on the schedule established by the accrediting organization. While the SOF’s graduate programs are reviewed on the ABOR-mandated seven-year cycle, the periodic review of its undergraduate program therefore conforms to the Society of American Foresters’ accreditation schedule.

The Academic Program Review Guidelines document, which can be accessed at http://www2.nau.edu/~d-ugstdy/apr/program_review_guidelines.pdf, provides details on how to conduct a program review. Much of the guidance is relevant in the context of an external accreditation review. This statement from the document applies equally well to the review conducted under the auspices of the SA and highlights the relationship between the program review and planning processes:

“Program reviews are a means to ensure advancement of the quality of Northern Arizona University’s academic programs. The process enables a comprehensive assessment of program goals, infrastructures, operations, and outcomes in relation to the mission and strategic plan of the university. The program review process facilitates dialogue among the provost, dean and program leadership that leads to the development of a plan for continued enhancement of the program.”

One outcome of the SAF accreditation process, then, will be the development of a plan of action that will be submitted for approval by the dean and the provost. While a key component of the plan will be to address any immediate concerns raised during the accreditation process, it will also include components that take a longer-term perspective.

Outside of the mandated program review and planning process, other planning efforts are conducted through faculty meetings, curriculum committee meetings, and ad hoc activities. For example, planning on faculty hiring priorities is conducted through a process that involves a call for faculty hiring proposals, which specify the discipline requested and the rationale, followed by a discussion of the proposals received and a vote at a faculty meeting. An example of a recent ad hoc activity was the roughly two-year lifespan of our “curriculum review committee,” which undertook an extensive review and revision of our undergraduate curriculum, the results of which are detailed in Standard II. This group consisted of the regular members of the curriculum committee, plus a number of other faculty members with an interest in curriculum issues.
6. Document in detail the process and methods for assessing educational outcomes of the specific curricular elements articulated in Standard II. Indicate whether academic and professional goals are being met, the elements most contributing to program success or lack thereof, and the means by which assessment findings are used to enhance program outcomes. Document that the interests of students and external constituents are represented in the assessments.

Since 2004 the SOF has participated in periodic program assessments that are coordinated by the NAU Office of Academic Assessment. The SOF was awarded the “Seal of Academic Achievement” from the NAU Office of Academic Assessment in 2010. This award recognizes significant implementation of an outcomes assessment plan through the collection and sharing of various outcomes data. The SOF Assessment Plan and the Assessment Report for 2009, the last year that a report was submitted, are provided in Appendix E.

In addition to the university-level program assessment, the SOF assesses its undergraduate program in two other formal ways. First, feedback is sought from students for each course using a structured course evaluation form/questionnaire. During the past ten years, the SOF has generally used a NAU-provided instrument, but in the past two years we have experimented with two commercial products, including the IDEA and SmarterSurveys/SETE course evaluation products. During the fall of 2012, the SOF was one of two academic units to pilot the SmarterSurveys/SETE course evaluation system, which may be adopted for use by the whole campus in the fall of 2013. Second, feedback is obtained about the program, courses, faculty and staff, facilities, and policies via an on-line exit survey that is available to all graduating students in the last month of each spring semester. Results of the survey are distributed to all faculty and may be discussed in faculty or curriculum committee meetings.

Informal means of program assessment are also employed. Like many other forestry programs, our faculty and staff get to know the students well and this leads to informal channels for feedback. This type of feedback can occur in offices, at club meetings, and during trips of various sorts, among other places. The Executive Director maintains an open door policy and attempts to create an environment in which students feel comfortable coming to him to bring up concerns, make suggestions, or make requests. Also, the faculty and some staff have the opportunity to interact with alumni and employers on a relatively frequent basis, and this often
leads to discussions regarding how well our graduates are prepared and how the program might be improved.

While most of the feedback we receive on our program is positive, criticisms of instructors or various aspects of our program do occur. Also, suggestions for curriculum revisions are occasionally made, the most frequent of which, perhaps, has been to incorporate more exposure to GIS into our program. Some of these criticisms and suggestions were important factors that led us to undertake the major curriculum revision described in Standard II. They have also affected both teaching assignments and faculty evaluations.
Standard IV: Faculty

1. Complete Document C-1, C-2, and Document D; follow the format as presented.
   Use Document C-1: Background Summary for Faculty Reporting to the Forest Resources Program Head, to show that faculty have a diversity of backgrounds as evidenced by varied professional experiences and education relevant to forestry from a variety of academic institutions. Use SAF Accreditation Handbook, 2012 Edition Page 35 Document C-2: Background Summary for Faculty Teaching Courses Listed in Forms B-1 and B-2 but NOT Reporting to the Program Head to indicate faculty from other departments or outside agencies who teach required professional courses or restricted electives. Document any use of individuals from outside the forestry program.

   Use Document D: Academic Summary for Faculty Reporting to the Forest Resources Program Head, to show the budgeted time allocation for faculty members who report to the forest resources program head; include adjunct or contract faculty who hold joint appointments or are otherwise part-time members of the forestry faculty. List vacant positions now authorized and for which funding is available. Do not list emeritus faculty unless actively teaching. Document D must document that a minimum of eight full-time equivalent (FTE) faculty members who participate in the program have their primary academic responsibilities in the forestry program and report to the responsible academic head.

   Document C-1 and Document D are presented in Appendix F. Document C-2 is not applicable in our case.

The School of Forestry currently has 20 tenured or tenure-track faculty, including the Executive Director. It also has three non-tenure-track research faculty. All faculty members except Regents’ Professor Wally Covington report to the Executive Director. Dr. Covington’s primary assignment is to serve as the Executive Director of the Ecological Restoration Institute and he reports directly to the NAU President. He advises graduate students, but is not active in the BSF program. One faculty member, Andrew Sánchez Meador, has a 51% assignment with the SOF and a 49% assignment with the Ecological Restoration Institute. The Executive Director only supervises the SOF portion of Dr. Sánchez Meador’s assignment.

The faculty is diverse in many ways, including their educational backgrounds, forestry sub-disciplines represented, gender and to a lesser degree ethnicity. Faculty members obtained their terminal degrees from a total of 14 different institutions, including institutions from widely varying parts of the U.S. Nine of the 23 faculty members are female which, at 39%, is believed to be one of the highest percentages of any forestry programs in the U.S. Three faculty members are originally from countries other than the United States.

In addition the regular faculty described above, there is one staff member who also regularly serves as an instructor, a variable number of part-time instructors, and 32 adjunct faculty members. The staff member who is involved in undergraduate teaching is Cheryl Miller, the Centennial Forest Manager. The adjunct faculty members participate in the SOF’s activities in different ways, such as by serving on graduate student committees, engaging in research with our faculty, providing guest lectures, and occasionally by co-teaching courses. For the most part,
they are more active at the graduate level. A list of adjunct faculty, with a brief description of each, is provided in Appendix G.

2. Complete Document E: Individual Faculty Information for each forestry faculty member who teaches forestry or forestry-related, professional-level courses required in the curricula.

This information is provided in Appendix H.

3. Document that the faculty provide high quality instruction, are empowered to keep the curriculum current and in concert with the program's educational goals and objectives, and provide effective guidance for students.

The quality of faculty instruction is monitored primarily through structured course evaluations administered to students. Informal feedback is also received occasionally, as well as input from sources such as the annual exit interviews and facilitated discussions that typically take place after the completion of Semester A and Semester B.

In most cases the feedback received on faculty instruction is very positive, but some faculty members have received below average and even poor course evaluations. In a few cases, this involved assistant professors who were in their first or second years. Those faculty members were encouraged to take our Teaching Practicum course (FOR 693), to seek other forms of assistance (e.g., mentoring), and to address specific concerns raised in their evaluations. Virtually all of those faculty members have made very good progress and have seen their evaluations improve considerably. In other cases, it appears that faculty members were not ideal matches with the courses for which their evaluations were below average. Some reassignments or other types of adjustments (e.g., bringing in additional instructors) have been made because of the feedback received.

Faculty are empowered to keep the curriculum content current both in the courses they teach and in the curriculum as a whole. In the case of individual courses, one way that faculty members help keep the curriculum current is through the development of new courses. Since the last self-study, several new undergraduate, co-convened or 500-level courses (the latter of which are open to seniors) have been developed on topics such as non-native species (FOR 443/543), fire monitoring and modeling (FOR 451) and wetlands (FOR 560). All faculty are expected to keep the content of their courses current and are expected to engage in the types of activities such as research and conference attendance that help keep them up to date in their respective fields.

The faculty as a whole are responsible for the overall curriculum, but the Curriculum Committee serves as the focal point for new curriculum proposals and other curriculum-related matters. The Curriculum Committee is chaired by the Executive Director and its other voting members are the Graduate Coordinator and the coordinators of Semesters A, B, C and D. The Student Services Coordinator and the Administrative Associate also attend Curriculum Committee meetings as non-voting members. The Curriculum Committee reviews curriculum proposals and conducts
votes, but the ultimate decision on significant curriculum issues is made by the faculty as a whole, typically through a process of discussion and voting at a faculty meeting.

All faculty members are expected to provide guidance to undergraduate students, but the primary responsibility for academic advising rests with the Student Services Coordinator. Faculty are therefore more involved in providing guidance in other forms, such as guiding students involved in independent studies or undergraduate research, rather than providing advice related to course loads and degree progression. Each of the forestry certificates has one or two faculty members assigned as coordinators, who are occasionally called upon to discuss their certificates with students who are deciding which certificate to choose.

4. Document faculty expertise in their assigned areas of instruction; ability and effectiveness in instructing; aptitude for working closely with students; and ability to stimulate independent thinking and provide intellectual leadership.

The background and expertise of each faculty member is presented in Document E (Appendix H). A comparison of our faculty members’ educational qualifications and research activity with their assigned areas of instruction (Document D; Appendix F) demonstrates that their interests and expertise are closely aligned with what they teach. As can be seen in Document E, many of our faculty are highly productive researchers and stay very current in their fields through their research, conference attendance, etc. They clearly have the expertise needed to teach their assigned courses and to bring some of the latest information in their respective fields to our students.

Faculty members’ aptitude for working closely with students, as well as their ability to stimulate independent thinking and provide intellectual leadership can be demonstrated through a variety of means. One way is to look at the number of undergraduate research (FOR 485) and independent study (FOR 697) courses offered by our faculty this academic year, which are listed just for this academic year in Document D (Appendix F). Several of our faculty have worked very closely with students to conduct undergraduate research, which has then been published and/or presented at conferences. A recent example is a student who works with Associate Professor Richard Hofstetter; the student won second place in the student presentation competition at the 2012 Entomological Society of America National Meeting in Knoxville, TN. Most of our research-intensive faculty have a welcoming attitude towards undergraduates with an interest in research. These faculty have shown a high degree of willingness to offer individualized courses and to employ some of these students as research technicians.

Some of the activities of our student organizations also provide opportunities for close interaction between faculty and students in ways that can stimulate them to think more independently and/or to think more about leadership. We make a significant effort each year to help our students attend professional conferences, for example. Faculty often interact with these students while at these conferences in an informal way, and by doing things like discussing some of the presentations, can help students to broaden their horizons and think a little “bigger” than they might otherwise do. A total of 30 undergraduates attended the 2012 SAF National
Convention in Spokane, and several others attended the national meetings of organizations such as the Association for Fire Ecology and the Entomological Society of America in 2012.

5. Document faculty involvement in professional development and scholarly activities appropriate to their disciplines.

Professional development activities can take many forms. Some of these, such as conference participation and both short and semester-length courses, are documented in the faculty’s CVs (Appendix H). Below, documentation is provided for one other forms of professional development – faculty sabbaticals. A general overview of scholarly activities is also presented, but much more detail can be obtained through a review of the faculty’s CVs.

Faculty Sabbaticals:

NAU and the SOF recognize the importance of faculty sabbaticals for faculty development and renewal. All tenured or tenure-track faculty are therefore eligible for sabbatical after six years of continuous service. Despite challenges such as university-wide budget cuts, no faculty members who have applied have been denied the opportunity to take a sabbatical. Faculty members who took sabbaticals since the previous program review are listed below. In addition, three faculty members have been approved for a sabbatical during all or part of the 2013/2014 academic year, including Paul Beier, Pete Fulé, and Ching-Hsun Huang.

Current faculty members who have taken one or more sabbaticals since the completion of the last self-study in 2003 include:

- Paul Beier: 2006/2007
- Stephen Dewhurst: 2012/2013
- Pete Fulé: 2005/2006
- Thomas Kolb: Fall 2011
- Margaret Moore: 2007/2008
- Aregai Tecle: 2009/2010
- Andrea Thode: 2011/2012
- Kristen Waring: 2012/2013

The activities undertaken as part of the faculty sabbaticals have been diverse. Three faculty members spent their sabbatical years overseas with the support of Fulbright Fellowships, including Pete Fulé (Spain), Paul Beier (Ghana) and Aregai Tecle (Ethiopia) and others have also spent part of their sabbaticals in other countries, including Carol Chambers (Nicaragua) and Bob Mathiasen (Australia and Mexico). All faculty members are required to submit a report on their sabbatical activities and to present a seminar upon their return.
Nature and Breadth of Faculty Scholarly Activities

SOF faculty members published at least 487 refereed articles and book chapters from 2004 through 2013 and so far have an additional 11 publications in press (Appendix I). The average rate of publication was 52 per year from 2004 through 2012.

The SOF has been recognized for its research productivity and the impact of its publications in several ways in recent years. The Faculty Scholarly Productivity Index ranked NAU tenth nationwide for research productivity in forestry in 2007 (the last year for which we have access to the ranking). A study published in the *Journal of Forestry* in 2006 ranked NAU sixth among North American forestry programs for the number of citations of its publications per faculty member\(^5\). The research of some of our faculty members extends into the field of conservation biology, and was clearly one of the main reasons why NAU was ranked in the top 15% of 317 programs nationwide in terms of research productivity in this field\(^6\). An impressive number of faculty members have “citation classics,” – publications that have been cited 100 times or more. Faculty members with papers cited 100 or more times, according to Google Scholar-based search on 2/15/13, include Jim Allen (1 paper, 1,215 citations of all papers combined), Paul Beier (13 papers; 4,194 citations), Wally Covington (17 papers; 7,063 citations), Pete Fulé (8 papers; 4,794 citations), Tom Kolb (10 papers; 4,582 citations), Margaret Moore (10 papers; minimum of 3,613 citations\(^7\)), and Andi Thode (2 papers, 517 citations).

In addition to the impact that the SOF has among its scientist peers, the School takes pride in the applied nature of its research, its collaboration with management agencies, and the impacts of our research on management actions. Much of our research is funded by government agencies in response to specific management needs. We collaborate with, or do research specifically to serve the US Forest Service, National Park Service, Bureau of Land Management, US Fish and Wildlife Service, Arizona State Lands Department, Arizona Game and Fish Department, federal and local Departments of Transportation, local governments, conservation NGO’s and tribal organizations.

Several faculty contribute substantially to the work of the Ecological Restoration Institute (ERI), which is NAU’s most visible and high-impact effort to join forest science, research, and management. The ERI is led by a SOF faculty member, Wally Covington, and is staffed in part by several SOF graduates. Although the focus of much of the SOF’s research has been in the Southwest, our research efforts extend further afield, including Mexico, Europe, and Africa.

---


\(^7\) It is difficult to sort out all the citations for common names like MM Moore, so we stopped counting citations that definitely hers at approximately the number listed.
6. Document that the program follows its institution's policies and guidelines in the recruitment and retention of faculty that reflect cultural, ethnic, and gender diversity.

All faculty recruitment efforts are subject to Human Resources and Affirmative Action guidelines, some of which specifically address cultural, ethnic, and gender diversity. One important guideline is to assure that the advertising for all faculty positions includes forms of outreach that will help attract diverse applicants. In addition to outlets such as the *Forestry Source* and *The Chronicle of Higher Education*, faculty positions are therefore advertised in outlets such as *Women in Natural Resources*.

Of the 10 tenure-track faculty hired since the last self-study, three are female and one is from an under-represented group. Also, two of the three research faculty members are female. Out of the 20 tenured or tenure-track faculty, seven are female and three are from an under-represented group (two are in both categories). Although the SOF faculty was not diverse for roughly the first half of its nearly 55-year history, its more recent record of recruiting and especially retaining diverse faculty is relatively strong. All but one of the female faculty members that have ever been hired by the SOF are still on the faculty, including Professor Margaret Moore, the first female faculty member, who was hired in 1986. Of the five faculty members from under-represented groups who were employed by the SOF since the last self-study, three are still on the faculty and one recently retired; only one left for a position elsewhere.
Standard V: Students


The number of recent Bachelor of Science in Forestry degrees granted by Northern Arizona University has varied from 17 in 2003 to 38 in 2007, with 36 awarded in 2012 (Figure 2). We expect the numbers of graduates to continue to increase slightly in the next few years, as a result of the large increases in enrollment experienced in the previous three years, as described in the following section.

![Figure 2. Annual Bachelors of Science in Forestry degrees awarded by the School of Forestry arranged by calendar year.](image)

Graduate Placement

Based on a graduate employment survey (Document F, Appendix J) conducted in late 2012 and early 2013 of alumni who have graduated in the past 5 years, 83% of our alumni respondents reported that they were employed in forestry or a forestry-related field or were currently in graduate school (Figure 3a). 52% of the respondents are employed in permanent positions and 20% are employed in temporary positions in forestry or a related field and another 14% are currently enrolled in graduate school (Figure 3b and Document F).

Typically, graduates are employed by a federal land management agency such as the Forest Service, Bureau of Land Management, Bureau of Indian Affairs, National Park Service, or they are working for a state agency (e.g., the Arizona Game and Fish Department, or a State Forest Service or Department of Natural Resources (e.g., Texas Forest Service and Washington State Department of Natural Resources). Utilizing personal knowledge of recent graduates, it is known that at least 33 additional alumni who did not respond to the survey are currently
employed in forestry or a forestry-related field and an additional 8 alumni are currently pursuing
graduate studies in forestry.

Figure 3. Proportion of recent BSF graduates (n=36) by employer category and
employment status based on survey responses.

2. Document that the program follows institutional policies and guidelines in recruiting and
retaining motivated and academically qualified students who reflect cultural, ethnic, and
gender diversity. Include data for accredited graduate degree students and identifiable
pre-forestry students. Use Document G: Student Data Summary to show the total current
undergraduate enrollment by class, gender, and race/ethnic diversity; provide those figures for
the previous three years and the expected number during the next three years. Show the
number of forestry graduates for the last three years and the expected number during the next
three years.

Enrollment

At the time of the last SAF accreditation review in 2003, the SOF fall enrollment was 148
students (declared forestry majors), with 53 enrolled in the professional program (Semester A
and C combined). As shown in Figure 4, the SOF undergraduate enrollment has fluctuated near
155 students, but has steadily increased since 2008 from 174 students enrolled to an
approximately 30-year high enrollment of 256 students for the fall of 2011 (Document G,
Appendix K). Enrollment in the professional program has also steadily increased since 2003 to
35% of the total Fall 2012 enrollment. During the Fall 2012 semester there 56 and 34 students
enrolled in Semester A and C, respectively.

Although we are not able to predict future enrollment with any degree of certainty, we believe
that the rate of enrollment growth will slow and that enrollment is likely to stabilize near its
current number. We believe this is likely due to some recent steps we have taken, such as raising
the minimum pre-professional GPA required for entrance into the professional program from 2.5
to 2.75. Frankly, we also believe that the current level of enrollment is at or very near our
capacity, given the structure of our professional program, the number of faculty we have available, and the amount and size of our classrooms.

Figure 4. Annual fall enrollment (full and part time) for declared forestry majors.

Since the last SAF accreditation review in 2003 and as shown in Figure 5, the proportion of women enrolled in forestry has increased slightly to its current proportion of 23.8%, up 3% from the previous year. As seen in Figure 6, the proportion of non-white undergraduates enrolled fluctuates around 20%, with Hispanic and Native American students being the largest minorities represented. The School of Forestry has seen small but constant increases in minority enrollment (from 15% in 2003 to 22% in 2012).
Figure 5. Annual fall enrollment (full and part time) categorized by gender for declared forestry majors.

Figure 6. Annual fall enrollment (full and part time) categorized by ethnicity for declared forestry majors.
Recruitment and Retention

The University, College and School have increased their collective and individual recruitment and retention programs in recent years. The NAU Undergraduate Admissions Office regularly sends information packets to all prospective students, hosts open houses, coordinates campus visits of prospective students and their parents, and produces a variety of promotional materials. Much of this work is coordinated at least to some degree with the colleges and departments.

The SOF plays an active role in student recruitment primarily through the work of the Student Services Coordinator and a group of forestry students known as the Student Ambassadors. Together these individuals help with open houses and other university-level recruiting events and also meet with prospective students and their families as part of their campus visits. These individuals, sometimes with the help of other faculty, staff or students, have also helped staff our school’s display at various conferences, including the SAF national conventions, as part of an effort aimed at raising the profile of our school in a way that also benefits recruitment.

The SOF produces some of its own recruiting materials, including traditional materials such as brochures and table-top displays, sometimes with the help of the University Marketing Department. We have also invested time and funds into our website, including adding both a Facebook page and a YouTube channel in recent years, which can be accessed from our SOF homepage.

Upon admission, all forestry students are encouraged to attend our annual fall weekend event, which we call the Forestry Centennial Campout. Here, new students (both freshmen and transfer students) get to know the faculty, meet other new students and explore their “new classroom” - the 47,500 acre NAU Centennial Forest. We view this as an important first step aimed at community-building and student retention.

We believe that our approach to student advising, which is centered around our Student Services Coordinator position, is also an important aspect of our retention efforts. The person in this position plays a vital role in guiding our students through the curriculum and helping them find the support they need if they are encountering academic or other types of difficulties. The Student Services Coordinator also helps our students find summer employment, which is important both for retention and for the longer-term career prospects of our students. Our faculty and staff also play an important role in retention, through the various types of support they provide, assistance in finding opportunities such as undergraduate research, and through strong personal relationships that often develop. More detail on the Student Services Coordinator position is provided in Section 3 below.

Another aspect of our program that we believe aids in retention is the sense of belonging that develops through the “Treehouse” learning community for our freshmen and the various student clubs. Our Forestry Club/Student Chapter of the SAF, for example, meets weekly and engages in a wide variety of service and social activities.

Recruitment and retention aimed specifically at minorities, especially of Native Americans and Hispanics, has long been a concern and priority of both the SOF and Northern Arizona
University. We have made significant efforts to attract minority/underrepresented students through various outreach efforts and through the formation of student support groups. The SOF has worked with, and travelled to, Native American schools (e.g., Cibecue High School, on the White Mountain Apache Reservation) and other institutions with a high diversity population to increase their awareness of NAU and the School of Forestry, as well as introduce their students to current SOF students who are from their tribe or region.

The Executive Director, faculty and staff have presented information about forestry education, careers and the SOF at numerous venues, including Society of American Foresters and Wildlife Society meetings. Several faculty and students also attended the Diversity and International Forestry Reception sponsored by ArborGen at the 2012 SAF National Convention.

Once minority students are in our program, counseling and advising services are available to them through the Student Services Coordinator, the Diversity Coordinator, and through a number of university-level offices. One recent effort has been to build a support network for Native American students by creating the Native American Forestry Support Group. This group meets every two weeks and the meetings include topics such as job opportunities, scholarships, and tribal requirements; it also provides the opportunity for our Native American students to socialize with one another. This group has also brought in guest speakers from AISES (American Indian Science and Engineering Society) and the Intertribal Timber Council.

Scholarships

To help attract and retain students, the School of Forestry offers over 50 scholarships that are awarded to students annually. The financial assistance that a scholarship provides is important in this time of tuition increases that exceed the rate of inflation. However, the intangible benefits a scholarship gives to students - recognition by the faculty, praise for performance, and acknowledgement of future potential - may mean just as much to the student recipients. We have been very fortunate to have a number of great supporters of our school, who have contributed to existing endowed scholarship funds and established new ones.

Scholarships are currently available from professional affiliates such as the Arizona Water Resources Committee, endowments such as the Charles O. Minor Endowment, and the numerous scholarships that have been established by alumni and friends of the SOF. While some of these scholarships were established 20 or more years ago, we have also had good success in recent years in establishing new scholarships. Through these scholarships, the School awarded approximately $75,000 to our students last year, an amount that has increased almost every year for the past decade (Figure 7).

Students are informed about the scholarship application process both through email and visits to classes. This process typically starts in early January, with the applications due by February 15th. Application forms are available upon request.
Figure 7. Annual total dollar amounts awarded in scholarships provided by the School of Forestry.

3. Document the program’s commitment to quality student advising. Document that advisors are readily available to students enrolled in the program for counsel regarding the student’s academic, professional, and career opportunities.

Advisement Counseling, Student Services, and Career Development

All undergraduate students are advised by the SOF’s Student Services Coordinator and first year students are also co-advised by the Gateway Student Success Center. The Student Services Coordinator works one-on-one with each forestry student to ensure his or her successful progress through the program and if needed, work with the student on ways to increase their success in the University setting. The Student Services Coordinator is also responsible for summer internships and job placement. The School maintains an up-to-date online job placement board and hosts workshops regarding the federal hiring process.

In addition to providing support academically, each semester, the Student Services Coordinator meets with students to:

- develop and improve their résumé and cover letter
- provide information about employers and upcoming employment opportunities
- practice interviewing using common forestry interview questions
- convert their work and research experience into credit through the School’s undergraduate fieldwork & research courses (via FOR 408 and 485)
- explore opportunities to expand student careers abroad through the Peace Corps and international forestry study abroad programs

The SOF firmly believes that hands-on work experience is essential to job placement and the faculty and staff is committed to helping students find internships and seasonal positions while in
the forestry program. This is primarily accomplished through a series of seminars and workshops where the students learn to:

- write résumés and cover letters; workshops are held at least once every semester
- develop interview skills
- “interview” with a real forestry employer through mock interviews held each fall in Semester A

Announcements for summer intern positions, volunteer opportunities and permanent jobs are also sent to all undergraduate students via the SOF’s undergraduate and graduate student listservs and via Facebook. Students receive these notices probably on the average at least once per week. Annually, the School of Forestry hosts a Natural Resources Career Fair where students have the opportunity to meet and potentially interview with 15-20 employers. These employers are usually advertising both permanent and summer seasonal positions and in the past have included representatives from local and regional offices of the US Forest Service, National Park Service, and Bureau of Land Management, industry companies such as Weyerhaeuser, state agencies such as the Arizona Game and Fish Department, and non-governmental organizations such as American Conservation Experience. In addition, the NAU Office of Career Services notifies the SOF of recruiting visits by forestry-related employers.

There are many opportunities to work and study abroad that students can learn about through both the NAU Center for International Education and the SOF. Every other summer, there is a forestry course offered by Regents’ Professor Mike Wagner in Ghana. This course runs for three weeks and can be taken for credit. There is also a standing exchange program with Southern Cross University in Australia that allows 1-2 seniors each spring to study abroad. Other opportunities arise each year. One such opportunity will be offered in Fall 2013 through USAC (University Studies Abroad Consortium). Dr. Pete Fulé and Dr. Richard Hofstetter will be teaching abroad (in France and Costa Rica, respectively) and several of our students will be travelling with them and using the credits earned towards their BSF degree.

Student Activities and Registered Student Organizations

Our School and its faculty encourage student participation in extracurricular activities including clubs, sports, and other student groups. Integration of students into a variety of activities and clubs encourages cohort cohesiveness and aids in retention, student academic success, and professional networking. The student organizations also provide opportunities for extracurricular personal growth, socialization, and volunteer activities.

NAU also recognizes approximately 200 other student organizations. Among them are the Association of Residence Halls, Associated Students for Women’s Issues, Native Americans United, Cardinal Key, Mortar Board, the Panhellenic Council, Interfraternity Council, Northern Lights, and many others. Student organizations are organized according to academic, advocacy, cultural, religious, service, special interest, and sports and recreational interest as well as fraternities and sororities.

Forestry faculty serve as advisers for several clubs, including the Forestry Club (also known as the Student Chapter of the Society of American Foresters), Xi Sigma Pi, Student Association for Fire Ecology (SAFE), and the Logging Sports Team.
The Forestry Club is an organization for students interested in forestry, ecology, botany, and the environment and currently has a membership of approximately 105. The Forestry Club is recognized by the university through the Office of Student Life and serves as the Student Chapter of the Society of American Foresters. The Forestry Club hosts several annual social events, participates in land management projects with local agencies, and organizes several camping/hiking trips throughout the year. Recent community service projects include the “Adopt an Aspen Fence” in conjunction with the Coconino National Forest; numerous projects with Habitat for Humanity and with Northern Arizona's Society of American Foresters Chapter, firewood collection and donations to the Flagstaff Food Bank. As a testament of this organization’s excellence, the NAU Student Chapter of the SAF was selected as the 2012 Outstanding Student Chapter, which is the second time in the past several years (2012 and 2009) that the NAU chapter has won this national award.

Xi Sigma Pi is the forestry honorary society with a membership of approximately 36. The members are active socially, professionally and academically. Guest speakers periodically share their professional expertise with the students at scheduled meetings. Finally, the society helps host the annual statewide FFA forestry Career Development Event for high school-aged students.

The Student Association for Fire Ecology (SAFE) is a student chapter affiliated with the Association for Fire Ecology (AFE) and currently has a membership of approximately 70. SAFE is committed to promoting the application of fire ecology through science and education, serves the local community through a volunteer burn crew, focuses to help students get fire experience.

The SOF recognizes that active student organizations are essential components of a total education program. A significant amount of School funds or support such as vehicle use has therefore been use to supported student club activities, such as travel to professional meetings. For example, students routinely attend Northern Arizona SAF chapter meetings and both SAF and AFE national meetings.
Standard VI: Parent Institution Support

1. Document the degree to which the parent institution provides resources needed to support the program being considered for accreditation. Document that the parent institution provides adequate funding and other institutional support to (1) allow the program to attract and retain highly qualified faculty, staff, and administrators, and (2) provide for elements critical to the learning environment for professional foresters such as computers, spatial information technologies, specialized laboratories, and field instruction.

Attraction and Retention of Highly Qualified Faculty, Staff and Administrators

Through the Office of the Provost and the Dean of the College of Engineering, Forestry and Natural Sciences, financial support is provided to advertise all new tenure-track faculty positions in appropriate national and international outlets. Our two newest faculty positions were advertised in the Forestry Source, the Chronicle of Higher Education and/or Science Careers, the NAUFRP and Ecolog-L listservs, and a variety of more specialized websites or newsletters. The Assistant Professor of Forest Soils and Ecosystem Ecology position attracted over 50 applications, including strong candidates from across the U.S. and from as far away as Australia. Some of our staff positions also attract applicants from a wide geographic range. Our recent Centennial Forest Manager search, for example, drew applications from individuals in Alaska, Florida, Oregon and Vermont.

NAU salaries are known to be below those of our peer institutions, and we have anecdotal evidence that this has discouraged some people from applying for or accepting positions within the SOF. Nevertheless, we have been relatively successful at attracting and retaining high-quality faculty and staff. Reasons for this may be due in part to other aspects of parent institution support (e.g., the Southwest Forest Science Complex described below) and in part to the attractions of living in Flagstaff.

Recent efforts to increase faculty and staff salaries to levels closer to our peer institutions may have helped with retention, although there is no definitive evidence of this for personnel within the SOF. Efforts to match offers made to our faculty by other institutions have been modest during this accreditation cycle and have been generally unsuccessful.

Provision of a Quality Learning Environment

Three key elements of the learning environment that we provide to our students are highlighted below, including the Southwest Forest Science Complex, our computing resources and other information technologies, and the Centennial Forest.
Southwest Forest Science Complex:

The SOF is housed on the Northern Arizona University campus in the Southwest Forest Science Complex that was completed in 1992. It consists of two wings, joined together by a large central atrium. One wing houses the SOF, while the other is occupied primarily by the Flagstaff Unit of the Forest Service Rocky Mountain Research Station.

Facilities include offices for faculty and graduate students, classrooms with multimedia capabilities, research laboratories, and two modern computer laboratories (one of which is specifically reserved for undergraduate students). Space within the NAU-owned wing of the Southwest Forest Science Complex assigned to the SOF is listed in Table 1.

Table 1. Facilities on the NAU side of the Southwest Forest Science Complex.

<table>
<thead>
<tr>
<th>Type of Space</th>
<th>Number of Rooms</th>
<th>Square Feet</th>
<th>Total Square Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auditorium</td>
<td>1</td>
<td>1,988</td>
<td>1,988</td>
</tr>
<tr>
<td>Lecture Hall</td>
<td>1</td>
<td>866</td>
<td>866</td>
</tr>
<tr>
<td>Seminar Room</td>
<td>1</td>
<td>446</td>
<td>446</td>
</tr>
<tr>
<td>Classrooms</td>
<td>4</td>
<td>3,200</td>
<td>3,200</td>
</tr>
<tr>
<td><strong>Total Classroom Space</strong></td>
<td></td>
<td></td>
<td><strong>6,500</strong></td>
</tr>
<tr>
<td>Computer Labs</td>
<td>2</td>
<td>2,674</td>
<td>2,674</td>
</tr>
<tr>
<td>Server/Storage</td>
<td>2</td>
<td>233</td>
<td>233</td>
</tr>
<tr>
<td>Information Technology</td>
<td>3</td>
<td>390</td>
<td>390</td>
</tr>
<tr>
<td>Student Space</td>
<td>2</td>
<td>677</td>
<td>677</td>
</tr>
<tr>
<td>Conference Room</td>
<td>2</td>
<td>536</td>
<td>536</td>
</tr>
<tr>
<td>Emeritus Faculty Office</td>
<td>1</td>
<td>144</td>
<td>144</td>
</tr>
<tr>
<td>Faculty Offices</td>
<td>19</td>
<td>152 (average)</td>
<td>2,900</td>
</tr>
<tr>
<td>Faculty Research Labs</td>
<td>12</td>
<td>720 (average)</td>
<td>8,644</td>
</tr>
<tr>
<td>Graduate Student Offices</td>
<td>5</td>
<td>351 (average)</td>
<td>1,758</td>
</tr>
<tr>
<td>Centennial Forest Offices</td>
<td>2</td>
<td>143</td>
<td>286</td>
</tr>
<tr>
<td>Research Offices</td>
<td>4</td>
<td>290 (average)</td>
<td>1,163</td>
</tr>
<tr>
<td>Administrative Offices</td>
<td>2</td>
<td>279 (average)</td>
<td>558</td>
</tr>
</tbody>
</table>

The SOF has 12 research labs. While these labs are used primarily to support faculty and graduate student research, undergraduate students also conduct research projects in them or are employed as research technicians. Most of the laboratories are allocated to specific forestry sub-disciplines, including Wildlife, Fire/GIS/Remote Sensing, Human Dimensions, Forest
Management, Entomology, Hydrology, Dendroecology, Silviculture, Ecophysiology, and Ecosystem Ecology. Each laboratory is managed by one or more members of the faculty.

In addition to the 12 labs, there are a number of other facilities with the Southwest Forest Science Complex that support research, including a walk-in cold storage unit, a room containing several freezers and drying ovens, and a fenced storage area on the loading dock for storage of equipment. Also, some of the USDA Forest Service Rocky Mountain Research Station’s labs and other facilities are used routinely by SOF faculty and students.

Computing Resources and Other Information Technologies:

The SOF maintains 125 desktop or laptop computers for faculty, staff, and specialized research labs; 70 desktop computers in several student PC Labs; and 7 desktop computers in multimedia classroom environments. The SOF also maintains a Microsoft® Windows® Server with ten terabytes of disk space which is backed up nightly to tape. A four-year replacement plan for computers is in place for permanent full-time faculty and staff as well as PC labs, classrooms, and servers. The graduate student PC lab is open to forestry graduate students 24/7; the undergraduate PC lab is open to all forestry students Monday through Friday into the evening and six hours on Sunday evening.

Most faculty and staff members have a black and white laser printer in their office. Additionally the school supports six network accessible high volume printers (three color and three black and white laser printers) as well as a color plotter capable of handling 42 inch wide roll paper. Other peripheral devices supported in the School include several flatbed scanners, a photographic slide scanner, digital cameras, and a digital camcorder.

The above IT infrastructure is supported by the School’s IT Team which is comprised of an IT Manager and a student staffed IT Help Desk. The School’s IT Team is available to faculty, staff, and students for assistance and consulting services during normal business hours.

In addition to the IT environment within the School, faculty, staff, and students have access to PC/MAC computing labs and two terminal servers on campus. The terminal servers and some campus labs are available 24 /7 during the school year.

Assistance and consulting services are available through the campus Information Technology Services (ITS) department. The ITS Student Technology Center is available 24/7 and staffed by IT professionals and student workers. The Solution Center is available to faculty and staff during normal business hours and is staffed by full-time IT professionals. Additionally, the campus provides in-class and on-line training for faculty and staff in a range of software applications.

The campus supports Microsoft Windows® IIS web servers for individual faculty, staff, and student web sites. In support of the SOF’s web site (nau.edu/forestry) the campus provides a content management system.
In April 2000, Governor Jane Hull signed an intergovernmental agreement creating the Centennial Forest to serve as a nationally recognized forest and model for the entire United States. The 75-year agreement between the Arizona State Land Department and Northern Arizona University specifies education, forest health, maintenance of natural forest assets and values, reduction of the risk of wildfire, and long term ecological research as stewardship objectives. The property consists of approximately 47,000 acres of forest, woodland and rangeland; most of the acreage is in two main areas to the southwest and north of Flagstaff (Figure 8). The Centennial Forest is managed by the SOF on behalf of NAU as a whole, but remains under the ownership of the Arizona State Land Division.

Figure 8. The NAU Centennial Forest.
Some of the most prominent activities on the forest include fuel reduction treatments, forestry research, and environmental education programs for youth. Because of proximity to campus, the southwestern portion of the Centennial Forest also serves as a primary outdoor laboratory for the BSF program.

2. Compare support for the forestry program, including faculty salaries by academic rank, to other academic units in the parent institution and indicate changes that have occurred or are anticipated in the educational budget. Provide the forestry program budget for the current fiscal year, and indicate by percent how the budget has changed in the last three years in terms of salaries, equipment, supplies, and travel and its relationship to the overall institutional budget. To the extent data for other forestry programs are available, regional comparisons are also encouraged.

A summary of the SOF budget for the current and previous three fiscal years (FY; July 1 - June 30) is shown below in Table 2. The budget has remained relatively stable over this period, with almost all the variation that did occur being attributable to fluctuations in the size of the faculty and therefore the salary line item. The non-salary portions of the SOF budget compare favorably with related academic units within the College of Engineering, Forestry and Natural Sciences.

Table 2. School of Forestry budget from state sources for the current and previous three fiscal years.

<table>
<thead>
<tr>
<th>Category</th>
<th>FY 2010</th>
<th>FY 2011</th>
<th>FY 2012</th>
<th>FY 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries</td>
<td>$1,634,022</td>
<td>$1,555,964</td>
<td>$1,656,749</td>
<td>$1,785,742</td>
</tr>
<tr>
<td>Student Wage</td>
<td>$30,206</td>
<td>$30,206</td>
<td>$30,406</td>
<td>$31,052</td>
</tr>
<tr>
<td>Operations</td>
<td>$60,930</td>
<td>$60,930</td>
<td>$60,930</td>
<td>$60,930</td>
</tr>
<tr>
<td>Professional and Outside Services</td>
<td>$3,014</td>
<td>$3,014</td>
<td>$3,104</td>
<td>$3,104</td>
</tr>
<tr>
<td>In State Travel</td>
<td>$14,154</td>
<td>$14,154</td>
<td>$14,154</td>
<td>$14,154</td>
</tr>
<tr>
<td>Capital</td>
<td>$42,439</td>
<td>$42,439</td>
<td>$42,439</td>
<td>$42,439</td>
</tr>
<tr>
<td>Bureau of Forest Research</td>
<td>$203,837</td>
<td>$204,173</td>
<td>$204,388</td>
<td>$204,389</td>
</tr>
<tr>
<td>Total</td>
<td>$1,933,762</td>
<td>$1,856,040</td>
<td>$2,012,170</td>
<td>$2,141,810</td>
</tr>
</tbody>
</table>

In addition to the state budget lines in the above table, the SOF maintains a total of 12 local accounts and a variable number of grant accounts. Local accounts are for special purposes and the funds come from a variety of sources. Examples of local accounts include Generated Overhead, Forestry Class Fees, and Forestry Vehicle Operations. Local accounts have been used for purposes such as purchasing equipment used in classes, support for faculty and staff travel, payment of publication page charges, and the purchase of new vehicles for the SOF fleet, including two during the past four years.

On January 31, 2013, there were 33 external grant accounts managed by the School of Forestry, totaling $4,292,605 over the life of the grants. Grant expenditures in FY 2012 totaled $3,275,328, but the average for FY10 – FY12 was lower, at $2,965,951. Major sources of funding on that date included the USDA Forest Service (including the Joint Fire Science
Program; $1,503,452), USDA-NIFA ($922,809), the State of Arizona ($672,254), the Bureau of Land Management ($148,929), NSF ($100,671), and the National Park Service ($82,256). In addition, there are another six external grants totaling $861,234. A number of School of Forestry faculty members also serve as co-PI on grants managed by the Ecological Restoration Institute, other NAU departments, or other institutions.

Average faculty salaries by rank are presented in Table 3 for the SOF and four other departments or schools within CEFNS. This data comes from the official FY 2013 budget book. Mid-fiscal year salary increases that were enacted in January 2013 are not incorporated into this table because the salaries for the other units are not yet published. However, the new average salaries for SOF faculty are $91,905 for professors, $71,584 for associate professors and $57,000 (i.e., no change) for assistant professors.

Table 3. Average faculty salaries for 9-month appointments for selected academic units within the College of Engineering, Forestry and Natural Sciences. The number in parentheses is the number of faculty used to compute the average.

<table>
<thead>
<tr>
<th>Faculty Rank</th>
<th>School of Forestry</th>
<th>Biological Sciences</th>
<th>SESES*</th>
<th>CEE**</th>
<th>Chemistry and Biochemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor***</td>
<td>$86,784 (9)</td>
<td>$90,492 (15)</td>
<td>$85,219 (12)</td>
<td>$108,478 (3)</td>
<td>$100,986 (3)</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>$66,848 (6)</td>
<td>$68,793 (6)</td>
<td>$75,022 (1)</td>
<td>$82,815 (5)</td>
<td>$68,021 (6)</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>$57,000 (2)</td>
<td>$60,000 (3)</td>
<td>$62,515 (2)</td>
<td>$71,829 (2)</td>
<td>$61,000 (2)</td>
</tr>
</tbody>
</table>

* School of Earth Sciences and Environmental Sustainability
** Civil and Environmental Engineering and Construction Management
*** Excludes Regents’ Professors, Endowed Chairs, Professors/Administrators

3. **Document that faculty are provided opportunities for development and continuing education.**

All NAU faculty have access to the services provided by the Faculty Development Program (FDP). As stated on their website (http://www.nau.edu/faculty-development/), the FDP organizes and conducts offerings aimed at engaging faculty in focused conversations about designing teaching and learning experiences to contribute to a "teaching commons" at Northern Arizona University. The FDP also manages a colleague-to-colleague mentoring program and provides consultations upon request to colleges, departments, committees, and individual faculty. The FDP is staffed by a full-time faculty member/program director and a full-time program coordinator.

The Arizona Board of Regents offers an Education Assistance Program (http://hr.nau.edu/benefits/additional_benefits/educ_assist/abor) through which all eligible NAU employees may enroll in courses at a highly reduced rate. Eligible employees, which includes all of our tenured and tenure-track faculty and all staff employed at greater than 50% FTE, pay only $25/semester to enroll in up to 9 credit hours of courses. This benefit has been used more frequently by SOF staff than faculty members, but there have several examples of faculty members enrolling in classes over the past five years. Associate Professor Kristen Waring, who is on sabbatical during the
2012/2013 academic year, is taking several statistics classes and hopes to complete NAU’s graduate-level Certificate in Applied Statistics. While they were still relatively new assistant professors, Ching Huang, Andi Thode, and Kristen Waring all took FOR 693 (Teaching Practicum) to improve their teaching skills.

4. **Document that the parent institution provides strong, well-staffed student support programs, and that non-forestry courses and support programs are readily accessible to forestry students.**

In addition to the extensive support provided by the SOF’s Student Services Coordinator, many other types of support are available to our students across the NAU campus. An overview of the types of services available can be found in the Student Support Services section of the Student Handbook (http://nau.edu/Student-Life/Student-Handbook/Support-Services/).

Forestry students, particularly in their freshman and sophomore years and for subjects such as math and chemistry, make frequent use of academic support services such as supplemental instruction and tutoring. These services are available at the North Campus and South Campus Student Learning Centers (SLCs; http://nau.edu/student-learning-centers/). The SLCs also offer other academic support services, such as workshops on improving study skills and short courses on preparation for tests such as the GRE.

More specialized support is available for particular types of students. For example, first-generation and low-income students have access to the Student Support Services program (http://nau.edu/student-support-services/), veterans can find additional services through the Student Veterans Center (http://home.nau.edu/veteransaffairs/student_vet_center.asp), and students with disabilities are supported by Disability Resources (http://www4.nau.edu/dr/).

Through Campus Health Services, our students also have access to Counseling Services (http://www4.nau.edu/counseling/). Their website message to students reads in part that “Counseling Services works with students to address the psychological challenges they may experience. Our counselors regularly work with depression and anxiety, relationship difficulties, eating and body image concerns, traumatic experiences, and adjustment issues, to name a few.”

5. **Document major strengths and weaknesses of the parent institution and supporting departments, including breadth and accessibility, and how they affect the forestry program.**

Despite some budgetary challenges over the past several years, Northern Arizona University remains a strong institution and has been able to make some significant improvements since the previous self-study. Some of the new facilities, such as the Health and Learning Center (http://home.nau.edu/hlc/default.asp) and the new student residences, have improved the quality of services offered to our students. New academic services and support structures, such as the University College (http://nau.edu/university-college/) and the Lumberjack Mathematics Center (http://nau.edu/CEFNS/NatSci/Math/Lumberjack-Mathematics-Center/About/), have been established to assist all undergraduate students. Also, as can be seen in the next section, the Cline Library continues to provide strong support to the SOF and our undergraduate students.
In an effort to promote faculty research, the university created a Vice President for Research office since the last self-study and has built up the staff in that area. While many of the services offered through the VPR’s office were in place before (e.g., a faculty grants program), there have been a number of new initiatives that will increase support for faculty research, which will in turn offer benefits to our undergraduate students. Several new grant and support programs have been established by that office, including ones to promote undergraduate research and to support hiring post-doctoral associates.

The most critical weaknesses of the parent institution are related to its tight budget, which has necessitated changes in funding, staffing levels, and organizational structures. Some of these changes, such as the loss of faculty positions and declines in staff support, have been documented elsewhere. The tight budget has also been a contributing factor to faculty salaries, which remain below NAU’s peer institutions despite much-appreciated efforts in recent years to increase them.

6. Document that adequate library facilities, holdings, electronic access to information, and related services are provided.

A report entitled Cline Library Support for the School of Forestry Undergraduate Program is provided in Appendix L. The report was prepared by Laura Rose Taylor, Coordinator of Planning and Assessment for NAU’s Cline Library.

Despite ongoing financial limitations on library holdings, Cline Library has continued to provide good support for the SOF’s undergraduate, graduate and research programs. Moreover, Cline Library assigns staff specifically to serve as a liaison to the SOF. Some key aspects of Cline Library’s support of our undergraduate program include:

- A demonstrated willingness of Cline Library staff to provide assistance to individual students and classes. One of the examples mentioned in the report is FOR 499 (Contemporary Developments), for which a librarian identified field guides and online resources that could be used for field identification during a class trip to the Smoky Mountains in North Carolina.
- Access to dozens of electronic journals pertinent to forestry and related fields of study.
- Access to numerous important databases, including Agricola, BioOne, Forest Science Database, ISI Web of Science, JSTOR, and Science Direct.
- An effective course reserve system.
- An efficient document delivery system for articles not available on campus.
- Access to hard copies of dozens of scientific journals, books and government publications pertinent to forestry and related fields of study.
7. Document that the parent institution, in collaboration with the unit housing the program, provides a physical environment that is safe, healthful, and conducive to learning.

Northern Arizona University provides a physical environment that is safe, healthful, and conducive to learning through a variety of means. The campus maintains its own full-service law enforcement agency staffed by sworn police officers certified by the state of Arizona and accredited by the Commission on Accreditation for Law Enforcement Agencies. Campus police patrol the campus on a 24-hour basis, offer a safety escort service on campus, and provide in excess of 100 blue emergency phones that ring directly to their dispatch center. They also offer student programs on a variety of health and safety-related subjects, including:

- alcohol and DUI awareness
- sexual assault and relationship violence awareness
- general safety and property theft prevention
- violence prevention support
- general safety tips and related information

In compliance with the Clery Act, the University produces an annual campus security and fire safety report that is available on line at:

(http://nau.edu/uploadedFiles/Homepage/Landing/cleryreport.pdf)

It is the official policy of Northern Arizona University to prohibit discrimination, to inform individuals of their right to be free from such behaviors, and to promote the safety of all individuals at university sites and activities. The University provides information on this Safe Working and Learning Environment (SWALE) policy on line and requires all new employees to complete a SWALE tutorial.

The SOF contributes to the safety of its students, faculty and staff through its own course-specific safety policies, by coordination with the campus police, building and grounds departments on issues that might affect workplace safety, and by compliance with regulations on matters such as chemical storage and fire codes.
APPENDICES
APPENDIX A

School of Forestry Advisory Council Members
NAU School of Forestry Advisory Council

Member List

Lee Alford (BSF, 1969; MSF 1971), Chair
Title: Vice President, Weyerhaeuser (Retired)
Summit, MS

Dan Binkley (BSF, 1977)
Title: Professor
Department of Forest, Rangeland and Watershed Stewardship
Warner College of Natural Resources
Colorado State University
Fort Collins, CO

Mary Coulombe (BSF, 1984)
Title: Chief
Natural Resources Management
US Army Corps of Engineers
Washington, DC

George Sam Foster
Title: Director
USDA Forest Service
Rocky Mountain Research Station
Fort Collins, CO

Scott Hunt (BSF, 1978)
Title: Arizona State Forester
Arizona State Forestry Division
Phoenix, AZ

Blair Moody (BSF, 1975)
Title: Biomass and Stewardship Lead
Medford District BLM/Rogue River-Siskiyou NF
Medford OR

Molly Pitts (BSF 1998)
Title: Former Executive Director
Northern Arizona Wood Products Association
Now lives in Salida, CO
Steven S. Rosenstock
Title: Research Biologist
Arizona Game and Fish Department/WMRS
5000 W. Carefree Highway
Phoenix, AZ 85365

Ted Schaefer (BSF, 1975)
Title: Vice President
Merrill Lynch
St. George, UT

David Schmidt (BSF, 1962)
Title: Owner,
Schmidt Family Forest, LLC
Albany, OR

Deanne Shulman (BSF, 1981)
Title: Senior Emergency Management Specialist (Retired)
USDA Forest Service
International Programs
Washington, DC

John Stephenson (BSF, 1963)
Title: Forester, Bureau of Land Management (Retired)
Cornville, AZ

Steve Templin (BSF, 1978)
Title: Owner
 Templin Forestry
Boyce, LA
APPENDIX B

CURRENT CURRICULUM

SAF Document A-1 General Education Summary – Required Courses
SAF Document B-1 Forestry Education Summary – Required Courses
SAF Document B-2 Forestry Education Summary – Restricted Electives
Curriculum Progression Plans
School of Forestry Certificates
## Required Courses:

<table>
<thead>
<tr>
<th># &amp; Title</th>
<th>Communications</th>
<th>Science and Mathematics</th>
<th>Social Science &amp; Humanities</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 105 Critical Reading and Writing in the University Community</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAT 125 Precalculus Mathematics</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>STA 270 Applied Statistics</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CHM 130 Fundamental Chemistry</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CHM 130L Fundamental Chemistry I Lab</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>BIO 181 Unity of Life I: Life of the Cell</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BIO 181L Unity of Life I Laboratory</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>BIO 182 Unity of Life II: Lives of Multicellular Organisms</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>BIO 182L Unity of Life II: Lives of Multicellular Organisms Laboratory</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECO 284 Principles of Economics: Micro</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CIS 120 Introduction to Computer Information Systems</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CST 111 Fundamentals of Public Speaking</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Credit Hours</strong></td>
<td>7</td>
<td>22</td>
<td>3</td>
</tr>
</tbody>
</table>
# Document B-1: Forestry Education Summary – Required Courses

**Institution Name:** Northern Arizona University  
**Academic Year:** 2012-2013

## Official Degree Program Title: Bachelor of Science in Forestry

## Official Option Title: NA

### Required Courses

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credit Hours in SAF-Required Areas of Study</th>
<th>Course Contains Significant Content in (check all that apply):</th>
<th>Total Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 101 Introduction to Forestry</td>
<td>1.0</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 211 Forest Measurements</td>
<td>3.0</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 212 Trees and Forests of North America</td>
<td>2.0</td>
<td></td>
<td>2.0</td>
</tr>
<tr>
<td>FOR 213 Forest Soils</td>
<td>3.0</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 215 Writing in Forestry</td>
<td>2.0</td>
<td>X</td>
<td>2.0</td>
</tr>
<tr>
<td>FOR 220 Introduction to Forest and Range Plants</td>
<td>2.0</td>
<td>X</td>
<td>2.0</td>
</tr>
<tr>
<td>FOR 313 Forest Ecology I</td>
<td>4.0</td>
<td>X</td>
<td>4.0</td>
</tr>
<tr>
<td>FOR 314 Forest Ecology II</td>
<td>3.0</td>
<td>X</td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 315 Silviculture I</td>
<td>2.0</td>
<td>X</td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 316 Silviculture Applications</td>
<td>2.0</td>
<td>X</td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 360 Natural Resources Policy</td>
<td>3.0</td>
<td>X</td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 323W Forest Management I</td>
<td>3.0</td>
<td>X</td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 324 Forest Management II</td>
<td>1.5</td>
<td>1.5</td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 325W Forest Management III</td>
<td>3.0</td>
<td>X</td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 326 Forest Management IV</td>
<td>4.0</td>
<td>X</td>
<td>4.0</td>
</tr>
<tr>
<td>FOR 413 Forest Ecosystem Assessment I</td>
<td>1.0</td>
<td>2.0</td>
<td>X</td>
</tr>
<tr>
<td>FOR 414C Forest Ecosystem Assessment II</td>
<td>1.0</td>
<td>2.0</td>
<td>X</td>
</tr>
<tr>
<td>FOR 423C Forest Ecosystem Planning I</td>
<td>2.0</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>FOR 424C Forest Ecosystem Planning II</td>
<td>1.0</td>
<td>2.0</td>
<td>X</td>
</tr>
</tbody>
</table>

**Total Required Credit Hours:** 22.0

---

1. Include only required courses in forestry, natural resource, or other professional areas. Do not include electives, restricted electives, or basic, general education courses such as math, basic sciences, or English.

2. See SAF Standard II: Curriculum, for specific areas of study definitions. Credit hours may be distributed among two or more areas of study for a listed course.
# Current Curriculum

## Document B-2: Forestry Education Summary – Restricted Electives

Institution Name: Northern Arizona University  
Academic Year: 2012-2013

Official Degree Program Title: Bachelor of Science in Forestry

Official Option Title: NA

### Required Courses

<table>
<thead>
<tr>
<th>Course # &amp; Title</th>
<th>Credit Hours in SAF-Required Areas of Study</th>
<th>Course Contains Significant Content in (check all that apply):</th>
<th>Total Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 203 Project Learning Tree</td>
<td>1</td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>FOR 204 Project Wild</td>
<td>1</td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>FOR 205 Project Wild Aquatic</td>
<td>1</td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>FOR 205 Project Wet</td>
<td>1</td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>FOR 222 Environmental Conservation</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>FOR 230 Multicultural Perspectives Of Natural Resource Management</td>
<td>2</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>FOR 240 Conservation Biology</td>
<td>2</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>FOR 250 Arizona’s Forests and Wildlife</td>
<td>2</td>
<td>1</td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 251 Introduction to Wildland Fire</td>
<td>2</td>
<td>2</td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 255 International Wildlife Issues</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>FOR 270 Native American Ecology</td>
<td>3</td>
<td>X</td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 283 Forestry in the Wildland Urban Interface</td>
<td>1</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>FOR 340 Environmental Hydrology</td>
<td>3</td>
<td>3.0</td>
<td></td>
</tr>
<tr>
<td>FOR 340L Environmental Hydrology Lab</td>
<td>1</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>FOR 351 Fire Monitoring And Modeling</td>
<td>2</td>
<td>1</td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 370 Indigenous Knowledge: Ecological Implications</td>
<td>3</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>FOR 381 Forest Ecosystem Management</td>
<td>0.5</td>
<td>2.5</td>
<td>X</td>
</tr>
<tr>
<td>FOR 382 Ecological Restoration</td>
<td>2</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>FOR 410 Multiple Resources Silviculture</td>
<td>2</td>
<td>1</td>
<td>X</td>
</tr>
<tr>
<td>FOR 415 Forestry In Developing Countries</td>
<td>2</td>
<td>1</td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 425 Forest Management Applications In GIS</td>
<td>3</td>
<td>X</td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 430 Leadership And The Environment</td>
<td>3</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
<td>Hours</td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------------------------------------</td>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>FOR 441</td>
<td>Sustainable Forestry In Tropical Ecosystems: International Field</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 442</td>
<td>Principles Of Wood Science And Technology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOR 443</td>
<td>Ecology And Management Of Introduced Species In Forests And</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 445</td>
<td>Wilderness Management</td>
<td>2.5</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 447</td>
<td>Human-forest Interactions From Community Perspective</td>
<td>2.5</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 451</td>
<td>Fire Ecology And Management</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 452</td>
<td>Forest Pathology</td>
<td>3</td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 453</td>
<td>Forest Insects</td>
<td>3</td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 454</td>
<td>Forest Health</td>
<td>2.5</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 465</td>
<td>Watershed Restoration</td>
<td>1.5</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 479</td>
<td>Ecosystems And Climate Change</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Total Required Credit Hours**: 45 5 30 9 89

1. Include only restricted electives in forestry, natural resource, or other professional areas. Do not include free electives or basic general education courses such as math, basic sciences, or English.

2. See SAF Standard II: Curriculum, for specific areas of study definitions. Credit hours may be distributed among two or more areas of study for a listed course.
# Bachelor of Science in Forestry
## Degree Progression Plan

### Freshman Year

<table>
<thead>
<tr>
<th>1st term</th>
<th></th>
<th>2nd term</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 101</td>
<td>Introduction to Forestry</td>
<td>3</td>
<td>FOR 212</td>
</tr>
<tr>
<td>CIS 120</td>
<td>Intro. Comp Info. Systems (SAS)</td>
<td>3</td>
<td>CST 111</td>
</tr>
<tr>
<td>MAT 125</td>
<td>Precalculus</td>
<td>4</td>
<td>BIO 181</td>
</tr>
<tr>
<td>ENG 105</td>
<td>Critical Reading &amp; Writing</td>
<td>4</td>
<td>BIO 181L</td>
</tr>
<tr>
<td>NAU 100</td>
<td>Transition to College</td>
<td>1</td>
<td>STA 270</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total units 15 16

### Sophomore Year

<table>
<thead>
<tr>
<th>3rd term</th>
<th></th>
<th>4th term</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 211</td>
<td>Forest Measurements</td>
<td>3</td>
<td>FOR 213</td>
</tr>
<tr>
<td>FOR 220</td>
<td>Intro. to Forest and Range Plants</td>
<td>2</td>
<td>BIO 182</td>
</tr>
<tr>
<td>CHM 130</td>
<td>Fundamental Chemistry (SAS) ***</td>
<td>4</td>
<td>BIO 182L</td>
</tr>
<tr>
<td>CHM 130L</td>
<td>General Chemistry-Lab ***</td>
<td>1</td>
<td>ECO 284</td>
</tr>
<tr>
<td>LS/ DIV/ CT</td>
<td>Liberal Studies/Diversity/Certificate *</td>
<td>3</td>
<td>FOR 215</td>
</tr>
<tr>
<td>GE</td>
<td>General Elective **</td>
<td>1</td>
<td>LS/ DIV/ CT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>GE</td>
</tr>
</tbody>
</table>

Total units 14 16

### Junior Year

<table>
<thead>
<tr>
<th>5th term: Semester A-Professional Program</th>
<th>6th term: Semester B-Professional Program</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 313</td>
<td>Forest Ecology I</td>
<td>4</td>
</tr>
<tr>
<td>FOR 314</td>
<td>Forest Ecology II</td>
<td>3</td>
</tr>
<tr>
<td>FOR 315</td>
<td>Silviculture Principles</td>
<td>3</td>
</tr>
<tr>
<td>FOR 316</td>
<td>Silviculture Applications</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total units 13 16

### Senior Year

<table>
<thead>
<tr>
<th>7th term: Semester C-Professional Program</th>
<th>8th term: Semester D-Professional Program</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 413C</td>
<td>Forest Ecosystem Assessment I</td>
<td>3</td>
</tr>
<tr>
<td>FOR 414C</td>
<td>Forest Ecosystem Assessment II</td>
<td>3</td>
</tr>
<tr>
<td>LS/ DIV/ CT</td>
<td>Liberal Studies/Diversity/Certificate *</td>
<td>3</td>
</tr>
<tr>
<td>LS/ DIV/ CT</td>
<td>Liberal Studies/Diversity/Certificate *</td>
<td>3</td>
</tr>
</tbody>
</table>

Total units 15 15

### Liberal Studies Distribution blocks

<table>
<thead>
<tr>
<th>AHI (6 units)</th>
<th>SPW (6 units)</th>
<th>CU (6 units)</th>
<th>Science (7 units)</th>
<th>Additional 3 units to reach 35 total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC 111 (3)</td>
<td>BIO 181/L (4)</td>
<td>CIS 120 (3)</td>
<td>STA 270 (3)</td>
<td></td>
</tr>
</tbody>
</table>
PROGRAM INFORMATION

- A minimum of 120 units are required for this degree. The Pre-Professional foundation (1st – 4th term) consists of the following 48 units (or the equivalent for transfer students), which you must satisfactorily complete with a grade of “C” or better before you are eligible to enter the Professional Program:
  - ENG 105 (4 units)
  - MAT 125 & STA 270 (7 units)
  - CHM 130 & 130L or CHM 151 & 151L (5 units)
  - BIO 181/181L (4 units)
  - BIO 182/182L (4 units)
  - ECO 284 (3 units)
  - CIS 120 (3 units)
  - BIO 181/181L (4 units)
  - BIO 182/182L (4 units)
  - FOR 101, 211, 212, 213, 215, and 220 (15 units)

- Application and admission to the Professional Program (5th – 8th term) is required. This is generally done during the 4th term. You must complete all of the listed lower-division Pre-Professional courses (above) with a 2.75 GPA before you can be admitted to and enrolled in the Professional Program. Be aware that the 5th term only starts in the Fall. Contact the Student Services Coordinator in the School of Forestry for details.

* Some courses must be multiple used in Liberal Studies, Diversity and/or Certificate requirements. For example: Take a liberal studies course that also satisfies a diversity requirement.

* Complete an approved Certificate or the Individualized Concentration for 12-15 units. Certificates require a minimum of 9 units of 300-400 level courses. You must also earn a grade of “C” or better in each Certificate or Concentration course (except FOR 408 or 485). Below is a list of approved certificates. See catalog for requirements.
  - Fire Ecology and Management
  - Forest Health and Ecological Restoration
  - International Forestry and Conservation
  - Human Dimensions of Forest Management
  - Wildlife Ecology and Management

** Recitations are available and strongly encouraged for BIO 181, BIO 182, & CHM 130; however they are not required.

*** You must complete CHM 130/130L or CHM 151/151L – CHM 130/130L is recommended.

GENERAL INFORMATION

- This degree progression plan is to be used in conjunction with the academic catalog and degree progress report.
- Students are encouraged to see an Academic Advisor regularly to confirm their academic progress.
- Many courses have pre-requisites. Please check the academic catalog for pre-requisite and placement information.
- Some courses are only offered once a year (Fall term only or Spring term only). Some of these courses may be pre-requisites for future courses. Please check with your department for current course rotations.
- Honors students complete different requirements to meet NAU’s Liberal Studies program. Students should consult an Honors Program Advisor for complete information on fulfilling Honors Liberal Studies requirements.
- All students are required to complete at least 120 total units which includes:
  - 35 units of Liberal Studies courses: [http://www4.nau.edu/aio/Articulation/LScourselist.htm](http://www4.nau.edu/aio/Articulation/LScourselist.htm)
  - 6 units of Diversity courses (3 units in Global & 3 units in Ethnic): [http://www4.nau.edu/aio/Articulation/DiversityCourseList.htm](http://www4.nau.edu/aio/Articulation/DiversityCourseList.htm)
  - 30 units of upper division courses (300-400 level), 18 of these units must be taken at NAU.
- Enrollment in the English foundations course for Liberal Studies is based off a student’s SAT/ACT scores or incoming transfer/test credit, otherwise the student must take the English Placement Exam: [http://www.nau.edu/comp/placement.html](http://www.nau.edu/comp/placement.html)
- Enrollment in the Math foundations course for Liberal Studies requires students to take the ALEKS Math Placement Exam: [http://www.cefns.nau.edu/Academic/Math/studentInformation/Placement/Placement.shtml](http://www.cefns.nau.edu/Academic/Math/studentInformation/Placement/Placement.shtml)

CONTACT INFORMATION

Erin Saunders  
Student Services Coordinator  
School of Forestry  
Building 82, Room 126  
Phone: (928) 523-7065  
EMAIL: Erin.Saunders@nau.edu

Debbie Wildermuth  
Academic Services Coordinator  
College of Engineering, Forestry & Natural Sciences  
Building 21, Room 132  
Phone: (928) 523-8956  
EMAIL: Debbie.Wildermuth@nau.edu
SCHOOL OF FORESTRY
NORTHERN ARIZONA UNIVERSITY
Certificate in
Fire Ecology & Management
Advising Checksheet: 2012-2013 Catalog

18 units, 9 must be completed at NAU
*Requirement may be waived for students with 4+ season’s fire experience
† Course designed for students in the Forestry Federal Agency Training Group
△ BSF student track

### Required:

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 251*</td>
<td>Intro to Wildland Fire</td>
<td>F/S</td>
<td>N/A</td>
<td>Before Sem. A</td>
</tr>
</tbody>
</table>

Choose one course from each block:

#### Ecology: (FOR students use FOR 313 as it is part of Semester A)

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 310†</td>
<td>Forest Ecology for Professionals</td>
<td>Fall Only</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 313</td>
<td>Forest Ecology I (Sem A)</td>
<td>Fall Only</td>
<td>Admission to BSF, Co requisite FOR 314</td>
<td>Sem. A</td>
</tr>
<tr>
<td>(3)</td>
<td>BIO 326</td>
<td>Ecology</td>
<td>F/S</td>
<td>BIO 181 or 181H and (BIO 182 or ENV 230)</td>
<td></td>
</tr>
</tbody>
</table>

#### Measurement, Analysis, & Technology:

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 351†</td>
<td>Fire Monitoring and Modeling</td>
<td>Fall Odd</td>
<td>FOR 251</td>
<td>Sem. A/C</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 425†</td>
<td>Forest Mgmt Applications in GIS</td>
<td>Check Louie</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

#### Fire Ecology:

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 450†</td>
<td>Fire Ecology for Professionals</td>
<td>Check Louie</td>
<td>FOR 310</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 451 or FOR 551</td>
<td>Fire Ecology and Management</td>
<td>Spring odd</td>
<td>FOR 351 or Jr. Status or higher</td>
<td>Sem. B/D</td>
</tr>
</tbody>
</table>
### Fuel Management:
(FOR students use FOR 315 as it is part of Semester A)

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 315</td>
<td>(3)</td>
<td>Sem. A</td>
<td></td>
</tr>
<tr>
<td>Silviculture Principals (Sem A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall Only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admission to BSF, Co requisite FOR 316</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOR 317†</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silviculture and Fire Principles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check Louie</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOR 318†</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel Treatments and Modeling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check Louie</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOR 410</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiple Resources Silviculture</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring odd</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOR 410 (co-510)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Management, Planning & Policy:
(FOR students cannot use FOR 360 to fulfill this block)

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 283</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forestry in Wildland Urban Interface</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring Var.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any spring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOR 360†</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Resources Policy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring Only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department consent required</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOR 444†</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilderness Mgmt for Professionals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall Only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOR 445</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilderness Mgmt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall Only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sem. C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Upper division coursework in areas related to natural resources mgmt or science</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOR 447</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human-Forest Interactions from Community Perspective</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall Only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructor consent required</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sem. C</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Student Plan:

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required: FOR 251</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecology: FOR 313</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measurement, Analysis, &amp; Technology:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire Ecology:</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuel Management: FOR 315</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mgmt., Planning &amp; Policy:</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SCHOOL OF FORESTRY
NORTHERN ARIZONA UNIVERSITY
Certificate in
Forest Health & Ecological Restoration
Advising Checksheet: 2012-2013 Catalog

*One course must be taken with Semester A and the other with Semester C
**One course must be taken with Semester B and the other with Semester D

<table>
<thead>
<tr>
<th>Required:</th>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 211</td>
<td>Forest Measurements</td>
<td>F/SS</td>
<td>MAT 125/125H or Higher Pre or Co-requisites STA 270</td>
<td>Fall Soph</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>*FOR 382</td>
<td>Ecological Restoration</td>
<td>Fall Only</td>
<td>Instructors Consent required</td>
<td>Sem. A/C</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>**FOR 454 or FOR 443</td>
<td>Forest Health</td>
<td>Spring only</td>
<td>454: FOR 413/414C, &amp; FOR 415 or 1 BIO/FOR Course</td>
<td>Sem. B/D</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 443</td>
<td>Ecology &amp; Mgmt of Intro Spp. in Forests &amp; Rnglds</td>
<td>Spring even</td>
<td>443: N/A</td>
<td>Sem. B/D</td>
<td></td>
</tr>
</tbody>
</table>

Forest Health Track:

| (3)       | *FOR 452 | Forest Pathology | Fall Only | FOR 313 - 316 or 1 Biology course | Sem. A/C |
| (3)       | **FOR 453 | Forest Insects | Spring Only | FOR 313 - 316 or 1 Biology course | Sem. B/D |

Ecological Restoration Track:

| (3)       | FOR 251 | Intro. To Wildland Fire | F/S     | N/A | Any |
| (3)       | †FOR 408 or FOR 485 | Fieldwork Experience/Undergrad Research | ALL | 408/485: Department consent required | |

†Students must visit with Student Services Coordinator in advance to determine the options for their INDIV course.
<table>
<thead>
<tr>
<th>Ecological Restoration Track:</th>
<th>(6)</th>
<th>Student Plan:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required: FOR 251</td>
<td>(3)</td>
<td></td>
</tr>
<tr>
<td>Required: FOR 408/485</td>
<td>(3)</td>
<td></td>
</tr>
</tbody>
</table>
Certificate in Human Dimensions of Forest Management
Advising Checksheet: 2012-2013 Catalog

*One course must be taken with Semester B and the other with Semester D

### Required:

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>*FOR 360</td>
<td>Natural Resources Policy</td>
<td>Spring Only</td>
<td>Department consent required</td>
<td>Sem. B/D</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 447</td>
<td>Human-Forest Interactions from Community Perspective</td>
<td>Fall Only</td>
<td>Instructor’s consent required</td>
<td>Sem. C</td>
</tr>
</tbody>
</table>

Select a minimum of 9 units from the following:

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 230</td>
<td>Multicultural Perspectives of Natural Resource Mgmt</td>
<td>Spring Only</td>
<td>N/A</td>
<td>Any Spring</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 283</td>
<td>Forestry in the Wildland-Urban Interface</td>
<td>Spring Var.</td>
<td>N/A</td>
<td>Any Spring</td>
</tr>
<tr>
<td>(3)</td>
<td>*FOR 415</td>
<td>Forestry in Developing Countries</td>
<td>Spring Only</td>
<td>1 FOR/1 BIO course</td>
<td>Sem. B/D</td>
</tr>
<tr>
<td>(3)</td>
<td>*FOR 430</td>
<td>Leadership and the Environment</td>
<td>Spring Only</td>
<td>Junior status or higher</td>
<td>Sem. B/D</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 445</td>
<td>Wilderness Management</td>
<td>Fall Only</td>
<td>Upper division coursework in natural resources mgmt or science</td>
<td>Sem. A/C</td>
</tr>
<tr>
<td>(3)</td>
<td>COM 150</td>
<td>Environmental Communication</td>
<td>F/S</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>GSP 206</td>
<td>Public Participation &amp; Communication</td>
<td>Spring Only</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>GSP 402</td>
<td>Environmental Impacts Statements</td>
<td>Fall Only</td>
<td>Junior Status</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>PR 272</td>
<td>Intro to Public Relations</td>
<td>F/S</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

### Student Plan:

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required: FOR 360</td>
<td>(3)</td>
<td>________</td>
<td>________</td>
</tr>
<tr>
<td>Required: FOR 447</td>
<td>(3)</td>
<td>________</td>
<td>________</td>
</tr>
</tbody>
</table>

9 Additional Units:

| ________ | ________ | ________ | ________ |
## Certificate in International Forestry & Conservation

**Advising Checksheet: 2012-2013 Catalog**

*One course must be taken with Semester B and the other with Semester D*

### Required:

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 240</td>
<td>Intro to Conservation Biology</td>
<td>Spring Only</td>
<td>N/A</td>
<td>Any spring</td>
</tr>
<tr>
<td>(3)</td>
<td>*FOR 415</td>
<td>Forestry in Developing Countries</td>
<td>Spring Only</td>
<td>1 FOR or BIO Course</td>
<td>Sem. B/D</td>
</tr>
</tbody>
</table>

**Select 6-9 of the following units:**

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 230</td>
<td>Multicultural Perspective of Natural Resource Mgmt</td>
<td>Spring Only</td>
<td>N/A</td>
<td>Any spring</td>
</tr>
<tr>
<td>(3)</td>
<td>*FOR 360</td>
<td>Natural Resources Policy</td>
<td>Spring Only</td>
<td>Department Consent Required</td>
<td>Sem. B/D</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 381</td>
<td>Forest Ecosystem Mgmt</td>
<td>Spring odd</td>
<td>N/A</td>
<td>Spring Soph/Sem. D</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 441</td>
<td>Sustainable Forestry in Tropical Ecosystems:</td>
<td>Spring odd</td>
<td>Instructor Consent Required</td>
<td>Any</td>
</tr>
<tr>
<td></td>
<td></td>
<td>International Field Experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 493</td>
<td>Natural Resource Economics</td>
<td>Fall Only</td>
<td>ECO 284 or 284H</td>
<td>Sem. A/C</td>
</tr>
<tr>
<td>(3)</td>
<td>ANT 370</td>
<td>Human Ecology</td>
<td>Various</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>ENV 440</td>
<td>Conservation Biology</td>
<td>Fall Only</td>
<td>ENV 326 or FOR 313</td>
<td>Sem. C</td>
</tr>
<tr>
<td>(3)</td>
<td>PHI 331</td>
<td>Environmental Ethics</td>
<td>F/S</td>
<td>Instructor’s consent</td>
<td>After Sem. A</td>
</tr>
<tr>
<td>(3)</td>
<td>POS 120</td>
<td>World Politics</td>
<td>F/S/Online</td>
<td>N/A</td>
<td>Any</td>
</tr>
<tr>
<td>(3)</td>
<td>POS 361</td>
<td>Politics of Developing Nations</td>
<td>Various</td>
<td>POS 120 or POS 201</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>POS 366/370/374</td>
<td>366: Studies In Latin America Politics 370: Asian Politics 374: African Politics</td>
<td>Various</td>
<td>POS 120 or POS 201 or POS 361</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>POS 380</td>
<td>Advanced International Politics</td>
<td>Various</td>
<td>POS 120 or POS 201</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>PRM 300</td>
<td>Ecotourism</td>
<td>Winter or Summer</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>
Select 0-3 of the following units:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Format</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANT 301</td>
<td>Peoples of the World</td>
<td>F/S/Online</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>ANT 302</td>
<td>World Area Studies</td>
<td>Check Louie</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>ANT 303</td>
<td>Peoples of Latin America</td>
<td>Online</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>GSP 240</td>
<td>World Geography West</td>
<td>F/S/Online</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>GSP 241</td>
<td>World Geography East</td>
<td>F/S/Online</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>GSP 348</td>
<td>Geography Area Studies</td>
<td>Various</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>CST 323</td>
<td>Intercultural Communication</td>
<td>F/S</td>
<td>Soph Status or higher</td>
<td></td>
</tr>
</tbody>
</table>

**Student Plan:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required: FOR 240 (3)</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>Required: FOR 415 (3)</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>Additional Units: (9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required: __________ (3)</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>Required: __________ (3)</td>
<td>______</td>
<td>______</td>
</tr>
<tr>
<td>Required: __________ (3)</td>
<td>______</td>
<td>______</td>
</tr>
</tbody>
</table>
**Required:** FOR students should plan on taking Sem A for ecology and BIO 478 due to prerequisite issues.

<table>
<thead>
<tr>
<th>Unit(s)</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(4)</td>
<td>BIO 182</td>
<td>Unity of Life II</td>
<td>F/S/SS</td>
<td>N/A</td>
<td>Spring Fresh, Fall/Spring Soph</td>
</tr>
<tr>
<td>(4)</td>
<td>BIO 326 &amp; 326L/</td>
<td>Ecology</td>
<td>Fall/Spring</td>
<td>BIO 181/H &amp; (182 or ENV 230)</td>
<td>Professional Prgm admit</td>
</tr>
<tr>
<td></td>
<td>or FOR 313 &amp; 314</td>
<td>Sem A</td>
<td>Fall only</td>
<td>Professional Prgm admit</td>
<td>Sem. A</td>
</tr>
<tr>
<td>(3)</td>
<td>BIO 477/</td>
<td>Fish Mgmt/</td>
<td>Spring</td>
<td>BIO 223 &amp; 425C</td>
<td>Sem. C</td>
</tr>
<tr>
<td></td>
<td>or BIO 478</td>
<td>Wildlife Mgmt</td>
<td>even</td>
<td>BIO 223, Sem A</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>BIO 526</td>
<td>Herpetology</td>
<td>Spring odd</td>
<td>BIO 182, 223</td>
<td>(Sem. D)</td>
</tr>
<tr>
<td>(3)</td>
<td>BIO 527</td>
<td>Ornithology</td>
<td>Spring</td>
<td>Junior Status</td>
<td>(Sem. D)</td>
</tr>
<tr>
<td>(3)</td>
<td>BIO 528</td>
<td>Mammalogy</td>
<td>Spring odd</td>
<td>Junior Status</td>
<td>(Sem. D)</td>
</tr>
</tbody>
</table>

**Choose one course from each block, at least 6 units must be upper division:**

**Wildlife Biology:**

<table>
<thead>
<tr>
<th>Unit(s)</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>BIO 526</td>
<td>Herpetology</td>
<td>Spring odd</td>
<td>BIO 182, 223</td>
<td>(Sem. D)</td>
</tr>
<tr>
<td>(3)</td>
<td>BIO 527</td>
<td>Ornithology</td>
<td>Spring</td>
<td>Junior Status</td>
<td>(Sem. D)</td>
</tr>
<tr>
<td>(3)</td>
<td>BIO 528</td>
<td>Mammalogy</td>
<td>Spring odd</td>
<td>Junior Status</td>
<td>(Sem. D)</td>
</tr>
</tbody>
</table>

**Zoology:** BIO 223 is highly recommended based on Federal requirements

<table>
<thead>
<tr>
<th>Unit(s)</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 453</td>
<td>Forest Insects</td>
<td>Spring only</td>
<td>SemA or BIO</td>
<td>Sem. B/D</td>
</tr>
<tr>
<td>(4)</td>
<td>BIO 223</td>
<td>Vert. Zoology</td>
<td>Spring only</td>
<td>BIO 181, 182</td>
<td>Soph Spring/Sem. D</td>
</tr>
<tr>
<td>(3)</td>
<td>BIO 322</td>
<td>Entomology</td>
<td>Fall only</td>
<td>BIO 181, 182</td>
<td>Sem. A/C</td>
</tr>
<tr>
<td>(3)</td>
<td>BIO 340</td>
<td>Genetics &amp; Evolution</td>
<td>Fall/Spring</td>
<td>BIO 181, 182</td>
<td>Sem. B</td>
</tr>
<tr>
<td>Course</td>
<td>Course Title</td>
<td>Units</td>
<td>Semester</td>
<td>Grade</td>
<td></td>
</tr>
<tr>
<td>--------</td>
<td>--------------</td>
<td>-------</td>
<td>----------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>BIO 424</td>
<td>Comparative Vertebrate Anat.</td>
<td>Fall odd</td>
<td>BIO 340</td>
<td>Sem. C <em>(conflicts with BIO 478)</em></td>
<td></td>
</tr>
<tr>
<td>BIO 425C</td>
<td>Animal Phys</td>
<td>Fall/Spring</td>
<td>CHM130,151L,BIO344</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIO 525</td>
<td>Ichthyology</td>
<td>Fall even</td>
<td>BIO 223, 425</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Botany:** Forestry students can use FOR 220 but will need an additional upper division course from another block to meet the ‘6 units of upper division coursework’ requirement stated above.

<table>
<thead>
<tr>
<th>Course</th>
<th>Course Title</th>
<th>Units</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 182</td>
<td>Plant ID</td>
<td>Fall only</td>
<td>N/A</td>
<td>Fresh/Soph Fall</td>
</tr>
<tr>
<td>BIO 411</td>
<td>Mycology</td>
<td>Various</td>
<td>BIO 181, 182</td>
<td>Soph Spring/Sem. D</td>
</tr>
<tr>
<td>BIO 414</td>
<td>Native Plants of AZ</td>
<td>Fall Odd</td>
<td>BIO 181, 182</td>
<td>Sem. A/C <em>(conflicts with BIO 478)</em></td>
</tr>
<tr>
<td>BIO 415</td>
<td>Plant Taxonomy</td>
<td>Spring even</td>
<td>BIO 182, 284/345/347/410/411/414/426C/431</td>
<td></td>
</tr>
<tr>
<td>BIO 517</td>
<td>Agrostology</td>
<td>Fall even</td>
<td>BIO 415</td>
<td></td>
</tr>
</tbody>
</table>

**Student Plan:**

| Required: | BIO 182 | (4) | Semester | Grade | No. upper division units: ____ |
| Required: | FOR 313-314 | (7) | | |
| Required: | BIO 478 | (3) | | |
| Wildlife Biology: | | (3) | | |
| Zoology: | | | | |
| Botany: | FOR 220 | (2) | | |
| 1 Additional: | | | | |

*(upper division)*
APPENDIX C

NEW CURRICULUM

SAF Document A-1 General Education Summary – Required Courses
SAF Document B-1 Forestry Education Summary – Required Courses
Curriculum Progression Plans
School of Forestry Certificates
## New Curriculum

### Document A-1: General Education/Pre-professional Summary—Required Courses

Institution Name: Northern Arizona University  
Academic Year: 2013+

Official Degree Program Title: Bachelor of Science in Forestry

Official Option Title: NA

<table>
<thead>
<tr>
<th>Required Courses: # &amp; Title</th>
<th>Total Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Communications</td>
</tr>
<tr>
<td>ENG 105 Critical Reading and Writing in the University Community</td>
<td>4</td>
</tr>
<tr>
<td>MAT 125 Precalculus Mathematics</td>
<td>4</td>
</tr>
<tr>
<td>STA 270 Applied Statistics</td>
<td>3</td>
</tr>
<tr>
<td>CHM 130 Fundamental Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHM 130L Fundamental Chemistry I Lab</td>
<td>1</td>
</tr>
<tr>
<td>BIO 181 Unity of Life I: Life of the Cell</td>
<td>3</td>
</tr>
<tr>
<td>BIO 181L Unity of Life I Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>BIO 182 Unity of Life II: Lives of Multicellular Organisms</td>
<td>3</td>
</tr>
<tr>
<td>BIO 182L Unity of Life II: Lives of Multicellular Organisms</td>
<td>1</td>
</tr>
<tr>
<td>ECO 280 or 284 Principles of Economics: Micro</td>
<td></td>
</tr>
<tr>
<td>CST 111 Fundamentals of Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credit Hours</strong></td>
<td>7</td>
</tr>
</tbody>
</table>
New Curriculum

Document B-1: Forestry Education Summary – Required Courses

Institution Name: Northern Arizona University

Official Degree Program Title: Bachelor of Science in Forestry

Official Option Title: NA

<table>
<thead>
<tr>
<th>Required Courses # &amp; Title</th>
<th>Credit Hours in SAF-Required Areas of Study</th>
<th>Course Contains Significant Content in (check all that apply):</th>
<th>Total Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 101 Introduction to Forestry</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 211 Forest Measurements</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 213 Forest Soils</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 215 Writing in Forestry</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>2.0</td>
</tr>
<tr>
<td>FOR 225 GIS Tools in Forestry</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>2.0</td>
</tr>
<tr>
<td>FOR 220 Introduction to Forest and Range Plants</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 313 Forest Ecology I</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 314 Forest Ecology II</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 315 Silviculture I</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 319 Forest Operations</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>2.0</td>
</tr>
<tr>
<td>FOR 360 Natural Resources Policy</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 323W Forest Management I</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>5.0</td>
</tr>
<tr>
<td>FOR 324 Forest Management II</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 325 Forest Management III</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 411 Capstone Preparation</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>1.0</td>
</tr>
<tr>
<td>FOR 413 Forest Ecosystem Assessment I</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 412 Silviculture II</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 423C Forest Ecosystem Planning I</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>3.0</td>
</tr>
<tr>
<td>FOR 422 Forest Planning</td>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
<td><img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /> <img src="https://via.placeholder.com/150" alt="Image" /></td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Required Credit Hours 16.0 11.0 16.5 10.5 54.0

1 Include only required courses in forestry, natural resource, or other professional areas. Do not include electives, restricted electives, or basic, general education courses such as math, basic sciences, or English.

2 See SAF Standard II: Curriculum, for specific areas of study definitions. Credit hours may be distributed among two or more areas of study for a listed course.
# Bachelor of Science in Forestry

**FORESTRY**

## 2013-2014 Undergraduate Catalog

### Degree Progression Plan

#### Freshman Year

<table>
<thead>
<tr>
<th>1st term</th>
<th>2nd term</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 101</td>
<td>ENG 105</td>
</tr>
<tr>
<td>MAT 125</td>
<td>CST 111</td>
</tr>
<tr>
<td>BIO 181</td>
<td>BIO 182</td>
</tr>
<tr>
<td>BIO 181L</td>
<td>BIO 182L</td>
</tr>
<tr>
<td>NAU 100</td>
<td>STA 270</td>
</tr>
<tr>
<td>LS/ DIV/ CT</td>
<td>GE</td>
</tr>
</tbody>
</table>

**Total units:** 15

#### Sophomore Year

<table>
<thead>
<tr>
<th>3rd term</th>
<th>4th term</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 211</td>
<td>FOR 213</td>
</tr>
<tr>
<td>FOR 220</td>
<td>FOR 215</td>
</tr>
<tr>
<td>CHM 130</td>
<td>FOR 225</td>
</tr>
<tr>
<td>CHM 130L</td>
<td>ECO 280</td>
</tr>
<tr>
<td>LS/ DIV/ CT</td>
<td>LS/ DIV/ CT</td>
</tr>
</tbody>
</table>

**Total units:** 14

#### Junior Year

<table>
<thead>
<tr>
<th>5th term: Semester A-Professional Program</th>
<th>6th term: Semester B-Professional Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 313 Forest Ecology I</td>
<td>FOR 323W Forest Management I</td>
</tr>
<tr>
<td>FOR 314 Forest Ecology II</td>
<td>FOR 324 Forest Management II</td>
</tr>
<tr>
<td>FOR 315 Silviculture I</td>
<td>FOR 325 Forest Management III</td>
</tr>
<tr>
<td>FOR 319 Forest Operations</td>
<td>LS/ DIV/ CT Liberal Studies/Diversity/Certificate *</td>
</tr>
<tr>
<td>LS/ DIV/ CT Liberal Studies/Diversity/Certificate *</td>
<td>GE General Elective **</td>
</tr>
</tbody>
</table>

**Total units:** 15

#### Senior Year

<table>
<thead>
<tr>
<th>7th term: Semester C-Professional Program</th>
<th>8th term: Semester D-Professional Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 411 Forestry Capstone Preparation</td>
<td>FOR 360 Natural Resources Policy</td>
</tr>
<tr>
<td>FOR 412 Silviculture II</td>
<td>FOR 422 Forest Planning</td>
</tr>
<tr>
<td>FOR 413 Forest Ecosystem Assessment</td>
<td>FOR 423C Forestry Capstone</td>
</tr>
<tr>
<td>LS/ DIV/ CT Liberal Studies/Diversity/Certificate *</td>
<td>LS/ DIV/ CT Liberal Studies/Diversity/Certificate *</td>
</tr>
<tr>
<td>LS/ DIV/ CT Liberal Studies/Diversity/Certificate *</td>
<td>GE General Elective</td>
</tr>
<tr>
<td>GE General Elective **</td>
<td></td>
</tr>
</tbody>
</table>

**Total units:** 16

### Liberal Studies Distribution blocks

<table>
<thead>
<tr>
<th>AHI (6 units)</th>
<th>SPW (6 units)</th>
<th>CU (6 units)</th>
<th>Science (7 units)</th>
<th>Additional 3 units to reach 35 total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CST 111 (3)</td>
<td>BIO 181/L (4)</td>
<td>CHM 130/L (5)</td>
<td>STA 270 (3)</td>
<td></td>
</tr>
<tr>
<td>ECO 280 (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PROGRAM INFORMATION

- A minimum of 120 units are required for this degree. The Pre-Professional foundation (1st – 4th term) consists of the following 46 units (or the equivalent for transfer students), which you must satisfactorily complete with a grade of “C” or better before you are eligible to enter the Professional Program:
  - ENG 105 (4 units)
  - MAT 125 & STA 270 (7 units)
  - CHM 130 & 130L or CHM 151 & 151L (5 units)
  - BIO 181/181L (4 units)
  - BIO 182/182L (4 units)
  - ECO 280 (3 units)
  - CST 111 (3 units)
  - FOR 101, 211, 213, 215, 220, and 225 (16 units)

- Application and admission to the Professional Program (5th – 8th term) is required. This is generally done during the 4th term. You must complete all of the listed lower-division Pre-Professional courses (above) with a 2.75 GPA before you can be admitted to and enrolled in the Professional Program. Be aware that the 5th term only starts in the fall. Contact the Forestry Academic Advisor for details.

* Some courses may be used to fulfill multiple requirements such as Liberal Studies, Diversity and/or Certificate requirements. For example: Take a liberal studies course that also satisfies a diversity requirement.

* Complete an approved Certificate or the Individualized Concentration for 12-15 units. Certificates require a minimum of 9 units of 300-400 level courses. You must also earn a grade of “C” or better in each Certificate or Concentration course (except FOR 408 or 485). Below is a list of approved certificates. See catalog for requirements.
  - Fire Ecology and Management
  - Forest Health and Ecological Restoration
  - International Forestry and Conservation
  - Human Dimensions of Forest Management
  - Wildlife Ecology and Management

** Recitations are available and strongly encouraged for BIO 181, BIO 182, & CHM 130; however they are not required.

*** You must complete CHM 130/130L or CHM 151/151L – CHM 130/130L is recommended.

GENERAL INFORMATION

- This degree progression plan is to be used in conjunction with the academic catalog and academic requirements report.
- Students are encouraged to see an Academic Advisor regularly to confirm their academic progress.
- Many courses have pre-requisites. Please check the academic catalog for pre-requisite and placement information.
- Some courses are only offered once a year (fall term only or spring term only). Some of these courses may be pre-requisites for future courses. Please check with your department for current course rotations.
- Honors students complete different requirements to meet NAU’s Liberal Studies program. Students should consult an Honors Program Advisor for complete information on fulfilling Honors Liberal Studies requirements.
- All students are required to complete at least 120 total units which includes:
  - 35 units of Liberal Studies courses: http://www4.nau.edu/aio/Articulation/LScourselist.htm
  - 6 units of Diversity courses (3 units in Global & 3 units in Ethnic): http://www4.nau.edu/aio/Articulation/DiversityCourseList.htm
  - 30 units of upper division courses (300-400 level), 18 of these units must be taken at NAU.
- Enrollment in the English foundations course for Liberal Studies is based off a student’s SAT/ACT scores or incoming transfer/test credit, otherwise the student must take the English Placement Exam: http://www.nau.edu/comp/placement.html
- Enrollment in the Math foundations course for Liberal Studies requires students to take the ALEKS Math Placement Exam: http://www.cefns.nau.edu/Academic/Math/studentInformation/Placement/Placement.shtml

CONTACT INFORMATION

Erin Saunders
Student Services Coordinator
School of Forestry
Building 82, Room 126
Phone: (928) 523-8956
EMAIL: Erin.Saunders@nau.edu

Kathleen Corak, PhD
Student Services Coordinator
College of Engineering, Forestry & Natural Sciences
Building 21, Room 132
Phone: (928) 523-7065
EMAIL: Kathleen.Corak@nau.edu
SCHOOL OF FORESTRY NORTHERN ARIZONA UNIVERSITY

Degree & Course Requirements for Wildlife Jobs with Various State & Federal Agencies

US FISH & WILDLIFE SERVICE / US GEOLOGICAL SURVEY

USFWS Fish & Wildlife Biologist (486)

Positions that involve professional work in biology, agriculture, or related natural resource management.

QUALIFICATION REQUIREMENTS:

- Successful completion of a full four-year course of study in an accredited college or university leading to a bachelor’s or higher degree;
- Includes a major field (24 semester hours) or study in biological sciences, agriculture, natural resource management, chemistry or related disciplines appropriate to this position or an appropriate combination in education and experience.

USFWS Wildlife Refuge Management (485)

Positions that require professional knowledge and competence in the management, administration, and scientific operation of public lands and waters designated as national wildlife refuges. The work involves a variety of land and water based activities including: water and habitat management; land planning; resources identification and allocation; administration; public relations; supervision; and other activities involving wildlife resource utilization, protection, inventory, and evaluation, and maintenance of grasslands, marshes and soils.

QUALIFICATION REQUIREMENTS:

- Successful completion of a full four-year course of study in an accredited college or university leading to a bachelor’s degree or higher in zoology, wildlife management or an appropriate field of biology;
- Includes at least:
  - 9 semester hours in zoology;
  - 6 semester hours in wildlife courses such as mammalogy, ornithology, animal ecology, or wildlife management and;
  - 9 semester hours in botany or:
Appropriate combination of education and experiences

USFWS/USGS Wildlife Biologist (401)

Positions that require professional knowledge and competence in the science of wildlife biology to perform work involving the conservation, propagation, management, protection, USGS/USFWS Biologist and administration of wildlife species; or the determination, establishment, and application of biological facts, principles, methods, techniques, and procedures necessary for the conservation and management of wildlife resources and habitats.

QUALIFICATION REQUIREMENTS:

- Successful completion of a full four-year course of study in an accredited college or university leading to a bachelor’s or higher degree in biological science;
- Includes at least 12 semester hours in subjects such as general zoolology, invertebrate or vertebrate zoology, comparative anatomy, physiology, genetics, ecology, cellular biology, parasitology, entomology or research courses in such subjects. Excess coursework in wildlife biology may be used to meet the zoology requirements where appropriate. Additionally, the position requires:
  - 9 semester hours in wildlife courses such as mammalogy, ornithology, animal ecology, and wildlife management or research courses in the field of wildlife biology and;
  - 9 semester hours in botany or the related plant disciplines or;
  - An appropriate combination of education and experience

ARIZONA GAME & FISH DEPARTMENT

Wildlife Manager (WM)

MINIMUM QUALIFICATIONS:

- Must be 21 years of age
- Must be a U.S. citizen
- Must have a bachelor’s degree in wildlife science* or closely related field from an accredited college or university
- Must possess or obtain an Arizona drivers license
- Must be able to pass AZ POST medical exam including full physical, drug screening, hearing and vision tests
- Must pass physical fitness testing

(*Special consideration will be given to applications with coursework and/or work experience in wildlife management related fields)
LIST A

*Degrees in List A meet the requirements for Wildlife Management. A transcript review is required.*

<table>
<thead>
<tr>
<th>Degree</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Science</td>
<td>Conservation Biology &amp; Ecology Sustainability</td>
</tr>
<tr>
<td>Biology</td>
<td>Fish and Wildlife Management</td>
</tr>
<tr>
<td>Biology</td>
<td>Zoology</td>
</tr>
</tbody>
</table>

The following degrees require a minimum of four upper divisions (300-400) wildlife management courses to be accepted. All Wildlife Manager I applicants must have two of the four upper division course work in Wildlife Management and/or Wildlife Biology. A transcript review is required.

<table>
<thead>
<tr>
<th>Degree</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>Botany</td>
</tr>
<tr>
<td>Biology</td>
<td>Cellular and Molecular</td>
</tr>
<tr>
<td>Biology</td>
<td>Ecology</td>
</tr>
<tr>
<td>Biology</td>
<td>Physiology</td>
</tr>
<tr>
<td>Biology</td>
<td>Marine Biology</td>
</tr>
<tr>
<td>Biological Science</td>
<td>Animal Physiology &amp; Behavior</td>
</tr>
<tr>
<td>Environmental Science</td>
<td>Biology</td>
</tr>
<tr>
<td>Natural Resources Science</td>
<td>Conservation Biology</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Degree</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Science</td>
<td>Forest Technology</td>
</tr>
<tr>
<td>Applied Biological Science</td>
<td>Land Use Management</td>
</tr>
<tr>
<td>Animal Science</td>
<td>Life Science</td>
</tr>
<tr>
<td>Biological Science</td>
<td>Microbiology</td>
</tr>
<tr>
<td>Biology</td>
<td>Molecular Biology</td>
</tr>
<tr>
<td>Environmental Science</td>
<td>Natural Resources</td>
</tr>
<tr>
<td>Environmental Management</td>
<td>Natural Science</td>
</tr>
<tr>
<td>Farm and Ranch Management</td>
<td>Parks Management</td>
</tr>
<tr>
<td>Forestry</td>
<td>Soil conservation</td>
</tr>
</tbody>
</table>
CERTIFICATION CATEGORIES FOR UPPER DIVISION WILDLIFE MANAGEMENT COURSES

a. **Wildlife Management:** Courses emphasizing the principles and practices of wildlife management. Course descriptions are required and should demonstrate training in understanding and manipulating habitat relationships and population dynamics in the context of objectives and influences established by human concerns and activities. (*Conservation biology courses count if they contain a specific focus on management and decision making.*)

b. **Wildlife Biology:** Courses in biology and behavior of birds, mammals, reptiles, or amphibians. Course descriptions are required. Courses should demonstrate training in understanding the biology of wildlife species and their habitation relationships as the basis for management and must include at least one course dealing solely with the science of mammalogy, ornithology, or herpetology. (*Ichthyology, marine biology except courses focusing on marine mammals or reptiles, microbiology, entomology, or related courses will not count in this category, but will qualify in the Zoology category.*)

c. **Ecology:** Courses in general plant or animal ecology (*excludes human ecology*). Course descriptions are required.

d. **Zoology:** Courses in taxonomy, biology, behavior, physiology, anatomy, and natural history of vertebrates and invertebrates. Course descriptions are required. Courses in genetics, nutrition, physiology, disease, and other biology or general zoology courses are accepted. Ichthyology or fisheries biology courses are accepted.

e. **Botany:** Courses in general botany, plant genetics, plant morphology, plant physiology, or plant taxonomy. Course descriptions are required. At least one course must deal with plant taxonomy or identification.

US FOREST SERVICE

**Wildlife Biologists** are hired at many different grade levels.

Recent college graduates may be hired at the GS-5 or GS-7 grade level. They spend up to 2 years in training and development positions, and then may be noncompetitively promoted to the GS-9 grade level. You may also be hired initially for a higher grade level position if you meet higher education and/or experience requirements. Promotion opportunities at GS-11 and above are competitive, and opportunities for advancement to higher grade levels are excellent.

MINIMUM QUALIFICATIONS:

- Must have a bachelor’s degree with a major in biological science or natural resource management with an emphasis in biology or ecology. A master’s degree will help you be more competitive for some positions.
- The following minimum course work must also be completed for all positions:
  - 9 semester hours in wildlife subjects such as mammalogy, ornithology, animal ecology, wildlife management, or research courses in the field of wildlife biology.
  - 12 semester hours in zoology subjects such as general zoology, invertebrate and vertebrate zoology, zoology, comparative anatomy, physiology, parasitology, ecology, cellular biology, entomology, genetics, or research in these fields (*Extra or additional course work in aquatic subjects may be used to meet the zoology requirements where appropriate*).
- 9 semester hours in botany or related plant sciences
BSF student track

**Required:**

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 251</td>
<td>Intro to Wildland Fire</td>
<td>F/S</td>
<td>N/A</td>
<td>Before Sem. A</td>
</tr>
</tbody>
</table>

Choose one course from each block:

**Ecology:** (FOR students use FOR 313 as it is part of Semester A)

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 313</td>
<td>Forest Ecology I (Sem A)</td>
<td>Fall Only</td>
<td>Admission to BSF, Co requisite FOR 314</td>
<td>Sem. A</td>
</tr>
<tr>
<td>(3)</td>
<td>BIO 326</td>
<td>Ecology</td>
<td>F/S</td>
<td>BIO 181 or 181H and (BIO 182 or ENV 230)</td>
<td>-----</td>
</tr>
</tbody>
</table>

**Measurement, Analysis, & Technology:**

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 351</td>
<td>Fire Monitoring and Modeling</td>
<td>Fall Odd</td>
<td>FOR 251</td>
<td>Sem. A/C</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 425</td>
<td>Forest Mgmt Applications in GIS</td>
<td>Check Louie</td>
<td>N/A</td>
<td>-----</td>
</tr>
</tbody>
</table>

**Fire Ecology:**

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 451</td>
<td>Fire Ecology and Management</td>
<td>Spring odd</td>
<td>FOR 251</td>
<td>Sem. B/D</td>
</tr>
<tr>
<td>or</td>
<td>FOR 551</td>
<td></td>
<td>Spring even</td>
<td>Junior Status</td>
<td>Sem. B/D</td>
</tr>
</tbody>
</table>
**Fuel Management:**  (FOR students use FOR 315 as it is part of Semester A)

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Course Title</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 315</td>
<td>Silviculture Principals (Sem A)</td>
<td>Fall</td>
<td>_____</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 410</td>
<td>Multiple Resources Silviculture</td>
<td>Spring</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>(co-510)</td>
<td></td>
<td></td>
<td>_____</td>
</tr>
</tbody>
</table>

**Management, Planning & Policy:**

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Course Title</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 483</td>
<td>Forestry in Wildland Urban</td>
<td>Spring</td>
<td>Junior status</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Interface</td>
<td></td>
<td>_____</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 445</td>
<td>Wilderness Mgmt</td>
<td>Fall</td>
<td>Junior status</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>_____</td>
</tr>
</tbody>
</table>

**Student Plan:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required: FOR 251</td>
<td>(3)</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>Ecology: FOR 313</td>
<td>(3)</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>Measurement, Analysis, &amp; Technology: FOR 351</td>
<td>(3)</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>Fire Ecology: ___________</td>
<td>(3)</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>Fuel Management: FOR 315</td>
<td>(3)</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>Mgmt., Planning &amp; Policy: ___________</td>
<td>(3)</td>
<td>_____</td>
<td>_____</td>
</tr>
</tbody>
</table>
**Pick either the Forest Health or Ecological Restoration Track**

**Forest Health Track (choose 6 units):**

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 443</td>
<td>Ecology &amp; Mgmt of Intro Spp. in Forests &amp; Rnglds</td>
<td>Spring even</td>
<td>One FOR/BIO/ENV &amp; Junior Status</td>
<td>Sem. B/D</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 452</td>
<td>Forest Pathology</td>
<td>Fall Only</td>
<td>One FOR/BIO/ENV &amp; Junior Status</td>
<td>Sem. A/C</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 453</td>
<td>Forest Insects</td>
<td>Spring Only</td>
<td>One FOR/BIO/ENV &amp; Junior Status</td>
<td>Sem. B/D</td>
</tr>
</tbody>
</table>

**Ecological Restoration Track (choose 6 units):**

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 251</td>
<td>Intro. To Wildland Fire</td>
<td>F/S</td>
<td>N/A</td>
<td>Any</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 443</td>
<td>Ecology &amp; Mgmt of Intro Spp. in Forests &amp; Rnglds</td>
<td>Spring even</td>
<td>One FOR/BIO/ENV &amp; Junior Status</td>
<td>Sem. B/D</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 483</td>
<td>Forestry in the WUI</td>
<td>Spring Only</td>
<td>Junior Status</td>
<td>Sem. B/D</td>
</tr>
</tbody>
</table>

**Student Plan:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required: FOR 211</td>
<td>(3)</td>
<td>________</td>
<td>______</td>
</tr>
<tr>
<td>Required: FOR 382</td>
<td>(3)</td>
<td>________</td>
<td>______</td>
</tr>
<tr>
<td>Required: FOR 454</td>
<td>(3)</td>
<td>________</td>
<td>______</td>
</tr>
</tbody>
</table>

Forest Health Track (choose 2): (6) ________ ________

Ecological Restoration Track (choose 2): (6) ________ ________
### Required:

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 360</td>
<td>Natural Resources Policy</td>
<td>Spring Only</td>
<td>Department consent required</td>
<td>Sem. B/D</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 483</td>
<td>Forestry in the Wildland-Urban Interface</td>
<td>Spring Only</td>
<td>Junior status</td>
<td>Sem. B/D</td>
</tr>
</tbody>
</table>

**Pick either the Communication or Planning and Management Track**

#### Communication Track:

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>COM 150</td>
<td>Environmental Communication</td>
<td>F/S</td>
<td>N/A</td>
<td>Any</td>
</tr>
<tr>
<td>(3)</td>
<td>GSP 206</td>
<td>Public Participation &amp; Communication</td>
<td>Spring Only</td>
<td>N/A</td>
<td>Any Spring</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 430</td>
<td>Leadership and the Environment</td>
<td>Spring Only</td>
<td>Junior status</td>
<td>Sem. B/D</td>
</tr>
</tbody>
</table>

#### Planning and Management Track:

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 230</td>
<td>Multicultural Perspectives of Natural Resource Management <em>ethnic</em></td>
<td>Spring Only</td>
<td>N/A</td>
<td>Any Spring</td>
</tr>
<tr>
<td>(3)</td>
<td>GSP 402</td>
<td>Environmental Impacts Statements</td>
<td>Fall Only</td>
<td>Junior status</td>
<td>Sem. A/C</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 445</td>
<td>Wilderness Management</td>
<td>Fall Only</td>
<td>Junior status</td>
<td>Sem. A/C</td>
</tr>
</tbody>
</table>

### Student Plan:

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required: FOR 360</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required: FOR 483</td>
<td>(3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Communication Track:**

- Required: COM 150 (3)  
- Required: GSP 206 (3)  
- Required: FOR 430 (3)  

**Planning & Management Track:**

- Required: FOR 230 (3)  
- Required: FOR 402 (3)  
- Required: GSP 445 (3)
## Certificate in International Forestry & Conservation
Advising Checksheets: 2013-2014 Catalog

### Required:

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3)</td>
<td>FOR 240</td>
<td>Intro to Conservation Biology</td>
<td>Spring Only</td>
<td>N/A</td>
<td>Any spring</td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 415</td>
<td>Forestry in Developing Countries (G)</td>
<td>Spring Only</td>
<td>Junior Status</td>
<td>Sem. B/D</td>
</tr>
</tbody>
</table>

### Select 9 of the following units:

| (3)   | FOR 230| Multicultural Perspective of Natural Resource Mgmt (E) | Spring Only  | N/A                      | Any spring          |
| (3)   | FOR 360| Natural Resources Policy                          | Spring Only  | Department Consent Required | Sem. B/D            |
| (3)   | FOR 441| Sustainable Forestry in Tropical Ecosystems: International Field Experience | Various | Instructor Consent Required | Any                |
| (3)   | ANT 301| Peoples of the World (G)                          | F/S          | N/A                      |
| (3)   | ANT 302| World Area Studies                                | Various      | N/A                      |
| (3)   | ANT 303| Peoples of Latin America (G)                      | Various      | N/A                      |
| (3)   | CST 323| Intercultural Communication (CU)                  | F/S          | Soph Status or higher    |
| (3)   | ENV 440| Conservation Biology                              | Fall Only    | ENV 326 or FOR 313       |
| (3)   | GSP 240| World Geography West                              | F/S          | N/A                      |
| (3)   | GSP 241| World Geography East (G)                          | F/S          | N/A                      |
| (3)   | PHI 331| Environmental Ethics (AHI)                        | F/S          | Instructor’s consent     |
| (3)   | POS 120| World Politics (CU)                               | F/S/Online   | N/A                      |
| (3)   | POS 361| Politics of Developing Nations (G)                | Various      | POS 120 or POS 201       |
| (3)   | POS 366/ 370/374| 366: Studies In Latin America Politics 370: Asian Politics 374: African Politics (CU+G) | Various | POS 120 or POS 201 or POS 361 |
| (3)   | POS 380| Advanced International Politics                   | Various      | POS 120 or POS 201       |
| (3)   | PRM 300| Ecotourism (G)                                    | Various      | N/A                      |

### LANGUAGE OPTION:
Will accept 1 (3-4 credits) of a “102” equivalent of any foreign language such as SPA, GRE, FRE, JPN, NAV, etc.

<table>
<thead>
<tr>
<th>Student Plan:</th>
<th>Course</th>
<th>Semester</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required:</td>
<td>FOR 240 (3)</td>
<td>__________</td>
<td>______</td>
</tr>
<tr>
<td>Required:</td>
<td>FOR 415 (3)</td>
<td>__________</td>
<td>______</td>
</tr>
<tr>
<td>Additional Units:</td>
<td>(9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required:</td>
<td>__________ (3)</td>
<td>__________</td>
<td>______</td>
</tr>
<tr>
<td>Required:</td>
<td>__________ (3)</td>
<td>__________</td>
<td>______</td>
</tr>
<tr>
<td>Required:</td>
<td>__________ (3)</td>
<td>__________</td>
<td>______</td>
</tr>
</tbody>
</table>
SCHOOL OF FORESTRY
NORTHERN ARIZONA UNIVERSITY
Certificate in
Wildlife Ecology & Management
Advising Checksheet: 2013-2014 Catalog

*The minimum requirements in this certificate, is accepted only by the AZ Game & Fish Department.
For requirements with other federal agencies, ask your advisor for the XXX

**Required:**

<table>
<thead>
<tr>
<th>Units</th>
<th>Course</th>
<th>Title</th>
<th>Offered</th>
<th>Prerequisites</th>
<th>FOR Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>(4)</td>
<td>BIO 182</td>
<td>Unity of Life II</td>
<td>F/S/SS</td>
<td>N/A</td>
<td>Before Soph. spring</td>
</tr>
<tr>
<td>(4)</td>
<td>BIO 326 &amp; L or FOR 313/314</td>
<td>Ecology</td>
<td>Fall/Spring</td>
<td>BIO 181 &amp; (182 or ENV 230)</td>
<td>Sem. A</td>
</tr>
<tr>
<td>(7)</td>
<td>FOR 313/314</td>
<td>Semester A</td>
<td>Fall only</td>
<td>Professional Prgm admint</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>BIO 477 or BIO 478</td>
<td>Fish Management</td>
<td>Spring even</td>
<td>BIO 223 &amp; 425C</td>
<td>Sem. A</td>
</tr>
<tr>
<td>(3)</td>
<td></td>
<td>Wildlife Management</td>
<td>Fall only</td>
<td>BIO 223 &amp; Sem A</td>
<td>Sem. C</td>
</tr>
</tbody>
</table>

Choose one course from each block, at least 6 units must be upper division:

**Wildlife Biology:**

| (3)   | BIO 526 | Herpetology | Fall various | BIO 182, 223 | Sem. A/C |
| (3)   | BIO 527 | Ornithology | Spring only  | Junior Status | Sem. B/D |
| (3)   | BIO 528 | Mammalogy   | Fall only    | Junior Status | Sem. A/C |

**Zoology:** BIO 223 is highly recommended based on Federal requirements

| (3)   | FOR 453 | Forest Insects | Spring only | SemA or BIO | Sem. B/D |
| (4)   | BIO 223 | Vert. Zoology  | Spring only  | BIO 181, 182 | Soph Spring/Sem. D |
| (3)   | BIO 322 | Entomology    | Fall only    | BIO 181, 182 | Sem. A/C |
| (3)   | BIO 340 | Genetics & Evolution | Fall/Spring | BIO 181, 182 | Sem. B |
| (4)   | BIO 424 | Comparative Vert Anat. | Fall odd | BIO 340 | Sem. C |
| (3)   | BIO 425C | Animal Physiology | Fall/Spring | CHM130, 151L, BIO344 |                     |
| (3)   | BIO 525 | Ichthyology    | Fall even    | BIO 223, 425 |                     |
**Botany:** Forestry students can use FOR 220 but will need an additional upper division course from another block to meet the ‘6 units of upper division coursework’ requirement stated above.

<table>
<thead>
<tr>
<th></th>
<th>Course</th>
<th>Title</th>
<th>Semester</th>
<th>Grade</th>
<th>Units</th>
<th>Semester</th>
<th>Grade</th>
<th>Year</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2)</td>
<td>FOR 220</td>
<td>Forest &amp; Range Plants</td>
<td>Fall</td>
<td></td>
<td></td>
<td>N/A</td>
<td></td>
<td>Fresh/Soph Fall</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 382/582</td>
<td>Ecological Restoration</td>
<td>Fall</td>
<td></td>
<td></td>
<td>Instructor consent</td>
<td></td>
<td>Sem. A/C</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>FOR 545</td>
<td>Rangeland Ecology &amp; Mgmt.</td>
<td>Spring</td>
<td></td>
<td></td>
<td>Senior status</td>
<td></td>
<td>Sem. D</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>BIO 411</td>
<td>Mycology</td>
<td>Various</td>
<td></td>
<td></td>
<td>BIO 181, 182</td>
<td></td>
<td>Soph Spring/Sem. D</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>BIO 414</td>
<td>Native Plants of AZ</td>
<td>Fall Odd</td>
<td></td>
<td></td>
<td>BIO 181, 182</td>
<td></td>
<td>Sem. A/C</td>
<td></td>
</tr>
<tr>
<td>(4)</td>
<td>BIO 415</td>
<td>Plant Taxonomy</td>
<td>Spring</td>
<td></td>
<td></td>
<td>BIO 182 &amp; (one of BIO 284/345/347/410/411/414/426C/431)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>BIO 431</td>
<td>Plant Morphology</td>
<td>Fall</td>
<td></td>
<td></td>
<td>BIO 181 &amp; BIO 182</td>
<td></td>
<td>Sem. A/C</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>BIO 517</td>
<td>Agrostology</td>
<td>Fall even</td>
<td></td>
<td></td>
<td>BIO 415</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Student Plan:**

<table>
<thead>
<tr>
<th>Required:</th>
<th>Course</th>
<th>Units</th>
<th>Semester</th>
<th>Grade</th>
<th>No. upper division units: _____</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 182</td>
<td></td>
<td>(4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required:</td>
<td>FOR 313-314</td>
<td>(7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required:</td>
<td>BIO 478</td>
<td>(3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wildlife Biology:</td>
<td></td>
<td>(3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoology:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Botany:</td>
<td>FOR 220</td>
<td>(2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Additional:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(upper division)</td>
</tr>
</tbody>
</table>
APPENDIX D

Fall Course Syllabi
Syllabus
Forest History and Policy Module

Instructor: Dr. Bruce Fox
Office: Room 232, Southwest Forest Science Center (SWFSC)
Phone: 928.523.6636
Email: Bruce.Fox@nau.edu
Office Hours: By appointment

Module Description

Robin Hood, John Muir, and Rachel Carson—among many others—have all had profound effects on what we call forestry today. They have influenced our land tenure systems, the preservation of land for its aesthetic values, and how we look at the industrial and post-industrial societies. In other words our history has shaped what our forested landscape looks like and how we have used and valued forests over time. A variety of forces—economic, social, and biological—have helped shape our worldview. And policy is an expression of these forests in our legal system.

In this module of FOR 101 we will look at some of the key actors and events that have shaped forests and the profession of forestry over time. Although we will look primarily at the European-American origins of forestry, we will also discuss the history and policy that have shaped forestry internationally.

"Those who cannot remember the past are condemned to repeat it" (from George Santayana. 1905-1906 “Life of Reason I”).

Learning Outcomes:

At the conclusion of this module, you will demonstrate your:

1. Understanding of the historical origins and philosophical underpinnings of the profession of forestry;
2. Knowledge of key individuals in the development of forestry, and what their roles;
3. Knowledge of forestland ownership patterns in the United States;
4. Understanding of key laws, policies, and regulations that govern modern forestry;
5. Knowledge of the forest products industry; and
6. Understanding of how the global environment affects the economics of forestry in the US.
FOR 203 – Project Learning Tree
Fall 2012

1 credit
Saturday, September 15, 9:30 – 4:30
Sunday, September 16, 9:30 – 4:30
Rm. 136, SWFSC (Forestry)

Facilitators: Dr. Marty Lee, Karen Malis-Clark
Office: M. Lee - SWFSC 241

Objectives:

Introduce students to Project Learning Tree and the environmental education resources it provides.
Provide students with information and examples of environmental education activities on forests, forestry, and fire.
Give students ideas for adapting Project Learning Tree activities for a variety of audiences.
Give students experience with leading Project Learning Tree activities.

NAU Policies
See the student handbook: http://www4.nau.edu/stulife/handbook.htm

Academic Honesty: Academic dishonesty is defined in the student handbook. Unauthorized use of another person’s intellectual work is cheating and includes: copying on exams, plagiarizing a student’s work, giving unauthorized aid on tests, falsification of data or calculations. Cheating will not be tolerated. Students caught cheating will be given a failing grade on the assignment or exam, and procedures outlined in the student handbook will be adhered to.

Antidiscrimination: Discriminatory or derogatory language and/or actions regarding race, gender, ethnic and cultural background, sexual orientation, or physical and mental abilities will not be tolerated. Offenders will be excused from class.

Disabilities: If you need course adaptations or special accommodations because of a disability, if you have emergency medical information or if you have special accommodations that need to be shared with the instructors in the event of an emergency, please contact the instructor immediately. If you use an alternative medium for communication, please let the instructor know before the course so appropriate accommodations can be made.

Attendance and Make-Up Work: The NAU attendance policy is found in the NAU Student Handbook and states that “…regular attendance…is the responsibility of the student…each student is accountable for all work missed due to any absence…Instructors are under no obligation to make special arrangements for students who have been absent…it is the responsibility of the student to report the reason for his/her absence to the instructor.” You must attend both days of the Project Learning Tree class to pass the class.

Day 1 - Saturday – Introduction to PLT + Focus on Forests (Marty Lee)
9:30 a.m.  Introductions, Nametags
9:45   Why are you taking PLT?
       What is Project Learning Tree?
10:00  Ponderosa pine forests – past and present
       Activity – “My Life as a Tree” – p. 329
12:00  LUNCH
1:00 p.m.  How trees function
          Activity – “Tree Factory” – p. 269
          Activity – “Every Tree for Itself” – p. 117
2:00  Break
2:15  Activity – “To Be a Tree” – p. 265
3:00  PLT resources and a hike through the guide
3:30  Choosing the right activity
     Select and work on Teachbacks
4:30  Adjourn

Day 2 – Sunday – Focus on Fire (Karen Malis-Clark) + Teachbacks

9:30 a.m  Fire in ponderosa pine ecosystems
          Activity - “Living with Fire”
          Activity - “Matchstick Forest”
          Activity – “Zip Game”
12:30  LUNCH
1:00  Teachbacks – Your Turn to Teach
4:00  Final exam
     Wrap-ups, evaluations
4:30  Adjourn
FOR 204 – Project WILD (6044)  
Fall 2012

1 credit  
Saturday, March 13, 9:30 am – 4:30 pm  
Sunday, March 14, 9:30 am – 4:30 pm  
Rm. 136, SWFSC (Forestry, Bldg 82)

Facilitators: Cheryl Miller (CM) and Shelly Shepherd (SS)  
Office hours: by appointment only  
Telephone: (928) 523-6727 (CM); (928) 214-1241 (SS)  
E-mail: Cheryl.Miller@nau.edu; SShepherd@azgfd.gov  

Objectives:
Introduce students to Project WILD and the environmental education resources it provides.
Provide students with information and examples of environmental education activities that teach about wildlife.
Give students ideas for adapting Project WILD activities for a variety of audiences.
Give students experience with leading Project WILD activities.

NAU Policies
See the student handbook: http://www4.nau.edu/stulife/handbook.htm

Academic Honesty: Academic dishonesty is defined in the student handbook. Unauthorized use of another person’s intellectual work is cheating and includes: copying on exams, plagiarizing a student’s work, giving unauthorized aid on tests, falsification of data or calculations. Cheating will not be tolerated. Students caught cheating will be given a failing grade on the assignment or exam, and procedures outlined in the student handbook will be adhered to.

Antidiscrimination: Discriminatory or derogatory language and/or actions regarding race, gender, ethnic and cultural background, sexual orientation, or physical and mental abilities will not be tolerated. Offenders will be excused from class.

Disabilities: If you need course adaptations or special accommodations because of a disability, if you have emergency medical information or if you have special accommodations that need to be shared with the instructors in the event of an emergency, please contact the instructor immediately. If you use an alternative medium for communication, please let the instructor know before the course so appropriate accommodations can be made.

Attendance and Make-Up Work: The NAU attendance policy is found in the NAU Student Handbook and states that “…regular attendance…is the responsibility of the student…each student is accountable for all work missed due to any absence…Instructors are under no obligation to make special arrangements
for students who have been absent…it is the responsibility of the student to report the reason for his/her absence to the instructor.”

**Saturday**

9:30 a.m.  Introductions, What Animal am I? Why are you taking WILD?
10:00    What is WILD?
      Mission and goal, history, a look at the national website
      What is Wildlife? Definition and Arizona Wildlife introduction
      Break
11:00    Activity – “Habitat Lap Sit” (p. 61)
      Activity – Adaptation Artistry (p. 128)
12:30 p.m.  LUNCH
1:00    Arizona Game and Fish educational materials
1:30    Hike through the Guide
2:00    Black footed ferrets and Activity – “Bottleneck Genes” (p. 172)
3:00    Activity – “Quick Frozen Critters” (p. 122)
4:00    Select and work on Teachbacks
      VARK homework
4:30    Adjourn

**Sunday**

9:30 a.m.  What kind of learner are you? VARK
      Understanding your audience
      Choosing the right activities
10:30    Teachbacks
12:00 p.m.  LUNCH
12:30    Teachbacks
1:30    Final: EE Scenarios
3:00    How will I use Project WILD?
      Wrap Up
4:30    Adjourn
FOR 207 – Project WET
Fall 2012

1 credit
Saturday, September 29, 9:30 a.m. – 4:30 p.m.
Sunday, September 30, 9:30 a.m. – 4:30 p.m.
Rm. 136, SWFSC (Forestry)
Instructors: Dr. Marty Lee, Mansel Nelson
M. Lee Office: SWFSC 241, martha.lee@nau.edu, 523-6644

Objectives:
Introduce students to Project WET and the environmental education resources it provides.
Provide students with information and examples of environmental education activities on water and water conservation.
Give students ideas for adapting Project WET activities for a variety of audiences.
Give students experience with leading Project WET activities.

NAU Policies
See the student handbook: http://www4.nau.edu/stulife/handbook.htm

Academic Honesty: Academic dishonesty is defined in the student handbook. Unauthorized use of another person’s intellectual work is cheating and includes: copying on exams, plagiarizing a student’s work, giving unauthorized aid on tests, falsification of data or calculations. Cheating will not be tolerated. Students caught cheating will be given a failing grade on the assignment or exam, and procedures outlined in the student handbook will be adhered to.

Antidiscrimination: Discriminatory or derogatory language and/or actions regarding race, gender, ethnic and cultural background, sexual orientation, or physical and mental abilities will not be tolerated. Offenders will be excused from class.

Disabilities: If you need course adaptations or special accommodations because of a disability, if you have emergency medical information or if you have special accommodations that need to be shared with the instructors in the event of an emergency, please contact the instructor immediately. If you use an alternative medium for communication, please let the instructor know before the course so appropriate accommodations can be made.

Attendance and Make-Up Work: The NAU attendance policy is found in the NAU Student Handbook and states that “…regular attendance…is the responsibility of the student…each student is accountable for all work missed due to any absence…Instructors are under no obligation to make special arrangements for students who have been absent…it is the responsibility of the student to report the reason for his/her absence to the instructor.”

Schedule:
Day 1 – Saturday, Sept. 29
9:30 a.m. Name tag activity and welcome to Project WET – Marty Lee
10:15 a.m.  
**Water and the Water Cycle**
Activity: “The Incredible Journey” – p. 161

12:00  
**LUNCH**

12:30 p.m.  
**Healthy Water, Healthy People** – Mansel Nelson, NAU
Environmental Education Outreach Program
Sparkling Water – p. 348
Where are the Frogs? – p. 279
H+ to OH

4:00 p.m.  
Select and work on Teachbacks

4:30 p.m.  
Adjourn

---

**Day 2 – Sunday, Sept. 30**

9:30 a.m.  
**Water Conservation – What Can You Do?**

10:30  
**History of Project WET**
Websites – [www.projectwet.org](http://www.projectwet.org)
http://www.ag.arizona.edu/azwater/wet
Hike through the guide

11:15  
Activity – “The Rain Stick” – p. 442

12:00  
**LUNCH**

12:30  
Activity: “Ice Cream in a Bag” – handout

12:45  
Final prep for teachbacks

1:00  
Teachbacks

4:00 p.m.  
**Final Exam**
Wrap-up and evaluations

4:30 p.m.  
Adjourn
**COURSE TITLE:** FOREST MEASUREMENTS (FOR 211)

**INSTRUCTOR:** Denver Hospodarsky, PhD, CF (a.k.a. Dr. "H")
Associate Professor
Certified Forester #3142
School of Forestry
SW Forest Sciences Complex (SWFSC) - Bldg 82
Office: Rm 104   Ph: 523-7525
Email: denver.hospodarsky@nau.edu

**OFFICE HOURS:** Dr. H: 9-10 MW; 3:30-4:00 TWTH; Drop-in; Or by appointment

**CREW EQUIPMENT:** Room 11, School of Forestry

**CREDITS:** 3

**REQUISITES:** MAT 125 (prerequisite) and STA 270 (prerequisite or corequisite)

**COURSE FORMAT:** Two-hours lecture and 3-hours lab each week

**CLASS TIMES AND LOCATION:**
- Lecture Section 1:MoWe 10:20-11:10 Rm 133 SWFSC
- Lecture Section 2:MoWe 11:30-12:20 Rm 133 SWFSC
- Lab Section A:Tu 12:45-3:15 Room 135 SWFSC or field
- Lab Section B:Th 12:45-3:15 Room 135 SWFSC or field
- Lab Section c:We 12:45-3:15 Room 135 SWFSC or field

**COURSE DESCRIPTION:**
This course provides students with fundamental knowledge of forest mapping and measurements. Theoretical and practical skills acquired in this course are essential to the forestry profession.

**COURSE OBJECTIVES:**
Students are expected to learn the fundamental concepts and tools in orienteering, land survey, mapping, tree measurements, sampling, and forest inventory. Students are also expected to develop preliminary knowledge for measuring other forest resources such as wildlife, recreation, water, and range.

**INDIVIDUAL EQUIPMENT:** (You will need the following equipment by your first field-lab session.)
- Hard hat (can be purchased from a hardware store: *bike helmets will not do*)
- Topographic map – Bellemont Quadrangle; 1/24,000 (get from DrH)
- Engineers scale – 10 to 60 scales (see a bookstore)
- Suunto Navigator (brand) Model MC-2 **Azimuth** Compass (or similar mirror-sighting compass).
- Clipboard or Tatum (for taking notes in the field, one with hinged cover will help keep your notes clean, dry, and smooth)
- Calculator with trigonometric functions
- Computer storage device (such as flash drive/memory stick)

Book Bag/Back Pack stocked with drinking water, clipboard, writing instruments, paper, compass, rain gear, hard hat, etc.
Proper field clothing includes: hard hat; sturdy, closed-toe shoes or boots; long pants; rain gear; and cruisers vest (recommended).

**TEXTBOOKS (required):**
Kiser, J. 2010. Surveying for Forestry and the Natural Resources. 2nd Ed. John Bell and Associates, Corvallis, Oregon

**EVALUATION:**
Grades will be based on attendance/participation, knowledge of lecture and lab material as follows: lab assignments including reports; reading quizzes; 1 midterm exam; 1 Lab (field) exam; and 1 final exam. Final grades will be based on the scale 90-100% = A, 80-89% = B, 70-79% = C, 60-69% = D, <60% = F, and distributed as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participation (including attendance)</td>
<td>3</td>
</tr>
<tr>
<td>Lab Assignments (see Lab Report Notes)</td>
<td>25</td>
</tr>
<tr>
<td>Reading Quizzes (5 @ 3 pts. each, unannounced)</td>
<td>15</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>17</td>
</tr>
<tr>
<td>Lab/Field Exam</td>
<td>20</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>100</td>
</tr>
</tbody>
</table>

**NOTE:** Students must receive a grade of "C" or better in FOR 211 to be considered eligible for advancement to FOR 313-316 (Semester A).

**COURSE POLICIES:**
1. Attendance is **REQUIRED** for all lectures, labs and field trip. Roll will be taken. Please be on time, it is professional and courteous. Thank you!
   No make-up exams or labs will be allowed without a signed medical excuse.
   Lab will proceed "rain or shine." You must wear proper attire and foot gear during field labs. Hard hats must be worn at all times while in the field. No smoking is allowed. Bring water and proper equipment. The vans will not wait for you, so don't be late!
   Because much of your lab work will be completed as a member of a 3 or 4-person permanently assigned crew, it is important to your crew's performance that you work with your assigned crew to complete each lab data-gathering assignment.
   Although you will collect data in crews, you will work on the final solutions and lab report individually. Please note item in Policy 8, below.
6. You will not be allowed to drive your personal vehicle to field labs, in compliance with NAU policy. If you miss the van, you have missed the lab for the day, unfortunately.
   Maps, aerial photos, field equipment, and materials are expensive and should always be handled with care. The student is responsible for repair or replacement of any abused or lost items that is the result of his/her actions.
   Plagiarism and other forms of cheating are grounds for dismissal from FOR 211. The complete policy statement on academic integrity can be found in Appendix F of the NAU Student Handbook. Also, please review the professional forester Code of Ethics (attached).
Cell phones must be turned off and stowed during all class times including lab. Do not access your cell phone or check your messages during class. Designated breaks are excepted. Your instructor will remind you of this policy should you forget.

<table>
<thead>
<tr>
<th>WEEK 1</th>
<th>TOPIC</th>
<th>READING ASSIGNMENT**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Course Introduction</td>
<td>Ch.1 A&amp;B; pp.1-6,20-24 K</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Land Measurements:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Horizontal Distance/Direction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>pp.61-63, 97-99 K;</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>no class Monday</strong></td>
</tr>
<tr>
<td>2</td>
<td>Slope Measurements</td>
<td>Section 4-10 to 4-15 A&amp;B</td>
</tr>
<tr>
<td>3</td>
<td>Grid Systems/Legal Description</td>
<td>Section 4-16 to 4-23, 14-6 to 14-9 A&amp;B; pp.265-274K</td>
</tr>
<tr>
<td>4</td>
<td>Maps and Mapping</td>
<td>Section 4-24 to 4-29 A&amp;B; pp.151-169 K; Handouts</td>
</tr>
<tr>
<td>5</td>
<td>Land Navigation</td>
<td>Handouts</td>
</tr>
<tr>
<td>6</td>
<td>Tree Measurements</td>
<td>Ch.7 A&amp;B</td>
</tr>
<tr>
<td>7</td>
<td>Calculation of Tree Variables</td>
<td>Ch.8 A&amp;B; Forest Structure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Class Notes</td>
</tr>
<tr>
<td>8</td>
<td>MIDTERM EXAM</td>
<td>Section 3-1 to 3-8 A&amp;B</td>
</tr>
<tr>
<td></td>
<td>Introduction to Sampling</td>
<td>Topics from Ch.9 and 10 A&amp;B</td>
</tr>
<tr>
<td></td>
<td>Forest Inventory</td>
<td>Section 11-1 to 11-17 A&amp;B</td>
</tr>
<tr>
<td></td>
<td>(fixed-area plot sampling)</td>
<td>(variable-radius sampling)</td>
</tr>
<tr>
<td>9</td>
<td>Forest Inventory</td>
<td>Ch. 18 A&amp;B, Handouts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Resources</td>
</tr>
<tr>
<td>10</td>
<td>Measurement of Other Forest</td>
<td>Ch. 18 A&amp;B, Resources</td>
</tr>
<tr>
<td>11</td>
<td>Forest Fuels</td>
<td>Handouts</td>
</tr>
<tr>
<td>12</td>
<td>Aerial Photo Measurements</td>
<td>Ch. 13 A&amp;B, Handouts</td>
</tr>
<tr>
<td>13</td>
<td>Measurement of Other Forest</td>
<td>Ch.18 A&amp;B,Resources</td>
</tr>
<tr>
<td></td>
<td>Handouts</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Measurements of Other Forest</td>
<td>Ch. 18 A&amp;B, Resources – cont.</td>
</tr>
<tr>
<td></td>
<td>Handouts</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Review,&quot;Catch-up&quot;Study for in-class final</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>FINAL (Lecture)</td>
<td></td>
</tr>
</tbody>
</table>

**EXAM:** Sec 1 10-12 Noon Dec. 10, Room 133 SWFSC; Sec 2 10-12 Noon Dec. 12, Room 133 SWFSC (all lecture and reading material since midterm; not comprehensive)

**A&B = Avery and Burkhart; K = Kiser**
LAB OUTLINE

<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPIC</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Technical report writing; Lab orientation</td>
<td>Office</td>
</tr>
<tr>
<td>2</td>
<td>Compass and Pacing</td>
<td>Field</td>
</tr>
<tr>
<td>3</td>
<td>Slope Estimation; Slope Correction</td>
<td>Field</td>
</tr>
<tr>
<td>4</td>
<td>Topographic Maps</td>
<td>Office</td>
</tr>
<tr>
<td>5</td>
<td>Land Navigation and Mapping</td>
<td>Field</td>
</tr>
<tr>
<td>6</td>
<td>Tree Measurements</td>
<td>Field</td>
</tr>
<tr>
<td>7</td>
<td>Calculation of Tree Variables</td>
<td>Office</td>
</tr>
<tr>
<td>8</td>
<td>Fixed-area Plot Sampling</td>
<td>Field</td>
</tr>
<tr>
<td>9</td>
<td><strong>No Lab</strong> (fixed area plot results calculations)</td>
<td>Field</td>
</tr>
<tr>
<td>10</td>
<td>Variable Radius Plot Sampling</td>
<td>Field</td>
</tr>
<tr>
<td>11</td>
<td>Forest Fuels</td>
<td>Field</td>
</tr>
<tr>
<td>12</td>
<td>Field Skills Demonstrations</td>
<td>Field</td>
</tr>
<tr>
<td>13</td>
<td><strong>No Lab</strong> – Thanksgiving Holiday</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Review and Practice for field exam</td>
<td>Field</td>
</tr>
<tr>
<td>15</td>
<td><strong>Lab/Field Exam</strong> (normal lab period)</td>
<td>Field</td>
</tr>
</tbody>
</table>

Notes about Lab Reports*:

Week 2 and 3 lab data are to be the basis for one **results-only** lab report worth 4 points and due at your lab on Sep. 18, 19 or 20.

Week 5 lab data are to be the basis for a **methods and results** lab report worth 4 points and due at your lab on Oct. 2, 3 or 4.

Week 6 and 7 lab data are to be the basis for an **introduction, results and literature cited** lab report worth 4 points and due on Oct. 16, 17 or 18.

Week 8 and 10 lab data are the basis for a **results, discussion and literature cited** lab report worth 4 points and due on Nov. 6, 7 or 8.

**Week 11 lab data are the basis for a full lab report worth 9 points and due on Nov. 27, 28 or 29.**

*Note: all lab reports are to have an Appendix that includes your field raw data forms.*

Guidelines to Help Succeed in FOR 211

This is probably not only one the most challenging classes you have taken so far, but also an excellent opportunity to learn fundamental concepts and skills for becoming competent forestry professionals. That is why we expect you to perform well. The following guidelines will help you succeed in this class as well as in the professional forestry program:

**Work hard.** You are expected to study all the material (from class notes AND textbook), deliver all required tasks thoroughly and professionally, attend class and participate actively

**Think!** Understand, analyze, and integrate all the material you are learning

**Take the initiative.** You are responsible for your own education

**Be consistent and remain focused** throughout the course

**Respect** your classmates and instructors

6) Remember Forest Measurements is a core skill to becoming a forester. Stay motivated by **keeping your eye on the prize.**

7) **Definition of a forester (according to DrH)** Forester (vt.) to understand; to act; to lead
TREES AND FORESTS OF NORTH AMERICA  
(Fall 2012)  
Course Name: FOR-212  

Office Hours:  
Dr. Gaylord has an open door policy and is happy to meet with you. It is best to email (use the course message tool, or monica.gaylord@nau.edu) or call (523-3079) to make an appointment. My office is room 204 in the Southwest Forest Science Complex (building 81 on the Flagstaff Mountain campus).  

Course Overview  
Audience  
This course is required for all students majoring in Forestry and for some options in the Parks and Recreation Management program at Northern Arizona University. It is also appropriate for students who are interested in learning about trees and forests, their associated taxonomy (kinds like genealogy) and their ecological niches and characteristics.  

Prerequisites  
There are no prerequisites other than interest in the subject and access to a good computer.  

Course Structure/Approach  
The web-based version of FOR212 combines summary information and guidance contained on the course web pages, which introduce the most important course concepts. In addition, there is a recommended textbook and other resources for detailed information and images. All students are expected to actively use the USDA handbook (available on the Web) to develop deeper understandings of the web-page material and to view range maps and pictures. Material is presented by the week to facilitate student learning and assessment. The key to success in this class is checking the course calendar and keeping up. You will be required to take a quiz or exam every week!  

Course Objectives  
Students who successfully complete this course will have the following context- and learning-competencies:  
- knowledge of basic principles in plant identification, classification and taxonomy  
- knowledge of the scientific and common names, ranges, physical appearances, and ecological and utilitarian characteristics of many important trees in North America  
- knowledge of major forest types in North America and their geographic locations and importance  
- knowledge and skills in baseline distance-education technology, primarily through the use of asynchronous "Blackboard learn" environments, and active linkages to the WWW  
- specialized knowledge and skills in the access of electronic articles relevant to trees and forests in North America and around the world, primarily through China Library's electronic periodicals search and available linkages on the WWW.
Fall 2012
Syllabus: FOR 215 – Writing in Forestry

Instructor: Sandra Knight
Email: sk639@nau.edu
Office: Forestry Sciences Complex Rm. 131
Office Hours:
Tuesday & Thursday from 12:00pm - 5:00pm
Also by Appointment
*I also tutor Forestry students who need help with writing, so please do not hesitate to come to my office hours for help with your assignments.*

Course Location: Forestry Rm. 133
Course Times: 4:10-5:00pm MW
Course Site: [http://BbLearn.nau.edu](http://BbLearn.nau.edu) (Log in for your list of courses)

1. Course Description

Forestry 215: Writing in Forestry

**Overall Course Goals:**
Acquire communication skills needed to succeed in your Forestry major and professional career
Emphasize clear and logical writing presented in a usable form and appropriate to its intended audience
Develop ways to market your talents and abilities

**Specific Course Learning Objectives:**
Learn to analyze the communication situation—audience, purpose, and context
Communicate effectively with your professor and classmates electronically and in person
Create and revise writing collaboratively
Use technology to research, plan, draft, and design documents that are easy to understand and navigate
Gather, interpret, and document information logically, efficiently, and ethically
Understand the basic terms and concepts of technical and scientific writing
Think critically about texts both in the context of class and in daily life
Develop strategies and styles appropriate for different writing situations
Organize and structure information effectively

**Course Document Types:**
Memos
Résumés and Cover/Application Letters
Emails
Abstracts and Research Writing
Lab Reports
Executive Summaries
Annotated Bibliographies
Literature Reviews

*Proposal assignment, completed during Semester B, replaces NAU's Junior-level writing requirement*

2. Course Materials

Course materials will include the course textbooks, handouts, PowerPoints, and other materials I will post on Blackboard Learn.

**Required Texts:**

3. Course Format and Blackboard Site

The course site includes weekly folders with the quizzes, detailed major writing assignment instructions, key supplementary handouts, and readings materials. However, the course site DOES NOT contain all handouts, lectures, and activities we cover in class.

The course **Home Page, Course Content**, and left-side navigation menu contain the links you will need. The **Course Content** is divided into 15 weekly folders each with a link on the Course Content page. The left side navigation menu contains your **Course Email and Discussion Boards**. You may or may not need the chat or discussion boards this semester, but they are available to you. You can also email me through the course site with questions in addition to my email address.

4. Course Requirements

The following assignments constitute the requirements of this course. Consult individual assignment instructions for details and requisites of each assignment.

4.1 Assignments and Point Breakdown

This course has a total of 600 points, organized into five main categories:

**Participation**
These points are awarded as you participate actively in class discussions, group activities, and peer reviewing and are engaged and paying attention in class. I will take away points if you are tardy, texting, sleeping, talking out of turn, interrupting the class discussions or lectures, or otherwise are rude or fail to participate. **You cannot get points for Class Participation if you are not in class.**

**Quizzes**
Five quizzes (10 pts. each) covering the textbook and other readings are all on the course site. Applicable **Course Content** folders on the course site will contain a link to each quiz. You may not make up a quiz after I have gone over it in class, unless you are absent and speak with me.

**Leopold Summaries**
Aldo Leopold is a person you will be expected to know about as a Forester, and this book represents a clear and accessible bit of scientific writing in the form of short essays. You will choose three of the essays by Aldo, one from each of the first three major sections (not the Editor’s Notes), and write three summaries of the essays. These summaries will be due throughout the semester for 15 points each. We will talk about how to write a summary in class and discuss good and bad examples.

**Homework and Class Exercises**
For some lessons, I will hand out or post instructions for homework exercises to take home and work on. We will go over each during the following class period. We will discuss the lessons and exercises as a class or in groups, and you will turn in your answers for credit. These are worth 15 points each.
Writing Assignments
These are the larger writing assignments you will work on at home and turn in to me in print on the due date. Points vary from 20 to 80 points per assignment. For any writing assignment worth 50 points or over, you will receive a detailed rubric. We will always go over the rubric in class and sometimes use it for peer review before your final assignments are due.
The table below shows each individual category and writing assignment points.

<table>
<thead>
<tr>
<th>Assignment Category</th>
<th>Individual Assignments and Point Values</th>
<th>Total Point Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Participation</td>
<td>Participation Points</td>
<td>50</td>
</tr>
<tr>
<td>Quizzes</td>
<td>Five Online Quizzes over readings – 10 pts each</td>
<td>50</td>
</tr>
<tr>
<td>Leopold Summaries</td>
<td>Three summaries – 15 pts each</td>
<td>45</td>
</tr>
<tr>
<td>Homework/Exercises</td>
<td>Five Grammar Assignments</td>
<td>70</td>
</tr>
<tr>
<td>Writing Assignments</td>
<td>Personal Statement Memo</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Résumé and Cover Letter</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Emails</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Abstract for Research Article</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Lab Report</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Executive Summary Assignment</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Annotated Bibliography</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Literature Review</td>
<td>80</td>
</tr>
<tr>
<td>Final Exam</td>
<td></td>
<td>60</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>600</strong></td>
</tr>
</tbody>
</table>

4.2 General Grading Criteria
I will use each of the following criteria to evaluate your work in this course. For major writing assignments worth 50+ points, an assignment-specific rubric based on these criteria will be included in the assignment instructions.
Compliance with assignment requirements and standards
Analysis of the writing situation, including audience, purpose, and context
Structure, organization, and accessibility of information
Development and usability of content and textual elements
Writing styles appropriate for the situation
Appropriate use of graphics
Effective use of design features and formatting
Proper citation and documentation methods
Correctness in grammar and usage

4.3 Final Grades
Your final grades will be based on the standard percentage point scale:
600-540 = A; 539-480 = B; 479-420 = C; 419-360= D; Below 360 = F

5. Policies and Procedures
The policies and procedures in this class are meant to ensure fair practice and assessment for all students.
If you have legitimate difficulties meeting the requirements of this course, notify me before these difficulties turn into late assignments.
5.1 Deadlines
Assignments will incur a 10% penalty once the due date and time/class period has passed. After 3 days, you will receive a 0% on the assignment. One exception to this is if you are at/in the hospital.

5.2 Attendance
At the beginning of each class, I will pass around a sign-in sheet. It is YOUR responsibility to make sure you have signed the sign-in sheet.
You will lose participation points if you do not attend class. In addition, keep in mind that we will engage in a lot group work during class. Consequently, if you don’t attend class, you are not only missing material, you are letting your group down.
If you require additional assistance because you missed a class, I will be more obliged to offer help if you have notified me of legitimate reasons why you could not attend class.
As for tardiness, repeated tardiness will also affect your Participation grade. Keep in mind that we only have 50 minutes per period.

5.3 Class Conduct
I expect all students to attend and participate actively in each class session and respectfully engage in class discussions. Rudeness, either to your classmates or to me, will result in a loss of your class participation points or possibly further action. Examples of rudeness include cell phone usage (including ringing) during class, talking to classmates near you while we are having a class discussion or lecture, non-class related internet surfing, and negative, non-constructive comments aimed towards classmates, me, or course materials. On the other hand, productive inquiry and constructive criticism are important parts of learning and always welcomed in this class.
I also expect all students to conduct themselves in a professional manner. We will discuss exactly what professionalism means, and I will hold you to these expectations in your coursework, class behavior, and participation.

5.4 Academic Integrity
Plagiarism is a common problem in any writing course, and as such, instructors are very good at detecting plagiarism. All outside sources, including sources of graphics, require proper reference in this course. We will discuss in class how to properly cite borrowed material. Any assignment found to be plagiarized will receive a grade of 0, and the student may also fail the course. These include group assignments! Please, for your sake and mine, speak with me if you are having problems completing an assignment, and do not plagiarize.

6. A Note on Time Management
You have many tools for completing your work in this course. While 215 is time intensive, you can work more efficiently by reviewing the schedule and materials on the course site thoroughly and planning ahead. If you have a problem completing an assignment or understanding any of the course material, please email, talk to me after class, or make an appointment during my office hours, and I will work with you. Deadlines are important because it is easy to get behind, but I can be flexible if you can show me you are working hard.

Policies of Northern Arizona University

1. Safe environment policy
NAU’s Safe Working and Learning Environment Policy seeks to prohibit discrimination and promote the safety of all individuals within the university. The goal of this policy is to prevent the occurrence of discrimination on the basis of sex, race, color, age, national origin, religion, sexual orientation, disability, or veteran status and to prevent sexual harassment, sexual assault or retaliation by anyone at this University.
You may obtain a copy of this policy from the college dean’s office. If you have concerns about this policy, it is important that you contact the departmental chair, dean’s office, the Office of Student Life (523-5181), the academic ombudsperson (523-9368), or NAU’s Office of Affirmative Action (523-3312).

2. Students with disabilities
If you have a documented disability, you can arrange for accommodations by contacting the office of Disabilities Support Services (DSS) at 523-8773 (voice), 523-6906 (TTY). In order for your individual needs to be met, you are required to provide DSS with disability related documentation and are encouraged to provide it at least eight weeks prior to the time you wish to receive accommodations. You must register with DSS each semester you are enrolled at NAU and wish to use accommodations.

Faculty are not authorized to provide a student with disability related accommodations without prior approval from DSS. Students who have registered with DSS are encouraged to notify their instructors a minimum of two weeks in advance to ensure accommodations. Otherwise, the provision of accommodations may be delayed.

Concerns or questions regarding disability related accommodations can be brought to the attention of DSS or the Affirmative Action Office.

3. Institutional review board
Any study involving observation of or interaction with human subjects that originates at NAU-including a course project, report, or research paper-must be reviewed and approved by the Institutional Review Board (IRB) for the protection of human subjects in research and research-related activities.

The IRB meets once each month. Proposals must be submitted for review at least fifteen working days before the monthly meeting. You should consult with your course instructor early in the course to ascertain if your project needs to be reviewed by the IRB and/or to secure information or appropriate forms and procedures for the IRB review. Your instructor and department chair or college dean must sign the application for approval by the IRB. The IRB categorizes projects into three levels depending on the nature of the project: exempt from further review, expedited review, or full board review. If the IRB certifies that a project is exempt from further review, you need not resubmit the project for continuing IRB review as long as there are no modifications in the exempted procedures.

A copy of the IRB Policy and Procedures Manual is available in each department’s administrative office and each college dean’s office and available online by clicking the link. If you have questions, contact Carey Conover, Office of Grant and Contract Services, at 523-4889.

4. Academic integrity
The University takes an extremely serious view of violations of academic integrity. As members of the academic community, NAU’s administration, faculty, staff, and students are dedicated to promoting an atmosphere of honesty and are committed to maintaining the academic integrity essential to the education process. Inherent in this commitment is the belief that academic dishonesty in all forms violates the basic principles of integrity and impedes learning. Students are therefore responsible for conducting themselves in an academically honest manner.

Individual students and faculty members are responsible for identifying instances of academic dishonesty. Faculty members then recommend penalties to the department chair or college dean in keeping with the severity of the violation. The complete policy on academic integrity is in Appendix F of NAU’s Student Handbook.

5. Academic contact hour
The Arizona Board of Regents Academic Contact Hour Policy (ABOR Handbook, 2-206, Academic Credit) states: “an hour of work is the equivalent of 50 minutes of class time…at least 15 contact hours or recitation, lecture, discussion, testing or evaluation, seminar, or colloquium as well as a minimum of 30 hours of student homework is required for each unit of credit.”

The reasonable interpretation of this policy is that for every credit hour, a student should expect, on average, to do a minimum of two additional hours of work per week; e.g., preparation, homework, studying.

Academic Integrity
NAU regards acts of academic dishonesty—including, but not limited to, plagiarism, cheating, fabrication, forging an instructor’s signature, stealing tests, copying themes or tests from other students, or using “crib notes”—as very serious offenses.

If you are charged with academic dishonesty, you are subject to the Arizona Board of Regents’ Student Code of Conduct and procedures established by NAU, specifically the Academic Dishonesty policy, that are outlined in the on-line Student Handbook.
FORESTRY 220 – INTRODUCTION TO FOREST and RANGE PLANTS

Credits: 2 semester hours
Location: Southwestern Forest Science Complex (SWFSC)
Meeting time: 12:45-5:15 pm, TUESDAY

Instructor(s): Dr. Margaret M. Moore, Professor
235 SWFSC
Phone: 523-7457
Email: margaret.moore@nau.edu
Office hours: by appointment

Course Prerequisites:
No formal prerequisites other than an interest in learning plants.

Course Objectives:
Students successfully completing this course will have the following competencies:
1) Knowledge of and ability to identify important and/or common forest and range plants of northern Arizona; and 2) knowledge of scientific and common names of these plants.

Course Structure/Approach:
Course emphasis is on field identification of common forest and range plants of northern Arizona. After week #1, all classes will be held outside at various field sites near Flagstaff. The School of Forestry will provide transportation. The following equipment is strongly recommended for your comfort and protection in the field: long pants, sturdy shoes or boots, water, rain gear.

The class will learn approximately 10 plants each week. After week #2, a quiz will be given at every class meeting on approximately 5-7 plants that were introduced previously.

Grading:
Grades will be based entirely on field quizzes of plants previously introduced in class. Your final grade will be: # of earned points ÷ by the total possible number of points.

Semester grades will be based on the percentage of the total number of points earned by each student as follows:

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100%</td>
<td>A</td>
</tr>
<tr>
<td>80-89%</td>
<td>B</td>
</tr>
<tr>
<td>70-79%</td>
<td>C</td>
</tr>
<tr>
<td>60-69%</td>
<td>D</td>
</tr>
<tr>
<td>below 60%</td>
<td>F</td>
</tr>
</tbody>
</table>
Course Syllabus

Forestry 222: Environmental Conservation

FALL 2012

School of Forestry

For 222: Environmental Conservation
Sec 01, LEC 4986 - Credit hours: 3 Class Room: 018
Class period: Tu and Thu 9:35 – 10:50 a.m.
Office hours: Tu and Thu 11:00 to 12:10 a.m. and 2:00 to 3:00 p.m.
Instructor: Professor Aregai Tede, Ph.D.
Office: SW Forest Science Building, Room 242
Contact Information: Tel. 523 6642
e-mail: aregai.tede@nau.edu

Course Prerequisites:

There are no prerequisites for this course.

Course Description

This course introduces students to the exciting, highly relevant and broad discipline of environmental science and management. The course contents are interdisciplinary that combine ideas from the natural and social sciences to describe and understand the interconnectedness and interactions between all the things and phenomena we encounter in our surroundings. A critical aspect of the learning processes is knowing the consequences of the actions and interaction and finding appropriate solutions. Specifically, students will become aware of the most important environmental issues in the United States and elsewhere around the world, and then identify real and practical steps that can be taken to toward achieving a more sustainable future. It will endeavor to help students become active participants during their life in developing and applying solutions to environmental problems to improve human quality of life, ecosystem functions and the overall conditions of the earth at the local and global scales.

Student Learning Expectations/Outcomes for this Course

After completing this course, students will be able to:
INSTRUCTOR: Bruce E. Fox, PhD  
Office: Room 232. School of Forestry (Building 82)  
Telephone: 928.523.6636  
e-mail: Bruce.Fox@nau.edu  
Web site: http://www.for.nau.edu/cms/content/view/17/39/  
Student consultation (aka “Office”) Hours: By appointment  

COURSE  
Day/time: Ti-Th 9:35-10:50 am  
Location: Room 136. Building 82: Southwest Forest Science Complex (aka “Forestry Building”)  
Section numbers:  
FOR 250: 2124  
FOR 250H: 2125  
Credits: 3  

COURSE PREREQUISITES: A sense of humor, curiosity, and a desire to learn  

COURSE DESCRIPTION:  
This course is an introduction to fundamental ecology and management of major forest and vegetation types and wildlife of Arizona. We will begin the semester with an overview of the state of Arizona, its climate, landforms, and land ownership patterns. Following our overview, we will examine some forest (and some non-forest) ecosystems in more depth. We will begin at high elevations (spruce-fir, aspen forests, etc.) and travel down in elevation to the woodland and riparian ecosystems. Finally, we will examine some key current issues relating Arizona’s forests and wildlife.  

Distribution Block: Science/Applied Science  
Essential Skills: Critical Thinking, Critical Reading  

STUDENT LEARNING EXPECTATIONS/OUTCOMES:  
Upon the successful completion of this course, students will have the knowledge and skills to effectively:  
1. Describe Arizona’s major forest ecosystems and how they relate to the southwestern region’s climate and landforms;  
2. Describe how Arizona’s major forest ecosystems influence key wildlife species and how these wildlife species influence forest ecosystems; and  
3. Describe key current forest and wildlife management issues in Arizona.
Northern Arizona University  
School of Forestry  

FOR 251 - Introduction to Wildland Fire  
Fall 2012  
3 credits  

Time: Tuesday and Thursday 8:00 - 9:15 a.m.  
Location: Southwest Forest Science Complex Rm 136  
Prerequisites: None  

Instructor: Dr. Andrea (Andi) Thode  
Email: andi.thode@nau.edu  
Office: SFSC room 200  
Phone: 928-523-5457  

Office hours: Stop by or make an appointment. I do have LOTS of meetings so it is best to schedule something with me as it is difficult to just catch me in my office.  

Course description:  
This course provides an introduction to wildland fire. Fire plays a critical ecological role in forests, grasslands, and other systems, and it also has a strong impact on human society. In this course you will be introduced to the basics of fire, including the combustion process and the "fire triangle." We will examine the way fires start, spread, grow, and become extinguished. Fire management strategies, including fire suppression and prescribed burning will be covered. Throughout the course, examples from fire ecology and the social impacts of fire will be used to illustrate fire concepts.  

Text and lectures:  

Additional readings will be provided. Readings will be posted on the course website. Copies of lecture slides will be posted as well.  

Student Learning Expectations:  
This course is designed to introduce the basics of wildland fire. After taking this course, you will have:  
- An understanding of the basic physical and chemical attributes of fire  
- Knowledge of how terrain, weather, and fuels affect fire behavior  
- An understanding of the basic elements of fire management  
- Knowledge of fire's effects on soil and vegetation  
- An understanding of techniques used to suppress, ignite, and manage fires  
- An understanding of the complexity of fire and fuel management in the wildland urban interface  
- Knowledge about the use of models commonly used in fire management
FOR 255: INTERNATIONAL WILDLIFE ISSUES (#5990)
Fall 2012 (3 credits)

General Information:
Instructor: Dr. Yeon-Su Kim
Office hours: SWFSC 233, by appointment or drop in Telephone: (928) 523-8643
I am an ecological economist with B.S. (1992) and M.S. (1994) from Seoul National University in South Korea; Ph.D. in Forest Resources from Oregon State University (1998). More about me here: http://nau.edu/CEENS/Forestry/Faculty-and-Staff/Directory/Kim/

Class Librarian: Academic Programs and Course Support – Cline Library Library. CEENS@nau.edu
Phone: 928-523-8805.

E-mail: Please use the BBLearn “Messages”. I will check in the class at least twice per day on weekdays. You will get a response from me within 24 hours.

Course Prerequisites: An interest in global issues, wildlife, and a desire to learn.

Course Description: This course will provide you with a survey of current issues in wildlife conservation and management from around the globe.

This course is in the Science/Applied Science block in Liberal Studies, in that “…students apply knowledge derived from scientific inquiry to address human needs through technological advancements. Students learn practical skills in the creation and application of various technologies. Courses in this block also address the impact of technology on the human condition and the natural world” (Liberal Studies Program).

This course also meets the criteria for the Global Diversity requirement with the primary goal of acquiring an understanding of the perspectives of non-Western peoples. As a Liberal Studies course, it provides the opportunity for students to practice, refine, and strengthen skills essential for their development as students and for their long term success. In this course we will specifically address the skill areas of effective written communication and critical thinking with respect to societal problems related to the environment. Thematically, this course will focus on developing student understanding, awareness, and appreciation of the environment and environmental issues, specifically relating to the global wildlife issues.

This course will be delivered web-based through BBLearn (http://BBLearn.nau.edu). The requirements and expectations for the web-based class are no different than those for in-person class. The students in this class are expected to log on to BBLearn AT LEAST THREE TIMES PER WEEK to follow lectures and to check their BBLearn messages.

Course Goals and Objectives: Upon the successful completion of this course, students will have the knowledge and skills to effectively:

1. Understand the complexity of biological diversity on a global scale (critical thinking and effective written communication).
2. Demonstrate an understanding of how wildlife resources are regulated by humans at a global scale (critical thinking).
NORTHERN ARIZONA UNIVERSITY
School of Forestry
Undergraduate Fire Ecology Certificate Program

FOR 310: Forest Ecology for Professionals

Course number: FOR 310
Instructor: Molly Hunter
Course Time: Monday–Friday 8:00am–5:00pm

Contact: Molly Hunter: molly.hunter@nau.edu

Course Location: NAU mountain campus
Southwest Forest Science Complex, room 034B

Course Prerequisites: none

Course Description:
This course is designed to introduce the student to the field of forest ecology. Forest Ecology is the study of forest ecosystems. We will be addressing the biotic and abiotic aspects of forest ecosystems that affect structure, composition, and function of forests. These concepts will be addressed at the individual, population, community, landscape and ecosystem levels. The course includes sections in adaptations, entomology/pathology, wildlife, community ecology, ecosystem processes, disturbance and landscape ecology.

Course Format:
Oct. 1st – Nov. 9th. On-line portion of the class
Nov. 12th – Nov. 16th. On-campus portion of the class (Note: class will meet on Veteran’s Day, Nov. 12th)

This class consists of three weeks of reading assignments and quizzes that are done before attending the class on the NAU campus. Reading assignments and quizzes start October 1st. The “pre-work” assigned for this class is critical. The on-line quizzes and assignments are part of the final grade for the course. The course is designed this way for your own sanity. You will be in-class from 8 am to 3 pm, Monday thru Friday for one week. In order to absorb the amount of information that is presented, you need to do the reading beforehand.

Required Text:

Other readings will be provided by instructor and posted on the course website.
Guidelines for “Semester A” (FOR313-314-315-316) – Fall 2012

Coordinators and Weekly Schedule

The first semester of your professional program is divided into two general subject areas: ecology (7 semester hours) and silviculture (6 semester hours). Each general subject area is managed by a sub-coordinator, with one overall coordinator. The coordinators this year are:

- Tom Kolb, ecology sub-coordinator and overall coordinator (Room 202, 3-7491, tom.kolb@nau.edu)
- Andrew Sanchez Meador, silviculture sub-coordinator (Room 234, 523-3448, andrew.sanchezmeador@nau.edu)

The sub-coordinators are responsible for the management and implementation of their subject areas, and the coordinator is responsible for the overall course management.

A teaching assistant (T.A.) will assist with instruction of silviculture during field and indoor labs.
- Adam Polinko, Sem A teaching assistant - Silviculture (SWFSC 219 lab, 505-400-6346, adam.polinko@nau.edu); office hours Wed. 3:10-4:00, Tues. and Thursday 8-9.

Each week typically has the following format:
- Monday: 9:10-3:10 All-day lab (ecology or silviculture)
- Tuesday/Thursday: 9:35-10:50 Ecology lecture
- 11:10-12:25 Silviculture lecture
- Wednesday/Friday: 9:10-10:00 Ecology lecture
- 10:20-11:10 Silviculture lecture
- Wednesday: 12:00-3:10 Afternoon lab (ecology or silviculture)

On most Mondays we will be away from campus the entire day. Students with NAU meal tickets should arrange to have bag lunches made for them on those days; students without meal tickets are responsible for their own lunches.

Please do not plan activities or work starting within one hour of the end of the laboratory periods. On Mondays and Wednesdays, if we return early from a field lab, we expect you to spend time in the computer lab getting started on the lab assignment or report. Occasionally we cannot return to campus on time (weather, traffic, etc.). Therefore, you should view the ending time as approximate.

Faculty Availability

NAU School of Forestry faculty members try to maintain an "open door" policy; we try to be available as much as possible and encourage you to talk to us about subject material and forestry in general. We like to get to know you and have you know us as we believe it enhances your education. However, students should realize that faculty members have other teaching, research, and administrative responsibilities, so please make an appointment.
FOR 340: Environmental Hydrology Syllabus – Fall 2011

Instructor: Professor Araghi Teke E-mail: araghi@ecologywasa
Office Address: Southwest Forest Science Building, School of Forestry. Room: 242
Classroom: Room 355. Building: Southwest Forest Science Building, School of Forestry
Course Home: 5. Class Days: TTH Class Periods: 8:00 - 9:15 a.m.
Office Hours: TTH from 11:00-12:00 a.m. and 2:00 - 3:30 p.m. or by appointment
Course Prerequisites: MA 114

Course Description

The earth is a suitable habitat for living things because of its unique environment in which water is one of the vital components. Getting adequate water of good quality is essential for proper physiological functioning of the body of living organisms. A lack of adequate quality water is very injurious not only to the health of individuals and sustainable development of communities for society as a whole, but also because of its effect on almost all other elements that affect life on earth. The environmental problems of water could be due to changes in either or both of its quantitative and qualitative attributes. Quantitative problems occur from either having too much or too little water, while qualitative problems arise from having excessive amounts of foreign materials or the form of contaminants or pollutants in the water. Human lives and the lives of other organisms are destroyed, and the ecology and socioeconomic structure of affected areas are damaged. and sometimes even beyond repair due to the presence of either of both qualitative and qualitative hydrological and water resources problems. Flooding, drought, erosion by water, sediments, biophysical, physical, and chemical pollution of water are becoming serious problems with serious social, economic, and environmental consequences. For these and many other reasons, environmental issues in water resources are undefined and should be at the heart of any educational program that involves students and field technicians about ecosystem sustainability, biodiversity, resources development, environmental science, and the management and conservation of natural resources.

The topics covered in this course include: (1) an overview of the state of water resources and hydrologic processes; (2) water balance and its components; precipitation, evaporation, transpiration, and two components; (3) unsaturated zone characteristics; (4) surface and ground water supply and their distributional and temporal characteristics; (5) causes and effects of climate change; (6) climate change and its effect on land and global hydrological conditions; (7) flood occurrences, their frequency, and their probability of occurrence, their nature, effects, and mitigation of flood events; (8) occurrence and causes of drought and coping with it; (9) water harvesting; (10) estimating amount of soil water and its control practices; (11) the interaction between hydrologic cycle and water resources, (12) an overview of point and nonpoint sources, pollution, and (13) students' participation in writing and presenting a selected real-world problem.

These important topics of environmental hydrology and water resources issues are effectively covered in the course to provide students with a good background on the subjects. Throughout the
ECOLOGICAL RESTORATION

Fall Semester, 2012    Online resources through WebCT Vista

Meeting time and place:      Tuesdays, 12:45 – 5:15 p.m., Forestry (Building 82), room 133

Instructor:       Dr. Pete Fuló (Forestry room 246C, 523-1463, Pete.Fulo@nau.edu, office hrs Mondays 2-5 or by appointment).       

Course No. & Sequence No.: FOR 382, FOR 382H and FOR 582, co-convened


COURSE DESCRIPTION

“Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed.”  SER (Society for Ecological Restoration) 2002.

The goal of ecological restoration is to regain the natural function, vitality, and sustainability of ecosystems, reducing or even reversing the effects of human-caused damage. With over 7 billion people on earth, our effects on the environment include overusing natural resources, introducing non-native species and eliminating native ones, changing traditional agricultural practices, and disrupting natural disturbance regimes such as floods and fires. Humans have affected our environment since the appearance of our species, but the unprecedented increase in the extent of human-caused change since the industrial revolution (mid-1800’s) threatens the sustainability of many species and even ecosystems. Restoration is one key strategy for combating critical environmental problems such as climate change, extinctions, and severe wildfires. But while it’s often relatively easy to inflict environmental damage, recovery can be much more difficult. For instance, construction of a dam can disrupt a river’s flow, nutrient content, fish reproduction, shoreline vegetation, and the livelihoods of nearby residents. Yet simply removing the dam might not reverse the complex and interconnected elements of ecosystem degradation.

In order to make the best possible decisions, restorationists try to design treatments in a holistic way grounded in ecological science. The characteristics of natural, undamaged ecosystems serve as a point of reference for designing restoration activities. Sources of degradation must be identified and addressed. Restoration goals must be specified and treatments tested, implemented, monitored, and revised as necessary. Social and political support are essential for successful long-term restoration. Restoration activities are occasionally low-cost but usually expensive, so the economics of costs and benefits requires careful analysis, including evaluating the monetary value of “free” services such as clean air and water that ecosystems provide to people.

Concepts and examples of ecological restoration are illustrated in this course by examining current restoration projects in southwestern ecosystems ranging from subalpine forests to grasslands. Drawing upon research and experience, we will see and apply practical methods of designing, applying, and evaluating ecological restoration treatments. Examples and demonstrations will occur in field trips to restoration sites in the
Syllabus: Forest Ecosystem Assessment I & II, aka “Semester C”

Instructors: Bruce E. Fox
Room 232 Forest Science Complex
523-6636; Bruce.Fox@nau.edu
Richard A. Van Demark
rvsfi@commspeed.net
Michael Smith
MikeSmith.AZ@gmail.com
Jeff Jenness
jeffj@jennessent.com

Field Equipment: University provided: Basic field equipment and class-time transportation
Student provided: field clothes (including appropriate high quality boots), rain gear, HARD HAT, and CRUISER'S VEST. Note: for safety reasons, students without this specified field equipment will not be allowed to participate in field activities. Tatum. “Rite in the Rain” field notebook.

Office Hours: By appointment. Please contact instructors in class or by e-mail to set up a mutually agreeable time to meet.

Course Hours: Monday and Wednesday 9:10am – 2:40pm, Room 136 Forest Science Complex

Course Prerequisites: Semesters A & B: FOR 313-316, FOR 323W-326W

Course Description: This is a linked set of two 3 credit clinical course focused on the techniques of gathering and analyzing biophysical and sociological information for the development of natural resource management plans. Students in the course collect data to determine current conditions and landowner and adjacent landowner concerns.

Forest Ecosystem Assessment forms the first segment of a senior capstone experience which integrates material learned in prior forestry courses as well as introducing new concepts and methods. The course specifically provides students with the technical knowledge, skills, and experience in gathering biophysical and sociological information and then analyzing and interpreting the data. Contents include interpretation of remotely sensed imagery, land records, and property boundaries; use of geographic information systems (GIS); learning field protocols for inventory of biophysical features; soil surveys; site classification; stand development pathways; recreation use assessments; and stakeholder assessments.

Learning Outcomes:

By the end of the semester, the successful students will have the skills and knowledge to demonstrate their

Understanding the relationship between inventory design and information needs;
Ability to conduct forest land classification;
Understanding of and ability to characterize current conditions of a forested land;
Understanding of field/office inventory skills;
Ability to develop project organization and management skills;
Ability to use analysis tools such as geographic information systems (GIS);
Ability to work effectively as part of a team;
Ability to create written documents that demonstrate the technical competence in the class subject matter and mastery of grammar, mechanics, and format appropriate for the target audience.
Ability to create and deliver effective oral presentations that demonstrate competence in the subject matter of the course and mastery of presentational techniques and styles appropriate for the target audience; and Ability to peer review technical documents and presentations;

**Course structure:** A combination of lectures, field data collection, and computer laboratory exercises, including data input and analysis. Lectures will provide direction and assistance in getting started, but more often faculty will serve as consultants working with students individually or in small groups to answer questions and to discuss approaches to problems. Students will be required to work independently and within groups. The use of sources of information and insight beyond the School of Forestry is encouraged and will no doubt be necessary

**Required books and materials:**

Textbooks and class notes from Semesters A and B
Tatum or clipboard
Hard hat
Compass
Cruiser’s vest
Appropriate clothes for field work, including raingear and footwear
“Rite in the rain” field notebook

**Recommended Resources:**


**Readings:** Assigned readings and other resources will be posted online and/or distributed in class.

---

**DRAFT/TENTATIVE/SUBJECT-TO-CHANGE but PRETTY CLOSE TO FINAL**

**Course Schedule:**

<table>
<thead>
<tr>
<th>Week</th>
<th>Day</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wednesday</td>
<td>August 29</td>
<td>Unit orientation field trip. Field skills review.</td>
</tr>
<tr>
<td>2</td>
<td>Monday</td>
<td>September 3</td>
<td>Labor Day Holiday. No class</td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>September 5</td>
<td>Graduation applications with Erin Saunders. Project management. Small group dynamics. Inventory procedures review. Field skills review.</td>
</tr>
<tr>
<td>3*</td>
<td>Monday</td>
<td>September 10</td>
<td>Group A: Field skills exam Group B: Field inventory/Rapid assessment/ROS</td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>September 12</td>
<td>Group A: Field inventory/Rapid assessment/ROS Group B: Field skills exam</td>
</tr>
<tr>
<td>4*</td>
<td>Monday</td>
<td>September 17</td>
<td>Group A: GIS I Group B: Inventory</td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>September 19</td>
<td>Group A: Inventory Group B: GIS I</td>
</tr>
<tr>
<td></td>
<td>Date</td>
<td>Assignment</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-------------</td>
<td>-------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>5*</td>
<td>Monday</td>
<td>September 24</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>GIS II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group B:</td>
<td>Inventory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>September 26</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>Inventory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group B:</td>
<td>GIS II</td>
<td></td>
</tr>
<tr>
<td>6*</td>
<td>Monday</td>
<td>October 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>GIS III</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group B:</td>
<td>Inventory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>October 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>Inventory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group B:</td>
<td>GIS III</td>
<td></td>
</tr>
<tr>
<td>7*</td>
<td>Monday</td>
<td>October 8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>GIS IV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group B:</td>
<td>Inventory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>October 10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>Inventory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group B:</td>
<td>GIS IV</td>
<td></td>
</tr>
<tr>
<td>8*</td>
<td>Monday</td>
<td>October 15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>GIS V</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group B:</td>
<td>Inventory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>October 17</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>Inventory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group B:</td>
<td>GIS V</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Monday</td>
<td>October 22</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>October 24</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>Current Conditions</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Monday</td>
<td>October 29</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>October 31</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>Current conditions analysis</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Monday</td>
<td>November 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>November 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>Draft Introductions and Unit Descriptions</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Monday</td>
<td>November 12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>November 14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>Current conditions analysis</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Monday</td>
<td>November 19</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>November 21</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>Current Conditions Reports due</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Monday</td>
<td>November 26</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>November 28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>Final Current Conditions Report</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Monday</td>
<td>December 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>December 5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>Oral Presentations</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Monday</td>
<td>December 10, 10am-HIGH NOON</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wednesday</td>
<td>December 12, 7:30am-9:30am</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td>Final Oral Presentations</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Split class

**TENTATIVE Assignment Schedule**

*You will earn separate grades for FOR 413C and FOR 414C.*

*Your grade for FOR 413C will be based on all your individual work only, including:*

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic integrity tutorial</td>
<td>P/NP</td>
<td>August 29</td>
</tr>
<tr>
<td>Emotional Intelligence Briefing Paper</td>
<td>75</td>
<td>August 31</td>
</tr>
<tr>
<td>Small group dynamics</td>
<td>75</td>
<td>September 5</td>
</tr>
<tr>
<td>Field skills</td>
<td>P/NP</td>
<td>September 10/12</td>
</tr>
<tr>
<td>Progress reports</td>
<td>45</td>
<td>On-going</td>
</tr>
<tr>
<td>Rapid Assessment</td>
<td>150</td>
<td>October 1</td>
</tr>
<tr>
<td>Worklog/Journal</td>
<td>40</td>
<td>On-going</td>
</tr>
<tr>
<td>Instructor assessment of professionalism</td>
<td>50</td>
<td>December 12</td>
</tr>
<tr>
<td>GIS</td>
<td>750</td>
<td>September 17-October 17</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1,185</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Note: you must complete all assignments to pass this course.*
Your grade for FOR 414C will be based on your crew work, including:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group project assessment techniques analysis and recommendation</td>
<td>50</td>
<td>September 17</td>
</tr>
<tr>
<td>Workplan</td>
<td>100</td>
<td>September 10</td>
</tr>
<tr>
<td>Introduction and Unit Description</td>
<td>100</td>
<td>November 5</td>
</tr>
<tr>
<td>Peer review of Introduction and Unit Description</td>
<td>50</td>
<td>November 7</td>
</tr>
<tr>
<td>Current Conditions Report</td>
<td>200</td>
<td>November 19</td>
</tr>
<tr>
<td>Peer review of Current Conditions Report</td>
<td>50</td>
<td>November 21</td>
</tr>
<tr>
<td>Final Current Conditions Report</td>
<td>300</td>
<td>November 28</td>
</tr>
<tr>
<td>Oral Presentation</td>
<td>100</td>
<td>December 3 or 5</td>
</tr>
<tr>
<td>Peer review of Oral Presentation</td>
<td>25</td>
<td>December 3 or 5</td>
</tr>
<tr>
<td>Final Oral Presentation</td>
<td>150</td>
<td>December 10 or 12</td>
</tr>
<tr>
<td>Instructor assessment of professionalism</td>
<td>50</td>
<td>On-going</td>
</tr>
<tr>
<td>Data compilation and organization</td>
<td>50</td>
<td>December 12</td>
</tr>
<tr>
<td>Attendance</td>
<td>10</td>
<td>December 12</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,225</td>
<td></td>
</tr>
</tbody>
</table>

Note: you must complete all assignments to pass this course.

Course policies:

Work submitted late. Students are required to submit assignments as scheduled. One letter grade (see above) will be deducted for every day that assignments are submitted after the due date and time. In the case of illness or other legitimate reason for submitting an assignment late, students must inform the instructor BEFORE the exam or class session.

Attendance. Is required at all class sessions unless prior approval is given by the instructor. You have one “vacation day” for the semester. For each absence beyond this, you will receive a 5 point penalty. Crews with perfect attendance will receive a 10 point bonus.

Safety. Safety is our number one concern. Although everyone has spent time in the woods, in Semester C you will be in a work setting that requires much more individual and crew attention. As a result, you will not be allowed to participate in field activities unless you have all the appropriate field equipment, including a hard hat and cruiser’s vest.

In addition, each crew must check in with one of the instructors at the end of the day in the field and then again when you return to campus. Failure to check in by 3:30 pm on field days will reflect in your professionalism grade. Due to safety and operational concerns, including the potential for limited access and parking, no personal vehicles are allowed for travel during field days.

Plagiarism and cheating will not be tolerated. Assignments that include plagiarized material will receive no credit with no option to make up lost points. Refer to the NAU statement of academic integrity below.

Northern Arizona University Policy Statements

SAFE ENVIRONMENT POLICY. NAU's Safe Working and Learning Environment Policy seeks to prohibit discrimination and promote the safety of all individuals within the university. The goal of this policy is to prevent the occurrence of discrimination on the basis of sex, race, color, age, national origin, religion, sexual orientation, disability, or veteran status and to prevent sexual harassment, sexual assault, or retaliation by anyone at this university. You may obtain a copy of this policy from the college dean's office. If you have concerns about this policy, it is important that you contact the departmental chair, dean's office, the Office of Student Life (523-5181), the academic ombudsperson (523-9368), or NAU's Office of Affirmative Action (523-3312).
STUDENTS WITH DISABILITIES. If you have a learning and/or physical disability, you are encouraged to make arrangements for class assignments/exams so your academic performance will not suffer because of the disability or handicap. If you have questions about special provisions for students with disabilities, contact the Counseling and Testing Center (523-2261). It is your responsibility to register with the Counseling and Testing Center. Application for services should be made at least eight weeks before the start of the semester. If the Counseling and Testing Center verifies your eligibility for special services, you should consult with your instructor during the first week in the semester so appropriate arrangements can be made. Concerns related to noncompliance with appropriate provisions should be directed to the Disability Support Services coordinator in the Counseling and Testing Center.

INSTITUTIONAL REVIEW BOARD. Any study involving observation of or interaction with human subjects that originates at NAU—including a course project, report, or research paper—must be reviewed and approved by the Institutional Review Board (IRB) for the protection of human subjects in research and research-related activities. The IRB meets once each month. Proposals must be submitted for review at least fifteen working days before the monthly meeting. You should consult with your course instructor early in the course to ascertain if your project needs to be reviewed by the IRB and/or to secure information or appropriate forms and procedures for the IRB review. Your instructor and department chair or college dean must sign the application for approval by the IRB. The IRB categorizes projects into three levels depending on the nature of the project: exempt from further review, expedited review, or full board review. If the IRB certifies that a project is exempt from further review, you need not resubmit the project for continuing IRB review as long as there are no modifications in the exempted procedures. A copy of the IRB Policy and Procedures Manual is available in each department's administrative office and each college dean's office. If you have questions, contact Carey Conover, Office of Grant and Contract Services, at 523-4889.

ACADEMIC INTEGRITY. The university takes an extremely serious view of violations of academic integrity. As members of the academic community, NAU's administration, faculty, staff, and students are dedicated to promoting an atmosphere of honesty and are committed to maintaining the academic integrity essential to the educational process. Inherent in this commitment is the belief that academic dishonesty in all forms violates the basic principles of integrity and impedes learning. It is the responsibility of individual faculty members to identify instances of academic dishonesty and recommend penalties to the department chair or college dean in keeping with the severity of the violation. Penalties may range from verbal chastisement to a failing grade in the course. The complete policy on academic integrity is in Appendix F of NAU's Student Handbook.

Classroom Management Statement. Membership in the academic community places a special obligation on all members to preserve an atmosphere conducive to a safe and positive learning environment. Part of that obligation implies the responsibility of each member of the NAU community to maintain an environment in which the behavior of any individual is not disruptive. It is the responsibility of each student to behave in a manner which does not interrupt or disrupt the delivery of education by faculty members or receipt of education by students, within or outside the classroom. The determination of whether such interruption or disruption has occurred has to be made by the faculty member at the time the behavior occurs. It becomes the responsibility of the individual faculty member to maintain and enforce the standards of behavior acceptable to preserving an atmosphere for teaching and learning in accordance with University regulations and the course syllabus.

At a minimum, students will be warned if their behavior is evaluated by the faculty member as disruptive. Serious disruptions, as determined by the faculty member, may result in immediate removal of the student from the instructional environment. Significant and/or continued violations may result in an administrative withdrawal from the class. Additional responses by the faculty member to disruptive behavior may include a range of actions from discussing the disruptive behavior with the student to referral to the appropriate academic unit and/or the Office of Student Life for administrative review, with a view to implement corrective action up to and including suspension or expulsion.

ACADEMIC INTEGRITY QUIZ
The goal of this assignment is to provide the opportunity to re-familiarize yourself with the basic elements of academic integrity. This assignment has two parts. The first part pertains specifically to plagiarism. This assignment is set up so that you keep taking it until you earn a perfect score. Not a bad deal. Do remember: you MUST earn this perfect score. No joke.
The process is pretty simple. Go to our BbLearn site. Click on “Assignments” then read the instructions for completing the quiz.
FOR 445  
WILDERNESS MANAGEMENT  
Fall 2012

Course Time: TTh 8:00 – 9:15 a.m.  
Credit Hours: 3  
Instructor: Dr. Marty Lee  
Rm. 241, Forestry  
Phone: 523-6644  
martha.lee@nau.edu  
Office hours: Open door or by appointment

Course Description:  
After more than 40 years of experience, we are just now recognizing the management implications of designating large and small tracts of lands for permanent preservation. This course will examine wilderness management issues from a multi-disciplinary approach, using current and historical readings along with first-hand experience to begin to understand the complexities involved in managing these areas.

Course Objectives:  
This course examines the philosophical, historical, legal, ecological, social and cultural aspects of lands managed under the Wilderness Act. It allows students to work collaboratively with Wilderness managers on a Wilderness planning and management project. It is designed to help students develop a personal feeling and sense of stewardship about Wilderness.

Course Structure:  
The course is broadly divided into two sections. First we will discuss what is meant by the term Wilderness—both philosophically and from a management perspective. We will discuss with managers current wilderness management laws and policies, paying particular attention to what is allowed and prohibited in designated Wilderness including issues such as prescribed fire, grazing, mining, water, Native American rights, and recreation use. The second focus of the course involves working in cooperation with managers from the Forest Service, Arizona Game and Fish, and others in a real-world Wilderness planning and management project.

Required Texts:  
A lined lab notebook.

Other readings  
Other readings may be provided as needed

Evaluation Methods and Deadlines:
Assignments: There will be 4 written essays each worth 30 points (total 120 pts or 40% of your grade

Essay topics:
1. What is wilderness? – due September 6
2. Find Your Special Wilderness – due October 11
3. Loving Wilderness to death! – due November 20
4. Developing your own wilderness ethic – due December 6

Reading notebook. At the conclusion of each chapter in the Hendee and Dawson book, the author(s) provide study questions. These questions will serve as a basis for our discussions so have them completed and be ready to discuss them in class. I will randomly call on class members to lead discussions of these questions. Your notebooks will also be of value in writing your essays. I will collect your notebooks periodically and look for evidence of serious effort and thought. Your notebook is worth 60 points (20% of your grade).

Wilderness management project – 110 points (37% of your grade). The project will involve working closely with Wilderness managers and will require out-of-class time, including some weekend work. There will be a written report (80 pts) and an oral presentation (30 pts).

Field day write-up – 10 points (3% of your grade). You are required to attend one of two scheduled field work days where we will work with wilderness managers on trail maintenance or other field work – these will be held on a weekend day. You will prepare a brief write-up of what you did and what you gained from that experience. There will be other work day opportunities – you can earn extra credit by attending these and preparing a brief write-up of your experience. The currently scheduled field days are attached to the syllabus.

<table>
<thead>
<tr>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essays – 4 @ 30 pts each</td>
</tr>
<tr>
<td>Reading notebook</td>
</tr>
<tr>
<td>Project</td>
</tr>
<tr>
<td>Report –</td>
</tr>
<tr>
<td>Presentation –</td>
</tr>
<tr>
<td>Field work day write-up</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

Course Policies:

Attendance: Required at all class meetings. Students are expected to come to class prepared to discuss issues and concepts developed in class and contained in assigned readings. While class attendance is required, please be cautious about attending class if you are feeling ill. Please inform me by phone or email if you are feeling unwell; if you are experiencing flu-like symptoms, you should not attend class; please take precautions not to infect others, and seek medical attention if your symptoms worsen.

Cell phones: Cell phones must be turned off during class.

Respect for instructors and classmates: Do not get up and leave during class unless it is an
emergency or you have made prior arrangements with me to do so.
Makeup Work: All assignments must be turned in. Late assignments will not be accepted unless there is a compelling reason for the lateness. Points will be deducted from late papers. Makeup policy will follow university guidelines.

See the University Catalog for policy on other issues such as plagiarism and cheating.
## Tentative Course Schedule

<table>
<thead>
<tr>
<th>Wk</th>
<th>Dates</th>
<th>Topic</th>
<th>Reading(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/28</td>
<td>Introduction to the course</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8/30</td>
<td>What is Wilderness?</td>
<td>H&amp;D chpt 1, p. 2-12, Wilderness Act sec. 2(c) (p. 495)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chpt. 1 Study Questions 1-3 due – journal</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>9/4</td>
<td>Why do we manage Wilderness?</td>
<td>H&amp;D chpt 1 p. 12-26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chpt. 1 Study Questions 4-10 due – journal</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Complete Wilderness values test (Q10)</td>
<td>(H&amp;D p. 26-28) in your journal</td>
</tr>
<tr>
<td></td>
<td>9/6</td>
<td>Wilderness class project - introduction</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Essay #1 Due</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>9/11</td>
<td>Wilderness planning--federal agencies</td>
<td>H&amp;D chpt. 8 p. 196-203</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chpt. 8 Study Questions 1-3 due – journal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/13</td>
<td>Class project – choosing project teams and start working on project</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>9/18</td>
<td>History of conservation, American wilderness</td>
<td>H&amp;D chpt 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chpt. 2 Study Questions due – journal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/20</td>
<td>Project work</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>9/25</td>
<td>Video &amp; discussion – “Wild by Law”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/27</td>
<td>Project work</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>10/2</td>
<td>The Wilderness Act</td>
<td>H&amp;D chpt. 4; p. 495-499, 525-527</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chpt. 4 Study Questions due – journal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10/4</td>
<td>Project Work</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>10/9</td>
<td>Natl Wilderness Preservation System</td>
<td>H&amp;D chpt 6; Wilderness System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chpt. 6 Study Questions due - journal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10/11</td>
<td>Project work</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Essay #2 Due</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>10/16</td>
<td>Wilderness management principles</td>
<td>H&amp;D chpt 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chpt. 7 Study Questions due – journal</td>
<td></td>
</tr>
<tr>
<td>Wk</td>
<td>Dates</td>
<td>Topic</td>
<td>Reading(s)</td>
</tr>
<tr>
<td>----</td>
<td>---------</td>
<td>----------------------------------------------</td>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>9</td>
<td>10/23</td>
<td>Wilderness planning</td>
<td>H&amp;D chpt 8, pp. 203-214</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chpt. 8 Study Questions 4-9 due - journal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10/25</td>
<td>Project work</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>10/30</td>
<td>Wilderness use</td>
<td>H&amp;D chpt 14 pp. 357-369</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chpt. 14 Study Questions 1-2 due – journal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/1</td>
<td>Project work</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>11/6</td>
<td>Wilderness users</td>
<td>H&amp;D chpt 14 pp. 369-390</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chpt. 14 Study Questions 3-7 due – journal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/8</td>
<td>Project work</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>11/13</td>
<td>Visitor management</td>
<td>H&amp;D chpt 16 pp. 439-454</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chpt. 16 Study Questions 1-6 due - journal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/15</td>
<td>Project work</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>11/20</td>
<td>Visitor management</td>
<td>H&amp;D chpt 16 pp. 454-482</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Chpt. 16 Study Questions 7-10 due – journal</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Essay #3 due</td>
<td></td>
</tr>
<tr>
<td>11/22</td>
<td>THANKSGIVING HOLIDAY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>11/27</td>
<td>Future issues and challenges for Wilderness management</td>
<td>H&amp;D chpt. 17</td>
</tr>
<tr>
<td></td>
<td>11/29</td>
<td>Project work</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>12/4</td>
<td>Project work</td>
<td></td>
</tr>
<tr>
<td>12/6</td>
<td>Project work</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Essay #4 due</td>
<td></td>
</tr>
</tbody>
</table>

Final Exam: December 13 (Thursday) – 8 a.m. – Presentation to Forest Service
Course Syllabus

General Information

College or Department: School of Forestry

Course Prefix, Number & Title: FOR 447 Forestry and Community

Semester Offered: Every Fall

Clock & Credit Hours: TTh 9:35-10:50; 3 Credit Hours

Instructor: Denver Hospodarsky, PhD, CF (aka DrH)
Associate Professor
Certified Forester # 3142

Office: Southwest Forest Science Complex – Bldg. 82
Room 104
928.523.7525
denver.hospodarsky@nau.edu

Office Hours: MW 9-10
TTh 3:30-4:00

Course Prerequisites

Senior standing, graduate student or consent of instructor

Course Description

The purpose of this course is to provide students with social science theory, concepts and analytic techniques for understanding human-forest ecosystems, from the perspective of human communities as a fundamental unit of social organization relevant to landscape-level and larger resource processes. The course develops and follows several perspectives in social theory drawing from sociology, anthropology, economics and social psychology in order to better describe, anticipate and affect interactions between communities and their natural environments. Forest management, in its many forms, is considered as a primary adaptive strategy mediating these interactions. Applications of theory, concepts and analytic techniques are made primarily through cases of forest management at the individual community and sub-state regional scales of community and forest interaction.
Student Learning Expectations/Outcomes

The primary learning outcomes for this course include:

1) To gain theoretical and conceptual understandings of human-forest resources interrelationships at the community level of analysis, with emphasis on social, cultural, psychological and economic dimensions.

2) To apply and expand theoretically and conceptually-based understandings through the analysis of local case studies in forest management.

3) To identify and address problems in research methods and data analysis related to understanding human-forest ecosystems.

4) To apply critical thinking, analysis and communications skills in the resolution of forest resources management problems.

Course Structure and Approach

Five learning modules have been designed to meet the four course outcomes outlined in the previous section.

Module 1 contains the course introduction and establishes basic concepts in forest resources management used throughout the course. As a general introduction to the course context, Module 1 does not correspond to any particular course outcome.

Module 2, social theories and concepts of community and region, promotes Outcome 1.

Module 3, applications of concepts and theory, serves Outcome 2.

Module 4, analytic tools, serves Outcome 3.

Module 5, implementation of planning and management, is intended to accomplish Outcome 4.

The overall content of the course is presented on the basis of about 10% lecture, 70% seminar readings and in-class discussion, and 20% student presentations of seminar issues and approaches to resolving community-forest management issues of particular interest to individual students.

Textbook and Required Readings

The assigned text is Lee, Robert G. and Field, Donald R. 2005. Communities and Forests: Where People Meet the Land. Oregon State University press, Corvallis. We will read and discuss several chapters from this text. In addition, a substantial number of additional readings will be assigned.
Recommended Optional References

Occasionally, the instructor or students may recommend pertinent readings in addition to those in the text and readings list.

Course Outline

The course is to be delivered according to the following weekly schedule. This schedule, however, will remain somewhat flexible to accommodate students’ interest, knowledge and experience with the various topics. For example, students are encouraged to suggest additional readings related to the various module themes.

<table>
<thead>
<tr>
<th>WEEKLY SCHEDULE (approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
</tbody>
</table>

Note: There will be no class October 23 and 25 so we can attend the Society of American Foresters national convention in Reno, NV

Assessment of Student Learning Outcomes

Methods of Assessment:

Students will keep a reading journal from which they will write five seminar discussion questions per assigned reading. The quality of the journal, study questions and student’s contribution to the seminar discussion will be evaluated bi-weekly as they contribute as much as 20% to the course grade.

Term paper # 1: Literature review and synthesis; 30% of course grade.

Term paper #2: Conceptual framework; 30% of course grade.

Final exam – assessment methods; study questions will be provided in advance but exam will be in the class room and closed-book.: 20%

(A final term paper may substitute for the in-class exam.)

Timeline for Assessment

Reading journal and contribution to seminar discussion evaluation – bi-weekly.

Term paper #1 – October 20

Term paper #2 – November 22
Final exam – Scheduled final exam period

**Grading System**

Final grades will be assigned according to the following scale:

- A = 100 – 91%
- B = 90 – 81%
- C = 80 – 71%
- D = 70 – 61%
- F <= 60%

**Course Policy**

Retests/makeup tests: Retests and makeup tests are only available with a doctor’s written excuse.

Attendance: Attendance is required. Seminar-based classes can only succeed when all class members attend and participate in the discussion.

Statement on plagiarism and cheating: Each student is expected to do his or her own work on all assignments. Plagiarism or cheating in any form will not be tolerated and may constitute grounds for dismissal. We will also abide by the SAF Code of Ethics in the conduct of this class.

University policies: Please see the NAU Student Handbook.

Cell phones: Cell phones must be turned off and stowed away at all times while class is in session. If your phone rings during class, the instructor reserves the right to answer it for you.
Forestry 452 - Forest Pathology
Course Syllabus

Course Prefix, Number and Title: FOR452, Forest Pathology

Credit Hours, Clock Hours: 3 credits,

Course Meets: Room 133, Thursday 12:45 – 5:15 p.m. (Lecture/Lab)

Instructor’s Name: Dr. Robert Mathiasen
Office - Room 002, Southwest Forest Science Complex
Phone: 523-0882; e-mail: Robert.Mathiasen@nau.edu

Office Hours: open door or by appointment.

Course Prerequisites: None

Course Description
This course covers the identification, biology, epidemiology, economic and ecological importance and management of the most commonly occurring tree diseases in western forests. Widely distributed tree diseases in the following categories are discussed in detail - root diseases, stem decays, rust diseases, and mistletoes. Several economically and ecologically important tree diseases will be included under each of the preceding disease categories. Students will be required to develop a thorough knowledge of how to identify and manage the tree diseases selected for discussion. In addition, students will become familiar with pertinent (historical and current) scientific literature related to each of the tree diseases covered in the course. The roles tree diseases play in forest ecosystems will be included as an integral part of the course.

Course Objectives:
1. Students will learn how to identify each of the tree diseases discussed in the course under laboratory conditions, and whenever possible, under field conditions.
2. Students will learn the biological and epidemiological characteristics of each tree disease covered in the course.
3. Students will learn the economic and ecological importance of each tree disease discussed in the course.
4. Students will learn appropriate strategies for managing the selected tree diseases.
5. Students will become familiar with important scientific literature pertaining to each of the tree diseases discussed.

**Course Structure/Approach:** The emphasis of this course will be on students gaining a thorough knowledge of the biology of causal agents and the identification and management of the major diseases affecting trees in western forests. Major tree diseases in the following categories will be covered in detail: root diseases, stem decays, rusts, and mistletoes. This course is not designed as a survey course of a wide range of tree diseases, but will concentrate on those tree diseases that are the most important economically and ecologically in the western United States. Students taking the course will become extremely familiar with the identification and biology of the causal agents associated with the tree diseases, their epidemiology, distribution, management, and ecological importance. Collected specimens representing symptoms and signs of the tree diseases covered in the course will be brought into class frequently. Students will be expected to be able to identify tree diseases using collected specimens representing the selected tree diseases and in many cases under field conditions.

**Field Trips:** When possible, field trips to local forest areas to observe forest tree diseases will be arranged. These will be during laboratory sessions when possible, but one weekend field trip is scheduled for over the Veterans Day Holiday weekend (see course schedule). Students not attending the weekend field trip will be given another assignment in lieu of attending the field trip. This assignment will be due on December 1. Arrangements for field trips will be discussed with students during the first and second class meetings. Transportation to field sites will be provided.

**Recommended Textbook:**


(Second Edition)

Readings will be required of students including specific scientific papers on different research efforts related to forest tree diseases covered in the course.

**Other Key References:**


**Assignments:** Assigned readings from the references will be used to cover material on each of the topics discussed in class. Because a detailed coverage of each tree disease included in the course will be emphasized, required readings will primarily be from the scientific literature specific to each disease.

**Evaluation Methods:** Course participants will be evaluated on the basis of their performance on quizzes, exams, participation on field trips, and other assignments.

**Examinations:** There will be one midterm (150 points) and a final exam (200 points). The final will be a comprehensive exam, but will emphasize material covered in the last half of the course. Each exam will consist of a combination of true/false, multiple choice, matching, short answer and essay questions. In addition, each exam will include the identification of selected tree diseases based on a variety of collected specimens representing symptoms or signs of the tree diseases covered in the course. In addition to the midterm and final exam, five short lab quizzes (10 points each) may be given at various times during the course. **The final exam will be in Room 133 on December 13 from 12:30 – 2:30 p.m.** Everyone must take the final at the NAU designated time.

**Grading:** Grades will be based on a possible total of 400 points: Midterm - 150 points; Final Exam - 200 points; five possible quizzes – possibly up to 50 points. Grades will be assigned by earned points as follows:

A – 90 - 100% of possible points

B - 80 - 89%
C – 70 - 79%

D – 60- 69%

F - Less than 60% of possible points

**Course Policies:** Policies for the course are described below under Northern Arizona University Policy Statements.

**Attendance:** Class attendance is the responsibility of each participant in the course. No penalty for not attending classes will be assessed, but it is the responsibility of each participant to acquire the material presented in classes they miss from the instructor or other class participants. If a class participant must miss the midterm they should notify the instructor in advance and make arrangements to take the exam at another time. Class participants will only be allowed to take a make-up exam or quiz if they have notified the instructor in advance that they will not be at the scheduled class meeting or on a pre-arranged field trip because of an illness, family emergency, or institutional excuse.

**Northern Arizona University Policies**

A summary of major university policies is found on the following web page for your information: [http://jan.ucc.nau.edu/academicadmin/policy.doc](http://jan.ucc.nau.edu/academicadmin/policy.doc)
Tentative Syllabus
FOR 493/593
Natural Resource Economics
Fall 2010
TTH 12:45 PM-2:00 PM, 3 credits

INSTRUCTOR INFORMATION:
Ching-Hsun Huang
Office: Room 238, Southwest Forest Sciences Complex
Phone: 928-523-7502, Email: Ching.Huang@nau.edu
Office Hours: Wednesday 3:00-4:00 PM or by appointment

COURSE DESCRIPTION:
FOR 493/593 Natural Resource Economics introduces economic theory and environmental and natural resource issues to students, offers them the tools and techniques to understand and analyze resource decisions and help them design practical policy solutions. Using simple algebra, a basic understanding of microeconomic theory and the concepts of the economics of natural resource systems, this course equips students with the skills and abilities to understand why resource decisions are made and how they can be improved upon in order to achieve the desired balance between utilization and conservation. FOR 493/593 also covers the topics on the economics of sustainability and identifies the interactions between economy, community and environment over the long-term as the subject of sustainability and sustainable development emerges and future environmental policy options are needed for a more sustainable society. FOR 493/593 is a skills-based course which prepares students to work in an interdisciplinary fashion and develop effective public policy with other economists, scientists and land managers.

FOR 493 co-convenes with FOR 593. Graduate students are expected to show higher standards of professionalism and complete work that is about one third higher in quality and quantity than their undergraduate classmates (See the Assessment of Student Learning Outcomes).

TEXTBOOK:
Environmental and Natural Resource Economics by Frank A. Ward. Pearson Prentice Hall, 2006. Additional readings will be assigned to supplement the text.

Students are expected to bring a calculator to every class meeting. No calculators will be provided for the quizzes or exams. Prepare extra batteries for your calculator if necessary.

CLASS FORMAT:
The class will be a combination of lectures and in-class discussions based on assigned readings.
Spring Course Syllabi
FOR 101, Introduction to Forestry

11:10-12:25 (TTH), 3 credits, Room 18 Forestry

Denver Hospodarsky (aka DrH), PhD, CF # 3142

Office: Room 104, SW Forest Science Bldg.

Office Hours: 2:00-4:00 TTh; otherwise Open door (it’s almost always open when I’m not in class) or by appointment

Phone: 523-7525

E-mail: denver.hospodarsky@nau.edu

This course is designed to give the student an overview of the practice and profession of forestry. The central theme is forestry as a societal function in which forests and other natural resources are managed for the benefit of human and natural ecosystems. In development of this main theme related topics of forest history, forestry as a profession, forest geographic description, forest structure and function, human dimensions of forest management, forest and land measurements, and other related topics will be discussed.

Goals: Successful completion of this course will enable you to --

1) Gain an understanding of the terminology of forestry and other natural resource management practices used in public and private land management settings.
2) Comprehend the forestry profession including employment and career opportunities in natural resources management, and the required qualities of a professional forester.
3) Attain an understanding of key concepts of forest management.
4) Obtain practical experience with some of the field skills used in the day-to-day management of forest resources.

The course format will be lecture, student presentations, class discussion, videos, field trips, and field forestry demonstrations and hands-on exercises.


Evaluation Methods: Three exams, two midterms and one final (100 points each); five short in-class readings quizzes (10 points each); three field work reports (10 points each); one video report (10 points); and one forestry field day exercise and report (100 points)

The final exam is not comprehensive and will cover only the material discussed after the second midterm exam. The final exam must be taken on the date and time specified by NAU for our class.

(Note: The two midterm exams and the final exam will draw about equally from the assigned readings and the instructor’s discussion of topics prompted by the readings.)
Grading Scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90-100%</td>
</tr>
<tr>
<td>B</td>
<td>80-89%</td>
</tr>
<tr>
<td>C</td>
<td>70-79%</td>
</tr>
<tr>
<td>D</td>
<td>60-69%</td>
</tr>
<tr>
<td>F</td>
<td>less than 60%</td>
</tr>
</tbody>
</table>

Course Policies:

You will be allowed up to three unexcused absences during the semester without incurring any reduction in your course grade. You will receive a 5% reduction in grade for each absence in addition to the allowed three. (The exception to the above absence policy is Forestry Field Day, which is required of all students unless you have obtained written permission for your Field Day absence from your medical doctor. An unexcused absence from Field Day will result in the loss of 100 points.)

Remember, according to the NAU Undergraduate Catalog, “…You are responsible for regularly attending all courses for which you are registered…Your instructors are under no obligation to make special arrangement for you if you are absent.”

An important summary of other NAU policies pertaining to this course is found at: http://jan.ucc.nau.edu/academicadmin/policy.doc. It is strongly urged that you review these policies before proceeding with this class.

Course Assignment Calendar:

<table>
<thead>
<tr>
<th>Due Date</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 15</td>
<td>Ch 1 (Text); Forestry Video (SAF meeting Jan 17-extra credit: extra credit also available for attending SAF meetings in Feb, Mar, and Apr.)</td>
</tr>
<tr>
<td>Jan 22</td>
<td>Ch 2; Video Report due Tuesday Jan 22;</td>
</tr>
<tr>
<td>Jan 27</td>
<td>Ch 3; Quiz Thursday Jan 31 on Chapter 3</td>
</tr>
<tr>
<td>Feb 5</td>
<td>Ch 4; Field Trip on Forest Ecology Thursday Feb 7</td>
</tr>
<tr>
<td>Feb 12</td>
<td>Ch 5; Field Trip Report due Tuesday Feb 12; Midterm Exam 1 Thursday Feb 14</td>
</tr>
<tr>
<td>Feb 19</td>
<td>Ch 6; Ch 7 (125-129, 134); Quiz Thursday Feb 21 on Chapters 6&amp;7</td>
</tr>
<tr>
<td>Feb 26</td>
<td>Ch 8; Field Trip on Fire/Fuels Thursday Feb 28</td>
</tr>
<tr>
<td>Mar 5</td>
<td>Ch 9; Field Trip Report due Tuesday Mar 5; Quiz Thursday Mar 7 on Chapter 9</td>
</tr>
<tr>
<td>Mar 12</td>
<td>Ch 12</td>
</tr>
<tr>
<td>Mar 19</td>
<td>Spring Break</td>
</tr>
<tr>
<td>Mar 26</td>
<td>Exam review Tue March 26: Midterm Exam 2 Thursday Mar 28</td>
</tr>
<tr>
<td>Apr 2</td>
<td>Ch 13 (277-278, 281-293); Ch 14 (299-313); Quiz Tuesday Apr 2 on Ch 13&amp;14</td>
</tr>
<tr>
<td>Apr 9</td>
<td>Ch 17; Field Trip on Forest Measurements Thursday Apr 11</td>
</tr>
</tbody>
</table>
Apr 16  Ch 18 (387-389); Ch 19 (405-419); Field Trip Report due Tuesday Apr 16; Quiz Thursday Apr 18 on Ch 18 and 19

Field Day Sat Apr 20, 9 am – 4 pm; 100 points

Apr 23  No class Apr 23 and 25 (work on Field Day report)

Apr 30  Hand Out: Wildland-urban Interface Forestry; Ch 20; Field Day Report due Apr 30

May 9  Final Exam Tuesday May 9; 10-12

*Field work and report dates are subject to change due to the weather*
FOR 203 – Project Learning Tree
Spring 2013

1 credit
Saturday, September 15, 9:30 – 4:30
Sunday, September 16, 9:30 – 4:30
Rm. 136, SWFSC (Forestry)

Facilitators: Dr. Marty Lee, Karen Malis-Clark
Office: M. Lee - SWFSC 241, martha.lee@nau.edu

Objectives:

1. Introduce students to Project Learning Tree and the environmental education resources it provides.
2. Provide students with information and examples of environmental education activities on forests, forestry, and fire.
3. Give students ideas for adapting Project Learning Tree activities for a variety of audiences.
4. Give students experience with leading Project Learning Tree activities.

NAU Policies
See the student handbook: http://www4.nau.edu/stulife/handbook.htm

Academic Honesty: Academic dishonesty is defined in the student handbook. Unauthorized use of another person’s intellectual work is cheating and includes: copying on exams, plagiarizing a student’s work, giving unauthorized aid on tests, falsification of data or calculations. Cheating will not be tolerated. Students caught cheating will be given a failing grade on the assignment or exam, and procedures outlined in the student handbook will be adhered to.

Antidiscrimination: Discriminatory or derogatory language and/or actions regarding race, gender, ethnic and cultural background, sexual orientation, or physical and mental abilities will not be tolerated. Offenders will be excused from class.

Disabilities: If you need course adaptations or special accommodations because of a disability, if you have emergency medical information or if you have special accommodations that need to be shared with the instructors in the event of an emergency, please contact the instructor immediately. If you use an alternative medium for communication, please let the instructor know before the course so appropriate accommodations can be made.

Attendance and Make-Up Work: The NAU attendance policy is found in the NAU Student Handbook and states that “…regular attendance…is the responsibility of the student…each student is accountable for all work missed due to any absence…Instructors are under no obligation to make special arrangements for students who have been absent…It is the responsibility of the student to report the reason for his/her absence to the instructor.” You must attend both days of the Project Learning Tree class to pass the class.
Day 1 - Saturday – Introduction to PLT + Focus on Forests (Marty Lee)

9:30 a.m. Introductions, Nametags

9:45 Why are you taking PLT?  
What is Project Learning Tree?

10:00 Ponderosa pine forests  
Activity – “My Life as a Tree” – p. 329

12:00 LUNCH

1:00 p.m. How trees function  
Activity – “Tree Factory” – p. 269  
Activity – “Every Tree for Itself” – p. 117

2:00 Break

2:15 Activity – “To Be a Tree” – p. 265

3:00 PLT resources and a hike through the guide

3:30 Choosing the right activity  
Select and work on Teachbacks

4:30 Adjourn

Day 2 – Sunday – Focus on Fire (Karen Malis-Clark) + Teachbacks

9:30 a.m Fire in ponderosa pine ecosystems  
Activity - “Living with Fire”  
Activity - “Matchstick Forest”  
Activity – “Zip Game”

12:30 LUNCH

1:00 Teachbacks – Your Turn to Teach

4:00 Final exam

Wrap-ups, evaluations

4:30 Adjourn
FOR 204 – Project WILD (6044)

Spring 2013
1 credit

Saturday, March 9, 9:30 am – 4:30 pm
Sunday, March 10, 9:30 am – 4:30 pm
Rm. 136, SWFSC (Forestry, Bldg 82)
Facilitators: Cheryl Miller (CM) and Shelly Shepherd (SS)
Office hours: by appointment only
Telephone: (928) 523-6727 (CM); (928) 214-1241 (SS)
E-mail: Cheryl.Miller@nau.edu; SShepherd@azgfd.gov

Objectives:
Introduce students to Project WILD and the environmental education resources it provides.
Provide students with information and examples of environmental education activities that teach about wildlife.
Give students ideas for adapting Project WILD activities for a variety of audiences.
Give students experience with leading Project WILD activities.

NAU Policies
See the student handbook: http://www4.nau.edu/stulife/handbook.htm

Academic Honesty: Academic dishonesty is defined in the student handbook. Unauthorized use of another person’s intellectual work is cheating and includes: copying on exams, plagiarizing a student’s work, giving unauthorized aid on tests, falsification of data or calculations. Cheating will not be tolerated. Students caught cheating will be given a failing grade on the assignment or exam, and procedures outlined in the student handbook will be adhered to.

Antidiscrimination: Discriminatory or derogatory language and/or actions regarding race, gender, ethnic and cultural background, sexual orientation, or physical and mental abilities will not be tolerated. Offenders will be excused from class.

Disabilities: If you need course adaptations or special accommodations because of a disability, if you have emergency medical information or if you have special accommodations that need to be shared with the
instructors in the event of an emergency, please contact the instructor immediately. If you use an alternative medium for communication, please let the instructor know before the course so appropriate accommodations can be made.

**Attendance and Make-Up Work:** The NAU attendance policy is found in the NAU Student Handbook and states that “…regular attendance…is the responsibility of the student…each student is accountable for all work missed due to any absence…Instructors are under no obligation to make special arrangements for students who have been absent…it is the responsibility of the student to report the reason for his/her absence to the instructor.”

**Saturday**

9:30 a.m.  Introductions, What Animal am I? Why are you taking WILD?

10:00  What is WILD?

   Mission and goal, history, a look at the national website

   What is Wildlife? Definition and Arizona Wildlife introduction

   Break

11:00  Activity – “Habitat Lap Sit” (p. 61)

   Activity – Adaptation Artistry (p. 128)

12:30 p.m.  LUNCH

1:00  Arizona Game and Fish educational materials

1:30  Hike through the Guide

2:00  Black footed ferrets and Activity – “Bottleneck Genes” (p. 172)

3:00  Activity – “Quick Frozen Critters” (p. 122)

4:00  Select and work on Teachbacks

   VARK homework

4:30  Adjourn

**Sunday**

9:30 a.m.  What kind of learner are you? VARK

   Understanding your audience

   Choosing the right activities

10:30  Teachbacks

12:00 p.m.  LUNCH

12:30  Teachbacks
1:30 Final: EE Scenarios
3:00 How will I use Project WILD?
    Wrap Up
4:30 Adjourn
FOR 207 – Project WET
Spring 2013

1 credit
Saturday, February 16, 9:30 a.m. – 4:30 p.m.
Sunday, February 15, 9:30 a.m. – 4:30 p.m.
Rm. 136, SWFSC (Forestry)

Instructors: Dr. Marty Lee, Mansel Nelson
M. Lee Office: SWFSC 241, martha.lee@nau.edu, 523-6644

Objectives:

1. Introduce students to Project WET and the environmental education resources it provides.
2. Provide students with information and examples of environmental education activities on water and water conservation.
3. Give students ideas for adapting Project WET activities for a variety of audiences.
4. Give students experience with leading Project WET activities.

NAU Policies
See the student handbook: http://www4.nau.edu/stulife/handbook.htm

Academic Honesty: Academic dishonesty is defined in the student handbook. Unauthorized use of another person’s intellectual work is cheating and includes: copying on exams, plagiarizing a student’s work, giving unauthorized aid on tests, falsification of data or calculations. Cheating will not be tolerated. Students caught cheating will be given a failing grade on the assignment or exam, and procedures outlined in the student handbook will be adhered to.

Antidiscrimination: Discriminatory or derogatory language and/or actions regarding race, gender, ethnic and cultural background, sexual orientation, or physical and mental abilities will not be tolerated. Offenders will be excused from class.

Disabilities: If you need course adaptations or special accommodations because of a disability, if you have emergency medical information or if you have special accommodations that need to be shared with the instructors in the event of an emergency, please contact the instructor immediately. If you use an alternative medium for communication, please let the instructor know before the course so appropriate accommodations can be made.

Attendance and Make-Up Work: The NAU attendance policy is found in the NAU Student Handbook and states that “…regular attendance…is the responsibility of the student…each student is accountable for all work missed due to any absence…Instructors are under no obligation to make special arrangements for students who have been absent…it is the responsibility of the student to report the reason for his/her absence to the instructor.”
Schedule:

Day 1 – Saturday, February 16
9:30 a.m. Name tag activity and welcome to Project WET – Marty Lee
10:15 a.m. Activity – “The Rain Stick” – p. 422
11:30 a.m. History of Project WET
Websites – www.projectwet.org
http://www.ag.arizona.edu/azwater/wet
Hike through the guide
12:00 LUNCH
12:30 p.m. Healthy Water, Healthy People – Mansel Nelson, NAU
Environmental Education Outreach Program
Sparkling Water – p. 348
Where are the Frogs? – p. 279
H+ to OH-
4:00 p.m. Select and work on Teachbacks
4:30 p.m. Adjourn

Day 2 – Sunday, Sept. 30
9:30 a.m. Activity: “The Incredible Journey” – p. 161
10:30 a.m. Water Conservation – What Can You Do?
12:00 LUNCH
12:30 Activity: “Ice Cream in a Bag” – handout
12:45 Final prep for teachbacks
1:00 Teachbacks
4:00 p.m. Final Exam
Wrap-up and evaluations
4:30 p.m. Adjourn
Forestry 212 Spring 2013
Trees and Forests of North America

Credits
2 semester hours

Location
Room 101 W.A. Franke College Business (Building 81)

Meeting Times
10:20-11:10, Monday and Wednesday

Instructor
Dr. Tom Kolb, Professor of Forestry
202 Southwest Forest Science Complex (Building 82)
523-7491, tom.kolb@nau.edu
Office hours: 11:30-2:00 Monday and Wednesday, or by appointment

Course Prerequisites
This course is required for all students majoring in Forestry. It also is appropriate for other students who are interested in learning about trees and forests. There are no prerequisites other than interest in the subject.

Course Objectives
Students who successfully complete this course will have the following competencies: 1) knowledge of basic principles of plant classification and taxonomy; 2) knowledge of the scientific and common names, range, and the physical, ecological, and utilitarian characteristics of many important trees in North America; 3) knowledge of the major forest types in North America and their geographic location and species composition.

Course Structure/Approach
This course will use lectures and discussions to introduce the most important concepts. All students are expected to supplement the material covered in lecture by reading in the assigned text and on the course web (http://www2.for.nau.edu/courses/for212/). Once the class covers a tree species (or even before), students should read about that species in the text. The key to success in this class is keeping up.

Grading
Students will be graded by a combination of traditional in-class exams and weekly quizzes.

Weekly quizzes 25%
Exam 1 (gymnosperms) 25%
Exam 2 (angiosperms) 25%
Exam 3 (forest types) 25%
Other Course Policies

Student attendance at all class activities is an academic policy of NAU. However, situations arise occasionally that prevent a student from attending class. If such a situation occurs, it is the student’s responsibility to contact the instructor. Calling or emailing the instructor in advance is a good way to do this. It is the student's responsibility to make up any material (including exams) he/she missed. If you do not inform the instructor of your absence, he is not obliged to let you make up the work.

Text

The text required for the course is:


Older editions of this book also will work adequately for the course. The book is available at the NAU Bookstore. One copy of the text is on reserve for this course at Cline Library (four-hour check-out in the library).

Web Enhancement

This is a web-enhanced course. Supporting content for the course is available at: http://www2.for.nau.edu/courses/for212/; the weekly quizzes are available on the BB Learn website (https://bblearn.nau.edu/) for the course under “assessments.”

Quizzes

Quizzes will be given most weeks (9 total) and are available only on the BB Learn website (https://bblearn.nau.edu/) for the course under “assessments.” The quiz points will make up 25% of your final grade and are meant to promote diligence in studying. Each week’s quiz will be open to students starting early Sunday morning and will be due no later than Friday, 9 pm, of the same week. You are expected to take each quiz independently outside of class. You will have only one attempt (30 minutes) for each quiz, except for the first quiz when you will have two attempts in order to learn the online system.

Exams

Exams are not cumulative except that the material in the last third of the course will revisit the major species of important forest types.

Other Policies


Northern Arizona University regards acts of academic dishonesty—including, but not limited to, plagiarism, cheating, fabrication, forging an instructor’s signature, stealing tests, copying themes or tests from other students, texting for answers, accessing the Internet during "closed" tests, or using “crib notes”—as very serious offenses. Official University policies regarding academic dishonesty are described at: http://home.nau.edu/images/userimages/awf/9476/ACADEMIC%20DISHONESTY.pdf
Spring 2013 Schedule

Jan. 14 M  Introduction/Principles of Taxonomy
Jan. 16 W  Start Gymnosperms/Pinus
Jan. 21 M  MLK Holiday
Jan. 23 W  Pinus
Jan. 25 F  Week 2 online quiz due
Jan. 28 M  Pinus/Larix
Jan. 30 W  Picea/Pseudotsuga/Tsuga
Feb. 1 F   Week 3 online quiz due
Feb. 4 M   Abies/Cupressus/Calocedrus
Feb. 6 W   Thuja/Chamaecyparis/Juniperus
Feb. 8 F   Week 4 online quiz due
Feb. 11 M  Sequoia/Sequoiadendron
Feb. 13 W  Taxodium/Taxus
Feb. 15 F  Week 5 online quiz due
Feb. 18 M  Gymnosperm Exam
Feb. 20 W  Start Angiosperms/Salix/Populus
Feb. 25 M  Betula/Alnus
Feb. 27 W  Quercus
Mar. 1 F   Week 7 online quiz due
Mar. 4 M   Fagus/Castanea
Mar. 6 W   Juglans/Carya/Ulmus/Celtis
Mar. 8 F   Week 8 online quiz due
Mar. 11 M  Magnolia/Liriodendron/Platanus
Mar. 13 W  Prunus/Liquidambar/Tilia
Mar. 18-22  **Spring Break**
Mar. 25 M  *Gleditsia/Robinia*
Mar. 27 W  *Acer/Aesculus/Cornus*
Mar. 29 F  Week 10 online quiz due
Apr. 1 M  *Nyssa/Fraxinus/Catalpa*
Apr. 3 W  **Angiosperm Exam**
Apr. 8 M  Southern Pine Forests
Apr. 10 W  Southern Bottomland Forests
Apr. 12 F  Week 12 online quiz due
Apr. 15 M  Appalachian Highland Forests
Apr. 17 W  Northeastern Forests
Apr. 19 F  Week 13 online quiz due
Apr. 22 M  Boreal Forests
Apr. 24 W  Lake States Forests
Apr. 29 M  Rocky Mountain Forests
May 1 W  Pacific Northwest/California Forests
May 6 M  **Forest Types Exam 10:00am**
ECOLOGY AND MANAGEMENT OF FOREST SOILS

FOR 213, SPRING 2013 (AND SPRING EVERY YEAR)

School of Forestry

(This syllabus is a draft dated 27 January 2013. Revisions may be made & students will be notified via email)

INSTRUCTOR:

Dr. Matthew A. Bowker

CLASS HOURS: Tu & Th 9:35 – 10:50 (Section 1) & 11:10 – 12:25 (Section 2) , Rm. 136 SWFSC (Bldg. 82)

OFFICE ADDRESS: Rm. 236 SWFSC; phone: 523-6600; Email: Matthew.Bowker@nau.edu

OFFICE HOURS: T & Th 1:30 – 2:30 pm, or by appointment

COURSE PREREQUISITES/COREQUISITES: BIO 181, BIO 182, CHM 130, and CHM 151L

COURSE DESCRIPTION: In this course, I will provide an overview of the chemical, physical, and biological properties of forest and rangeland soils through lectures, field trips and class exercises. Additionally, we will discuss the development and classification of soils, how disturbances and forest management activities influence soil properties, and the role of forest soils in global climate change.

COURSE OBJECTIVES: By the end of this course, students should have a clear understanding of the properties of forest soils as a medium for plant growth, and how these properties can be positively and negatively affected by management activities. Also students should understand the meaning of the statement “Soils are the foundation of terrestrial ecosystems”.

COURSE STRUCTURE/APPROACH: Two, 75m lectures per week. One all-day Saturday field trip will also be required where students will be exposed to how forest soils are described and the field assessment of some of their properties.


Supplementary Readings from:


Occasionally, handouts and selected readings from the primary literature will also be provided. No other materials are required. These include:


Others TBA
EVALUATION METHODS AND DEADLINES: One field report will be required based on the Saturday, all-day field trip. Four exams (three midterms and a comprehensive final) will also be used for evaluation purposes. See below for examination schedule.

GRADING SYSTEM: Three Midterm Exams 20% each; Comprehensive Final Exam 30%; Field Report 10%. The course will be graded using the absolute scale: >89%=A, 80-89%=B; 70-79%=C, 60-69%=D, <60%=F. If this scale results in a modal student grade significantly lower than about 75%, a grading curve will be used.

COURSE POLICIES:

RETESTS/MAKEUP TESTS: No retests will be provided. Makeup tests will be administered only when the student provides an official medical excuse, or under conditions were the student has notified the instructor in writing at least one-week in advance of missing a test for mutually acceptable personal/professional reasons.

ATTENDANCE: Although no official roll will be taken, students are expected to attend all lectures. Attendance and participation at the Saturday field trips is mandatory.

STATEMENT ON PLAGIARISM AND CHEATING: Plagiarism and cheating will not be tolerated. A first offense will result in a grade of “F” for the entire course and additional action may be taken.

USEFUL WEB LINKS
http://soils.usda.gov/ (US Natural Resources Conservation Service - Soils)
http://soilslab.cfr.washington.edu/S-7/ (Soil Science Society of America Forest and Range Soils Division)
http://www.pedosphere.com/ (On-line introductory soil science text)
http://soils.ag.uidaho.edu/soilorders/ (US Soil Taxonomy)
http://soil.gsfc.nasa.gov/ (GLOBE Soil Science Education)

LECTURE OUTLINE:

<table>
<thead>
<tr>
<th>WEEK</th>
<th>DATE</th>
<th>TOPIC (reading in Brady &amp; Weil's 2010 unless otherwise noted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:</td>
<td>15 Jan.</td>
<td>Introduction: Soils are the foundation of terrestrial ecosystems</td>
</tr>
<tr>
<td></td>
<td>17 Jan.</td>
<td>Soil genesis, Soil forming factors (B&amp;W Chapter 2)</td>
</tr>
<tr>
<td>2:</td>
<td>22 Jan.</td>
<td>Soil architecture &amp; physical properties (B&amp;W Chapter 4; skip 4.9)</td>
</tr>
<tr>
<td></td>
<td>24 Jan.</td>
<td>Soil architecture &amp; physical properties (<em>in class texture by feel exercise, hydrometer demonstration</em>)</td>
</tr>
<tr>
<td>3:</td>
<td>29 Jan.</td>
<td>Soil porosity &amp; water (B&amp;W Chapter 5)</td>
</tr>
<tr>
<td></td>
<td>31 Jan.</td>
<td>Soil air &amp; climate (B&amp;W Chapter 7; skip 7.11)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soil &amp; the hydrological cycle (B&amp;W Chapter 6; skip 6.7-6.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bowker research highlight: Ecosystem engineering of hydrology in Australia</td>
</tr>
<tr>
<td></td>
<td>7 Feb</td>
<td>The colloidal fraction (B&amp;W Chapter 8)</td>
</tr>
<tr>
<td>5:</td>
<td>12 Feb.</td>
<td>EXAM 1 (through 5 Feb.)</td>
</tr>
<tr>
<td>Date</td>
<td>Event</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>14 Feb.</td>
<td>Soil acidity, alkalinity, aridity, salinity (B&amp;W Chapter 9)</td>
<td></td>
</tr>
<tr>
<td>6:</td>
<td>19 Feb. Highlight: Terra Preta soils (in class videos) (Marris 2006)</td>
<td></td>
</tr>
<tr>
<td>21 Feb.</td>
<td>Mineral nutrition of plants &amp; soils (Singer &amp; Munns Chapter 9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Guest: Kyle Doherty; in class microscope demonstrations)</td>
<td></td>
</tr>
<tr>
<td>28 Feb.</td>
<td>Soil Biota &amp; Ecology: mycorrhizal fungi (Guest Lecturer: Anita Antoninka; Reading TBA)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(in class microscope demonstrations)</td>
<td></td>
</tr>
<tr>
<td>8:</td>
<td>5 Mar. Soil Biota &amp; Ecology: soil fauna &amp; food webs (B&amp;W Chapter 10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Guests: Kara Gibson &amp; Tiffani Falluca; in class microscope exercise)</td>
<td></td>
</tr>
<tr>
<td>7 Mar.</td>
<td>Organic Matter (B&amp;W Chapter 11)</td>
<td></td>
</tr>
<tr>
<td>9:</td>
<td>12 Mar. EXAM 2 (through 5 Mar.)</td>
<td></td>
</tr>
<tr>
<td>14 Mar.</td>
<td>Free day, no class – I’m trading you a freebie for attending the field trip</td>
<td></td>
</tr>
<tr>
<td>10:</td>
<td>18-22 Mar. SPRING BREAK!</td>
<td></td>
</tr>
<tr>
<td>11:</td>
<td>26 Mar. Nutrient Cycles 1 (B&amp;W Chapter 12)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>28 Mar. Nutrient Cycles 2 (B&amp;W Chapter 12)</td>
<td></td>
</tr>
<tr>
<td>12:</td>
<td>2 Apr. Nutrient Management (B &amp; W Chapter 13)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 Apr. Soil Classification (B&amp;W Chapter 2);</td>
<td></td>
</tr>
<tr>
<td>13:</td>
<td>9 Apr. Finding and using soil survey data/ Focus on Major Forest Soil Orders</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(in class GIS demonstration)</td>
<td></td>
</tr>
<tr>
<td>11 Apr.</td>
<td>Fire effects on soil (Fisher &amp; Binkley Chapter 10)</td>
<td></td>
</tr>
<tr>
<td>12 Apr.</td>
<td>FRIDAY FIELD TRIP-Group 1 12:00 – 5:00 PM</td>
<td></td>
</tr>
<tr>
<td>14:</td>
<td>16 Apr. EXAM 3 (Through 9 April)</td>
<td></td>
</tr>
<tr>
<td>18 Apr.</td>
<td>Effects of timber harvest &amp; forest thinning on soils (Reading TBA)</td>
<td></td>
</tr>
<tr>
<td>20 Apr.</td>
<td>SATURDAY FIELD TRIP-Group 2 12:00 – 5:00PM</td>
<td></td>
</tr>
<tr>
<td>15:</td>
<td>23 Apr. Soil Erosion &amp; the dust cycle (B&amp;W Chapter 14; Shao et al. 2011)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25 Apr. Invasive species (Bardgett 6.1)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FIELD REPORT DUE-Group 1 (beginning of class)</td>
<td></td>
</tr>
<tr>
<td>16:</td>
<td>30 Apr. Global Change effects on soil &amp; vice-versa (Bardgett Chapter 6)</td>
<td></td>
</tr>
<tr>
<td>2 May</td>
<td>Review</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FIELD REPORT DUE-Group 2 (beginning of class)</td>
<td></td>
</tr>
</tbody>
</table>
SAFE ENVIRONMENT POLICY

NAU’s Safe Working and Learning Environment Policy seeks to prohibit discrimination and promote the safety of all individuals within the university. The goal of this policy is to prevent the occurrence of discrimination on the basis of sex, race, color, age, national origin, religion, sexual orientation, disability, or veteran status and to prevent sexual harassment, sexual assault or retaliation by anyone at this university.

You may obtain a copy of this policy from the college dean’s office. If you have concerns about this policy, it is important that you contact the departmental chair, dean’s office, the Office of Student Life (928-523-5181), the academic ombudsperson (928-523-9368), or NAU’s Office of Affirmative Action (928-523-3312).

STUDENTS WITH DISABILITIES

If you have a documented disability, you can arrange for accommodations by contacting the office of Disability Support Services (DSS) at 928-523-8773 (voice), 928-523-6906 (TTY). In order for your individual needs to be met, you are required to provide DSS with disability related documentation and are encouraged to provide it at least eight weeks prior to the time you wish to receive accommodations. You must register with DSS each semester you are enrolled at NAU and wish to use accommodations.

Faculty are not authorized to provide a student with disability related accommodations without prior approval from DSS. Students who have registered with DSS are encouraged to notify their instructors a minimum of two weeks in advance to ensure accommodations. Otherwise, the provision of accommodations may be delayed.

Concerns or questions regarding disability related accommodations can be brought to the attention of DSS or the Affirmative Action Office.

INSTITUTIONAL REVIEW BOARD

Any study involving observation of or interaction with human subjects that originates at NAU—including a course project, report, or research paper—must be reviewed and approved by the Institutional Review Board (IRB) for the protection of human subjects in research and research-related activities.

The IRB meets once each month. Proposals must be submitted for review at least fifteen working days before the monthly meeting. You should consult with your course instructor early in the course to ascertain if your project needs to be reviewed by the IRB and/or to secure information or appropriate forms and procedures for the IRB review. Your instructor and department chair or college dean must sign the application for approval by the IRB. The IRB categorizes projects into three levels depending on the nature of the project: exempt from further review, expedited review, or full board review. If the IRB certifies that a project is exempt from further review, you need not resubmit the project for continuing IRB review as long as there are no modifications in the exempted procedures.

A copy of the IRB Policy and Procedures Manual is available in each department’s administrative office and each college dean’s office. If you have questions, contact Melanie Birck, Office of Grant and Contract Services, at 928-523-8288.

ACADEMIC INTEGRITY

The university takes an extremely serious view of violations of academic integrity. As members of the academic community, NAU’s administration, faculty, staff and students are dedicated to promoting an atmosphere of honesty and are committed to maintaining the academic integrity essential to the education process. Inherent in this commitment is the belief that academic dishonesty in all forms violates the basic principles of integrity and impedes learning. Students are therefore responsible for conducting themselves in an academically honest manner.
Individual students and faculty members are responsible for identifying instances of academic dishonesty. Faculty members then recommend penalties to the department chair or college dean in keeping with the severity of the violation. The complete policy on academic integrity is in Appendix F of NAU’s Student Handbook.

**ACADEMIC CONTACT HOUR POLICY**

The Arizona Board of Regents Academic Contact Hour Policy (ABOR Handbook, 2-206, Academic Credit) states: “an hour of work is the equivalent of 50 minutes of class time…at least 15 contact hours of recitation, lecture, discussion, testing or evaluation, seminar, or colloquium as well as a minimum of 30 hours of student homework is required for each unit of credit.”

*The reasonable interpretation of this policy is that for every credit hour, a student should expect, on average, to do a minimum of two additional hours of work per week: e.g., preparation, homework, studying.*
Knight Spring 2013 Syllabus: FOR 215 – Writing in Forestry

Instructor: Sandra Knight  
Email: sk639@nau.edu  
Office: Forestry Sciences Complex Rm. 131  
Office Hours: M/W 10 – 11.30 & 12.30 – 1 p or by appointment  
Course Location: Forestry Rm. 18  
Course Times: M/W 9.10a – 10a OR M/W 11.30a – 12.20p  
Course Site: http://BbLearn.nau.edu

1. Course Description  
Overall Course Goals:  
Acquire communication skills needed to succeed in your Forestry major and professional career  
Emphasize clear and logical writing presented in a usable form and appropriate to its intended audience  
Develop ways to market your talents and abilities  

Specific Course Learning Objectives:  
Learn to analyze the communication situation—audience, purpose, and context  
Communicate effectively with your professor and classmates electronically and in person  
Create and revise writing collaboratively  
Use technology to research, plan, draft, and design documents that are easy to understand and navigate  
Gather, interpret, and document information logically, efficiently, and ethically  
Understand the basic terms and concepts of technical and scientific writing  
Think critically about texts both in the context of class and in daily life  
Develop strategies and styles appropriate for different writing situations  
Organize and structure information effectively  

Course Document Types:  
Memos  
Lab Reports  
Résumés  
Application Letters  
Emails  
Annotated Bibliographies  
Abstracts  
Literature Reviews  
Briefs

2. Course Materials  
Course materials will include the course textbooks, handouts, PowerPoints, and other materials I will post on Blackboard Learn.
3. Course Format and Blackboard Site
The course site includes weekly folders with the quizzes, detailed major writing assignment instructions, key supplementary handouts, and readings materials. However, the course site DOES NOT contain all handouts, lectures, and activities we cover in class. The course Home Page, Course Content, and left-side navigation menu contain the links you will need. The Course Content is divided into 15 weekly folders each with a link on the Course Content page. The left side navigation menu contains your Course Email and Discussion Boards. You may or may not need the chat or discussion boards this semester, but they are available to you. You can also email me through the course site with questions in addition to my email address.

4. Course Requirements
The following assignments constitute the requirements of this course. Consult individual assignment instructions for details and requisites of each assignment.

4.1 Assignments and Point Breakdown
This course has a total of 600 points, organized into five main categories:

Participation
These points are awarded as you participate actively in class discussions, group activities, and peer reviewing and are engaged and paying attention in class. I will take away points if you are tardy, texting, sleeping, talking out of turn, interrupting the class discussions or lectures, or otherwise are rude or fail to participate. **You cannot get points for Class Participation if you are not in class.**

Quizzes
Five quizzes (10 pts. each) covering the textbook and other readings are all on the course site. Applicable Course Content folders on the course site will contain a link to each quiz. You may not make up a quiz after I have gone over it in class, unless you are absent and speak with me.

Leopold Summaries
Aldo Leopold is a person you will be expected to know about as a Forester, and this book represents a clear and accessible bit of scientific writing in the form of short essays. You will choose three of the essays by Aldo, one from each of the first three major sections (not the Editor’s Notes), and write three summaries of the essays. These summaries will be due throughout the semester for 15 points each. We will talk about how to write a summary in class and discuss good and bad examples.
Homework and Class Exercises
For some lessons, I will hand out or post instructions for homework exercises to take home and work on. We will go over each during the following class period. We will discuss the lessons and exercises as a class or in groups, and you will turn in your answers for credit. These are worth 15 points each.

Writing Assignments
These are the larger writing assignments. Points vary from 20 to 80 points per assignment. For any writing assignment worth 50 points or over, you will receive a detailed rubric. We will always go over the rubric in class and sometimes use it for peer review before your final assignments are due. The table below shows each individual category and writing assignment points.

<table>
<thead>
<tr>
<th>Assignment Category</th>
<th>Individual Assignments and Point Values</th>
<th>Total Point Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Participation</td>
<td>Participation Points</td>
<td>50</td>
</tr>
<tr>
<td>Quizzes</td>
<td>Five Online Quizzes over readings – 10 pts. each</td>
<td>50</td>
</tr>
<tr>
<td>Leopold Summaries</td>
<td>Leopold Summaries – 15 pts. each</td>
<td>45</td>
</tr>
<tr>
<td>Homework/Exercises</td>
<td>Four Grammar Assignments</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Literature Review Activity</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Lab Report Activity</td>
<td>10</td>
</tr>
<tr>
<td>Writing Assignments</td>
<td>Personal Statement Memo</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Résumé and Cover Letter</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Email Assignment</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Abstract</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Lab Report</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Brief</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Annotated Bibliography</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Literature Review</td>
<td>80</td>
</tr>
<tr>
<td>Final Exam</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>325</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>600</strong></td>
</tr>
</tbody>
</table>

4.2 General Grading Criteria
I will evaluate your work using the criteria listed below. For major writing assignments worth 50+ points, an assignment-specific rubric based on these criteria will be included in the assignment instructions.

- Compliance with assignment requirements and standards
- Analysis of the writing situation, including audience, purpose, and context
- Structure, organization, and accessibility of information
- Development and usability of content and textual elements
- Writing styles appropriate for the situation
- Appropriate use of visuals
- Effective use of design features and formatting
- Proper citation and documentation methods
Correctness in grammar and usage

4.3 Final Grades
Your final grades will be based on the standard percentage point scale:
600-540 = A; 539-480 = B; 479-420 = C; 419-360 = D; Below 360 = F

5. Policies and Procedures
The policies and procedures in this class are meant to ensure fair practice and assessment for all
students. If you have legitimate difficulties meeting the requirements of this course, notify me before
these difficulties turn into late assignments.

5.1 Deadlines
Assignments will incur a 10% penalty once the due date and time/class period has passed. You will
receive a 0% on the assignment after the following class period. One exception to this is if you are
at/in the hospital.

5.2 Attendance
At the beginning of each class, I will pass around a sign-in sheet. It is YOUR responsibility to make
sure you have signed the sign-in sheet. You will lose participation points if you do not attend class. In addition, keep in mind that we will
engage in a lot group work during class. Consequently, if you don’t attend class, you are not only
missing material, you are letting your group down.
If you require additional assistance because you missed a class, I will be more obliged to offer help if
you have notified me of legitimate reasons why you could not attend class.
As for tardiness, repeated tardiness will also affect your Participation grade. Keep in mind that we
only have 50 minutes per period.

5.3 Class Conduct
I expect all students to attend and participate actively in each class session and respectfully engage in
class discussions. Rudeness, either to your classmates or to me, will result in a loss of your class
participation points or possibly further action. Examples of rudeness include cell phone usage
(including ringing) during class, talking to classmates near you while we are having a class discussion
or lecture, non-class related internet surfing, and negative, non-constructive comments aimed
towards classmates, me, or course materials. On the other hand, productive inquiry and constructive
criticism are important parts of learning and always welcomed in this class.
I also expect all students to conduct themselves in a professional manner. We will discuss exactly
what professionalism means, and I will hold you to these expectations in your coursework, class
behavior, and participation.
5.4 Academic Integrity
Plagiarism is a common problem in any writing course, and as such, instructors are very good at detecting plagiarism. All outside sources, including sources of graphics, require proper reference in this course. We will discuss in class how to properly cite borrowed material. Any assignment found to be plagiarized will receive a grade of 0, and the student may also fail the course. These include group assignments! Please, for your sake and mine, speak with me if you are having problems completing an assignment, and do not plagiarize.

6. A Note on Time Management
You have many tools for completing your work in this course. While 215 is time intensive, you can work more efficiently by reviewing the schedule and materials on the course site thoroughly and planning ahead. If you have a problem completing an assignment or understanding any of the course material, please email, talk to me after class, or make an appointment during my office hours, and I will work with you. Deadlines are important because it is easy to get behind, but I can be flexible if you can show me you are working hard.

Policies of Northern Arizona University
1. Safe environment policy
NAU’s Safe Working and Learning Environment Policy seeks to prohibit discrimination and promote the safety of all individuals within the university. The goal of this policy is to prevent the occurrence of discrimination on the basis of sex, race, color, age, national origin, religion, sexual orientation, disability, or veteran status and to prevent sexual harassment, sexual assault or retaliation by anyone at this University.

You may obtain a copy of this policy from the college dean’s office. If you have concerns about this policy, it is important that you contact the departmental chair, dean’s office, the Office of Student Life (523-5181), the academic ombudsperson (523-9368), or NAU’s Office of Affirmative Action (523-3312).

2. Students with disabilities
If you have a documented disability, you can arrange for accommodations by contacting the office of Disabilities Support Services (DSS) at 523-8773 (voice), 523-6906 (TTY). In order for your individual needs to be met, you are required to provide DSS with disability related documentation and are encouraged to provide it at least eight weeks prior to the time you wish to receive accommodations. You must register with DSS each semester you are enrolled at NAU and wish to use accommodations. Faculty are not authorized to provide a student with disability related accommodations without prior approval from DSS. Students who have registered with DSS are encouraged to notify their instructors a minimum of two weeks in advance to ensure accommodations. Otherwise, the provision of accommodations may be delayed.
Concerns or questions regarding disability related accommodations can be brought to the attention of DSS or the Affirmative Action Office.

3. Institutional Review Board
Any study involving observation of or interaction with human subjects that originates at NAU-including a course project, report, or research paper-must be reviewed and approved by the Institutional Review Board (IRB) for the protection of human subjects in research and research-related activities.

The IRB meets once each month. Proposals must be submitted for review at least fifteen working days before the monthly meeting. You should consult with your course instructor early in the course to ascertain if your project needs to be reviewed by the IRB and/or to secure information or appropriate forms and procedures for the IRB review. Your instructor and department chair or college dean must sign the application for approval by the IRB. The IRB categorizes projects into three levels depending on the nature of the project: exempt from further review, expedited review, or full board review. If the IRB certifies that a project is exempt from further review, you need not resubmit the project for continuing IRB review as long as there are no modifications in the exempted procedures.

A copy of the IRB Policy and Procedures Manual is available in each department’s administrative office and each college dean’s office and available online by clicking the link. If you have questions, contact Carey Conover, Office of Grant and Contract Services, at 523-4889.

4. Academic integrity
The University takes an extremely serious view of violations of academic integrity. As members of the academic community, NAU’s administration, faculty, staff, and students are dedicated to promoting an atmosphere of honesty and are committed to maintaining the academic integrity essential to the education process. Inherent in this commitment is the belief that academic dishonesty in all forms violates the basic principles of integrity and impedes learning. Students are therefore responsible for conducting themselves in an academically honest manner.

Individual students and faculty members are responsible for identifying instances of academic dishonesty. Faculty members then recommend penalties to the department chair or college dean in keeping with the severity of the violation. The complete policy on academic integrity is in Appendix F of NAU’s Student Handbook.

5. Academic contact hour
The Arizona Board of Regents Academic Contact Hour Policy (ABOR Handbook, 2-206, Academic Credit) states: “an hour of work is the equivalent of 50 minutes of class time...at least 15 contact hours or recitation, lecture, discussion, testing or evaluation, seminar, or colloquium as well as a minimum of 30 hours of student homework is required for each unit of credit.”

The reasonable interpretation of this policy is that for every credit hour, a student should expect, on average, to do a minimum of two additional hours of work per week; e.g., preparation, homework, studying.
6. Academic Integrity
NAU regards acts of academic dishonesty—including, but not limited to, plagiarism, cheating, fabrication, forging an instructor’s signature, stealing tests, copying themes or tests from other students, or using “crib notes”—as very serious offenses.
If you are charged with academic dishonesty, you are subject to the Arizona Board of Regents’ Student Code of Conduct and procedures established by NAU, specifically the Academic Dishonesty policy, that are outlined in the on-line Student Handbook.
Course Syllabus

Forestry 222: Environmental Conservation

SPRING 2013

School of Forestry

For 222: Environmental Conservation

Lecture 3872, Credit hours: 3, Class Room: 018

Class period: Tu and Thu 12:45 – 2:00 pm.

Office hours: By appointment. I am in my office most days; please feel free to drop by.

Instructor: Monica Gaylord

Office: SW Forest Science Building, Room 204

Contact Information: Tel. 523 3079
e-mail: Monica.Gaylord@nau.edu

Course Prerequisites:

There are no prerequisites for this course.

Course Description

This course provides an introduction to the exciting, highly relevant and broad discipline of environmental science and management. It is an interdisciplinary study that combines ideas from the natural sciences as well as the social sciences to describe and understand the interconnectedness of the different things in our surroundings and their interactions, consequences and ways of handling them. This course will help students identify and understand problems related to the environmental sustainability, natural resources science and management and become active participants during their life in developing and applying solutions to improve human quality of life, ecosystem functions and the overall conditions of the earth at the local and global scales.

Student Learning Expectations/Outcomes for this Course

After completing this course, students will be able to:
Know and understand major environmental science and management concepts and related issues, their occurrences and consequences;

Know the causes and effects of various environmental problems and their possible solutions;

Learn the definitions and uses of basic environmental terms.

Know about the different, some of them opposing with each other, viewpoints on the environment and its stewardship and any possible solutions.

Critique major improvements in environmental quality that have taken place so far, and determine what needs to be done in the future at levels of spatial scales.

Discuss issues and find satisfactory solutions through consensus and/or making compromises

Course Structure/Approach

The course is divided into three modules taken over 16 weeks. The modules are arranged to reflect their similarity or interconnectedness with each other. The three modules may be grouped as: Module 1, which consists of topics or chapters that are related to environmental problems and ecosystem health and sustainability, factors affecting them and their consequences; Module 2, which comprises of subjects related to energy and water resources, their conservation and environmental sustainability and management in an efficient and reliable manner; and Module 3, which groups topics that relate to sustaining biodiversity, describing sources and methods of handling solid and hazardous wastes, and that address the economic, political and environmental aspects of sustainability. In addition to reading assignments, students will watch and discuss carefully selected relevant videos with global and international content and, for extra credit should attend and learn from one outside public lecture. Students will be required to write a three-page report on a journal article. All these materials together, if used as directed, are expected to provide the students with a good background on the many ecosystem and social issues in the environment we are facing today at the local and global scales.

Textbook and Required Materials

i. Textbook

*Living in the Environment*, 17th Edition by G. Tyler Miller Jr. and Scott E. Spoolman 2010. ISBN: 0-495-55671-8. It is available in the NAU bookstore and other nearby bookstores. However, students may also purchase the material either in book form or as separate chapters from the publisher as long as it is obtained in a timely manner.

ii. Videos

The course materials also will include six videos and out of class presentations, students are encouraged to attend. The six videos listed below will be shown in class. It is important to note that these videos are not available for borrowing by students. Hence students are expected to watch them in class at the time scheduled for their presentation. The list of videos is:
1. Cadillac Desert- Last Oasis. Narrated by Alfre Woodard;

2. Journey to Planet Earth, Season Two: On the Brink narrated by Matt Damon;

3. Journey to Planet Earth, Season One: Rivers of Destiny narrated by Kelly McGillis;


5. Journey to Planet Earth: Hot Zones narrated by Matt Damon;

6. Journey to Planet Earth, Season Three: Future Condition narrated by Matt Damon.

iii. Recommended outside class lectures

Below are websites where you can find on campus seminars. You may attend one of these lectures and write a one page summary and critique for extra points. In addition, the report should include how the seminar relates to environmental conservation.

http://nau.edu/CEFNS/Forestry/Student-Resources/Seminar-Schedule/

(Forestry, Wednesdays 4-5)

https://nau.edu/CEFNS/NatSci/SESES/Seminars/

(Earth Sciences and Environmental Sustainability; Tuesdays 4-5)

http://nau.edu/CEFNS/NatSci/Biology/News-Events/

(Biology; Thursdays from 4-5)

Course Outline

The following constitutes the course outline, and related text reading and video viewing schedules. Please read each assigned chapter before coming to class so you will be able to participate in class discussions and have a good grasp of the subject matter covered in each lesson.

Topical chapter reading (or video viewing) schedule for Environmental Conservation and related quizzes and examinations.

<table>
<thead>
<tr>
<th>Week days</th>
<th>Topic /Module</th>
<th>Assigned Material</th>
<th>Text Page</th>
<th>Quiz/Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan. 15 &amp; Jan. 17</td>
<td>Course introduction</td>
<td>Chapter 1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Environmental Problems, their causes and sustainability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jan. 22 Jan. 24</td>
<td>Ecosystems: What are they &amp; how do they work? Cadillac Desert, The Last Oasis</td>
<td>Chapter 3 Video</td>
<td>54</td>
<td>Qz 1</td>
</tr>
</tbody>
</table>

218
<table>
<thead>
<tr>
<th>Date(s)</th>
<th>Topic</th>
<th>Chapter(s)</th>
<th>Page</th>
<th>Quiz/Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 29</td>
<td>The Human Population and Its Impact</td>
<td>Chapter 6</td>
<td>125</td>
<td>Qz 2</td>
</tr>
<tr>
<td>Feb. 31</td>
<td>The Human Population and Its Impact</td>
<td>Chapter 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb. 5 &amp; Feb. 7</td>
<td>Climate and Biodiversity</td>
<td>Chapter 7</td>
<td>147</td>
<td>Qz 3</td>
</tr>
<tr>
<td>Feb. 12 &amp; Feb. 14</td>
<td><em>Journey to Planet Earth, On the Brink</em></td>
<td>Video</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feb. 25 &amp; Feb. 27</td>
<td>Aquatic Biodiversity</td>
<td>Chapter 8</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>February 19</td>
<td><strong>EXAM #1 on Tuesday, February 19, 2013</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Module 2**

<table>
<thead>
<tr>
<th>Date(s)</th>
<th>Topic</th>
<th>Chapter(s)</th>
<th>Page</th>
<th>Quiz/Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 21</td>
<td>Food, Soil and Pest Management</td>
<td>Chapter 12</td>
<td>277</td>
<td></td>
</tr>
<tr>
<td>Feb. 26 &amp; Feb. 28</td>
<td>Water Resources</td>
<td>Chapter 13</td>
<td>317</td>
<td>Qz 4</td>
</tr>
<tr>
<td>Mar. 5 &amp; Mar. 7</td>
<td><em>Journey to Planet Earth, Season One: Rivers of Destiny</em></td>
<td>Video</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mar. 12 - Mar. 14</td>
<td>Geology and Nonrenewable Mineral Resources</td>
<td>Chapter 14</td>
<td>346</td>
<td>Qz 5</td>
</tr>
<tr>
<td>Mar. 18 &amp; Mar. 22</td>
<td>Nonrenewable Energy</td>
<td>Chapter 15</td>
<td>370</td>
<td></td>
</tr>
<tr>
<td>Mar. 26 &amp; Mar. 28</td>
<td>Energy Efficiency and Renewable Energy</td>
<td>Chapter 16</td>
<td>397</td>
<td>Qz 6</td>
</tr>
<tr>
<td>April 2</td>
<td><strong>EXAM #2 on Tuesday, April 2, 2013</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Module 3**

<table>
<thead>
<tr>
<th>Date(s)</th>
<th>Topic</th>
<th>Chapter(s)</th>
<th>Page</th>
<th>Quiz/Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 4</td>
<td>Environmental Hazards and Human Health</td>
<td>Chapter 17</td>
<td>436</td>
<td></td>
</tr>
<tr>
<td>Apr. 9 &amp; Apr. 11</td>
<td>Climate disruption and Ozone Depletion</td>
<td>Chapter 19</td>
<td>492</td>
<td>Qz 7</td>
</tr>
<tr>
<td>Apr. 16 &amp; Apr. 18</td>
<td><em>Journey to Planet Earth, Hot zones</em></td>
<td>Video</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apr. 23 &amp; Apr. 25</td>
<td>Water Pollution</td>
<td>Chapter 20</td>
<td>528</td>
<td>Qz 8</td>
</tr>
<tr>
<td>Apr. 30 &amp; May 2</td>
<td><em>Journey to Planet Earth, Season Three: Future Condition</em></td>
<td>Video</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exam week: 5/6-5/10</td>
<td>Solid and Hazardous Waste</td>
<td>Chapter 21</td>
<td>557</td>
<td></td>
</tr>
<tr>
<td>Exam week: 5/6-5/10</td>
<td>Economics, Environment, and Sustainability</td>
<td>Chapter 23</td>
<td>611</td>
<td>Qz 9</td>
</tr>
</tbody>
</table>

**Assessment of Student Learning Outcomes**

Each quiz is taken at the end of the corresponding chapter and in the beginning of the next chapter. Some quizzes may cover two chapters. All the quizzes and exams are closed book exercises and each student is expected to work independently and copying of answers is a serious matter that results with the copying student getting zero in the quiz or exam. Also use of computers or other electronic equipment or use of search engines such as google, yahoo and similar others in...
the test is absolutely prohibited. Each exam will test only the chapters and other materials (such as videos) covered since the last exam in the module. Note that there will be **one required regular assignment to complete.** It is a journal article summary (worth 100 points). The length of this regular assignment should not be more than three pages typed in double space.

There will be one Extra Credit (optional) assignment of a one-page written critique of a public lecture. Websites for some possible public lectures for students to attend are listed above. Suggestions of other talks to attend will be provided as information comes. The extra credit report is worth a total of 2 points (to be added to the final weighted grade). Students will submit the one page lecture critique exactly one week after the lecture is given to be considered. Submitting work any time after one week will NOT be accepted. All students are expected to attend and participate in classes discussions. Sometimes students may be divided into groups to discuss opposing issues. Students must do their reading assignments beforehand in order to participate in and contribute to the discussions. A total of **30** points are allocated for attendance and participation.

Semester grades will be based on the weighted total as shown below.

<table>
<thead>
<tr>
<th><strong>Total Assignments</strong></th>
<th><strong>Possible points for each</strong></th>
<th><strong>Total points</strong></th>
<th><strong>Weight</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>9 Quizzes</td>
<td>@ 10 points</td>
<td>90</td>
<td>10%</td>
</tr>
<tr>
<td>3 Exams</td>
<td>@150 points</td>
<td>450</td>
<td>20% each</td>
</tr>
<tr>
<td>1 Article summary</td>
<td>@ 100 points</td>
<td></td>
<td>20 %</td>
</tr>
<tr>
<td>Class attendance and participation</td>
<td>@ 30 points</td>
<td></td>
<td>10%</td>
</tr>
<tr>
<td><strong>TOTAL POINTS</strong></td>
<td></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Grading System:**

Semester grades will be based on a weighted total as shown above. The final grade for the course is determined by the following calculations:

90 -100 %  = A
80 - 89 %  = B
70 -79 %  = C
60 - 69 %  = D
Below 60 %  = F

Please be aware that each of the categories indicates the absolute minimum value in order to achieve that grade. Thus, if a student scores **89.94%**, the individual would receive a B for the course. However, if the individual has completed the extra credit assignments, I would round up the score to an A. (This would also apply to the other letter grade categories as well).
Course Policy

Retest/ makeup work: Makeup tests will be given only if the student(s) had permission to miss the scheduled test beforehand, or if the student was involved in a verifiable emergency or was verifiably ill at the time of the test.

University Policies:

Important policies regarding a Safe Working Environment, Students with Disabilities, Institutional Review Board, and Academic Integrity are found in the Student Handbook at http://www4.nau.edu/stulife/handbook.htm.
FOR 230
Multicultural Perspectives of Natural Resource Management
Spring 2013

Credits: 3
Location: SWFSC, rm. 133
Meeting time: TTh 8:00 – 9:15 a.m.

Instructor: Dr. Marty Lee, Professor, School of Forestry
Office: Rm. 241, SWFSC
Phone: 523-6644
e-mail: martha.lee@nau.edu
Office hours: Monday, Wednesday 1:30 – 3:30 or by appointment

Course prerequisites: None

Course Description:
The course is designed to introduce students to the effects of culture on environmental management planning and management. “Culture” is used in the narrow sense of ideas, ethics, values, and world views, not in the sense of an entire way of life. The course explores how and why culture affects attitudes of decision-makers and stakeholders involved in natural resource management. We will discuss a range of values within the context of natural resource planning and management. Much of the discussions will occur in learning groups that will report out to the larger group.

Our discussions will focus on natural resource use and management within a multi-value context. Many of our examples will involve forests, parks, and protected areas within the U.S. but we will also look at international values toward nature and natural resources using case studies and guest lectures. We will particularly focus on natural resource management issues involving collaboration between groups and individuals with diverse values.

Collaboration and collaborative decision-making are very much a part of ecosystem management and is being called “a new style of environmental problem solving and management” and involve “building relationships between individuals and groups who have been isolated and alienated from each other” (Wondolleck and Yaffee, 2000 p. 3).1


Course Objectives:

By the end of this course you should be able to:
describe different ways of categorizing ideas and values in order to recognize and compare different cultural positions toward nature and natural resource management;
appreciate and illustrate the complexities involved in managing ecosystems within a multi-value context;
identify the characteristics of multi-value and multi-cultural groups and individuals working toward collaboratively managing natural resources and protected areas;
have a greater realization of and appreciation for your own values toward nature and natural resources and be able to express them in written and verbal form;
work more effectively in a group learning environment, including being able to more clearly express your own and your group’s collective ideas and arguments.

**Course Structure/Approach:**
Throughout the course, students will participate in class discussions as well as work in groups on case studies and problem analysis. There will be a combination of out-of-class individual assignments and in-class group work. A final group project will involve both in- and out-of-class group work. Each group will be made up of 3-4 individuals. Each group will have:
- a **facilitator** – responsible for moderating team discussions, keeping the group on task for each assignment, and ensuring everybody assumes their share of the work
- a **recorder/folder monitor** – responsible for picking up the team folder, distributing all class materials and returning papers and assignments to their team-mates. They are responsible for making sure all relevant materials are in the team folder before returning it to the instructor at the end of the class period. Recorders keep all necessary records, including attendance. They prepare group’s activities and summarize discussions for their group’s oral reports or for submission to the instructor.
- a **reporter** – orally summarize the group’s activities or conclusions and assist group recorder with the preparation of group reports and summaries.
- a **wild card** – assume the role of any missing member or fill in however they are needed.

Roles within each group will be rotated weekly. In your career you will likely hold a number of different positions and play different roles. Learning to assume responsibility for the duties associated with various roles is a key part of your work experience and in the classroom.

Each group will be responsible for maintaining a group folder that will contain handouts, attendance sheets, notes, and group assignments (for example, case study summaries (described below) to be prepared by the group and summarized by the recorder, will be kept in the folder to be collected and graded by the instructor on a regular basis). Groups will be formed at the beginning of the semester. New groups may be created about the middle of the semester.

**Textbooks/Course Materials:**


Other Readings: Articles and case studies that are required reading are available as electronic reserves through BbLearn at http://bblearn.nau.edu. A list of the readings is attached. The course syllabus and other on-line materials will also be posted on BbLearn.

**Evaluation Methods and Deadlines:**

There are multiple ways of earning points in the class:

**Individual Chapter/Reading Summaries (60 points – 20% of your grade)**
Each student will prepare a brief 1-2 page summary for each of the readings in Parts I and II of the course. Each summary is worth 5 pts and there are 12 total (beginning with Kellert, chpt 2 – “Values”). These summaries will form the basis for class discussions of the readings. Each summary should include: (use these as headings in your summary)

- a brief summary of the article or chapter
- a description of the values toward nature being expressed by the individuals or groups described in the reading
- a brief comparison of the values expressed with your own values toward nature

223
The reading summaries must be typed, single-spaced and are **due the day we discuss the reading.**

**Exams (2 at 50 pts each = 100 pts – 33% of your grade)**

- Exam dates: Thursday, February 14
- Thursday, March 7

**Individual Paper (1 @ 35 pts – 11% of your grade)**

This paper is a case study analysis that summarizes what you see are the challenges and rewards of managing America’s forests and protected areas in a multi-value, multi-cultural context.

- Length: 4-5 pages double spaced
- Due date: Thursday, April 18

**Group Case Study Summaries (8 @ 5 pts each = 40 pts – 13% of your grade)**

Groups will be responsible for summarizing 8 case studies. Group members will talk about the various positions of groups and the outcomes discussed in the readings. A written group summary must be prepared along with the discussion. These can be hand written but must be neat and readable. They will be kept in the group folder to be periodically collected and graded. Format for discussing the reading and writing up the summaries:

- Decide who the key players are who are involved in the case study.
- You will present the positions/issues of the key players to the group and the class (if time is available).
- As a group discuss the outcomes, keys to success, factors leading to a lack of success.
- Record on your case summary any recommendations you might have for resolving conflicts involving multiple, conflicting values.

**Guest Lecture Summaries (3 @ 5 pts each = 15 pts = 5% of your grade)**

Each student will prepare a brief 1-page summary for each guest speaker. Summaries are due at the beginning of the class following the guest discussion. Each summary should include:

- A brief summary of the lecture/discussion
- Description of the values expressed
- Discussion of value conflicts mentioned
- Recommendations for collaborative management learned from the discussion

**Final Group Project (50 pts – 16% of your grade)**

The final group project will consist of preparation of a poster, a paper and a 10 minute presentation on an example of a multi-value, multi-cultural natural resource management issue where there are conflicts over values. A portion of the points will be based on a peer-evaluation of group members’ participation in the project.

Included in the paper and poster/presentation should be a discussion of:

- The situation—the primary issue, conflict, or decision
- The setting/location
- The players and their values, points of view
- The process used to try to achieve the objective(s)
- The key outcome(s) of the process
- Conclusions you would draw from the analysis

Sample topics:

- Bitterroot grizzly bear reintroduction
- Mexican grey wolf reintroduction
- Caribou co-management in Canada
Snowmobile use in Yellowstone National Park

Each group will have 10-15 minutes to present their poster and there will be 5 minutes for questions to be posed to all group members.

Specific requirements for the paper and poster will be discussed later in the semester along with helps on poster making. Begin thinking about your topic early!
The papers will be due and the posters will be presented at a poster session held during the final exam period for the class – **Thursday, May 9, 7:30 am – 9:30 a.m.**

**Attendance and class participation (5 pts – 2% of your grade)**
**You can’t learn if you’re not here.** Attendance will be taken regularly and points deducted for multiple absences.

**Grading Scheme:**

Grades will be based on the total points earned for the semester:

- Reading summaries (12) 60 points
- Exams (2) 100 points
- Individual paper (1) 35 points
- Group case study summaries (8) 40 points
- Guest lecture summaries (3) 15 points
- Final group project 50 points
- Attendance 5 points

Total 305 points

A = 274 – 305
B = 243 – 273
C = 213 – 242
D = 182 – 212
F = 181 and below

There may be opportunities to earn extra credit during the course.

**Course Policies:**

Attendance is critical to the success of this class. Your absence will not only lessen your ability to learn but will also handicap your group. Students will lose points for absences during group discussion and presentations. If a situation arises where you cannot attend or arrive on time, it is your responsibility to notify, in advance, the instructor and your team members.

All assignments must be turned in on time and in class unless prior arrangements have been made. No “e” papers will be accepted. There will be no paper rewrites or makeup tests except under extenuating circumstances such as illness or family emergencies. In these instances you must let me know ahead of time in order to make up the work.

Cell phones and other electronic devices must be turned off during class unless given special permission.

We will maintain an atmosphere of collegiality and respect in the class and encourage open and honest discussion, questions, and reflections and course material.
## Tentative Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic/Activity</th>
<th>Reading Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>T 1/15</td>
<td>Introduction to culture, values</td>
<td></td>
</tr>
<tr>
<td>Th 1/17</td>
<td>Course introduction con’t, assign and name groups</td>
<td></td>
</tr>
</tbody>
</table>

### Part I: Culture and values toward nature

| T 1/22 | Classifying values toward nature | Kellert, chpt. 2, pp. 9-26 – “Values” - Bb |
| T 1/29 | Native American perspectives | Bengston, “Listening to neglected voices” – Bb |
| Th 1/31 | Hispanic perspectives | Flood and McAvoy, “Voices of my ancestors, their bones talk to me” - Bb |
| T 2/5 | African American values toward nature | Garcia, “Hispanic perspectives and values - Bb |
| Th 2/7 | Australia – multi-cultural perspectives | Bagby, “African American naturifocal values” - Bb |
| T 2/12 | Scandinavia forest values | Birckhead, “‘Dreaming’ down under” - Bb |
| Th 2/14 | Exam #1 | Reunala, “Cultural and spiritual forest values in …” - Bb |

### Part II: Historic uses of natural resources

| T 2/19 | History of land use in Monterey, CA | Li, pp. 57-64 (Hackel) |
| Th 2/21 | Basque shepherders | Li, pp. 74-91 (Bieter) |
| T 2/26 | Columbia River gillnetters | Li, pp. 92-101 (Martin) |
| Th 2/28 | Logging culture | Li, pp. 102-113 (LeMonds) |
| T 3/5 | Japanese internment camps in Arizona | Li, pp. 137-150 (Sakurai) |
| Th 3/7 | Exam #2 | |

### Part III: Managing natural resources in a multi-value, multi-cultural context

| T 3/12 | Everglades National Park | Keller & Turek–“Everglades National Park and ...” - Bb |
| Th 3/14 | Southwest national monuments | Keller & Turek, “Navajoland” – Bb |

3/18-3/22 **SPRING BREAK!**

| T 3/26 | Devil’s Tower – consensus and conflict | Burton and Ruppert—“Rising to heaven ...” - Bb |
| Th 3/28 | Snowbowl snowmaking decision | Handouts |

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic/Activity</th>
<th>Reading Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>T 4/2</td>
<td>Quinault canoe building</td>
<td>Li, pp. 8-14 (Wilkinson)</td>
</tr>
<tr>
<td>Th 4/4</td>
<td>Comanaging sea otters</td>
<td>Li, pp. 25-34 (Garza)</td>
</tr>
<tr>
<td>Day</td>
<td>Date</td>
<td>Topic</td>
</tr>
<tr>
<td>-----</td>
<td>------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>T</td>
<td>4/9</td>
<td>Walrus hunting in the Arctic</td>
</tr>
<tr>
<td>Th</td>
<td>4/11</td>
<td>California Indian basketweavers</td>
</tr>
<tr>
<td>T</td>
<td>4/16</td>
<td>Introduction to poster making</td>
</tr>
<tr>
<td>Th</td>
<td>4/18</td>
<td>International collaborative research and management</td>
</tr>
</tbody>
</table>

**Paper due**

<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>4/23</td>
<td>Collaboration in action</td>
</tr>
<tr>
<td>Th</td>
<td>4/25</td>
<td>International collaboration</td>
</tr>
<tr>
<td>T</td>
<td>4/30</td>
<td>Work day – meet in computer lab</td>
</tr>
<tr>
<td>Th</td>
<td>5/2</td>
<td>Work day – meet in computer lab</td>
</tr>
</tbody>
</table>

**Th 5/9** 7:30 – 9:30 a.m. – Poster session and presentations
FOR 230  
Spring 2013

Course Readings References


NORTHERN ARIZONA UNIVERSITY

POLICY STATEMENTS

SAFE ENVIRONMENT POLICY

NAU’s Safe Working and Learning Environment Policy seeks to prohibit discrimination and promote the safety of all individuals within the university. The goal of this policy is to prevent the occurrence of discrimination on the basis of sex, race, color, age, national origin, religion, sexual orientation, disability, or veteran status and to prevent sexual harassment, sexual assault or retaliation by anyone at this university.

You may obtain a copy of this policy from the college dean’s office. If you have concerns about this policy, it is important that you contact the departmental chair, dean’s office, the Office of Student Life (928-523-5181), the academic ombudsperson (928-523-9368), or NAU’s Office of Affirmative Action (928-523-3312).

STUDENTS WITH DISABILITIES

If you have a documented disability, you can arrange for accommodations by contacting the office of Disability Support Services (DSS) at 928-523-8773 (voice), 928-523-6906 (TTY). In order for your individual needs to be met, you are required to provide DSS with disability related documentation and are encouraged to provide it at least eight weeks prior to
the time you wish to receive accommodations. You must register with DSS each semester you are enrolled at NAU and wish to use accommodations.

Faculty are not authorized to provide a student with disability related accommodations without prior approval from DSS. Students who have registered with DSS are encouraged to notify their instructors a minimum of two weeks in advance to ensure accommodations. Otherwise, the provision of accommodations may be delayed.

Concerns or questions regarding disability related accommodations can be brought to the attention of DSS or the Affirmative Action Office.

INSTITUTIONAL REVIEW BOARD

Any study involving observation of or interaction with human subjects that originates at NAU—including a course project, report, or research paper—must be reviewed and approved by the Institutional Review Board (IRB) for the protection of human subjects in research and research-related activities.

The IRB meets once each month. Proposals must be submitted for review at least fifteen working days before the monthly meeting. You should consult with your course instructor early in the course to ascertain if your project needs to be reviewed by the IRB and/or to secure information or appropriate forms and procedures for the IRB review. Your instructor and department chair or college dean must sign the application for approval by the IRB. The IRB categorizes projects into three levels depending on the nature of the project: exempt from further review, expedited review, or full board review. If the IRB certifies that a project is exempt from further review, you need not resubmit the project for continuing IRB review as long as there are no modifications in the exempted procedures.

A copy of the IRB Policy and Procedures Manual is available in each department’s administrative office and each college dean’s office. If you have questions, contact Melanie Birck, Office of Grant and Contract Services, at 928-523-8288.

ACADEMIC INTEGRITY

The university takes an extremely serious view of violations of academic integrity. As members of the academic community, NAU’s administration, faculty, staff and students are dedicated to promoting an atmosphere of honesty and are committed to maintaining the academic integrity essential to the education process. Inherent in this commitment is the belief that academic dishonesty in all forms violates the basic principles of integrity and impedes learning. Students are therefore responsible for conducting themselves in an academically honest manner.

Individual students and faculty members are responsible for identifying instances of academic dishonesty. Faculty members then recommend penalties to the department chair or college dean in keeping with the severity of the violation. The complete policy on academic integrity is in Appendix F of NAU’s Student Handbook.

ACADEMIC CONTACT HOUR POLICY

The Arizona Board of Regents Academic Contact Hour Policy (ABOR Handbook, 2-206, Academic Credit) states: “an hour of work is the equivalent of 50 minutes of class time…at least 15 contact hours of recitation, lecture, discussion, testing or evaluation, seminar, or colloquium as well as a minimum of 30 hours of student homework is required for each unit of credit.”

*The reasonable interpretation of this policy is that for every credit hour, a student should expect, on average, to do a minimum of two additional hours of work per week: e.g., preparation, homework, studying.*
For 240 Introduction to Conservation Biology

Location: SWFSC Rm 18
Instructor: Annika Keeley, E-mail: atk25@nau.edu
Office Hours: Tuesdays 1-2 pm & Fridays 10-11 pm, after class, or by appointment

Course Prerequisites: None

Course Description
This course is designed to provide students with a knowledge of fundamental concepts in Conservation Biology and to show how these concepts apply to local and global conservation issues.

Liberal Studies Information
This is a Liberal Studies class in the Science/Applied Science distribution block. The course challenges you to more deeply understand the natural environment, to evaluate strategies to conserve biodiversity on a human-dominated planet, to evaluate conflicting claims about proposed conservation interventions, and to develop skills to be an effective citizen throughout life. The geographic scope is global, with much of the material relevant to the developing world and areas outside the USA. The course focuses on developing essential skills in critical thinking.

Course Objectives
The desired outcomes of this course are for you to:
1. Understand the main concepts that are relevant to biodiversity conservation.
2. Develop as an informed citizen by practicing critical thinking skills:
   • Think critically when evaluating material from reading, lectures, and public talks
   • Articulate your thoughts and opinions verbally and in writing
   • Demonstrate your ability to make informed, evidence-based decisions regarding biodiversity conservation
3. Be inspired to take an active role in conservation.

Course Structure
Each 75 minute class is divided into short lectures, in-class exercises, and group discussion. In addition, there will be several participatory group and individual projects that promote active engagement in the issues, and a few guest lectures. You are expected to be prepared for each class by reading the relevant book chapter or assigned supplemental readings prior to class. You are also expected to attend conservation lectures outside of class and complete online and written assignments. This is not a class where you just show up, take notes, and then cram for the exams. Be prepared for 3-5 hours of work per week outside of class. If you work hard, you will learn a lot, and will have fun.
All material that is not provided in class is available on the class BBLearn page (www.bblearn.nau.edu). Make sure you can access this page right away!

Required Reading
2. Assigned Supplemental Reading: provided via BBLearn (www.bblearn.nau.edu)
FOR 250: ARIZONA FORESTS AND WILDLIFE: SPRING 2013
Course Syllabus

General Information:
Instructor: Dr. Robert Mathiasen
Office: SWFSC Room 002, Office hours are open door or by appointment.
Telephone: 523-0882
E-mail: Robert.Mathiasen@nau.edu

Class Meetings: T-Th; 12:45 p.m - 2:00 pm; SW Forest Science Complex, Room 136

Course Prerequisites: A sense of humor, curiosity, and a desire to learn.
Course Philosophy: We are all life-long learners.

Course Description: This course will introduce you to the forest ecosystems and their associated wildlife in Arizona. Forest ecosystems are complex. To understand them, we must examine forest ecology including forest structure and function, the roles of individuals, populations, and communities, and environmental influences on the development of forest ecosystems. We will also examine current issues relating to use, management, and protection of forests and wildlife in Arizona.

We will begin the semester with an overview of the state of Arizona, its climate, landforms, and land ownership patterns. Following our overview, we will examine several forest ecosystems in more depth. We will begin at high elevations (limber pine, spruce-fir, and aspen forests) and travel down in elevation, to riparian and desert ecosystems. Finally, we will apply what we have learned to the study of areas that encompass many of the forest ecosystems we have covered in the class, the "sky islands" of southern Arizona.

This course falls in the Science/Applied Science (SAS) block for Liberal Studies, in that “...students apply knowledge derived from scientific inquiry to address human needs through technological advancements. Students learn practical skills in the creation and application of various technologies. Courses in this block also address the impact of technology on the human condition and the natural world” (Liberal Studies Program). As a Liberal Studies course, it provides the opportunity for students to practice, refine, and strengthen skills essential for their development as students and for their long term success. In this course we will specifically address the skill areas of effective critical thinking with respect to societal problems related to the environment. Thematically, this course will focus on developing student understanding, awareness, and appreciation of the environment and environmental issues, specifically relating to the forest ecosystems of Arizona: their structure, function, and the role of wildlife and humans in these systems. Given this subject matter, this course is in the thematic area of Environmental Consciousness.

Course Goals and Objectives: Upon the successful completion of this course, students will have the knowledge and skills to effectively:

Describe how forest ecosystems function and how they are likely to respond to change.
Describe how wildlife influence forest ecosystems and how forest ecosystems influence wildlife populations.
Describe the ecological and management issues related to Arizona’s forests and wildlife currently faced by natural resource professionals and the public.
Describe how knowledge of ecology and management can help solve problems similar to those currently faced by natural resource managers and the public in Arizona.

**Course Structure:** Class meetings will include lectures, one or two short on-campus field trips, and tree identification of common trees found in northern Arizona. Different forest ecosystems in Arizona will be used to gain knowledge about forest and wildlife ecology, wildlife habitat components, and the inter-related roles of forest and wildlife management.


**Other Reading Requirements:** The reading assignments are contained in the Bb Learn shell for FOR 250 in the Folder - Reading Assignments.


Other course materials are available on-line in Bb Learn for FOR 250. This includes lecture outlines, maps, tables, and other information relevant to the course. Students are encouraged to print hard copies of the lecture outlines, exercises related to videos, and maps/tables and bring them to class.

**Assessment of Outcomes:** I will use written exams to assess your achievement of the learning objectives listed above. There will be two midterm exams (100 points each) and a final comprehensive exam (150 points) (Total exam points possible: 350). Exams may include short definitions, multiple-choice, true/false, map labels, fill-in-the-blank, listings, mini-essay questions, and/or matching questions. Mini-essay questions will take 2 to 4 sentences to answer and will be scored on content. Exams will also include the identification, using common names, of trees commonly found in northern Arizona. Midterm exams are not cumulative – you will only be tested on material since the previous midterm exam. All class participants must take the final exam. The final exam will be a comprehensive exam. All students are expected to take the final exam at the scheduled time: Tuesday, May 7, 12:30 – 2:30 p.m. in Room 136, Southwest Forest Science Complex. **No final exams will be given early.**
There will also be one short paper required worth 25 points. Plus there will be a campus tree walk assignment worth 25 points. These assignments will be discussed in class. The tree walk assignment will be due on April 4 and the short paper will be due on May 2.

In addition, there will be a few in-class quizzes, video worksheets, and possibly a “mini-lab” for students to complete and submit at the end of the class period. These will be worth a total of 100 points. This brings the total number of points possible for the course up to 500 (Exams [350 points] + Short paper [25 points] + Tree Walk [25 points] + In-class assignments [100 points] = 500 points)

Final grades will be assigned as: A = 90 – 100 % of 500 possible points; B = 80 – 89.9 %; C = 70 – 79.9 %; D = 60 – 69.9 %; and F = < 60% (less than 300 points)

Course Policies: You are expected to come to class prepared, having read the required reading assignment before class. In addition to the specific policies outlined below, you are also responsible for reading and adhering to the Northern Arizona University Policy Statements regarding a Safe Environment, Students with Disabilities, the Institutional Review Board, and Academic Integrity.

Attendance and Make-Up Work: The NAU attendance policy is found in the NAU Student Handbook on page 2 and states that “…regular attendance…is the responsibility of the student…each student is accountable for all work missed due to any absence. Instructors are under no obligation to make special arrangements for students who have been absent…it is the responsibility of the student to report the reason for his/her absence to the instructor.”

Make-up exams for the midterms will be allowed ONLY if the student has contacted the instructor before the exam date and time. Reasons for taking a make-up midterm exam include illness, a family emergency, or an institutional excuse related to a NAU sponsored activity.

Northern Arizona University Policies
Important policies regarding a Safe Working Environment, Students with Disabilities, Institutional Review Board, and Academic Integrity are found in the Student Handbook at http://www4.nau.edu/stulife/handbook.htm.
Northern Arizona University  
School of Forestry  

FOR 251 - Introduction to Wildland Fire  
Spring 2013  
3 credits  

Time:  Tuesday and Thursday 9:35-10:50 a.m.  
Location:  Southwest Forest Science Complex Rm 135  
Prerequisites:  None  

Instructor:  Dr. Andrea (Andi) Thode  
Email: andi.thode@nau.edu  
Office:  SFSC room 200  
Phone:  928-523-5457  

Office hours:  Stop by or make an appointment. I do have LOTS of meetings so it is best to schedule something with me as it is difficult to just catch me in my office.  

Course description:  
This course provides an introduction to wildland fire. Fire plays a critical ecological role in forests, grasslands, and other systems, and it also has a strong impact on human society. In this course you will be introduced to the basics of fire, including the combustion process and the “fire triangle.” We will examine the way fires start, spread, grow, and become extinguished. Fire management strategies, including fire suppression and prescribed burning will be covered. Throughout the course, examples from fire ecology and the social impacts of fire will be used to illustrate fire concepts.  

Text and lectures:  

Additional readings will be provided. Readings will be posted on the course website. Copies of lecture slides will be posted as well.  

Student Learning Expectations:  
This course is designed to introduce the basics of wildland fire. After taking this course, you will have:  
• An understanding of the basic physical and chemical attributes of fire  
• Knowledge of how terrain, weather, and fuels affect fire behavior  
• An understanding of the basic elements of fire management  
• Knowledge of fire’s effects on soil and vegetation  
• An understanding of techniques used to suppress, ignite, and manage fires  
• An understanding of the complexity of fire and fuel management in the wildland urban interface  
• Knowledge about the use of models commonly used in fire management  

Class Schedule and Readings  
The class schedule is handed out separately and is subject to change. Readings will be posted on the class website and announced in class throughout the semester.
Field Trip
There may be one mandatory field trip for this class on a Saturday. The field trip will most likely be scheduled for a Saturday in September or October. The field trip will be either a staff ride on the Dude Fire; a wildfire outside of Payson, AZ where 6 firefighters were killed, or a trip to the Schultz Fire burned area. This is currently being worked out.

Coursework
Homework Assignments
Homework assignments will be handed out throughout the semester. Assignments are designed to strengthen your understanding of material presented in class. NOTE: I will allow one rewrite per student of a homework assignment. If you wish to rewrite an assignment, you need to contact me via email within 36 hours of the homework being returned in class. 10% of the points will automatically be deducted from rewrites.

Quizzes
Quizzes will be given throughout the semester. The quizzes are designed to help emphasize important concepts from the lectures and the readings and will normally be discussed and self-corrected in class. They will also be useful for you as study guides for the tests. You may make up quizzes ONLY if you contact me before class with a valid reason for missing class. NOTE: On random days, I will collect the quizzes, grade them, and count them toward your grade.

Short Presentation
Through the semester students will present to the class on “Notable Fires in History”. Students will sign up for presentation slots at the beginning of the semester. Presentations should be 5-10 minutes in length, and both students will do background research as well as present in class. Presentations should include background (e.g. location, size, weather conditions, vegetation types), management taken (e.g. people & equipment, incident command), noteworthy aspects of the fire, and what lessons we learned as a result of the fire. Photos presented in PowerPoint are encouraged.

Exams
The exams will focus on concepts and examples of wildland fire, with definitions, multiple choice, and short-answer formats. The final exam will be cumulative.

Participation
Students are expected to attend class. If you cannot attend for some reason, you need to notify the instructor ahead of time. If you miss class, it is your responsibility to ask if you missed something. Missing class is not an excuse for late or missing assignments. If you miss class, you should ask a fellow student for lecture notes.

Part of your participation grade will be based on class attendance. The other part of the participation grade will be a subjective assessment based on my perception of the quantity and quality of your participation throughout the semester (asking questions, participating in the book discussions and other activities, making comments and answering questions). In addition, some group work and other in-class work will be assessed points for participation.
Illness

While class attendance is required per the above stated policy, please be cautious about attending class if you are feeling ill. Please inform me by email if you are feeling unwell; if you are experiencing flu-like symptoms, you should not attend class; please take precautions not to infect others, and seek medical attention if your symptoms worsen.

Late Work Policy
Late work will be accepted up to 48 hrs after the due date. Penalties are as follows:
Up to 24 hrs late – 10% of total points deducted
24 to 48 hrs late – 20% of total points deducted
More than 48 hrs late – Zero points

This stated, please email, call or talk to me if you have extenuating circumstances. This must be done BEFORE assignments are due or tests are taken.

Performance evaluation
Grades are given as follows:
A (90-100%)
B (80-89%)
C (70-79%)
D (60-69%)
F (59% or below)

Points are earned as followed:
Participation and attendance 15%
Quizzes 15%
Homework (including presentation) 20%
Mid-term Exams (15% each) 30%
Final Exam 20%

Total 100%

Extra credit
Extra credit can be earned by attending a fire-related School of Forestry Seminar (Wednesday afternoons at 4:00) and writing a 400-600 word essay about the seminar, including a summary, points covered that you recognized from class, and questions you would (or did) ask the speaker. You can check the schedule (http://www.for.nau.edu/cms/; go to Student Resources and then Seminars), and I will also announce the fire-related seminars in class

Resources for Student Success
Successful university students take advantage of services and resources designed to boost learning and achievement. NAU recommends that you begin with:
MyFoundations- use this online tool to assess and develop required university skills at your own pace (free for first-time freshmen at NAU Flagstaff)
Supplemental Instruction- attend these course-specific review sessions whenever offered; proven to reduce D’s and F’s
Student Learning Centers- free drop-in, online, and individual tutoring appointments for math, writing, and over 100 courses; available Monday through Friday
ResourceConnect- your online central navigation point for all NAU student resources
For a full-listing of University College services visit: http://nau.edu/University-College/
**My Foundations Fact Sheet**

*Need to fill a gap? Brush up on your skills? Whether you need to get up to speed for your calculus class or brush up on your essay writing skills, the MyFoundations Self-Assessment and Development tool gets you on track for university-level academics.*

*Free to all incoming first-year NAU Flagstaff students—topics include:*

- Math
- Reading
- Writing
- Study Skills

**How it works**

Self-Assess: Complete a path builder assessment in the topic area of your choice, which creates specific modules for your personalized learning path based on your demonstrated needs for improvement or development.

Self-Develop: Complete the learning paths for mastery.

Instant feedback

Choose activities that fit your learning style

Work at your own pace

**Where to find it**—MyFoundations is in your course list in BbLearn.

**Northern Arizona University Policy Statements**

[http://www4.nau.edu/avpaa/UCCPolicy/plcystmt.html](http://www4.nau.edu/avpaa/UCCPolicy/plcystmt.html).

These statements address safe environments, students with disabilities, the institutional review board, academic integrity, the academic contact hour policy, and sensitive course materials. You need to be familiar with them.
FOR 283 Forestry in the Wild land-Urban Interface

SEMESTER OFFERED: Spring Semester
CLOCK HOURS: TTH 8 – 9:15
CREDIT HOURS: 3
INSTRUCTOR: Denver Hospodarsky, PhD, CF (AKA DrH)
Associate Professor
School of Forestry
SW Forest Science Complex (SWFSC) – Bldg. 82
Office: Room 104 Ph: 928-523-7525
Email: denver.hospodarsky@nau.edu

OFFICE HOURS: TTH 2:00-4:00, otherwise Open Door or by Appointment
COURSE PREREQUISITES: None

COURSE DESCRIPTION: This course provides an overview of the social and biological complexities of managing forests in wildland-urban interface (WUI). The course focuses on basic theories, concepts, methods, and case studies in order to improve students’ understanding and skills for the management and planning of WUI natural resources. An additional focus is placed on understanding how WUI management may differ from the management of similar resource values in wildlands. Emphasis is placed on resource managers’ roles in reducing risks to forest and human communities, while sustaining the benefits accruing to both the biophysical and social components of functioning human ecosystems.

STUDENT LEARNING EXPECTATIONS & OUTCOMES:

By the end of this course, students should be able to describe and explain the range of issues and strategies involved in WUI management including: collaboration, communications, property rights, fire risk, urban wildlife, forest health and ecological restoration, and meeting multiple landowner objectives. Students will be able to evaluate WUI case studies and demonstrate in writing their rationale for managing the WUI, as they describe it should be managed.

COURSE STRUCTURE & APPROACH:

Two, 75 minute combination lecture/discussion sessions per week. Sessions will be structured to allow considerable opportunities for discussion and questions in response to the reading material. The case study approach will frequently be used in conjunction with evaluating WUI management issues. Lecture/discussion topics will largely expand upon readings assigned from the text. We'll try to take at least 3 field trips during the normally scheduled class period as weather permits.


OTHER MATERIALS: Occasionally additional readings will be assigned and provided.

COURSE OUTLINE: (specific topics may be added or deleted as time allows)

Weeks 1 – 3  Introduction: Defining the wildland-urban interface (WUI) (“Are WUI’s really from outer space?”)
What is the WUI and how will we know it when we see it?
How is WUI formed?
Where is WUI located?
What is the role of forests in the WUI?
What are the management issues in the WUI?
What does it mean to manage human ecosystems?

Weeks 4 – 7  Managing WUI forests as human ecosystems
(yes, humans are an integral part of natural ecosystems too)
Concepts of forest outputs and values
Minimizing risk and maximizing benefits to both human and forest communities

A) Managing human dimensions
(values, beliefs, and institutions – oh my!)
Social-psychological services and benefits
Quality-of-life
Property rights
Economic values
Perceived environmental risk
Aesthetics
Community capacity and capability

B) Managing physical and biological dimensions
(the natural resources upon which humans depend)
Ecological services and benefits
Fire
Forest health
Ecological restoration
Wildlife
Invasive plants
Soils
Hydrologic processes
Weeks 8 – 9  The social context of WUI Forestry
(just as surely as death and taxes)
Legal
Political
Administrative
“Grass-roots”

Weeks 10–13  Tools for managing WUI forests
(the craftsman can never have too many tools; and they must be
sharp for the task!)
Communications
Collaboration
Landscape assessment
Criteria and indicators
Management and planning frameworks
Decision support systems

Weeks 14-15  Forest management in action
(to think and to act is to be alive!)
Private land
Public land
Quasi-public land

ASSESSMENT OF STUDENT LEARNING OUTCOMES:
A variety of assessment methods, in sufficient numbers, will be used in order to account for variability in student learning styles and daily vagaries in individual performance.

METHODS OF ASSESSMENT:
Two mid-term exams and a final exam will be given in order to assess comprehension of lecture/discussion material. Four unannounced reading quizzes will be given during the semester to encourage students to remain current with the assigned readings, and to evaluate comprehension of topics prior to their treatment in lecture and discussion. Students will keep a reading journal for each assigned reading throughout the course to consist of at least three discussion questions for each reading. DrH will review and grade the content of your reading journal.

TIMELINE FOR ASSESSMENT:
<table>
<thead>
<tr>
<th>Semester</th>
<th>Week 3</th>
<th>Reading Quiz 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 5</td>
<td>Midterm Exam 1</td>
<td></td>
</tr>
<tr>
<td>Week 7</td>
<td>Reading Quiz 2</td>
<td></td>
</tr>
<tr>
<td>Week 8</td>
<td>Reading Quiz 3</td>
<td></td>
</tr>
<tr>
<td>Week 12</td>
<td>Midterm Exam 2</td>
<td></td>
</tr>
<tr>
<td>Week 14</td>
<td>Reading Quiz 4</td>
<td></td>
</tr>
</tbody>
</table>
Week 16  Final Exam  
(Thursday May 9 7:30-9:30 AM, Rm. 136)

GRADING SYSTEM: Two midterm exams at 20% each; final exam at 25%; four reading quizzes at 5% each; and a reading journal at 15%. The course will be graded using the scale: > 90% = A; 81 – 90% = B; 71 – 80% = C; 61 – 70% = D; and < 61% = F.

COURSE POLICY: This course will be conducted in accordance with the following policies. Please read these policies carefully.

RETESTS AND MAKEUP TESTS: No makeup exams, quizzes, or late assignments will be allowed without a signed medical excuse, or under conditions where the student has notified the instructor at least one-week in advance for mutually acceptable personal/professional reasons.

ATTENDANCE: Regular attendance is required. Role will be taken at the beginning of each class period. Please be on time in order to be counted on the role, it is both professional and courteous.

STATEMENT ON PLAGIARISM & CHEATING: Plagiarism and other forms of cheating are grounds for dismissal from FOR 283. The complete policy statement on academic integrity can be found in Appendix F of the NAU Student Handbook. Be sure to read this statement for your own protection.

UNIVERSITY POLICIES: Five NAU Policy Statements are particularly relevant to this class viz., Safe Environment Policy, Students With Disabilities, Institutional Review Board, Academic Integrity, and Academic Contact Hour Policy. These are statements are cited in this syllabus for reference (see pertinent NAU Policy Statements in the Student handbook.)

OTHER: Your thinking about WUI forestry issue in this class may benefit from consideration of the forester code of ethics. Please read the Society of American Foresters Code of Ethics.
## Reading Assignments

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Reading from Vince Text</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3</td>
<td>Chapters 1-3</td>
<td></td>
</tr>
<tr>
<td>4-7</td>
<td>Chapters 4-7</td>
<td></td>
</tr>
<tr>
<td>8-9</td>
<td>Chapters 9-10</td>
<td>Spring Break March 18-22</td>
</tr>
<tr>
<td>10-13</td>
<td>Chapters 12-15</td>
<td>No Class Week 11, March 27 and 29</td>
</tr>
<tr>
<td>14-15</td>
<td>Chapters 16-18</td>
<td>No class Apr. 24 and 26</td>
</tr>
<tr>
<td>16</td>
<td>Final Exam</td>
<td>Thursday May 9 7:30-9:30 Room 136</td>
</tr>
</tbody>
</table>

Additional readings may be assigned during the semester
~Course Syllabus~

Silviculture and Fire Applications  
FOR 317, 3 credits  
Spring 2013  
Hybrid online/classroom/field course

This class begins January 21 with on-line sessions and requires web access and an NAU e-mail account. The Flagstaff classroom/field component will meet March 4-7 in Flagstaff, AZ.

Instructor: Dr. Larissa Yocom  
larissa.yocom@nau.edu  
928-523-1378  
Office: Room 205, School of Forestry (Bldg. 82)

Prerequisites: An introductory ecology course or FOR 310: Forest Ecology

Course description: In the simplest terms, silviculture is applied forest ecology. Throughout the course, you will be introduced to both silvicultural treatments and underlying ecological concepts. By the end of the course, you should be able to distinguish stand structures by species, size, age and horizontal spatial pattern. You will be able to identify the most common silvicultural practices and link them to fire applications and have the knowledge and tools to select an appropriate prescription for a given stand.

Learning Outcomes:

Module 1:

1. Understand what silviculture is and how it applies to fire management.
2. List and describe the four stages of stand development.
3. Discuss forest strata, the four crown classes, and how these relate to fire.
4. List the steps involved in both gene conservation and tree breeding programs; understand how genetic gain in trees is calculated.
5. Describe basic regeneration mechanisms for trees and how disturbance is linked to regeneration.
6. Discuss the differences between natural and artificial regeneration and the advantages/disadvantages of both.
7. Understand the role of site preparation in silviculture; know why different methods are applied and the means of applying them.
FOR 318 – Fuel Treatments

Spring 2012 Syllabus

Instructor:
Molly Hunter - Assistant Research Professor, School of Forestry, NAU
molly.hunter@nau.edu, 928-523-6650

**Use this e-mail address only for emergencies—all e-mail correspondence for this course should
normally be sent using Bb Blackboard Mail**

Prerequisites:
An introductory ecology course or FOR 310 Forest Ecology or instructor consent.

Course description:
Fire is an important component of many forest ecosystems that has been suppressed since the early
1900s. These same forests now have an abundance of available fuels and high tree densities, leading to
high fire hazard. This course will briefly cover the history of fire management in the United States and a
sampling of forest types in which fuel treatments may be necessary. Much of the content will delve into
the variety of fuel treatments available, along with their success and ecological effects. The field portion
of the course will involve use of models that may be used in fuel treatment planning and application. We
will also visit examples of fuel treatments in the field.

Course Outline:
Module 1: Background
  • Unit 1 - History of fire management in the U.S.
  • Unit 2 - Forest types and fire regimes of the U.S.
  • Unit 3 - Silviculture background
Module 2: Fuel treatment design and implementation
Module 3: Fuel treatment effects
  • Unit 1 - Treatment effectiveness
  • Unit 2 - Other effects of fuel treatments
  • Unit 3 - Monitoring
Module 4: Fuel treatment planning
  • Unit 1 - Social factors
  • Unit 2 - Economic factors
  • Unit 3 - Landscape planning

Course Schedule:
Print out the course schedule. You'll need to refer to it often. This shows due dates for all discussions,
assignments, and quizzes. Keep to the recommended schedule of modules as much as possible so that you
don't fall behind.

The in-person portion of the course will begin Wednesday March 21st and go through Friday March 23rd.
We will meet on the NAU campus in Flagstaff in the Du Bois Center, the Southwest room. We will meet
from 8:00 am to approximately 5:00 pm each day. A schedule of the in-person portion will be provided
upon meeting in Flagstaff.

Required Readings:
Readings from the current scientific literature will be assigned. Readings will be posted on Blackboard.
Hard copies of readings published by the Rocky Mountain Research Station and the Pacific Northwest
Spring 2013 Semester B 323-326W

CLASS HOURS: MWF 9:10 – 11:10; T 9:35 – 10:50; Th 9:35-12:25; Room 17
Labs: Tuesday noon – 3:35; Thursday 1:00 – 3:35

COORDINATOR: Dr. Carol Chambers
OFFICE: SFSC Rm 209
PHONE: 523-0014
E-MAIL: Carol.Chambers@nau.edu
OFFICE HOURS: Open door or by appointment

SEMESTER B Carol Chambers Jeff Jenness
FACULTY: Bruce Fox Marty Lee
Ching-Hsun Huang

WRITING
CONSULTANT: TBA

COURSE OBJECTIVES:

The intent of Semester B is to provide students with up-to-date knowledge for managing forestland resources in a social context. We examine the techniques for producing wood, water, and livestock commodities, and recreation and wildlife amenities in distinct units in order to focus on the fundamental principles of management for each product or use of forestlands. We also seek to help students grasp the integrated nature of forest management; not only are the production activities noted above components of an interrelated ecological system, they are parts of a complex social system as well. We will learn not only how to produce commodities and amenities from our forestlands, but how much, for whom, and why.

COURSE STRUCTURE AND APPROACH:

Topic areas covered and faculty:
Biometrics – Fox
Collaborative management – Lee
Forest economics – Huang
Forest level management – Huang
Forest operations/roads – Fox
GIS - Jenness
Recreation management - Lee
Watershed management – Fox
Wildlife habitat and range management - Chambers
In addition to teaching forest management, the Semester B faculty is committed to teaching and facilitating student development of integrating skills and abilities. These skills and abilities are crucial to your development as forestry professionals. One or more of the following skills will be emphasized in the teaching of each unit:

- using graphical, mathematical, and analytical tools
- writing critically and analytically
- evaluating scientific publications
- public speaking and presenting information professionally
- negotiating and participating in group processes
- integrating concepts in a multidisciplinary approach

Welcome to Semester B!

TEXTBOOKS AND REQUIRED MATERIALS:

Required Books

Recommended Books
Davis, L. S.; K. N. Johnson; P. Bettinger; and T. Howard. 2001. Forest management. 4th edition. Waveland Press. *Journal of Forestry* – we encourage you to continue to read the *Journal of Forestry* and, when appropriate, we will assign readings from the *Journal*.

Other Required Readings:
Other required readings are listed under individual FOR 323W-326W courses in BbLearn. Syllabi, lecture and lab schedules, the assignment calendar and other individual unit materials will be posted on BbLearn.

EVALUATION METHODS:

Syllabi will be provided for the individual units in Semester B that will contain the schedules, assignments, and deadlines for that particular unit.

Writing:

Semester B is designed to meet the requirements of the junior level writing course required under the Liberal Studies Program. You will write an integrative paper focused on a forest management topic of your choice. You will have the chance to turn in drafts of the paper components to receive feedback before rewriting and turning in the final paper. Details on the paper will be provided in the Semester B lab – Writing Your Briefing Paper – 1/29/13.
The McMillan text is our standard and is used to assess your writing. **We expect you to read McMillan and you are responsible for the information contained in this text!**
GRADING SYSTEM:

The instructional content of Semester B is grouped into four blocks designated as FOR 323W – FOR326, worth 3, 3, 3, and 4 credits, respectively. Students will earn grades on the basis of how many points they accumulate on exams and graded exercises in each unit in each block during the semester. The topics included, their individual credits, and the number of points that may be earned in each unit are:

FOR 323W, 3 credits:
Forest operations – 2 credits (200 pts)
Briefing paper – topic (5 pts); draft topic background (15 pts); draft management plan (15 pts); final paper (35 pts); oral presentation (15 pts); Land Management Forum (15 pts) -- 1 credit (100 pts.)

FOR 324, 3 credits:
Forest economics -- 1.5 credits (150 pts.)
Biometrics -- 1.0 credit (100 pts.)
GIS (35 pts) + Crew Expectation Exercise (15 pts) -- 0.5 credit (50 pts.)

FOR 325, 3 credits:
Recreation management -- 1.5 credits (150 pts)
Wildlife habitat and range management -- 1.5 credits (150 pts.)

FOR 326, 4 credits:
Forest watershed management -- 1.0 credit (100 pts.)
Forest level management -- 2.5 credits (250 pts.)
Collaborative management -- 0.5 credit (50 pts.)

Grades will be turned in to the registrar for each of the four blocks. To enroll in Semester C, students must receive 70% or more of the total points possible in each of the four blocks.

Evaluation methods include in-class exams, field exams, individual writing assignments, and project reports done independently or by crews. Cheating, plagiarism, excessive cooperation among students on independent projects or other acts of academic dishonesty will result in the assignment of a failing grade for that exam or exercise. Penalties for turning work in late will be at the discretion of the appropriate faculty team leader.

A student may request a change in grade on any exam or exercise if he/she believes an error has been made. The request must be made in writing, including the reasons why the student believes an error has been made, and must be submitted to the faculty team leader within one week after the exam or exercise has been returned to the class. The faculty team leader will respond, in writing, by indicating whether or not a grade change has been made and why.

Crew Assignments

There will be crew assignments throughout Semester B. These serve several purposes: they teach group skills needed in the forestry profession; they facilitate collaborative learning; and they (hopefully) decrease individual workloads on both students and faculty. If you have problems with a crew you are in, try to address it within the crew. If you are unable to resolve the problem, bring it up with Dr. Chambers, the Semester B coordinator.
COURSE POLICIES:

Faculty Availability

The NAU School of Forestry faculty members try to maintain an open-door policy and try to be available as much as possible. We encourage you to talk to us about subject material and forestry in general. We like to get to know you and have you know us. Should we not be available, make an appointment to see the professor at a time convenient to both of you.


Violations of the Student Code of Conduct which exclusively involve issues of Academic Dishonesty are normally dealt with by faculty and academic administrators. Allegations of academic dishonesty may be initiated by both students, and faculty or where appropriate, by administrative personnel. The faculty member may impose penalties for academic dishonesty in accordance with the course syllabus, program policy, and in direct relation to the nature of the infraction and the degree to which the involved academic work affects the course grade, as well as pursuant to the specific procedures set forth herein. See the Academic

ACADEMIC INTEGRITY means that students and faculty jointly agree to adhere to a code of conduct appropriate to the mutually trusting relationship that must exist between student and teacher. It is the expectation at NAU that all students will conduct themselves in a truthful, straightforward and honest fashion at all times. All NAU students are expected to be familiar with the definitions of academic dishonesty. Not knowing that certain activities qualify as academic dishonesty is not a defense to a charge of academic dishonesty.

ACADEMIC DISHONESTY is a form of academic misconduct that violates the university’s academic standards and is subject to disciplinary action under the Student Code of Conduct. Academic dishonesty includes, but is not limited to, the following infractions: cheating, collusion, fabrication, obtaining an unfair advantage, and plagiarism.

Cheating: intentional use of or attempted use of unauthorized materials, information, study aids, or previously prepared solutions in any academic exercise, exam, paper, or other assignment. Cheating includes (but is not limited to):
Copying another student’s work.
Sharing answers for either a take-home or in-class examination.
Using notes, books or web materials on an exam when such aids are forbidden.
Taking an examination in another student’s name or having another person take one for a student.
Changing the answers on an examination after it has been graded in order to gain more credit than deserved.
Using a “cheat-sheet” or other prohibited assistance (calculator, cell phone, text messaging, etc.) during an examination.
Working on an examination outside the specified time limits, such as beginning before the faculty member directs students to begin, or continuing to work after the faculty member has declared an end to the examination period.

Using a commercial service or engaging another person (whether paid or unpaid) to prepare assigned work. Unless prohibited by the faculty member for educational reasons, editing and/or proof-reading by another person is not considered cheating.

Collusion: when two or more students work together to produce individually submitted work without the permission of the faculty member. Collusion also occurs when one student produces work and knowingly allows another student to copy it and submit that copy for assessment. In such a case, both students will be considered to have colluded.

Obtaining an unfair advantage: activities that directly or indirectly compromise fair assessment or grading or constrain other students’ abilities to successfully complete their assignments.

Stealing, reproducing, or circulating exam materials prior to the time authorized by faculty.

Possessing, using, or circulating previously administered examinations, unless authorized by the faculty member.

Fabrication/Fraud: unauthorized falsification or invention of any information, data, or citation in an academic exercise.

Plagiarism: representing the words, expressions, productions or creative works of another as one’s own in any academic exercise. Examples of plagiarism include:

Complete plagiarism occurs when an essay or other work has been copied word for word from another source or sources (for example, purchase or copying of an online paper) without citation and/or without any original contribution by the student.

Partial plagiarism occurs when another work has been used by a student as part of an assessment or project without proper acknowledgement of the original source. Because of the accessibility of the internet, partial plagiarism can easily occur if students cut and paste from web pages.

Improper paraphrasing occurs when a student changes one or two words in order to make the copied work look like original work instead of properly paraphrasing and citing the material.

Insufficient citation occurs when a student cites a source one time and not again for subsequent uses of the source.

Self-plagiarism occurs when a student reuses his or her own work or data without permission of the faculty member. Even when using one’s own material, it must be cited properly. Also, using the same work for different courses without permission of the faculty members is self-plagiarism.

**Attendance and Professionalism**

Students are expected to attend all lectures, exams, and field trips during Semester B. Missing a full day in Semester B is equivalent to missing 4-6 lectures in a traditional 3-credit course. We expect students to arrive on time for all lectures, exams, and field trips. We will leave on field trips at the appointed time and cannot wait for late students.

Attendance and punctuality are important aspects of professional behavior and common courtesy. If a situation arises where you cannot attend or arrive on time, it is your responsibility to notify, **in advance**, the faculty team leader responsible for that day’s material.
Faculty are not required to make accommodations for students wanting to miss classes for an extended spring break or to leave early at the end of Spring semester for employment. Additional policies and guidelines applicable to individual instructional units will be specified in the syllabi for those units.

Cell phones and other electronic devices are to be turned off during class unless special permission has been granted.

Turning in Assignments

All assignments such as essays and lab reports are due before Semester B starts on the assigned due date and are to be turned in at the beginning of class or put in the appropriate faculty mailbox in room 116 unless other prior arrangements have been made.

Forestry Seminar Series:
You are strongly encouraged to attend the Forestry Seminar Series on Wednesday afternoons 4:00-5:00 p.m. in Room 17. This is a great opportunity to learn directly from some of the best researchers in the world (including some of our NAU faculty) about research related to ecology and management of forests and wild lands.

Weekly Schedule

We meet from 9:10 a.m. to 11:10 on Mondays, Wednesdays, and Fridays; and from 9:35 a.m. to 3:35 on Tuesdays, and Thursdays. On full days when we are in the classroom the lunch time will vary depending on the lab schedule (TTh). You may need to bring a lunch for extended field labs. The lecture and lab schedules are found at the end of the syllabus.

A typical week has the following format:

Monday/Wednesday/Fridays: Biometrics, forest economics, forest-level management, or watershed management
Tuesday/Thursday mornings: Wildlife habitat and range management, forest operations, or recreation management

Tuesday/Thursday afternoons: Labs--individual topic and integrated
We encourage students to bring lunch on lab days. We will give advanced notice on days with field trips that may require bringing a lunch.

The University’s self-insurance plan does not provide medical coverage to students if injured while participating in University-related activities or academic programs. Students are strongly encouraged to obtain medical/health insurance prior to participation, either through their parents’ health insurance plan or by purchasing insurance (such as the package offered through Fronske Health Center).

All students and faculty who drive vehicles on field trips must have gone through the training sessions provided by the Motor Pool. Student van drivers will receive a modest hourly wage for driving time. Van drivers are responsible and accountable for making sure that vans are at the Southwest Forest Sciences Building 15 minutes prior to the vans’ departure to the field and returned to the NAU garage after returning from the field when appropriate.
FOR 351: Fire Monitoring and Modeling
3 credits

Instructor: Dr. Larissa Yocom
Office: Forestry #205
Email: larissa.yocom@nau.edu
Office phone: 928-523-1378
Office hours: stop by or make an appointment

Course Time: Monday/Wednesday 12:30-2:50 pm

Course Location: School of Forestry, Room 018

Course Description:
Wildland fire is a high-impact disturbance with important ecological and social implications in most of the world’s ecosystems. There are currently several existing Fire Monitoring programs used by land managers in the United States. Two of the main monitoring protocols include the National Park Service Fire Monitoring Handbook (FMH) and the USFS Fire Monitoring Program (FIREMON). In addition, many existing vegetation sampling techniques in vegetation community ecology are relevant to monitoring fire effects. The important components of any monitoring program will be discussed, the protocols and sampling techniques of existing fire monitoring programs will be explored, and the positive and negative aspects of each will be examined. Much of the data from fire monitoring can be incorporated into several different Fire Effects and Fire Behavior Models. These models will be explored, and monitoring data will be linked to inputs and outputs from the models. Models that will be addressed include fire behavior, fire hazard, fire effects, weather, and remote sensing models.

Prerequisites:
Forestry 251: Introduction to Wildland Fire is required to take this course. Upper division undergraduate students and graduate students are welcome in this class. To do well in the course, students should have a basic understanding of biology, mathematics, and natural resource management. Interested students who have not taken these courses are invited to talk with the instructor about registering for this course.

Student Learning Expectations:
This course is designed to introduce the basics of developing a monitoring program and to familiarize you with two existing fire monitoring programs. In addition you will become familiar with the inputs and outputs of existing fire effects and fire behavior models and how they relate to data collected in existing monitoring programs.
At the end of the course, you will have:

- A mastery of the basic components of a monitoring program (Critical reading, critical thinking).
- An understanding of existing fire monitoring programs & the advantages/disadvantages of them (Critical reading, critical thinking).
- A mastery of basic vegetation and fuel sampling techniques that are applicable to fire monitoring in multiple vegetation types (Quantitative/spatial analysis).
- An understanding of fire effects and fire behavior model inputs and outputs (Critical thinking).
- An understanding of the positive and negative aspects of different models (Critical thinking).
- An understanding of how monitoring data can feed into existing fire effects and fire behavior models (Quantitative/spatial analysis).
- The ability to present monitoring and model results to a professional audience (Effective oral and written communication).

**Required Text:**

The topics addressed in this class span several topics of study in order to link vegetation sampling techniques, fire monitoring, fire behavior and modeling.

Vegetation sampling and monitoring techniques will be taught from:

- FIREMON, available at [http://fire.org](http://fire.org)

Fire models are available to the public at [http://fire.org](http://fire.org) and are loaded on the School of Forestry computers in the computer labs.

Readings will be provided from technical documentation, the scientific literature, and selected readings from books.
COURSEWORK

Participation/Attendance
Students are expected to attend classes. Class will include group work that counts towards participation. If you cannot attend for some reason, you need to notify the instructor ahead of time. If you miss class, it is your responsibility to ask if you missed something. Missing class is not an excuse for late or missing assignments. If you miss class, you should ask a fellow student for lecture notes.

Quizzes
Quizzes will be given from time to time throughout the semester.

Homework/Lab Assignments
At least seven homework assignments will be given throughout the semester. These assignments will be based on monitoring concepts and the use of models taught in the course. Basic analyses and a write-up will be turned in. Specifics on the assignments will be given in writing at the time of the assignments.

Exams
The only exam will be the final exam.

Term Project/Paper
Students will be responsible for a term project in which each student designs a framework for independently using two models covered in the course. Students will need to come up with the appropriate management questions to be addressed with the models. Students will also design a monitoring protocol designed to assess your hypothetical management scenario. The term project description and grading rubric will be handed out separately.

Term Presentation
Students will present their term project/paper in class. Presentations will be 15 minutes long and will be scheduled into class sessions during the last week of the semester. Presentations should be approached as though they are being given at a professional meeting or conference. PowerPoint slides are recommended.

Late Assignments
Late assignments will be accepted for the first 2 days after they are due. Assignments that are one day late (24 hrs or less from the due date and time) will be docked 10%. Assignments that are two days late (24-48 hrs from the due date and time) will be docked 20%. After 48 hrs, late assignments will not be accepted and will receive a zero.
PERFORMANCE EVALUATION

The guidelines below describe the characteristics of excellent academic work, as well as work that is less than excellent. The rubric is organized around “answering a question”, as on a traditional test, but the guidelines below can be easily adapted for presentations, reports, and projects.

- Excellent: Clearly and completely addresses the question. Thorough and logical development of thoughts. Points supported by literature. Correct grammar and spelling, citations in proper format.
- Good: Complete or nearly complete in addressing the question. Thoughts are generally logically and thoroughly expressed. Most arguments or questions of fact are supported by the literature. Only minor errors of grammar, spelling, or citation format.
- Needs Improvement: Incomplete answer or discussion that is tangential to the question. Thoughts sometimes illogical or incomplete. Arguments or questions of fact sporadically supported by the literature. Moderate errors of grammar, spelling, or citation format.
- Poor: Answer mostly fails to address the question. Thoughts often illogical or incomplete. Arguments or questions of fact rarely supported by the literature. Substantial errors of grammar, spelling, or citation format.

Grades are given as follows:
A (90-100%)
B (80-89%)
C (70-79%)
D (60-69%)
F (59% or below)

Points are earned as followed:
Participation and Attendance 5%
Quizzes 10%
Homework 35%
Term Project and Presentation 30%
Final Exam 20%

Total 100%

Statement on plagiarism and cheating:
Plagiarism and cheating will not be tolerated in this course. Any instance will result in failure of the assignment and, depending on the circumstances, failure in the course.
SAFE ENVIRONMENT POLICY

NAU’s Safe Working and Learning Environment Policy seeks to prohibit discrimination and promote the safety of all individuals within the university. The goal of this policy is to prevent the occurrence of discrimination on the basis of sex, race, color, age, national origin, religion, sexual orientation, disability, or veteran status and to prevent sexual harassment, sexual assault or retaliation by anyone at this university.

You may obtain a copy of this policy from the college dean’s office or from the NAU’s Affirmative Action website http://home.nau.edu/diversity/. If you have concerns about this policy, it is important that you contact the departmental chair, dean’s office, the Office of Student Life (928-523-5181), or NAU’s Office of Affirmative Action (928-523-3312).

STUDENTS WITH DISABILITIES

If you have a documented disability, you can arrange for accommodations by contacting Disability Resources (DR) at 523-8773 (voice) or 523-6906 (TTY), dr@nau.edu (e-mail) or 928-523-8747 (fax). Students needing academic accommodations are required to register with DR and provide required disability related documentation. Although you may request an accommodation at any time, in order for DR to best meet your individual needs, you are urged to register and submit necessary documentation (www.nau.edu/dr) 8 weeks prior to the time you wish to receive accommodations. DR is strongly committed to the needs of students with disabilities and the promotion of Universal Design. Concerns or questions related to the accessibility of programs and facilities at NAU may be brought to the attention of DR or the Office of Affirmative Action and Equal Opportunity (523-3312).

ACADEMIC INTEGRITY

The university takes an extremely serious view of violations of academic integrity. As members of the academic community, NAU’s administration, faculty, staff and students are dedicated to promoting an atmosphere of honesty and are committed to maintaining the academic integrity essential to the education process. Inherent in this commitment is the belief that academic dishonesty in all forms violates the basic principles of integrity and impedes learning. Students are therefore responsible for conducting themselves in an academically honest manner.

Individual students and faculty members are responsible for identifying instances of academic dishonesty. Faculty members then recommend penalties to the department chair or college dean in keeping with the severity of the violation. The complete policy on academic integrity is in Appendix G of NAU’s Student Handbook http://www4.nau.edu/stulife/handbookdishonesty.htm.
NORTHERN ARIZONA UNIVERSITY
Course Syllabus
FOR 360: Natural Resources Policy
Spring 2013

General Information:
Time and place: Monday, Wednesday and Friday; 8:00 – 8:50am
Southwest Forest Science Complex (Bldg. 82), Room 136
Instructor: Jim Allen
Southwest Forest Science Complex, Room 124
Office Phone: 523-5894
Email: James.Allen@nau.edu
Office Hours: By appointment. On most days, I expect to be available immediately after class.

Course Description:
This course will examine past, present and emerging policies, laws and issues that affect natural resources management in general and forestry in particular. It will also cover the fundamentals of the natural resources policy making process. The emphasis will be on policy-related topics of relevance to public natural resource management agencies in the United States, but issues affecting the management of private lands and international natural resources management will also receive some attention.

Learning Outcomes:
Upon completion of this course, students will be able to demonstrate:
1. An understanding of the historical development and importance of key natural resources policies and laws.
2. An understanding of the policy process as it applies to natural resources management, primarily at the federal level.
3. An understanding of the role played by various parties in the policy process.
4. The ability to think critically about current natural resources policy issues.
5. The ability to communicate their knowledge and thoughts about natural resources policy effectively in writing and through participation in class discussions.

Course Structure/Approach:
This course is structured as lecture-only, and in most cases a typical class period will involve a lecture from the primary instructor (but see the section on class participation). Periodically a class period will involve interaction with a guest or will be a structured discussion session among the class on a particular policy-related topic.

Textbook:
No textbook is required for this course.

Assigned Readings:
Readings will be assigned on a relatively regular basis. They will come from a variety of sources and most will either be posted on Bb Learn or handed out in class. Some assignments will involve reading material posted on the websites of government agencies, non-governmental organizations involved in natural resource management or policy, or news organizations. At some point in the semester, I also plan to ask you to sign on to a natural resources policy-related blog called A New Century of Forest Planning. Some of the posts will then become the
basis for discussions and possibly a written assignment. You can check it out and sign up at any
time by going to http://ncfp.wordpress.com/ and entering your email address.

Grading:
Grading will be based on six quizzes, two exams (a mid-term and a final), two written
assignments, and class participation. The percentage of the total grade assigned to each of these
is listed below:

<table>
<thead>
<tr>
<th>Percent of Final Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes (6; 5% each):</td>
</tr>
<tr>
<td>Mid-Term Exam</td>
</tr>
<tr>
<td>Final Exam</td>
</tr>
<tr>
<td>Written Assignments (2; 10% each)</td>
</tr>
<tr>
<td>Class Participation</td>
</tr>
</tbody>
</table>

A  90-100%
B  80-89.9%
C  70-79.9%
D  60-69.9%
F  <60%

Written Assignments:
An important part of this course is the opportunity that will be provided for students to think
critically about a particular natural resource policy or issue, to dig into the topic a little more
deeply than was done in class, and then to share their thoughts in writing. More details on these
assignments will be provided in separate handouts later in the semester.

Class Participation: Student participation is critical to making this course a success. The
material in this course could be taught entirely in the traditional lecture format, but would be
much more interesting if combined with questions, discussions and debate. Active participation is
expected; staying silent throughout the semester, being absent or late on a frequent basis, or being
otherwise disengaged, may result in the loss of all or most of the 10% of the grade allocated to
participation.
Extra Credit:
Students will have the opportunity to earn up to an additional 5 percent of their final grade by completing an optional written assignment. The primary means for earning this credit will be to attend a public event with some policy-related content. The event must be pre-approved by the instructor and generally will need to be an event that is also attended by the instructor. Examples of the types of events that are likely to qualify include a government agency-sponsored public meeting on a policy issue or a seminar or public presentation on campus that is policy-related. To receive full credit, the write-up must include a well-written summary of the meeting/seminar content and a critical reaction/analysis.

Tentative Course Outline:
I. Introduction to Natural Resources Policy
   • What is policy? Some definitions and related terms
   • Why is understanding policy and the policy process important to natural resource managers?

II. History of Natural Resources Policy in the United States
   • Eras of policy development in the U.S.
   • Nation-building and natural resources exploitation
   • Rise of the Conservation Movement
   • Marsh, Pinchot and contemporaries, Leopold
   • Scientific forestry and sustained yield/multiple use concepts
   • The environmental era
   • Some policy makers/influencers of the environmental era

III. Policy and Political Processes
   • The making of laws, regulations, and policies
   • The role of agencies, interest groups, and appropriations
   • The role of appeals and litigation

IV. Natural Resources Policy Issues and Public Lands
   • Overview of some key forestry and environmental laws
   • Forest Planning Rule
   • NEPA
   • Endangered Species Act and biodiversity protection
   • Evolution of forest management paradigms
   • Ecosystem management, adaptive management, collaboration
   • Forest health, restoration and fire policies
   • Case Study: Kaibab National Forest Plan Revision

V. Natural Resources Policy Issues and Private Lands
   • Regulation of forestry practices on private lands, Farm Bill
   • Forest certification
   • Conservation easements, Forest Legacy Program
   • Forest biotechnology

VI. International Policy Issues
   • Climate change and forests, REDD
   • Forestry, indigenous peoples and international development
VII. What Will Drive Natural Resources Policy in the Future?

- Demographic, political, environmental changes (external factors)
- Changes within the natural resources profession (internal factors)

General Course and NAU Policies

Course Policies:

*Makeup quizzes and exams:* Students are required to take the quizzes and exams as scheduled. In the case of illness or other legitimate reason, students must inform the instructor BEFORE the quiz or exam.

*Attendance* is expected at all class sessions. Although daily attendance will not be taken, a pattern of frequent absences will be considered when determining the grade for class participation.

*Plagiarism and other forms of cheating* will not be tolerated. Refer to the NAU statement on academic integrity below.

Northern Arizona University Policy Statements:

**SAFE ENVIRONMENT POLICY.** NAU’s Safe Working and Learning Environment Policy seeks to prohibit discrimination and promote the safety of all individuals within the university. The goal of this policy is to prevent the occurrence of discrimination on the basis of sex, race, color, age, national origin, religion, sexual orientation, disability, or veteran status and to prevent sexual harassment, sexual assault or retaliation by anyone at this university. You may obtain a copy of this policy from the college dean’s office or from the NAU’s Affirmative Action website [http://home.nau.edu/diversity/](http://home.nau.edu/diversity/). If you have concerns about this policy, it is important that you contact the departmental chair, dean’s office, the Office of Student Life (928-523-5181), or NAU’s Office of Affirmative Action (928-523-3312).

**STUDENTS WITH DISABILITIES.** If you have a documented disability, you can arrange for accommodations by contacting Disability Resources (DR) at 523-8773 (voice) or 523-6906 (TTY), [dr@nau.edu](mailto:dr@nau.edu) (e-mail) or 928-523-8747 (fax). Students needing academic accommodations are required to register with DR and provide required disability related documentation. Although you may request an accommodation at any time, in order for DR to best meet your individual needs, you are urged to register and submit necessary documentation ([www.nau.edu/dr](http://www.nau.edu/dr)) 8 weeks prior to the time you wish to receive accommodations. DR is strongly committed to the needs of student with disabilities and the promotion of Universal Design. Concerns or questions related to the accessibility of programs and facilities at NAU may be brought to the attention of DR or the Office of Affirmative Action and Equal Opportunity (523-3312).

**ACADEMIC INTEGRITY.** The university takes an extremely serious view of violations of academic integrity. As members of the academic community, NAU’s administration, faculty, staff and students are dedicated to promoting an atmosphere of honesty and are committed to maintaining the academic integrity essential to the education process. Inherent in this commitment is the belief that academic dishonesty in all forms violates the basic principles of integrity and impedes learning. Students are therefore responsible for conducting themselves in an academically honest manner.

Individual students and faculty members are responsible for identifying instances of academic dishonesty. Faculty members then recommend penalties to the department chair or college dean in keeping with the severity of the violation. The complete policy on academic integrity is in Appendix G of NAU’s Student Handbook [http://nau.edu/Student-Life/Student-Handbook/](http://nau.edu/Student-Life/Student-Handbook/).
CLASSROOM MANAGEMENT STATEMENT. Membership in the academic community places a special obligation on all members to preserve an atmosphere conducive to a safe and positive learning environment. Part of that obligation implies the responsibility of each member of the NAU community to maintain an environment in which the behavior of any individual is not disruptive.

It is the responsibility of each student to behave in a manner which does not interrupt or disrupt the delivery of education by faculty members or receipt of education by students, within or outside the classroom. The determination of whether such interruption or disruption has occurred has to be made by the faculty member at the time the behavior occurs. It becomes the responsibility of the individual faculty member to maintain and enforce the standards of behavior acceptable to preserving an atmosphere for teaching and learning in accordance with University regulations and the course syllabus.

At a minimum, students will be warned if their behavior is evaluated by the faculty member as disruptive. Serious disruptions, as determined by the faculty member, may result in immediate removal of the student from the instructional environment. Significant and/or continued violations may result in an administrative withdrawal from the class. Additional responses by the faculty member to disruptive behavior may include a range of actions from discussing the disruptive behavior with the student to referral to the appropriate academic unit and/or the Office of Student Life for administrative review, with a view to implement corrective action up to and including suspension or expulsion.
Course Syllabus
FOR 415/515: Forestry in Developing Countries
Spring 2013

General Information:
Time and place: Mondays and Wednesdays; 12:45 – 2:00 pm
Southwest Forest Science Complex (Bldg. 82), Room 133

Instructors: Dr. Pete Fulé
Southwest Forest Science Complex, Room 246C
Office Phone: 523-1463
Email: Pete.Fule@nau.edu

Office Hours: By appointment. On most days, I should be available immediately after class.

Course Description:
Developing countries hold much of the world’s forests. These forests provide many goods and services, including wood products, medicinal plants, food, environmental protection, carbon uptake, ecotourism opportunities, and much of the planet’s plant and animal biodiversity. While they are very important, forests in developing countries are also at considerable risk due to factors such as deforestation, forest degradation, and climate change. This course begins with an introduction to the concept of developing countries and to their physical and biological environment. The majority of the course is devoted to forest management approaches, including both the biological and socioeconomic aspects of forest management. A number of individual country or regional case studies are also presented.

Student Learning Expectations/Outcomes:
By the end of the course students will have:

Developed an understanding of the biology, management, and policy aspects of forests in developing countries.
Acquired an understanding of social, political, economic, and environmental issues as they relate to people from developing countries and how they manage their forests.
Developed an understanding of traditional ecological knowledge and the role of minorities and underrepresented groups in economic development.
Studied the role of women in forest resource management worldwide.
Become familiar with organizations and career opportunities working in international forestry.

At the end of the course students will be able to:
Discuss the differences and similarities between forests in different regions within the developing world.
Demonstrate understanding of major forestry problems such as over-exploitation, deforestation, and loss of biological diversity.
Communicate in writing and oral presentations an understanding of cultural and social aspects of a forest problem in developing countries.
Describe the social and cultural context of the forestry enterprise and how it varies between developing countries and the U.S.
Demonstrate an understanding of how international policies and treaties can achieve improved management of developing country forests.

**Course Structure:**

This is a three credit lecture course with most of the classes devoted to lectures by the instructors and guest speakers. Approximately 25% of the class periods will be devoted to discussion sessions on specific topics and to student presentations. Students will actively participate, as members of teams, in a special project that they will present to the class near the end of the semester. Because this is a co-convened course, some assignments and expectations will vary depending on whether the student is enrolled in FOR 415 or FOR 515.

**Textbooks and Required Materials:**

There is no textbook required for this course. Selected readings are required and will be posted on the Blackboard Learn web page and/or handed out in class.

**Discussion Sessions:**

Four discussion sessions are scheduled in the semester. Articles for discussion will be placed on BBLearn. All students will participate in discussions and graduate students will be assigned to lead discussion sections. Further details will be given in a separate document.

**Student Project:**

Each student in this class is required to participate in a special project on international forestry. This project is designed to allow students to develop skills working in a team and to pursue in greater detail a topic of particular interest to that group. Teams will consist of a graduate student plus several undergraduate students. Assignment details will be given in a separate document.

**Assessment of Student Learning Outcomes:**

The rubric or guideline below describes the characteristics of excellent academic work, as well as levels that are less than excellent. The rubric is organized around “answering a question”, as on a traditional test, but the guidelines below can be easily adapted for presentations, reports, and the mid-term essays.

**Excellent:** Clearly and completely addresses the question. Thorough and logical development of thoughts. Points supported by literature. Correct grammar and spelling, citations in proper format.

**Good:** Complete or nearly complete in addressing the question. Thoughts are generally logically and thoroughly expressed. Most arguments or questions of fact are supported by the literature. Only minor errors of grammar, spelling, or citation format.

**Needs Improvement:** Incomplete answer or discussion that is tangential to the question. Thoughts sometimes illogical or incomplete. Arguments or questions of fact sporadically supported by the literature. Moderate errors of grammar, spelling, or citation format.

**Poor:** Answer mostly fails to address the question. Thoughts often illogical or incomplete. Arguments or questions of fact rarely supported by the literature. Substantial errors of grammar, spelling, or citation format.
Excellent participation in discussions means reading and considering the articles ahead of class, actively seeking any additional information needed to understand the concepts, and participating thoughtfully and actively in the class discussion.

Graduate students are expected to display a good knowledge of the scientific literature, including the capability to find literature independently and interpret technical information.

**Grading:**

There will be two in-class exams, a mid-term and a final. The exams will consist primarily of short answer and essay questions, although other types of questions (e.g., multiple choice) may be included.

Grading will be based on the following:

<table>
<thead>
<tr>
<th></th>
<th><strong>FOR 415</strong></th>
<th><strong>FOR 515</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Term Exam</td>
<td>30%</td>
<td>25%</td>
</tr>
<tr>
<td>Student Project:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual Performance</td>
<td>30%</td>
<td>20%</td>
</tr>
<tr>
<td>Project Leadership</td>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>Discussion Participation</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Discussion Leadership</td>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
<td>25%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**Course Outline 2013 (Topics subject to change)**

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 Jan</td>
<td>Intro, syllabus, what is a developing country?</td>
<td></td>
</tr>
<tr>
<td>16 Jan</td>
<td>Physical environment</td>
<td></td>
</tr>
<tr>
<td>21 Jan</td>
<td><strong>Holiday: Martin Luther King, Jr. Day</strong></td>
<td></td>
</tr>
<tr>
<td>23 Jan</td>
<td>Biological environment</td>
<td></td>
</tr>
<tr>
<td>28 Jan</td>
<td>Approaches &amp; challenges to forestry</td>
<td></td>
</tr>
<tr>
<td>30 Jan</td>
<td>Community forestry</td>
<td></td>
</tr>
<tr>
<td>4 Feb</td>
<td>Agroforestry</td>
<td></td>
</tr>
<tr>
<td>6 Feb</td>
<td>Discussion #1 (topic: community/agroforestry)</td>
<td>Graduate students</td>
</tr>
<tr>
<td>11 Feb</td>
<td>Indigenous forest management</td>
<td></td>
</tr>
<tr>
<td>13 Feb</td>
<td>Case study: Bolivia, Mexico</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Topic</td>
<td>Instructor</td>
</tr>
<tr>
<td>--------</td>
<td>------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>18 Feb</td>
<td>Commercial plantation forestry</td>
<td></td>
</tr>
<tr>
<td>20 Feb</td>
<td>Case study: Swaziland</td>
<td>Dr. Jim Allen</td>
</tr>
<tr>
<td>25 Feb</td>
<td>Gender roles</td>
<td></td>
</tr>
<tr>
<td>27 Feb</td>
<td>Discussion #2 (topic: gender roles)</td>
<td>Graduate students</td>
</tr>
<tr>
<td>4 Mar</td>
<td>Carbon management, REDD</td>
<td></td>
</tr>
<tr>
<td>6 Mar</td>
<td>Ecotourism</td>
<td></td>
</tr>
<tr>
<td>11 Mar</td>
<td><strong>Midterm Exam</strong></td>
<td></td>
</tr>
<tr>
<td>13 Mar</td>
<td>Non-market forest products</td>
<td>Dr. Yeon-Su Kim</td>
</tr>
<tr>
<td>18-22 Mar</td>
<td><strong>Spring Break</strong></td>
<td></td>
</tr>
<tr>
<td>25 Mar</td>
<td>International development policy &amp; legal issues</td>
<td></td>
</tr>
<tr>
<td>27 Mar</td>
<td>Discussion #3 (topic: TBA)</td>
<td>Graduate students</td>
</tr>
<tr>
<td>1 Apr</td>
<td>Case study: Pacific islands</td>
<td>Dr. Jim Allen</td>
</tr>
<tr>
<td>3 Apr</td>
<td>Case study: Ghana</td>
<td>Dr. Mike Wagner</td>
</tr>
<tr>
<td>8 Apr</td>
<td>TBA</td>
<td></td>
</tr>
<tr>
<td>10 Apr</td>
<td>Case study: Honduras</td>
<td>Dr. Erik Neilsen</td>
</tr>
<tr>
<td>15 Apr</td>
<td>Student presentations</td>
<td></td>
</tr>
<tr>
<td>17 Apr</td>
<td>Student presentations</td>
<td></td>
</tr>
<tr>
<td>22 Apr</td>
<td>Student presentations</td>
<td></td>
</tr>
<tr>
<td>24 Apr</td>
<td>Peace Corps</td>
<td>Returned PC Volunteers</td>
</tr>
<tr>
<td>29 Apr</td>
<td>Case study: Mainpat, India</td>
<td>Amanda Knauf, Emily Fulé</td>
</tr>
<tr>
<td>1 May</td>
<td>Discussion #4 (topic: TBA)</td>
<td>Graduate students</td>
</tr>
<tr>
<td>6 May</td>
<td><strong>Final Exam 12:30-2:30</strong></td>
<td></td>
</tr>
</tbody>
</table>
General Course and NAU Policies

Course Policies:

Makeup exams: Students are required to take the exams as scheduled. In the case of illness or other legitimate reason, students must inform the instructor BEFORE the exam.

Attendance is expected at all class sessions unless prior approval is given by the instructor; in the case of illness or other unforeseen events, students should notify the instructor in advance of the class session.

Plagiarism and cheating will not be tolerated. This includes using the same (or a very similar) term paper for this class and any other class. Refer to the NAU statement of academic integrity below.

Northern Arizona University Policy Statements:

SAFE ENVIRONMENT POLICY. NAU's Safe Working and Learning Environment Policy seeks to prohibit discrimination and promote the safety of all individuals within the university. The goal of this policy is to prevent the occurrence of discrimination on the basis of sex, race, color, age, national origin, religion, sexual orientation, disability, or veteran status and to prevent sexual harassment, sexual assault, or retaliation by anyone at this university. You may obtain a copy of this policy from the college dean's office. If you have concerns about this policy, it is important that you contact the departmental chair, dean's office, the Office of Student Life (523-5181), the academic ombudsperson (523-9368), or NAU's Office of Affirmative Action (523-3312).

STUDENTS WITH DISABILITIES. If you have a learning and/or physical disability, you are encouraged to make arrangements for class assignments/exams so your academic performance will not suffer because of the disability or handicap. If you have questions about special provisions for students with disabilities, contact the Counseling and Testing Center (523-2261). It is your responsibility to register with the Counseling and Testing Center. Application for services should be made at least eight weeks before the start of the semester. If the Counseling and Testing Center verifies your eligibility for special services, you should consult with your instructor during the first week in the semester so appropriate arrangements can be made. Concerns related to noncompliance with appropriate provisions should be directed to the Disability Support Services coordinator in the Counseling and Testing Center.

INSTITUTIONAL REVIEW BOARD. Any study involving observation of or interaction with human subjects that originates at NAU-including a course project, report, or research paper-must be reviewed and approved by the Institutional Review Board (IRB) for the protection of human subjects in research and research-related activities. The IRB meets once each month. Proposals must be submitted for review at least fifteen working days before the monthly meeting. You should consult with your course instructor early in the course to ascertain if your project needs to be reviewed by the IRB and/or to secure information or appropriate forms and procedures for the IRB review. Your instructor and department chair or college dean must sign the application for approval by the IRB. The IRB categorizes projects into three levels depending on the nature of the project: exempt from further review, expedited review, or full board review. If the IRB certifies that a project is exempt from further review, you need not resubmit the project for continuing IRB review as long as there are no modifications in the exempted procedures. A copy of the IRB Policy and Procedures Manual is available in each department's administrative office.
and each college dean's office. If you have questions, contact Carey Conover, Office of Grant and Contract Services, at 523-4889.

ACADEMIC INTEGRITY. The university takes an extremely serious view of violations of academic integrity. As members of the academic community, NAU's administration, faculty, staff, and students are dedicated to promoting an atmosphere of honesty and are committed to maintaining the academic integrity essential to the educational process. Inherent in this commitment is the belief that academic dishonesty in all forms violates the basic principles of integrity and impedes learning. It is the responsibility of individual faculty members to identify instances of academic dishonesty and recommend penalties to the department chair or college dean in keeping with the severity of the violation. Penalties may range from verbal chastisement to a failing grade in the course. The complete policy on academic integrity is in Appendix F of NAU's Student Handbook.

CLASSROOM MANAGEMENT STATEMENT. Membership in the academic community places a special obligation on all members to preserve an atmosphere conducive to a safe and positive learning environment. Part of that obligation implies the responsibility of each member of the NAU community to maintain an environment in which the behavior of any individual is not disruptive.

It is the responsibility of each student to behave in a manner which does not interrupt or disrupt the delivery of education by faculty members or receipt of education by students, within or outside the classroom. The determination of whether such interruption or disruption has occurred has to be made by the faculty member at the time the behavior occurs. It becomes the responsibility of the individual faculty member to maintain and enforce the standards of behavior acceptable to preserving an atmosphere for teaching and learning in accordance with University regulations and the course syllabus.

At a minimum, students will be warned if their behavior is evaluated by the faculty member as disruptive. Serious disruptions, as determined by the faculty member, may result in immediate removal of the student from the instructional environment. Significant and/or continued violations may result in an administrative withdrawal from the class. Additional responses by the faculty member to disruptive behavior may include a range of actions from discussing the disruptive behavior with the student to referral to the appropriate academic unit and/or the Office of Student Life for administrative review, with a view to implement corrective action up to and including suspension or expulsion.
Course description

Forest Ecosystem Planning I & II form the second semester capstone experience, which integrates the materials learned in previous forestry courses as well as introduces new concepts. The course includes trainings on Professional Ethics and National Environmental Policy Act.

Ecosystem Planning/Analysis: Students will conduct an ecosystem management analysis and develop a forest ecosystem management plan, which considers multiple resources and ecosystem health desired conditions. Students develop desired future conditions for a legacy forest (i.e., forest left to future generations in the future) under their chosen scenario. Students develop a desired legacy forest conditions based on forest ecology and ecosystem management principles learned in FOR 313-316, FOR 323-326, and focus area courses, as well as their own research under the guidance of faculty advisors. Students conduct analyses to determine specific management strategies, which should be undertaken over the planning horizon to achieve the desired condition. This year, Semester D will focus on improving the management of the NAU’s Centennial Forest (Historic School Forest).

Professional Ethics: this section will help increase your awareness and understanding of the ethical values associated with professional practice in forest ecosystem planning. In this section you will work in groups but with a substantial portion of your assignments being based on your own efforts. We will combine traditional lectures, small group discussions, in-class exercises, and individual assignments throughout this section.

National Environmental Policy Act: As with the Professional Ethics section, in this section you will work in groups but with a substantial portion of your assignments being based on your own efforts. We will have a guest presenter, Mr. David Brewer, formally with the US Forest Service and the Ecological Restoration Institute, as our instructor in this section. Your scores will be based on a combination of individual quizzes and an exam, plus a crew-based review assignment (tentative).
Syllabus For 425

Class Hours:
On-line
Credit Hours: 3
Instructor:
Steve Dewhurst, Associate Professor, School of Forestry
Office: Room 237, Southwest Forest Science Complex
Phone: (928) 523-9647 note: no voice mail;
E-mail: Steve.Dewhurst@nau.edu (preferred mode of contact)
Office hours: I am most available (quickest response) on Tuesdays and Thursdays.

A 401-Series course for in-service professionals

This a course designed for in-service professionals in fire science, fire management, and other forest management related fields. It combines 3 elements: 1) on-line tutorials in key Arc/GIS concepts and techniques, delivered through ESRI, 2) e-lectures describing and demonstrating key tools, concepts and techniques, and 3) a one-week intensive lab experience, using Arc/Map software, held at the Flagstaff Campus March 9-12.

Course Dates, Jan 22nd-Mar 20th, 2009

The class begins February 5th with online sessions. Students will be expected to complete the following ESRI Virtual Campus courses as part of the course:
Learning Arc/GIS Desktop (version 9.2) (24 hours)
Learning Arc/GIS Spatial Analyst (version 9.2) (18 hours)
Students should have completed “Learning Arc/GIS Desktop” by the end of week 3, and “Learning Arc/GIS Spatial Analyst” by the end of week 5. Certificates of Completion provided by ESRI at the end of each Virtual Campus courses will be used as proof of course completion, and must be provided to the instructor by the end of the course in order to obtain credit for them. Students may register for and begin these courses as soon as they have registered, paid their fees, and obtained their NAU e-mail account. Registration codes will only be sent to NAU e-mail addresses!
Students who have already completed these Virtual Campus courses may submit their Certificates of Completion for credit. Students who wish to begin these courses before Feb 5th may do so.

Course Location
This course will be delivered in “hybrid” format. Most course content will be delivered on-line, through the NAU Vista system. 4 days (March 9-12) will be spent in Flagstaff, using NAU
facilities. Students wishing to work with datasets from their professional activities should arrange with the instructor for those datasets to be available for their use at NAU.

Class Structure
The first 2 weeks of the course will be devoted to the completion of the “Learning Arc/GIS Desktop” ESRI Virtual Campus course. This will be done through accomplished through ESRI’s Virtual Campus facility. Registration fees for these courses are included in the NAU course registration fee.
Beginning in week 3, and proceeding through Week 6, students will view e-lectures, delivered in Vista. There will be 4 e-lecture modules, each with a quiz and follow up activities.
Week 7 will be devoted to each student producing a final GIS project using NAU computing facilities, datasets provided by NAU, or datasets pre arranged with the instructor.

Technical Requirements
No special technical requirements. A web browser and internet connection is all you need. However, your web browser will need to support viewing of Flash video, and your Internet connection will need to be fast enough to allow download of large files. The content will be graphics-intensive, and faster connections will work better.

Course PreWork
Students who wish to complete the ESRI Virtual Campus courses before Jan 22nd may do so. Students may register for and begin these courses as soon as they have registered, paid their fees, and obtained their NAU e-mail account. Registration codes will only be sent to NAU e-mail addresses!

Textbook Information
No textbook is required for this course. For students wishing a hardcopy reference, the following is recommended:
This book is widely available, both new and used, through Amazon.com and other online booksellers. It is recommended that students who wish to purchase this book do so before beginning the “Learning Arc/GIS Desktop” Virtual Campus course, as the book will be most useful in supporting that material.

Desired Course Outcomes:
Upon the successful completion of this course, students should be able to demonstrate:
A general knowledge of geographic and spatial analysis techniques commonly used in forest management.
Understanding of the relationship between types of spatial data commonly encountered in forest-related applications.
A depth and breadth of understanding of geographic and spatial analysis techniques relevant to forest management.
An awareness of the software and hardware resources available to support geographic and spatial analysis.
The ability to develop a work plan to incorporate geographic and spatial analysis into their management application of interest.

**Grading:**
Grading is by letter-grade. Grades will be calculated as follows:
(50%) On-line quizzes. (4 quizzes on e-lecture material)

(40%) Work plan and demonstration project: Completed during lab week in Flagstaff (40 points)

(10%) Participation

Additional course requirements: Completion of specified ESRI training modules
Readings:
As assigned.

**Course Outline**
Week 1: On-line ESRI modules
Week 2: On-line ESRI modules
Week 3: Basic GIS concepts (e-lectures)
Week 4: GIS data sources (e-lectures)
Week 5: GIS analysis techniques (e-lectures)
Week 6: GIS applications (e-lectures)
Week 7: GIS lab experience (Flagstaff)
Course Syllabus
FOR 441: Sustainable Tropical Forestry in Ghana, West Africa
Summer 2013
Credits: 3 semester hours
Location: Ghana, West Africa (see schedule of activities)
Dates: July 25- August 15, 2013
Instructors: Michael R. Wagner
School of Forestry
PO Box 15018
Flagstaff, AZ 86011
(928) 523-6646
Mike.Wagner@nau.edu

Paul Bosu
FORIG
KNUST Box 63
Kumasi, Ghana
011-233-51-60123
pbosu@forig.org

Course Description:
Tropical forests provide wood products, medicinal plants, foodstuffs, tourism, environmental protection, habitat for wildlife and humans, and the majority of the planet’s plant and animal biodiversity. This course examines a broad range of issues related to tropical wet and dry ecosystems including: their distribution, ecology, and management; deforestation issues and actions; conservation management and preservation; community forestry, natural forest management, plantation forestry and agroforestry; ecotourism and cultural tourism; and gender roles, indigenous knowledge and land tenure issues. All of the issues in this course are raised in the context of the social, political, economic, and cultural conditions under which Africans live and work in Ghana. A three week trip across Ghanaian forests will provide students with first hand experience in tropical forestry.

Course Objectives:
Students will, by the completion of this course:
Understand current trends in the ecology and management of wet and dry tropical forests throughout the world, with a focus on West Africa
Appreciate the major challenges for sustainable management of tropical forests, much beyond traditional silviculture and planning requirements; and
Develop first-hand experience in tropical forest (ecosystem) management in Ghana. Understand and participate in forest based economic development through the Bobori Butterfly Sanctuary Ecotourism Project. Acquire a social, political, economic and cultural perspective on the role of forestry in the lives of traditional African people. Learn the difference in the view of western culture and Ghanaians in how they perceive and value forests.

Student Learning Expectations/Outcomes:
- Discuss the differences between the traditional use of forests in tropical and temperate regions
- Demonstrate an understanding of major forestry issues like deforestation, certification and indigenous knowledge that affect developing country forests.
- Describe the social and cultural context in how local Africans view their forest.
- Demonstrate the knowledge of development approaches (i.e. ecotourism, agroforestry) and how the strategies can be effective to achieve broad economic development within a cultural context.

Course Structure:
This is a three-week field course.

Required Textbooks:
Course-pack

Recommended (optional) Textbooks:

Ecotourism Project:
The course includes a service learning element on ecotourism. Ecotourism is often cited as a potential strategy to achieve economic development using forests without extracting wood products from the forest. This part of the course is designed to give students the opportunity to actively develop and implement some activity that will improve the potential of the Bobiri Guest House to succeed as an ecotourism business. In 2009 the students did three projects: 1) designed and built an energy efficient wood stove using local “landerete” clay blocks, 2) developed and executed a fund raising campaign to purchase a new generator and 3) made physical improvements in facilities by painting and repair of cook house and original wooden guest house.
Students will develop project ideas during a series of evening sessions shortly after arrival. A series of articles on ecotourism are included in the course pack. These should be read prior to the first evening session. The initial session will review the goals and constraints of this activity. The ecotourism project must be something that can be accomplished within the time frame of the course (potential follow up is permitted) and must be completed within a budget of $100 per project. During the second evening ecotourism session, preliminary ideas will be vetted for discussion by the group. During the third evening session revised project proposals will be presented. These may be individual or group projects. During the fourth session proposed projects will be presented to Bobiri senior staff for final approval. Two days are allocated for implementation of ecotourism projects during the second week of the course.

The ecotourism project creates an opportunity for the class to give back something to the Bobiri Guest House and develop an appreciation of difficulties associated with forestry based economic development in the third world.

**Evaluation and Grading:**

During the course, students will be evaluated based on: a) participation (involvement in activities, synthesis and questioning, and punctuality), b) professionalism. Each student will be assigned 1 day/event during the course to serve as the group host. The host for the day/event will be responsible for obtaining contact information and writing thank you letters from the class to the professional host, and c) a journal describing the main lessons learned each field day. As part of the journal assignments, students should prepare a detailed response to the following synthesis question: contrast Ghanaian and US views of forests and their use. What economic or cultural factors explain this difference? Describe one forest management challenge that Ghanaian foresters face and offer two alternative strategies to address this challenge. Include the answer to this question as the final section of your journal. Journals will be due September 15, and should contain approximately a one-page typed account for each day of the field course and about 3-5 typed pages for your answer to the synthesis question.

**Assessment of Student Learning Outcomes:**

Instructors for the course are engaged with students from breakfast until the end of each day. During breakfast activities for each day are outlined. Student expectations are reviewed and instructors participate in clarifying what is expected from students that day. Throughout the daily activities student participation and professionalism are assessed. During and after the evening meal a discussion of lessons learned for that day are reviewed. Students are asked to actively participate in the discussion and ask questions about what experiences they had that day and how they connected with the
forestry issues presented. Students are encouraged to complete their journal at the end of each day.

The timeline for assessment is a daily assessment of each student’s participation and professionalism and a final assessment of their written journal at the end of the course.

Other Course Policies:

This course will comply with all academic policy statements established by NAU.

Course Instructor Roles

Instruction for this course is provided by a team of instructors and about 10 professional Ghanaian staff. The senior instructor is Professor Michael R. Wagner, Regents’ Professor of International Forestry Emeritus. Dr. Wagner has 31 years experience at NAU and has taught eight previous international field courses (five in Ghana, two in Honduras, one in Panama). Dr. Wagner coordinated international programs in the School of Forestry (SOF) and for many years taught a NAU based course- FOR 415 Forestry in Developing Countries. Dr. Wagner has over 3 years experience working in Ghana. He served as a US Peace Corps volunteer in Ghana from 1973-1975 as an instructor in the Forestry Training School. Since 1973 he has taken about 25 professional trips to Ghana supported by two Fulbright scholarships and has managed several research projects. He has published two books and over 25 scientific papers just on his research in Ghana. He currently is Co-PI on an International Tropical Timber Organization grant to develop and demonstrate methods to restore tropical forest on deforested lands in Ghana. Dr. Wagner co-founded the Bobiri Butterfly Sanctuary in Kubease, Ghana where the course will be centered. Finally, Professor Wagner or “Prof” as he is widely known in forestry circles in Ghana speaks the language of the Ashanti people- Twi at a basic level.

Dr. Paul Bosu, Forestry Research Institute of Ghana, is a co-instructor. Dr. Bosu is an alumni of Northern Arizona University, School of Forestry and among his many duties manages the Bobiri Forest and Butterfly Sanctuary Guest House. Dr. Bosu is a native of Ghana from the Fanti tribal group, but speaks fluent Twi. Dr. Bosu coordinates all the Ghana instructors, provides local logistical support, and stays with the course during the entire 3 weeks. Dr. Bosu is capable of delivering any of the course lectures.

Important Contact Numbers:

Michael R. Wagner
School of Forestry
PO Box 15018
Flagstaff, AZ 86011
(928) 523-6646
Mike.Wagner@nau.edu
Medical Information:

All students participating in this course must demonstrate they are covered by medical insurance. Centers for Disease Control (CDC) recommended vaccines and preventive medical practices are described in the course pack. All CDC recommended procedures must be followed. All students must obtain an International Student Identification card which includes emergency medical evacuation insurance. It will be each attendee’s responsibility to make known all medical/allergy conditions to the course instructors by the completion of medical history forms included in your acceptance packets. All precautions will be made to ensure your personal safety during this course and first aid as required will be administered while further medical attention is arranged if needed. As medical first aid ethics require, no medication will be administered to a patient. However, the patient may decide to medicate themselves with the appropriate over the counter products. For additional information consult your medical release forms and risk management statement.
College of Engineering, Forestry and Natural Sciences
School of Forestry

Ecology and Management of Introduced Species in Forests and Rangelands

FOR 443 Spring 2012 Course Syllabus

Instructor: Dr. Kristen M. Waring
Office/lab: Southwest Forestry Science Complex (Bldg 82) Rm 201/219
Office Hours: By appt. or open door
Email: Kristen.waring@nan.edu Phone: 523-4920

Prerequisites: Basic ecology helpful but not required.

Course Description: Introductions of non-native insect, plant, animal and pathogen species have increased at an alarming rate around the world in the past 100 years and tend to have negative ecological and economic impacts once established. This course will introduce students to the ecology of introduced and invasive species, how land managers and policy makers are dealing with introductions and case studies examining the ecology and management of specific introduced species in forests and rangelands.

Learning outcomes: Students will be able to

1. Compare and contrast definitions and terminology used in the broad field of invasion ecology/introduced species.
2. Describe invasion ecology in terms of arrival, establishment and spread of invasive species and apply those concepts to management strategies.
3. Identify and describe positive and negative effects of introduced species.
4. Describe the different management strategies employed and their limitations, and the role of policy in introduced species’ management.
5. Thoughtfully participate in discussions and dialogue concerning the ecology and management of introduced species worldwide.
6. Conduct a literature search and gather information into a coherent oral presentation on a topic related to invasive species in collaboration with a teammate.

Course structure: Primarily lecture format with an emphasis on active learning, including group activities and discussion. Students will work in teams to develop an oral presentation late in the semester. When possible, guest lectures will provide diversity in background, viewpoint and expertise.

Discussions and active learning: To facilitate an active learning environment, each student is required to turn in one question by 10 am the day of each class session that is based on the readings (textbook or others); questions will be turned in via Bb Learn. These questions are worth 5 points each and count towards the participation grade. You have two ‘freebie’ class sessions over the course of the semester. Questions should be related to understanding reading material with greater clarity or depth or generating discussion (including controversy).

Required text:

FIRE ECOLOGY AND MANAGEMENT
SPRING 2013

Course number: FCR 450
Prerequisites: Forest Ecology or knowledge of basic ecology
Instructor: Molly Hurter (molly.hurter@nau.edu)
Course location: NAU, Southwest Forest Science Complex Room 034B

Other readings will be provided by the instructor as needed.

COURSE DESCRIPTION
Wildland fire is a disturbance force with important ecological and social implications in most of the world’s ecosystems. This course integrates ecological and cultural aspects of wildland fire, providing a broad foundation for people interested in natural resource management, fire management, and ecological science. We will begin with basics of fire behavior. Next we will look at fire regimes and the ecological effects of fire at various scales ranging from individual organisms to landscapes and continents. Case Studies from around the country will tie concepts learned at the start of the course to different ecosystems with real on the ground issues. The historical interaction of humans with fire will set the stage for understanding principles, techniques, and challenges in present-day fire management, the final portion of the course.

COURSE FORMAT
January 28th - March 14th. On-line portion of the class
March 11th - March 14th. On-campus portion of the course

This class consists of six weeks of reading, assignments, quizzes, and completion of a term paper. Reading assignments, quizzes, and instructions for completion of a term paper are given on January 25th. The "pre-work" assigned for this class is critical. The on-line quizzes and assignments are part of the final grade for the course. The course is designed this way for to help you absorb material presented in a short amount of time. You will be in class from 8 am to 5 pm, Monday thru Thursday and there will be little time for reading and homework during this time. The quiz schedule is designed to keep you on track. However, if you have extenuating circumstances that keep you from completing the quizzes and assignments on time, please contact the instructor.

Coursework

On-line coursework

Readings
Readings will be assigned starting January 28th with the on-line portion of the class. There will be an average of 2-3 hours of reading per day in preparation for the on-campus portion of the class. DO NOT FALL BEHIND ON THE READINGS or it will be very difficult to catch up.
Northern Arizona University  
School of Forestry

FOR 451 – Fire Ecology and Management  
Spring 2013
3 credits

**Time:** Tuesday and Thursday 8:00 – 9:15 a.m.  
**Location:** Southwest Forest Science Complex Rm 135  
**Prerequisites:** FOR 251 – Introduction to Wildland Fire

**Instructor:** Dr. Andrea (Andi) Thode  
Email: andi.thode@nau.edu  
Office: SFSC room 200  
Phone: 928-523-5457

**Office hours:** Stop by or make an appointment. I do have LOTS of meetings so it is best to schedule something with me as it is difficult to just catch me in my office. Around 11:00am on Tuesday/Thursday is often a good time to catch me.

**Course description:**
Wildland fire is a disturbance force with important ecological and social implications in most of the world’s ecosystems. This course integrates ecological and cultural aspects of wildland fire, providing a broad foundation for people interested in natural resource management, fire management, and ecological science. This course builds heavily on FOR251-Introduction to wildland fire. We will look at fire effects on biotic and abiotic resources, fire regimes and current issues in fire ecology. Case Studies presented by the students will tie concepts learned at the start of the course to different ecosystems with real on the ground issues. Current issues in fire will be pulled from current webinars, readings and lecture material. The course will include lecture, discussion of the literature, and team projects. The text will be supplemented by other readings and recorded webinars.

**Text and lectures:**

Additional readings will be provided. Readings will be posted on the course website. Copies of lecture slides will be posted as well.

**Student Learning Expectations:**
This course is designed to delve into fire ecology and fire effects. After taking this course, you will have:
An understanding of the ecological theory surrounding fire regimes
Understanding of fire effects on both biotic and abiotic facets of ecosystems
Knowledge and understanding of different fire regimes around the country and internationally
Exposure and understanding of management issues related to fire ecology
Exposure to current topics in fire ecology

In addition to the above learning expectations, students will work on the following skill sets:
Working in groups towards a common goal
Presentation skills
Research skills, review and synthesis of a variety of information
Technical writing skills
Ability to read about and discuss thoughts on a topic

Class Schedule and Readings
The class schedule is handed out separately on the first day of class and is subject to change. Readings are shown on the schedule and will be posted on the class website and announced in class throughout the semester.

Field Trip
Details for a field trip are currently being worked out.

Presentation/Mini-lecture/Discussion
A detailed description and rubric for this portion of the class will be handed out separately on the first day of class. This is a large percentage of the class and is based heavily on collaborative learning.

Homework Assignments
Assignments are designed to strengthen your understanding of material presented in class and in the readings/webinars. In addition, they are meant to introduce you to current topics of interest to you.

Lecture/Webinar Assignment: DUE April 25th
Homework will include attending three lectures/webinars related to fire that are of interest to you. Sources include the Forestry Graduate Student Association seminar series, the Southwest Fire Science Consortium and other consortia around the country, the Lessons learned center advances in fire practice (http://wildfirelessons.net/ AFP.aspx?Page=AFPOverview) and the Nature Conservancy’s Fire Learning Network. Lectures need to address fire ecology in some sense. If you are not sure, ask me.

NOTE: Some webinars will be used in class for inverted lectures. You will not get credit for using these lectures for this homework assignment.

750 words or less total
Topic description – 500 words or less
Describe what you found particularly interesting
Describe what the presenter did well and did not do well
Discuss questions you have or questions you did ask of the speaker
These may be turned in at any time but all three are due April 25th at the latest

*Fire in CA Ecosystems* Textbook Review: **DUE April 18th**
I am an editor on the textbook used in this class, *Fire in CA Ecosystems* (all proceeds from the textbook go to the Association for Fire Ecology). We are currently starting the process of revising this book and upper-division undergraduate students are one of the target audiences for this book. Your input and review of portions of this book will be invaluable in the revision process. This is a rare opportunity to give input as a student to a textbook.

For each of the chapters assigned in class, assess the following items:
How well do the authors fulfill the promises made in the introduction?
How effective is the authors methodology and organization?
Do they present frameworks that are useful for understanding and applying the topic?
Are there better ways to present the information that would have made more sense to you?
How effectively do the authors make their arguments? How persuasive is the evidence the authors present?
When conflicting perspectives are presented, is it done well?
For its audience, what are the chapter’s strengths? Weaknesses?
How clearly is the chapter written? Was anything particularly confusing?
Are there topics missing that you would have liked to see addressed?
Do NOT wait until the end of the semester to do this. It is suggested you at least take notes on all these questions as you read the chapters for the first time, think about the lectures/discussions and then re-visit the chapters again. Several well-thought out sentences with details per question is a good goal.

This assignment is due April 18th but individual chapter reviews may be turned in throughout the semester.

**Assessments/Exams**
The exams will focus on concepts covered in lectures and readings for the class. A portion of the first exam will address individual group topics to ensure independent learning.

**Participation**
Students are expected to attend class. If you cannot attend for some reason, you need to notify the instructor ahead of time. If you miss class, it is your responsibility to ask if you missed something. Missing class is not an excuse for late or missing assignments. If you miss class, you should ask a fellow student for lecture notes.

Part of your participation grade will be based on class attendance. The other part of the participation grade will be a subjective assessment based on my perception of the quantity and quality of your participation throughout the semester (asking questions,
participating in discussions and other activities, making comments and answering questions). In addition, some group work and other in-class work will be assessed points for participation.

**Illness**

*While class attendance is required per the above stated policy, please be cautious about attending class if you are feeling ill. Please inform me by email if you are feeling unwell; if you are experiencing flu-like symptoms, you should not attend class; please take precautions not to infect others, and seek medical attention if your symptoms worsen.*

**Late Work Policy**

Late work will be accepted up to 48 hrs after the due date. Penalties are as follows:
- Up to 24 hrs late – 10% of total points deducted
- 24 to 48 hrs late – 20% of total points deducted
- More than 48 hrs late – Zero points

This stated, please email, call or talk to me if you have extenuating circumstances. This must be done BEFORE assignments are due or tests are taken.

**Performance evaluation**

Grades are given as follows:
- A (90-100%)
- B (80-89%)
- C (70-79%)
- D (60-69%)
- F (59% or below)

Points are earned as followed:
- Research Paper/Presentation/Discussion 35%
- Homework 20%
- Assessments/Exams 30%
- Participation 15%

Total 100%

**Northern Arizona University Policy Statements**

[http://www4.nau.edu/avpaa/UCCPolicy/plcystmt.html](http://www4.nau.edu/avpaa/UCCPolicy/plcystmt.html).

These statements address safe environments, students with disabilities, the institutional review board, academic integrity, the academic contact hour policy, and sensitive course materials. You need to be familiar with them.
Forestry 453/553 – Forest Entomology – 2013

3 Credits, 4-5:15, T, TH Rm. 133, Southwest Forest Science Complex

Instructor: Dr. Richard Hofstetter, Office Hours: T, TH 1:00-2:00pm, or by appointment, rm 208, Southwest Forest Science Complex, 523-6452, rich.hofstetter@nau.edu

Course description and objectives: Insects and forest trees have co-evolved over millions of years. In this course we will examine the spectrum of interactions that occur between forest insects and their plant/tree hosts. Students will learn basic entomology, identify common forest insect guilds and the impact they have on individual hosts, forest structure, and other forest ecosystem process. Additionally, students will be taught management techniques for forest insects. Although we will focus on insects common in western forests we will discuss other areas of the world and will pay particular attention to some of the exotic insects impacting forests. We explore the ecological role of forest insects and the idea that damage or destruction of forest trees is neither good nor bad but may depend on your philosophical view about the role of forests in society and particular management objectives.

Standard learning expectations/outcomes: At the end of the course students will be able to:
Discuss basic attributes of insects
Identify common forest insects and their damages
Describe the basic biology/life cycle of several key forest insect species
Understand the role that forest insects play in the ecology and succession of forest systems
Describe management techniques used to manage forest insect populations

Grading: The grades in this course will be determined according to the following:

<table>
<thead>
<tr>
<th>Undergraduates</th>
<th>Graduate students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam I 25%</td>
<td>Exam I 25%</td>
</tr>
<tr>
<td>Exam II 25%</td>
<td>Exam II 25%</td>
</tr>
<tr>
<td>Final Exam 30%</td>
<td>Final Exam 25%</td>
</tr>
<tr>
<td>Report 10%</td>
<td>Report 7.5%</td>
</tr>
<tr>
<td>Presentation 10%</td>
<td>Presentation 7.5%</td>
</tr>
<tr>
<td>Grad Class Project 10%</td>
<td>Grad Class Project 10%</td>
</tr>
</tbody>
</table>

A = >90%, B = >80%, C =>70%, D=>60%, F <60%

Text books and required materials: There is no textbook required for this course. Selected readings are required for this course and will be handed out in class or posted on the course webpage (BBLearn).

Favorite Insect Presentation and Paper: All students will present on their favorite insect. A written paper (3-5 pages, double spaced) will also be handed at the date of the presentation. Presentations will be 5-10 minutes during April 16-25th. See additional handout for more instructions about the paper and presentation.
**Graduate Student Class Project:** An additional paper and class presentation is required for all graduate students in this course. The purpose is to get students acquainted with current entomology research and develop organization and communication skills. Each graduate student will give a **15-20 minute presentation** (March 7-12) on a recent discovery (published within the last year) about insect(s) ecology, function, structure, behavior or similar field and is general enough to interest everyone. The information presented will be covered in the exam. Sample topics are available from the instructor if needed. Topics need to be approved by the instructors in advance (by February 7th). Grading criteria will be provided later in the semester. Presentations will occur the week before the second Exam (March). Graduate students will also hand in a written summary (paper) about the topic. Length of summary paper should 3-6 pages double spaced and include a general introduction to the topic (what is new about it), what the discovery is, and how this has or will change entomology or another field. Please include references. Figures and images can also be added to the end of the paper (but not included in the 3-6 page limit).

**Field trips:** In April, we will attempt to go on a field trip or two during the class period. A Saturday field trip may also be a possibility.

**Audits:** Auditing students are required to attend lectures

**Class Policy:** University policy statement is available on the internet at: http://jan.ucc.nau.edu/academicadmin/policy.doc

**Attendance:**

You are responsible for regularly attending all lectures. Should an absence from class be unavoidable, you are responsible for reporting the reason to the instructor. (Be aware that Fronske Health Center does not provide documentation of your health problems.) In addition, you are responsible for making up any work you miss. Your instructor is under no obligation to make special arrangements for you if you are absent. You will not be discriminated against for seeking a religious accommodation. The Office of Student Life and the Fronske Health Center do not issue excuses for health or personal reasons. Only the instructor may "excuse" an absence except for Institutional Excuses for activities such as athletic events or other university sponsored activities which are approved by the Office of the Associate Provost-Undergraduate Studies, or the Office of Student Life.

Please note that a student served through the office of Disability Resources may qualify for an attendance policy modification. The Attendance Modification policy can be found at the following address:
http://www4.nau.edu/dr/assets/docs/Attendance_Accommodation.pdf

Students who miss more than two lectures without legitimate excuse will be penalized by a reduction in overall points awarded for the class. Each additional missed lecture will result in a 2% loss of your total grade. Students who miss multiple lectures could receive up to 10% reduction in their total grade.
**Makeup quizzes and tests:**

Students must present information via an email or letter received at least 1 day PRIOR to an exam or quiz date to be excused from a test. Whether the student can retake the test will depend upon information provided by the student and will be decided upon by the instructors. Students with an accepted excuse will be required to take the test within 1 week of their return.

**Plagiarism and cheating:**

The university takes an extremely serious view of violations of academic integrity. As members of the academic community, NAU’s administration, faculty, staff and students are dedicated to promoting an atmosphere of honesty and are committed to maintaining the academic integrity essential to the education process. Inherent in this commitment is the belief that academic dishonesty in all forms violates the basic principles of integrity and impedes learning. Students are therefore responsible for conducting themselves in an academically honest manner. Severe violations can result in expulsion from NAU.

**Students with Disabilities:**

If you have a documented disability, you can arrange for accommodations by contacting Disability Resources (DR) at 523-8773 (voice) or 523-6906 (TTY), dr@nau.edu (e-mail) or 928-523-8747 (fax). Students needing academic accommodations are required to register with DR and provide required disability related documentation. Although you may request an accommodation at any time, in order for DR to best meet your individual needs, you are urged to register and submit necessary documentation (www.nau.edu/dr) 8 weeks prior to the time you wish to receive accommodations. DR is strongly committed to the needs of student with disabilities and the promotion of Universal Design. Concerns or questions related to the accessibility of programs and facilities at NAU may be brought to the attention of DR or the Office of Affirmative Action and Equal Opportunity (523-3312).
Forestry 454 - Integrated Forest Health  
Course Syllabus – Spring 2013

Instructors: Drs. Tom Kolb and Robert Mathiasen  
Offices: SWFSC Room 202 and 002, respectively  
Phone: 523-7491 and 523-0882, respectively  
E-mail: Tom.Kolb@nau.edu / Robert.Mathiasen@nau.edu  
Office Hours: Open door or by appointment  
Class Meets: T-Th, 2:20 – 3:55 p.m.; Room 136

Course Prerequisites: Graduate Standing

Course Structure/Approach: This will be a three-hour lecture course. The first part of the course will emphasize forest health concepts and principles. The second part of the course will emphasize biotic agents. The third part will emphasize abiotic agents including air pollution. The fourth part will emphasize current research on forest health presented by forest health specialists with the USDA Forest Service and by the graduate students in this class.

Texts and Required Materials:  
The required text book for the course is:  

Additional reading assignments will be provided to students via handouts distributed in class or on line from pdf files on Blackboard Learn.

Course Outline: A tentative class schedule is at the end of this document.

Assignments: Assigned readings from the textbook and other readings will be used to support each of the topics discussed in class (see schedule). Student learning will be assessed by in-class exams.

Evaluation Methods: Course participants will be evaluated on the basis of their performance on exams (300 points). The total number of possible points is 300.

Examinations: There will be two midterm exams (100 points each) and a comprehensive final exam (100 points). Each exam will consist of a combination of true/false, multiple choice, matching, short answer and essay questions. All students are expected to take the final exam at the scheduled time.

Grading: Grades will be based on a total of 400 points. Grades will be assigned as follows:  
A – 90.100%; B – 80.89%; C – 70.79%; D – 60.69%; F – < 60%.  

Course Policies: Class attendance is the responsibility of each participant in the course. No penalty for not attending classes will be assessed, but it is the responsibility of each participant to
Course Description
Research will be carried out by the student in the laboratory and field during the semester. The student will take part in the designing, carrying out and interpretation of experiments. The purpose of the course is to provide students with research experience while working on a question of current scientific interest. Students will learn how science is practiced in forestry/ecology, and will also make new discoveries that will likely lead to scientific publications. Research will be done under the supervision of faculty member Rich Hofstetter. Students are enrolled for 2 credit hours of FOR485. For each credit hour we expect ~3-4 hours of research per week, on average, although more hours may occur if the student is getting paid to perform work on research performed by their mentors.

Student Learning Expectations
Upon completion of this course, students will be able to:
Demonstrate knowledge of experimental design and the use of the scientific method.
Demonstrate an understanding of the process of initiating a research project from conception of a fundamental question to publication.
Demonstrate competence in literature search engines to obtain scientific articles.
Demonstrate the ability to use excel spreadsheets, enter data and make simple statistic interpretations.
Create a poster of their research (with help from mentors).
Write a scientific report of their work.

Course Structure/Approach
The student will meet regularly (every week) as a class and will gain exposure to the scientific method, literature, and other aspects of research during these class periods.

The paper should be in the format of a scientific paper, and should contain the following sections: i) an Introduction that describes the rationale for the research and the biological question it addresses; ii) a Methods section describing how the experiments were done; iii) a Results section showing any data obtained; and iv) a Discussion explaining what (if any) conclusions were reached from the experiments. Appropriate literature should be cited.

Textbook and required materials
No textbook will be used. Students will be given papers and other materials by the instructor during each weekly discussion. The instructor will provide the papers to the class by posting them on the course web site.

Course outline
A weekly topic schedule will be provided during the first week of classes.
Assessment of Student Learning Outcomes

Grading is on a pass-fail basis. Attendance (20%), participation (20%), project presentation (30%) and project paper (30%) will make up final grade assessment.

Attendance policy

You may miss two classes without penalty if you notify the instructor in advance of expected absences. You may not earn a passing grade if you miss more than two discussions. Two occurrences of lateness shall result in one unexcused absence.

University policies

All relevant university policies are incorporated into this syllabus by reference; please see http://jan.ucc.nau.edu/academicadmin/plcystmt.html for short summaries of the following: University policies: the Safe Working and Learning Environment, Students with Disabilities, Institutional Review Board, Academic Integrity, and Academic Contact Hour policies.
New Curriculum Course Syllabi
FOR 220 FOREST AND RANGE PLANTS

**General Information**
College and Department: College of Engineering, Forestry, and Natural Sciences; School of Forestry
Course prefix, number, and title: FOR 220, Forest and Range Plants
Semester in which course will be offered: Fall semester (even and odd years)
Credit hours: 3 semester hours
Clock hours/meeting times:
One 50-minute meeting each week of the entire class
One afternoon (12:45-5:15pm) lecture/field lab each week offered to multiple sections (3 or 4 based on recent history)

**Instructor names:**
Dr. Margaret Moore, Professor, School of Forestry
235 SWFSC
Phone: 523-7457
Email: margaret.moore@nau.edu
Office hours: by appointment

Dr. Thomas Kolb, Professor, School of Forestry
202 SWFSC
Phone: 523-7491
Email: tom.kolb@nau.edu
Office hours: by appointment

Additional instructors (lecturers, graduate teaching assistants) may teach lab sections depending on enrollment.

**Course Prerequisites**
No formal prerequisites other than an interest in learning forest and range plants.

**Course Description**
The course will train students in identification, taxonomy, range, and uses of forest and range plants via classroom activities and field labs.

**Student Learning Expectations/Outcomes**
Students successfully completing this course will have the following competencies:

1) Knowledge of principles of plant classification and taxonomy;
2) Knowledge of and ability to identify common forest and range plants of northern Arizona;
3) Knowledge and understanding of scientific and common names of these plants;
4) Knowledge of the major forest types in North America and their geographic location and species composition.
**Course Structure/Approach**
This course will use a combination of classroom activities (e.g., lecture, discussion) and field labs to enhance student learning of identification, taxonomy, range, and uses of forest and range plants. Each week students will attend: 1) one classroom meeting of all students that will focus on enhancing knowledge of dominant forest communities and tree species that occur in major forest regions of the United States or Canada; 2) one afternoon field lab in lab sections of approximately 20 students each that will focus on enhancing identification and knowledge of common forest and range plants via the study of live plants. All field labs will be held outside at various locations near Flagstaff. The School of Forestry will provide transportation. The following equipment is *strongly* recommended for student comfort and protection in the field: long pants, sturdy shoes or boots, water, rain gear.

**Textbook and Required Materials**
1. **Text:** “Field Guide to Forest and Mountain Plants of Northern Arizona,” 2009, Ecological Restoration Institute, Northern Arizona University, Flagstaff, AZ.
2. **Quiz Pad/Forms:** Pad of quiz sheets (~125-150 sheets)

You are *required* to purchase the text and pad of quiz forms. Both of these are available from the NAU Bookstore. The text and quiz pads will be used for field labs. Lastly, students are encouraged to collect plant specimens or pictures each field lab (clippers, sandwich bags, and/or camera may be helpful).

**Recommended Optional Materials/References (attach reading list)**
Many web pages exist that contain additional information or color photographs of plants that students might find useful when reviewing important characteristics of species. Do not be confused by the multiple names used for the same plant species (called synonyms). A website that is particularly useful is: [http://plants.usda.gov/](http://plants.usda.gov/)

**Course Outline (tentative)**
**Week 1**
- Class: Introduction to the course and principles of taxonomy and nomenclature
- Lab: Plant morphological characteristics used in identification

**Week 2**
- Class: Boreal region
- Lab: Subalpine/upper mixed conifer community (San Francisco Peaks)

**Week 3**
- Class: Rocky Mountain region
- Lab: Subalpine/upper mixed conifer community (San Francisco Peaks)

**Week 4**
- Class: Pacific Northwest region
- Lab: High elevation prairie (Hart Prairie)

**Week 5**
- Class: California region
- Lab: Lower elevation mixed conifer community (Elden Hills)

**Week 6**
- Class: Western riparian forests
- Lab: Riparian community - high elevation (Fry Canyon)

**Week 7**
Class: Review of western forest regions  
Lab: Pinyon-juniper woodland (Walnut Canyon area)

Week 8  
Class: Regional midterm exam  
Lab: Urban forest – deciduous trees (NAU Campus)

Week 9  
Class: Appalachian region  
Lab: Exotic invasive plants (NAU Campus)

Week 10  
Class: Appalachian region  
Lab: Riparian community – mid-elevation (upper Oak Creek Canyon)

Week 11  
Class: Northeastern region  
Lab: Evergreen oaks and chaparral (Lower Oak Creek)

Week 12  
Class: Southeastern bottomland hardwood region  
Lab: Urban forest – evergreen trees (NAU Campus)

Week 13  
Class: Lake States region  
Lab: No class due to Thanksgiving holiday

Week 14  
Class: Southeastern pine region  
Lab: High desert shrub community (Beaver Creek area)

Week 15  
Class: Review of eastern forest regions  
Lab: Final field quiz (locations to be determined)

Week 16  
Class: Regional final exam  
Lab: No meeting

Assessment of Student Learning Outcomes

- Methods of Assessment: Student learning will be assessed by frequent quizzes on field identification of forest and range plants and by two in-class exams on regional forest types.
- Timeline for Assessment: Assessments will occur in most weeks of the semester starting in week three.

Grading System

Students will earn letter grades in the course based on the following graded activities:

- Field lab quizzes on plant identification – 60% of total grade
- Midterm exam regional forest types – 20% of total grade
- Final exam regional forest types – 20% of total grade

Quizzes on plant identification will be given most field labs on approximately five to eight plants. A larger final field quiz will be given near the end of the semester on approximately 30–40 plants.

Letter grades will be assigned based on traditional guidelines: A= 90-100%; B=80-89%; C=70-79%; D=60-69%; F= below 60%.
Course Policy

- Retests/makeup tests: Students cannot make up the field lab quizzes and are allowed only one excused absence for the field lab quizzes. Students must take the final field lab quiz (no excused absences). Requests for makeup tests for the in-class regional forest type exams must be made with the instructor in advance of the exam and must be well justified by severe illness or essential family or cultural activities. Retests are not offered in this course.
- Attendance: Attendance is essential. It will be impossible to perform well if you are not present at all class meetings.
- Statement on plagiarism and cheating: Obvious occurrences of plagiarism and cheating by students in this course will be handled by assigning a grade of zero on the assignment to the offending student. Reoccurrence will result in assignment of a grade of F to the student for the entire course.
- Student disability: Students who have a disability should provide documentation from NAU Disability Resources the first day (or first week) of class so that we can try to accommodate your specific needs. Students who qualify with a spelling disability will be provided with a master list of plant names during the plant quizzes starting with quiz #1.

University Policy

- [http://www4.nau.edu/avpaa/UCCPolicy/plcystmt.html](http://www4.nau.edu/avpaa/UCCPolicy/plcystmt.html)
GIS TOOLS IN FORESTRY
FOR 225

General Information:
College and Department: College of Engineering, Forestry, and Natural Sciences; School of Forestry
Course prefix, number, and title: FOR 225, GIS Tools in Forestry
Semester in which course will be offered: Spring Semester (even and odd years)
Credit hours: 2 semester hours
Clock hours/meeting times: One 50 minute lecture and one 3 hr computer lab per week

Instructor name(s):
Dr. Stephen M. Dewhurst, School of Forestry
237 SWFSC
Phone: 523-9647
Email: Steve.Dewhurst@nau.edu
Office hours: by appointment

Additional instructors (lecturers, graduate teaching assistants) may teach lab sections depending on enrollment.

Course Prerequisites:
None

Course Description:
This course will train students in basic tools and skills involved with geographic information systems (GIS). We will use lectures and hands-on labs to train the student in the ArcGIS system starting with a survey of technologies and applications such as ArcGIS Explorer and Google Maps. By the end of the course, the student will have an understanding of how GIS maps are made, edited, and analyzed. The student will be introduced to a few spatial problem solving techniques and basic spatial modeling tools. 1hr. lecture, 3 hrs. lab.

Student Learning Expectations/Outcomes:
Upon the successful completion of this course, students should be able to demonstrate:
1. A general knowledge of geographic and spatial analysis techniques commonly used in forest management.
2. Understanding of the relationship between types of spatial data commonly encountered in forest-related applications.
3. A depth and breadth of understanding of geographic and spatial analysis techniques relevant to forest management.
4. An awareness of the software and hardware resources available to support geographic and spatial analysis.
5. The ability to develop a work plan to incorporate geographic and spatial analysis into a forestry management application demonstrated in class.
6. An awareness of basic spatial statistics and temporal modeling approaches.
Course Structure/Approach:
This course will use a combination of lectures and computer labs to enhance student learning of basic GIS tools and applications in forestry. Each week students will attend: 1) one classroom lecture that includes all students that will focus on geographic information system (GIS) principles; 2) one computer lab that will focus on hands-on computer training of ArcGIS.

Textbook and Required Materials:

Course Outline (tentative):
Week 1: Basic GIS Concepts – Map Basics, ArcGIS Explorer and Google Maps
Week 2: Basic GIS Concepts - Map Basics, ArcGIS Explorer and Google Maps
Week 3: Basic GIS Concepts – Data Structures
Week 4: Basic GIS Concepts – Data Structures
Week 5: Basic GIS Concepts – Basics of ArcGIS
Week 6: GIS Data Sources – mini project one due
Week 7: GIS Data Sources
Week 8: GIS Analysis Techniques in Forestry (Mid-Term Exam; lecture and lab material)
Week 9: GIS Analysis Techniques in Forestry
Week 10: GIS Analysis Techniques in Forestry (including model building)
Week 11: GIS Analysis Techniques in Forestry – mini project two due
Week 12: GIS Applications in Forestry
Week 13: GIS Applications in Forestry
Week 14: GIS Applications in Forestry – mini project three due
Week 15: Introduction to basic spatial statistics
Week 16: Final Exam (lecture and lab material)

Assessment of Student Learning Outcomes:
Students will earn letter grades in the course based on the following graded activities:

1. Computer lab exercise and/or mini-projects – 60% of total grade
2. Midterm exam GIS lectures and lab material – 20% of total grade
3. Final exam GIS lectures and lab material – 20% of total grade

Grading System:
Letter grades will be assigned based on traditional guidelines:

A= 90-100 %;
B=80-89%;
C=70-79%;
D=60-69%;
F= below 60%.
Course Policy:
Retests/makeup tests: Requests for makeup exams or lab exercises must be made with the instructor in advance of the exam and well justified by severe illness or essential family or cultural activities.

Attendance: Attendance is essential. It will be impossible to perform well if you are not present at all class meetings.

Statement on plagiarism and cheating: Obvious occurrences of plagiarism and cheating by students in this course will be handled by assigning a grade of zero on the assignment to the offending student. Reoccurrence will result in assignment of a grade of F to the student for the entire course.

University policies:

Attach the Safe Working and Learning Environment, Students with Disabilities, Institutional Review Board, and Academic Integrity policies or reference them on the syllabus. See the following document for policy statements: http://www4.nau.edu/avpaa/UCCPolicy/plcystmt.html.
Silviculture I

**General Information**
College of Engineering, Forestry, and Natural Sciences; School of Forestry
FOR 315, Silviculture I
Fall Semester (even and odd years)
3 semester hours

**Clock hours/meeting times:**
Schedule will vary, depending on weather and subject matter.
Lectures, when held, will be M and/or W and/or F from 9:10-10:00
Labs, when held, will be M and/or W from 12:40-3:50

**Instructor name(s):**
Dr. Kristen Waring, School of Forestry
201 SWFSC
Phone: 523-4920
Email: Kristen.Waring@nau.edu
Office hours: by appointment
Additional instructors (lecturers, graduate teaching assistants) may teach lab sections depending on enrollment.

**Course Prerequisites**
Admission to professional forestry program

**Course Corequisites**
FOR 313 and FOR 314

**Course Description**
Silviculture is applied forest ecology. This course, paired with FOR 313 and FOR 314 (Forest Ecology I and II, respectively), introduces students to the application of ecological knowledge to the management of forests. Students will be introduced to the principles and theories of silviculture both in the classroom and in forest-based field labs.

**Student Learning Outcomes**
By the end of the course, you should be able to identify, define, and explain the most common silvicultural practices and their relationship to forest ecology. Specifically, by the end of the course, successful students (i.e. you) will have the skills and knowledge to:
Define and explain basic silvicultural principles;
Define and explain silvicultural-related terminology;
Describe the relationships between silvicultural principles and applications;
Describe the underlying ecological concepts directly relevant to silviculture;
Describe the most common tools and practices used in silviculture and understand how to use and modify those tools and practices to meet management objectives;
Course Structure/Approach.
The course will combine traditional in-class lectures with field lectures and labs. The field labs will enhance and reinforce classroom material. Therefore attendance at labs is essential for your success. We will go out in the field unless the weather is absolutely abysmal or safety issues are of concern.

Required Texts

Other readings available through BbLearn

Optional / Additional Resources

Course Outline (tentative)

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction to silviculture; begin sampling review</td>
<td>N: Ch 1</td>
</tr>
<tr>
<td></td>
<td>Review of sampling</td>
<td>AB: Review Ch 2 and 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AB: Review Ch 2 and 3</td>
</tr>
<tr>
<td>2</td>
<td>Tree breeding &amp; applications; gene conservation</td>
<td>L: Zobel and Talbert, Ch1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L: DeWald and Mahalovich</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1997</td>
</tr>
<tr>
<td>3</td>
<td>Site classification &amp; productivity; site trees</td>
<td>AB: Ch 15 (312-320)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N: Ch 6 (117-129)</td>
</tr>
<tr>
<td>4</td>
<td>Stand dynamics I &amp; II</td>
<td>L: Smith et al. Ch 2</td>
</tr>
</tbody>
</table>
### Assessment of Student Learning Outcomes

**Methods and Timeline:**

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Points</th>
<th>Date of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short exam (3 at 25 points each)</td>
<td>75</td>
<td>End of weeks 3, 6, 9</td>
</tr>
<tr>
<td>Long exams (3 at 50 points each)</td>
<td>150</td>
<td>End of weeks 5,10,14</td>
</tr>
<tr>
<td>Lab reports (8 at 25 points each)</td>
<td>200</td>
<td>Beginning of weeks 3,4,6,7,9,10,11,12</td>
</tr>
<tr>
<td>Participation (25 points)</td>
<td>25</td>
<td>On-going</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>450</strong></td>
<td></td>
</tr>
</tbody>
</table>

Grades are based on lecture and lab material, plus overall course participation. Lecture content is graded through the use of exams. The lab grade is a direct outcome of eight graded lab write-ups. Finally, participation will be graded based on:

- Attendance in both lecture and labs;
- Submittal of assignments related to participation labs; and
Pop quiz and other lecture participation activities.

Lab grading:
Lab grades are assigned using the following categories:

<table>
<thead>
<tr>
<th>Letter grade</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>100</td>
</tr>
<tr>
<td>A</td>
<td>95</td>
</tr>
<tr>
<td>A-</td>
<td>90</td>
</tr>
<tr>
<td>B</td>
<td>85</td>
</tr>
<tr>
<td>B-</td>
<td>80</td>
</tr>
<tr>
<td>C</td>
<td>75</td>
</tr>
<tr>
<td>C-</td>
<td>70</td>
</tr>
<tr>
<td>D</td>
<td>65</td>
</tr>
<tr>
<td>D-</td>
<td>60</td>
</tr>
<tr>
<td>F</td>
<td>55</td>
</tr>
<tr>
<td>not completed</td>
<td>0</td>
</tr>
</tbody>
</table>

For each graded lab, 20% of the grade will be related to writing. See Semester A guidelines for an overview of how writing will be graded. Writing grades of less than a B- require a re-write to earn credit for the lab.

Crew-based labs: When a crew works together to turn in a single lab assignment, crew evaluation forms are also required from each member of the crew, for each member of the crew. Lab credit will not be given without the required evaluation forms. This includes a self-assessment. Poor overall crew evaluations will result in grade reduction for that lab and crew member. For example, if, in a three person crew, both crew members rate the third member poorly in most categories on the evaluation, this will result in a reduction for that member. The reduction will be at least a half-grade but the exact reduction will depend on the situation and may be more.

**Grading System:**

<table>
<thead>
<tr>
<th>Points earned</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90+</td>
<td>A</td>
</tr>
<tr>
<td>80-89</td>
<td>B</td>
</tr>
<tr>
<td>70-79</td>
<td>C</td>
</tr>
<tr>
<td>60-69</td>
<td>D</td>
</tr>
<tr>
<td>&lt;60</td>
<td>F</td>
</tr>
</tbody>
</table>

Grades are assigned based on the exact percentage earned and are not rounded.
Course Policies

Assignments are due at 9:10 am on the due date unless otherwise noted. These should be turned by email or to my mailbox in the main office or outside my office door (Rm. 234). Late assignments are accepted for 12 hours (reduced ½ letter grade) and 24 hours (reduced 1 full letter grade) after the due date and time.

Attendance is important and required. If you need to miss a lab section, you must contact the instructor in advance and provide your legitimate reason for missing. Lecture sections are important as well and I expect attendance and respect.

While class attendance is required per the above stated policy, please be cautious about attending class if you are feeling ill. Please inform me by phone or email if you are feeling unwell; if you are experiencing flu-like symptoms, you should not attend class; please take precautions not to infect others, and seek medical attention if your symptoms worsen.

Respect: Respectful and professional behavior is expected and required at all times. Show up on time, no cell phones or iPods in class, laptops and other electronics to be used only for note-taking. Wait until the session is over before packing your bags. Do not disrupt the classroom environment or you may be asked to leave.

You WILL be graded on grammar and spelling in addition to content on all written assignments and exams. Grading rubrics will be provided for all lab assignments.

Emails to Instructors will receive a response within 36 hours unless announced otherwise in class (i.e., if instructor is traveling or in the field without internet).

Graded assignments and exams will generally be returned within one week if possible.

Overall course grades will be posted on Bb Learn periodically throughout the semester. The instructor will let you know when updates occur.

Cheating and plagiarism will not be tolerated. Be careful when sharing data or assignments even as examples. The NAU policy on cheating and plagiarism can be found in the online student handbook.

University Policies:

For Northern Arizona University policy statements, please reference the online student handbook, http://www4.nau.edu/stulife/handbook.htm
FOR 319 : Forest Operations Syllabus

General Information:

College of Engineering, Forestry, and Natural Sciences; School of Forestry
Course prefix, number and title: FOR 319 Forest Operations
Semester in which course will be offered: Every fall semester
Credit Hours: 2
Clock hours: Lectures: Tu 8:00-8:50 Laboratories: Tu 12:45-3:35

Instructor: Dr. Bruce E. Fox
Room 232, Forest Sciences Building (Building 82)
928.526.0148
Bruce.fox@nau.edu
Office hours: by appointment
Course prerequisites: admission to the professional forestry program

Course Description:
This course will focus on forest operations: the skills, knowledge, and attitudes required
to successfully implement forest management practices. To this end, we will read about,
discuss, and provide opportunities for you to acquire and/or improve skills (e.g.
computational skills necessary to accurately calculate stumpage values and culvert sizes)
and expand knowledge (e.g. learning the elements of road design and maintenance).

Student Learning Outcomes:
By the end of this course the successful student will be able to
Correctly calculate current stumpage values;
Describe the capabilities, limitations, and optimal conditions under which major
harvesting systems and equipment operate;
Analyze field harvesting and road construction activities for their efficiency,
effectiveness, and environmental effects;
Compare and contrast the operation of wood processing facilities of different types and
different scales;
Use aerial photography to identify potential road locations and timber harvest units
Define and explain basic timber harvesting, road construction, and road maintenance
terminology;
Prescribe specific road maintenance treatments based on road conditions and landowner
objectives; and
Calculate optimal culvert sizes based on biophysical attributes of a watershed, estimated
precipitation, and landowner objectives.

Course Structure and Approach:
A. The delivery method will be a combination of in-class lectures and discussions
supplemented by videos, films, and slide presentations. In addition, we will have one lab
per week
B. Completing assigned readings prior to the instructional period where they are assigned will greatly aid you to understand and appreciate the material covered in class.

**Textbook and Required Materials**


Other required readings will be available through BbLearn. Reading list is attached.
## Course Schedule

### Subject Outline and Reading Assignments

<table>
<thead>
<tr>
<th>Week</th>
<th>Subject</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction: Operations overview and components</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>Converting facilities</td>
<td><a href="http://www.rfu.org/cacw/basic.html">http://www.rfu.org/cacw/basic.html</a> Falk*</td>
</tr>
<tr>
<td>4</td>
<td>Harvesting</td>
<td>Greulich et al.*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sang-Kyun* Introduction and Conclusion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stokes, et al. <em>(skim)</em></td>
</tr>
<tr>
<td>5</td>
<td>Harvesting</td>
<td>Burton*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Anderson and Lockaby*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Studier*</td>
</tr>
<tr>
<td>6</td>
<td>Field Trip: Sawmill tour</td>
<td>Kretschmann*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WDNR*</td>
</tr>
</tbody>
</table>
| 7 | Appraisal | Bardon*  
|   |           | Uliabarri* pp. 11-14  
|   |           | WDNR*  
| 8 | Lab/Field Trip: Culvert sizing and design and/or appraisal | Kramer* Chapters 1 & 4  
| 9 | Aerial photography | Avery and Berlin* Chapters 2, 3, and 11  
| 10 | Roads: Design principles and Drainage | Kramer* Chapters 1, 2 & 3  
|   |           | W&H* Chapters I, II, III & IV  
| 11 | Roads: Maintenance | Kramer* Chapter 6  
|   |           | W&H* Chap. V & VI  
| 12 | Field trip: Forest Energy Corporation, Showlow | W&H* Chap. VII & VIII  
| 13 | Roads: Maintenance and Closure | Kramer* Chapter 6  
|   |           | W&H* Chap. IX  
| 14 | Field trip: Camp Navajo and Kaibab NF  
|   | Harvesting and Roads |  
| 15 | Round-up & Catch-up | Andréassian*  

*Available through BbLearn
Assessment of Student Learning Outcomes
Ten 10 minute quizzes worth 5 points each. Quizzes will take place during the first ten minutes of lecture and/or laboratory periods. Quizzes will not be announced beforehand. Quizzes will be closed book/notes/neighbors. No make up quizzes will be given.
Individual work.
Four laboratory/homework assignments worth 25 points each. Crew work.
Timber appraisal
Timber sale preparation,
Field Operations, or Culvert Sizing Road Layout and/or Field Operations
Culvert sizing and/or Field operations
Take-home final examination. Individual work. [75 points]

Academic integrity quiz: P/NP

Grading system

<table>
<thead>
<tr>
<th>Percent of points earned</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100</td>
<td>A</td>
</tr>
<tr>
<td>80-89.9</td>
<td>B</td>
</tr>
<tr>
<td>70-79.9</td>
<td>C</td>
</tr>
<tr>
<td>60-69.9</td>
<td>D</td>
</tr>
<tr>
<td>&lt;60</td>
<td>F</td>
</tr>
</tbody>
</table>

Course Policies
A. NO make-up or re-tests of the quizzes will be given.
B. Attendance. You know the drill: be at the right place at the right time ready to go. If you cannot attend a class or lab, please let me know as soon as possible.
C. Statement on Plagiarism, Cheating, and Academic Integrity. Do not engage in the first and second items on this list and always fully meet the expectations of the third item. Students charged with academic dishonesty are subject to the Arizona Board of Regents’ Code of Conduct and procedures outlined in the NAU Student Handbook. Let us not go there; it’s not fun for any of us.
D. Other policies. In this class we will adhere to the “Classroom Management” policy included in the NAU Student Handbook, as well as the Safe Working and Learning Environment, Students with Disabilities, Institutional Review Board, and Academic Integrity policies as described at: http://www4.nau.edu/avpaa/UCCPolicy/plcystmt.html
G. Preparation. Please fully engage in this activity!
H. No late assignments accepted except in very extenuating circumstances.

**Reading List**


Sang-Kyun Han, Han-Sup Han, Deborah S. Page-Dumroese, and Leonard R. Johnson. 2009. Soil compaction associated with cut-to-length and whole tree harvesting of a coniferous forest. Canadian Journal Forest Research 39:976-989


SYLLABUS
Forest Management I-III or Semester B

General Information
College of Engineering, Forestry and Natural Sciences; School of Forestry
FOR 323W, 324, 325 Forest Management I-III, Semester B
Spring semester (odd and even years)
11 credit hours
Clock hours: MWF 9:10-10; 10:20-11:10; 11:30-12:20
MW 12:40-3:50 (labs)

Instructors:
Dr. Carol Chambers, Professor, School of Forestry, Coordinator
Rm , SWFSC (Building 82)
Email: Carol.Chambers@nau.edu
Office hours: by appointment

Dr. Ching-Hsun Huang, Associate Professor, School of Forestry
Rm. , SWFSC (Building 82)
Office hours: by appointment

Dr. Aregai Tecle, Professor, School of Forestry
Rm. , SWFSC (Building 82)
Email: Aregai.Tecle@nau.edu
Office hours: by appointment

Dr. Marty Lee, Professor, School of Forestry
Rm. 241, SWFSC (Building 82)
Phone: 523-6644
Email: Martha.Lee@nau.edu
Office hours: by appointment

Course Prerequisites
FOR 313, 314-Forest Ecology I, II; FOR315-Silviculture I

Course Description
The courses making up Semester B will provide students with up-to-date knowledge for managing forest resources within a social context. We examine techniques for producing wood, water, livestock commodities, recreation and wildlife amenities, focusing on the fundamental principles of management. We also help students grasp the integrated nature of forest management. This is accomplished through readings, discussions, guest speakers, field and indoor labs, and writing. One of the courses making up Semester B is designed to meet the junior level writing requirements as defined under the Liberal Studies Program. Students will write an integrative paper focused on a forest management topic of their choice.
Student Learning Expectations/Outcomes
Students successfully completing these courses will be able to:

- demonstrate their knowledge and application of forest economics;
- demonstrate their knowledge and application of watershed management;
- demonstrate their knowledge and application of recreation management;
- demonstrate their knowledge and application of wildlife habitat and range management;
- demonstrate their knowledge and application of forest level management;
- demonstrate their knowledge and application of GIS;
- demonstrate a basic knowledge of collaborative management;
- demonstrate their ability to writing critically and analytically through development of a research or management proposal;
- demonstrate their ability to integrate concepts described above in a multidisciplinary approach.

Course Structure and Approach
This series of courses uses a combination of classroom activities (e.g., lecture, discussion) and field and indoor labs to enhance student learning of the following topics:

- forest economics
- watershed management
- recreation management
- wildlife habitat and range management
- collaborative management
- forest level management
- GIS

Students will also be exposed to and gain practice in using graphical, mathematical and analytical tools, evaluating scientific publications, public speaking and presenting information professional, negotiating and participating in group processes, and critical and analytical writing.

Textbook and Required Materials
Required Books:


Recommended Books:

- Journal of Forestry – we encourage students to continue to read the J. of Forestry and, when appropriate, we will assign readings from the Journal.

Other Required Readings:
• Other required readings are listed under individual FOR 323W-325 courses in BbLearn.
Syllabi, lecture and lab schedules, an assignment calendar and other individual unit materials will be posted on BbLearn.

Assessment of Student Learning Outcomes
Syllabi will be provided for the individual units in Semester B that will contain the schedules, assignments, and deadlines for that particular unit.

Grading System
The instructional content of Semester B is grouped into three classes designated as FOR323W, FOR324, and FOR325, worth 4, 4, and 3 credits, respectively. Students will earn grades for each course based on points accumulated on exams and graded exercises in each unit in each class during the semester. The topics included and their individual credits for each unit are:

- FOR323W – 5 credits
  - Recreation management – 1.5 credits
  - Forest economics – 1.5 credits
  - Individual forest management proposal – 0.7 credit
  - GIS – 0.5 credit
  - Collaborative management – 0.5 credit
  - Small group dynamics and integrated labs – 0.3 credit

- FOR324 – 3 credits
  - Wildlife habitat and range management – 1.5 credits
  - Watershed management – 1.5 credits

- FOR325 – 3 credits
  - Forest management – 3 credits

Grades will be turned in to the registrar for each of the four classes. Students must receive 70% or more of the total points possible in each of the four classes to enroll in FOR411, FOR412, and FOR413.

Course Policies
Evaluation methods include in-class exams, field exams, individual writing assignments, and project reports done independently or by crews. Cheating, plagiarism, excessive cooperation among students on independent projects or other acts of academic dishonesty will result in the assignment of a failing grade for that exam or exercise. Penalties for turning work in late will be at the discretion of the appropriate faculty.

A student may request a change in grade on any exam or exercise if he/she believes an error has been made. The request must be made in writing, including the reasons why the student believes an error has been made, and must be submitted to the faculty member within one week after the exam or exercise has been returned to the class. The faculty member will respond, in writing, by indicating whether or not a grade change has been made and why.
There will be crew assignments throughout Semester B. If you have problems with a crew you are in, try to address it within the crew. If you are unable to resolve the problem, bring it up with the Semester B coordinator.

The NAU School of Forestry faculty members try to maintain an open-door policy and try to be available as much as possible. We encourage you to talk to us about subject material and forestry in general. We like to get to know you and have you know us. Should we not be available, make an appointment to see the professor at a time convenient to both of you.


Violations of the Student Code of Conduct which exclusively involve issues of Academic Dishonesty are normally dealt with by faculty and academic administrators, rather than the Dean of Students. Allegations of academic dishonesty may be initiated by both students, and faculty or where appropriate, by administrative personnel. Informal procedures (see sections I and II of this Appendix) apply when the student has no previous record of academic dishonesty after an examination of the records by the Associate Provost for Academic Administration, and when the proposed sanctions do not include suspension or expulsion of the student. Formal procedures (see section III of this Appendix) apply when there is a record of previous academic dishonesty, or when there are other aggravating circumstances or when recommended sanctions include suspension or expulsion.

ACADEMIC INTEGRITY means that students and faculty jointly agree to adhere to a code of conduct appropriate to the mutually trusting relationship that must exist between student and teacher. Those values will not allow either to take credit for work not their own, or to be deceitful in any way, or to take unfair advantage of other students or of each other, or to be other than totally truthful and straightforward in all that they do.

ACADEMIC DISHONESTY is a form of misconduct that is subject to disciplinary action under the Student Code of Conduct and includes the following: cheating, fabrication, fraud, facilitating academic dishonesty and plagiarism.

Plagiarism: any attempt to pass off other's work as your own
Cheating: any attempt to gain an unfair, hidden advantage over one's fellow students
Fabrication: any attempt to present information that is not true
Fraud: any attempt to deceive an instructor or administrative officer of the university

Furthermore, any attempt to facilitate any act of academic dishonesty on the part of oneself or others shall constitute a violation of this policy.
Attendance and Professionalism: Students are expected to attend all lectures, exams, and field trips during Semester B. Missing a full day in Semester B is equivalent to missing 4-6 lectures in a traditional 3-credit course. We expect students to arrive on time for all lectures, exams, and field trips. We will leave on field trips at the appointed time and cannot wait for late students.

If a situation arises where you cannot attend or arrive on time, it is your responsibility to notify, in advance, the faculty member responsible for that day’s material. Faculty are not required to make accommodations for students wanting to miss classes for an extended spring break or to leave early at the end of Spring semester for employment.

Cell phones and other electronic devices are to be turned off during class unless special permission has been granted.

All assignments (essays, lab reports, etc.) are due before Semester B starts on the assigned due date and are to be turned in at the beginning of class or put in the appropriate faculty mailbox in room 116 unless other prior arrangements have been made.

The University’s self-insurance plan does not provide medical coverage to students if injured while participating in University-related activities or academic programs. Students are strongly encouraged to obtain medical/health insurance prior to participation, either through their parents’ health insurance plan or by purchasing insurance (such as the package offered through the Health Center).

All students and faculty who drive vehicles on field trips must have gone through the training sessions provided by the Motor Pool. Student van drivers will receive a modest hourly wage for driving time. Van drivers are responsible and accountable for making sure that vans are at the Southwest Forest Sciences Building 15 minutes prior to the vans’ departure to the field and returned to the NAU garage after returning from the field when appropriate.
<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/14-1/18</td>
<td>Introduction</td>
<td>Recreation</td>
<td>Crew Member</td>
<td>Biometrics</td>
<td>GIS-C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10:20-11:10</td>
<td>Lab 12:30-3:30</td>
<td>Expectations-C</td>
<td>GIS-C</td>
<td>Biometrics</td>
</tr>
<tr>
<td>2</td>
<td>1/21-1/25</td>
<td>HOLIDAY-MLK Day</td>
<td>Wildlife</td>
<td>GIS-C</td>
<td>Biometrics</td>
<td>Economics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10:20-11:10</td>
<td>Writing Your</td>
<td>Recreation</td>
<td>Recreation</td>
<td>Recreation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Briefing Paper</td>
<td>Recreation</td>
<td>Recreation</td>
<td>Recreation</td>
</tr>
<tr>
<td>3</td>
<td>1/28-2/1</td>
<td>Biometrics</td>
<td>Wildlife</td>
<td>Biometrics</td>
<td>GIS-C</td>
<td>Biometrics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10:20-11:10</td>
<td>Biometrics-C</td>
<td>Biometrics</td>
<td>Economics</td>
<td>Biometrics</td>
</tr>
<tr>
<td>4</td>
<td>2/4-2/8</td>
<td>Biometrics</td>
<td>Wildlife</td>
<td>Biometrics</td>
<td>Economics</td>
<td>Biometrics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10:20-11:10</td>
<td>Biometrics-C</td>
<td>Biometrics</td>
<td>Economics</td>
<td>Biometrics</td>
</tr>
<tr>
<td>5</td>
<td>2/11-2/15</td>
<td>Biometrics</td>
<td>Wildlife</td>
<td>Biometrics</td>
<td>Economics</td>
<td>Forest Level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10:20-11:10</td>
<td>Biometrics-C</td>
<td>Biometrics</td>
<td>Economics</td>
<td>Forest Level</td>
</tr>
<tr>
<td>6</td>
<td>2/18-2/22</td>
<td>Economics</td>
<td>Land mgmt</td>
<td>Forest Level</td>
<td>Economics</td>
<td>Forest Level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10:20-11:10</td>
<td>discussion</td>
<td>Economics</td>
<td>Wildlife</td>
<td>Forest Level</td>
</tr>
<tr>
<td>7</td>
<td>2/25-3/1</td>
<td>Forest Level</td>
<td>Wildlife</td>
<td>Forest Level</td>
<td>Economics</td>
<td>Forest Level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10:20-11:10</td>
<td>Wildlife (GIS)-C</td>
<td>Economics</td>
<td>Wildlife</td>
<td>Economics</td>
</tr>
<tr>
<td>8</td>
<td>3/4-3/8</td>
<td>Forest Level</td>
<td>Operations</td>
<td>Forest Level</td>
<td>Recreation</td>
<td>Forest Level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10:20-11:10</td>
<td>Operations</td>
<td>Recreation</td>
<td>Recreation</td>
<td>Forest Level</td>
</tr>
<tr>
<td>9</td>
<td>3/11-3/15</td>
<td>Forest Level</td>
<td>Wildlife</td>
<td>Forest Level</td>
<td>Recreation</td>
<td>Forest Level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10:20-11:10</td>
<td>Operations</td>
<td>Recreation</td>
<td>Forest Level-C</td>
<td>Forest Level</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Forest Level-C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/18-3/22</td>
<td></td>
<td>SPRING BREAK</td>
<td></td>
<td>Visual Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Operations-C</td>
<td>Forest Level</td>
<td>Visual Quality</td>
<td>Visual Quality</td>
</tr>
<tr>
<td>11</td>
<td>4/1-4/5</td>
<td>Forest Level</td>
<td>Watershed</td>
<td>Forest Level</td>
<td>Operations</td>
<td>Watershed</td>
</tr>
<tr>
<td>12</td>
<td>4/8-4/12</td>
<td>Forest Level</td>
<td>Watershed</td>
<td>Forest Level</td>
<td>Operations</td>
<td>Forest Level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10:20-11:10</td>
<td>Operations</td>
<td>Operations</td>
<td>Operations</td>
<td>Forest Level</td>
</tr>
<tr>
<td>13</td>
<td>4/15-4/19</td>
<td>Forest Level</td>
<td>Watershed</td>
<td>Forest Level</td>
<td>Operations</td>
<td>Forest Level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10:20-11:10</td>
<td>Operations</td>
<td>Operations</td>
<td>Operations</td>
<td>Forest Level</td>
</tr>
<tr>
<td>14</td>
<td>4/22-4/26</td>
<td>Forest Level</td>
<td>Watershed</td>
<td>Forest Level</td>
<td>Collaborative</td>
<td>Collaborative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10:20-11:10</td>
<td>Operations</td>
<td>Collaborative</td>
<td>Collaborative</td>
<td>Collaborative</td>
</tr>
<tr>
<td>15</td>
<td>4/29-5/3</td>
<td>Forest Level</td>
<td>Collaborative</td>
<td>Forest Level</td>
<td>Collaborative</td>
<td>Collaborative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10:20-11:10</td>
<td>Collaborative</td>
<td>Collaborative</td>
<td>Collaborative</td>
<td>Collaborative</td>
</tr>
<tr>
<td>16</td>
<td>5/6-5/10</td>
<td>Presentations</td>
<td>Presentations</td>
<td>Presentations</td>
<td>Presentations</td>
<td>Presentations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(10-noon)</td>
<td>(7:30-9:30)</td>
<td>(12:30-2:30)</td>
<td>(7:30-9:30)</td>
<td>(7:30-9:30)</td>
</tr>
</tbody>
</table>

C=Computer lab, meet in Room 109
I=Integrated lab
GIS=GIS lab
Syllabus
FOR 411 : Forestry Capstone preparation

General Information
College and Department: College of Engineering, Forestry, and Natural Sciences; School of Forestry

Course prefix, number, and title: FOR 411, Forestry Capstone Preparation
Semester in which course will be offered: Fall Semester
Credit hours: 1
Clock hours/meeting times: One 50-minute lecture period per week

Instructor name(s): TBD

Course Prerequisites
FOR 323W, FOR 324, & FOR 325

Course Description
This is the first in a two-course sequence that also includes FOR 423, Forestry Capstone. The goal of this course is to assist students in the preparation of a capstone plan that is well conceived and developed fully enough to be implemented in FOR 423. This course will include (1) discussion of the goals and rationale for capstone projects, (2) information on the overall capstone process from initial planning through the preparation of the final presentation and report, (3) an overview of research methods that may be used in capstone projects, and (4) the development of a capstone proposal.

Student Learning Expectations/Outcomes
Upon the successful completion of this course, students should be able to demonstrate:
The ability to prepare a capstone plan that is well conceived, well written and has a high probability of resulting in a successful capstone project.
The ability to apply research, information synthesis, and analytical skills to the development of forestry-related project proposal.
The ability to present the details of the plan in an oral presentation.

Course Structure/Approach
This course will use a combination of lectures and meetings with the instructor to discuss project ideas and progress in the development of the capstone plan. Students may develop capstone plans/projects either individually or in teams of up to four individuals. In addition to the development of a formal, written capstone plan, students will also prepare an oral presentation on their plan that will be presented around mid-semester, which will allow for feedback from their fellow students and any others who attend.

Textbook and Required Materials
No textbook will be required. Occasional reading materials will be assigned and will either be handed out in class or posted on BB Learn.
Tentative Course Outline

Week 1: Course Introduction
Week 2: Topic Brainstorming - What have others done? Does it need to be “research?” Is the goal clear? Will a project mentor be needed?
Week 3: Components of a Good Plan and Plan Formatting
Week 4: Project Methods - What methods will you use? How can you ensure that your project is “doable?” What should be in the Methods section of the proposal?
Week 5: One-On-One or Team Meetings to Discuss Project Ideas (no class at regular time)

Week 6: Proposal/Project Topic Due; Guidelines for Student Presentations
Week 7: One-on-one or team meetings to discuss plan progress and presentation
Week 8: Student Presentations and Discussion of Capstone Plans
Week 9: Student Presentations and Discussion of Capstone Plans
Week 10: Student Presentations and Discussion of Capstone Plans
Week 11: Student Presentations and Discussion of Capstone Plans (if needed, or else topic TBA)

Week 12: Draft Plans Due
Week 13: One-on-one or team meetings to discuss plan progress and to receive feedback on draft
Week 14: Preparation of final plans, instructor available for consultations

Week 15: Final Plans Due

Assessment of Student Learning Outcomes
Students will earn letter grades in the course based on the following graded activities:

Identification of Suitable Topic by Deadline 10%
Capstone Project Plan (oral presentation) 15%
Draft Capstone Project Proposal 20%
Final Capstone Project Plan (written proposal) 45%*
Class Participation 10%

*Peer feedback will be a component of this grade for team projects.

Letter grades will be assigned based on traditional guidelines:
A= 90-100%
B=80-89%
C=70-79%
D=60-69%
F= below 60%

Course Policy
Assignment deadlines: Failure to meet deadlines for the graded assignments usually will mean forfeiture of at least 50% of the points unless approved in advance by the instructor. **Also, to pass this course, the Final Capstone Project Plan must be turned in on time and must receive a grade of C or better, regardless of the other points earned.**

Attendance and participation: Class attendance is viewed as essential to student success in this course. Also, active participation in class discussions and presentation question and answer sessions is expected of all students.
Statement on plagiarism and cheating: Obvious occurrences of plagiarism and cheating by students in this course will be handled by assigning a grade of zero on the assignment to the offending student. Reoccurrence will result in assignment of a grade of F to the student for the entire course.

University policies: Attach the Safe Working and Learning Environment, Students with Disabilities, Institutional Review Board, and Academic Integrity policies or reference them on the syllabus. See the following document for policy statements: http://www4.nau.edu/avpaa/UCCPolicy/plcystmt.html.
SYLLABUS

FOR 412: SILVICULTURE II

General Information
College of Engineering, Forestry, and Natural Sciences; School of Forestry
FOR 412, Silviculture II
Fall Semester (even and odd years)
3 semester hours
Clock hours/meeting times:
Schedule will vary, depending on weather and subject matter.
Lectures, when held, will be MWF from 9:10-10:00
Labs, when held, will be M and/or W from 12:40-3:50

Instructor name(s):
Dr. Kristen Waring, School of Forestry
201 SWFSC
Phone: 523-4920
Email: Kristen.Waring@nau.edu
Office hours: by appointment
Additional instructors (lecturers, graduate teaching assistants) may teach lab sections depending on enrollment.

Course Prerequisites

FOR 315 – Silviculture I

Course Description

This is a course in advanced silviculture. This course, in combination with FOR 413 (Forest Ecosystem Assessment), will provide students with quantitative skills necessary for the development of specific silvicultural prescriptions to meet management goals. Skills will be developed both in the classroom and in forest-based field labs.

Student Learning Outcomes

By the end of the course, you should be able to identify the most common silvicultural practices and link them to multiple resource objectives and have the knowledge and tools to select an appropriate prescription for a given stand. Specifically, by the end of the course, successful students (i.e. you!) will have the skills and knowledge to:
Describe the most common tools and practices used in silviculture and understand how to use and modify those tools and practices to meet management objectives;
Explain growth and yield dynamics for both even and uneven-aged stands;
Identify assess management goals and objectives;
Evaluate silviculturally-related real-world scenarios and situations both quantitatively and qualitatively; and
Develop silvicultural prescriptions that meet management goals.
Course Structure/Approach.
The course will combine traditional in-class lectures with field lectures and labs. The field labs will enhance and reinforce classroom material. Therefore attendance at labs is essential for your success. We will go out in the field unless the weather is absolutely abysmal or safety issues are of concern.

Required Texts
Other readings available through BbLearn

L = available on Bb Learn
N = Nyland 2002  M = McComb 2007
AB = Avery&Burkhart 2005

Optional / Additional Resources


Course Outline (tentative)

<table>
<thead>
<tr>
<th>WEEK</th>
<th>LECTURE TOPIC</th>
<th>READING</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pure even-aged stands</td>
<td>N: Ch 13 (277-291); Ch 14 (313-333)</td>
</tr>
<tr>
<td>2</td>
<td>Uneven-aged stands</td>
<td>N: Ch 11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L: Smith et al Ch 15; O'Hara &amp; Gersonde 2004 (opt)</td>
</tr>
<tr>
<td>3</td>
<td>Vegetatively reproduced stands (Short Exam II)</td>
<td>N: Ch 13</td>
</tr>
<tr>
<td>4</td>
<td>Mixed species stands</td>
<td>L: Smith et al Ch 16</td>
</tr>
<tr>
<td>5</td>
<td>Release operations, forest pruning,</td>
<td>L: Penn State 1997; O'Hara et</td>
</tr>
</tbody>
</table>
fertilizer applications, and herbicide use al. 1996
Smith et. al Chap 6

6 Fire and fuels treatments N: Ch 5 (106-116); L: Hunter et al. 2007 (23-47)

7 Management objectives: Timber

8 Management objectives: Restoration and forest health N: Ch 21 (483-502); L: Waring and O’Hara 2005

9 Management Objectives: Watershed and wildlife M: Ch 6 (79-92); Ch 7 (99-109)

10 Management Objectives: Recreation L: Shelby et al. 2005

11 Landscape objectives L: Crow and Gustafson 1997; M: Ch14 (205-211)

12 Agroforestry N: Ch 6 (129-131)
L: Long and Nair 1999

13 Marking guides and implementation tba

14 Regional silviculture tba

15 Review/wrap-up/questions

Assessment of Student Learning Outcomes
Methods and Timeline:

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Points</th>
<th>Date of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short exam (3 at 25 points each)</td>
<td>75</td>
<td>End of weeks 3, 6, 9</td>
</tr>
<tr>
<td>Long exams (3 at 50 points each)</td>
<td>150</td>
<td>End of weeks 5,10,14</td>
</tr>
<tr>
<td>Lab reports (8 at 25 points each)</td>
<td>200</td>
<td>Beginning of weeks 3,4,6,7,9,10,11,12</td>
</tr>
<tr>
<td>Participation (25 points)</td>
<td>25</td>
<td>On-going</td>
</tr>
<tr>
<td>TOTAL</td>
<td>450</td>
<td></td>
</tr>
</tbody>
</table>
Grades are based on lecture and lab material, plus overall course participation. Lecture content is graded through the use of exams. The lab grade is a direct outcome of eight graded lab write-ups. Finally, participation will be graded based on:

1. Attendance in both lecture and labs;
2. Submittal of assignments related to participation labs; and
3. Pop quiz and other lecture participation activities.

**Lab grading:**
Lab grades are assigned using the following categories:

<table>
<thead>
<tr>
<th>Letter grade</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90-100</td>
</tr>
<tr>
<td>B</td>
<td>80-89</td>
</tr>
<tr>
<td>C</td>
<td>70-79</td>
</tr>
<tr>
<td>D</td>
<td>60-69</td>
</tr>
<tr>
<td>F</td>
<td>&lt;60</td>
</tr>
<tr>
<td>not completed</td>
<td>0</td>
</tr>
</tbody>
</table>

For each graded lab, 20% of the grade will be related to writing. See Semester A guidelines for an overview of how writing will be graded. **Writing grades of less than a B- require a re-write to earn credit for the lab.**

*Crew-based labs:* When a crew works together to turn in a single lab assignment, *crew evaluation forms are also required* from each member of the crew, for each member of the crew. **Lab credit will not be given without the required evaluation forms.** This includes a self-assessment. Poor overall crew evaluations will result in grade reduction for that lab and crew member. For example, if, in a three person crew, both crew members rate the third member poorly in most categories on the evaluation, this will result in a reduction for that member. The reduction will be at least a half-grade but the exact reduction will depend on the situation and may be more.

**Grading System:**

<table>
<thead>
<tr>
<th>Points earned</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90+</td>
<td>A</td>
</tr>
<tr>
<td>80-89</td>
<td>B</td>
</tr>
<tr>
<td>70-79</td>
<td>C</td>
</tr>
<tr>
<td>60-69</td>
<td>D</td>
</tr>
<tr>
<td>&lt;60</td>
<td>F</td>
</tr>
</tbody>
</table>
Grades are assigned based on the exact percentage earned and are not rounded.

Course Policies
1. Assignments are due at 9:10 am on the due date unless otherwise noted. These should be turned by email or to the instructor’s mailbox in the main office or outside my office door (Rm. 234). Late assignments are accepted for 12 hours (reduced ½ letter grade) and 24 hours (reduced 1 full letter grade) after the due date and time.
2. Attendance is important and required. If you need to miss a lab section, you must contact the instructor in advance and provide your legitimate reason for missing. Lecture sections are important as well and instructors expect attendance and respect.
3. While class attendance is required per the above stated policy, please be cautious about attending class if you are feeling ill. Please inform me by phone or email if you are feeling unwell; if you are experiencing flu-like symptoms, you should not attend class; please take precautions not to infect others, and seek medical attention if your symptoms worsen.
4. Respect: Respectful and professional behavior is expected and required at all times. Show up on time, no cell phones or iPods in class, laptops and other electronics to be used only for note-taking. Wait until the session is over before packing your bags. Do not disrupt the classroom environment or you may be asked to leave.
5. You WILL be graded on grammar and spelling in addition to content on all written assignments and exams. Grading rubrics will be provided for all lab assignments.
6. Emails to Instructors will receive a response within 36 hours unless announced otherwise in class (i.e., if instructor is traveling or in the field without internet).
7. Graded assignments and exams will generally be returned within one week.
8. Overall course grades will be posted on Bb Learn periodically throughout the semester. The instructor will let you know when updates occur.
9. Cheating and plagiarism will not be tolerated. Be careful when sharing data or assignments even as examples. The NAU policy on cheating and plagiarism can be found in the online student handbook.

University Policies:
For Northern Arizona University policy statements, please reference the online student handbook, http://www4.nau.edu/stulife/handbook.htm
Course Syllabus

COLLEGE AND DEPARTMENT: Forestry, Engineering and Natural Science; Forestry

FOR 422 Forest Planning
SEMESTER OFFERED: Spring Semester
CLOCK HOURS: TTH 8 – 9:15
CREDIT HOURS: 3
INSTRUCTOR: Denver Hospodarsky, PhD, CF (AKA DrH)
Associate Professor
School of Forestry
SW Forest Science Complex (SWFSC) – Bldg. 82
Office: Room 104 Ph: 928-523-7525
Email: denver.hospodarsky@nau.edu

OFFICE HOURS: TTH 9:30-11, otherwise Open Door or by Appointment
COURSE PREREQUISITES: FOR413
COURSE COREQUISITES: FOR423C

COURSE DESCRIPTION:
Forest Planning describes the process of discovery and preparation that occurs both before and after management actions, which are conducted to achieve prescribed resource outcomes on forest lands. This process is recorded in a planning document, and this ‘plan’ serves as both process record and guide for future management activity. FOR422 Forest Planning establishes the theoretical foundations of the planning process and lays out the many procedures of planning, including NEPA, so as to result in effective and efficient resource management practices. The roles of professional leadership and ethics in planning success are also stressed.

STUDENT LEARNING EXPECTATIONS & OUTCOMES:
By the end of this course, students should be able to understand the theories and concepts of planning and the range of issues and strategies involved in forest planning including: public participation and collaboration, planning goal setting, current conditions assessment, trends analysis, alternatives formulation, alternatives assessment, alternative selection and management plan development, plan implementation, plan monitoring, and plan updating.
Students should also understand the practice of NEPA planning on federal lands, and the concepts of leadership and ethics that are a foundation of professional resource planning practice.

COURSE STRUCTURE & APPROACH:
Two, 75 minute combination lecture and discussion sessions per week. Sessions will be structured to allow considerable opportunities for discussion and questions in response to the lecture material. Small-group learning activities will frequently be used in conjunction with evaluating planning issues and procedures. Lectures topics will largely expand upon readings assigned from the texts.

TEXTBOOK & REQUIRED MATERIALS:

**COURSE OUTLINE:**
- Weeks 1 – 3: Course introduction; planning theory and concepts
- Weeks 4 – 7: Forest planning issues and processes
- Weeks 8 – 13: NEPA planning procedures for federal lands management
- Weeks 14 – 15: Planning case study analysis

**ASSESSMENT OF STUDENT LEARNING OUTCOMES:**
A variety of assessment methods, in sufficient numbers, will be used in order to account for variability in student learning styles and daily vagaries in individual performance.

**METHODS OF ASSESSMENT:**
Two exams will be given to assess comprehension of lecture and discussion material. Four announced quizzes will be given during the semester to encourage students to remain current with the assigned readings, and to evaluate comprehension of topics prior to their treatment in lecture and discussion. One case study analysis report will be assigned as a summary project in the class. Analysis Group work involved will evaluated in terms of both overall group performance and individuals’ contributions to the group effort.

**TIMELINE FOR ASSESSMENT:**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Week 3</th>
<th>Quiz 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 5</td>
<td>Quiz 2</td>
<td></td>
</tr>
<tr>
<td>Week 7</td>
<td>Mid-term exam</td>
<td></td>
</tr>
<tr>
<td>Week 9</td>
<td>NEPA Quiz 1</td>
<td></td>
</tr>
<tr>
<td>Week 12</td>
<td>NEPA Quiz 2</td>
<td></td>
</tr>
<tr>
<td>Week 13</td>
<td>NEPA Exam</td>
<td></td>
</tr>
<tr>
<td>Week 15</td>
<td>Planning case study analysis Report</td>
<td></td>
</tr>
<tr>
<td>Week 16</td>
<td>Final exam</td>
<td></td>
</tr>
</tbody>
</table>

**GRADING SYSTEM:**
Two exams at 20% each; final exam at 25%; four quizzes at 5% each; and a planning case study analysis at 15%. The course will be graded using the scale: 90-100% = A; 80 – 89% = B; 70 – 79% = C; 60 – 69% = D; and < 60% = F.

**COURSE POLICY:**
This course will be conducted in accordance with the following policies. Please read these policies carefully.

**RETESTS AND MAKEUP TESTS:**
No makeup exams, quizzes, or late assignments will be allowed without a signed medical excuse, or under conditions where the student has notified the instructor at least one-week in advance for mutually acceptable personal/professional reasons.
ATTENDANCE:
Regular attendance is required. Role will be taken at the beginning of each class period. Please be on time in order to be counted on the role, it is both professional and courteous.

STATEMENT ON PLAGIARISM & CHEATING:
Plagiarism and other forms of cheating are grounds for dismissal from FOR 283. The complete policy statement on academic integrity can be found in Appendix F of the NAU Student Handbook. Be sure to read this statement for your own protection.

UNIVERSITY POLICIES:
Five NAU Policy Statements are particularly relevant to this class viz., Safe Environment Policy, Students With Disabilities, Institutional Review Board, Academic Integrity, and Academic Contact Hour Policy. These are statements are cited in this syllabus for reference (see pertinent NAU Policy Statements in the Student handbook: http://www4.nau.edu/avpaa/UCCPolicy/plcystmt.html.)

OTHER:
Your thinking about forest planning in this class may benefit from consideration of the forester code of ethics. Please read the Society of American Foresters Code of Ethics.
Syllabus
FOR 423C : Forestry Capstone

General Information
College and Department: College of Engineering, Forestry, and Natural Sciences; School of Forestry
Course prefix, number, and title: FOR 423C, Forestry Capstone
Semester in which course will be offered: Spring Semester
Credit hours: 3
Clock hours/meeting times: Two 75-minute class periods per week; scheduled team meetings; mandatory presentations during final week of semester

Instructor name(s): TBD

Course Prerequisites
Completion of FOR 411 with a grade of C or better.

Course Description
Students will implement the capstone project they conceived in FOR 411. This course will culminate in the preparation of a formal capstone report and an oral presentation that will be open to the School of Forestry community.

Student Learning Expectations/Outcomes
Upon the successful completion of this course, students should be able to demonstrate:
- The ability to apply research, information synthesis, and analytical techniques to the successful implementation of a forestry-related project of the student(s) own design.
- The ability to communicate project results clearly both in writing and in an oral presentation.

Course Structure/Approach
This course will use a combination of lecture periods and scheduled meetings with the instructor to discuss the implementation of your capstone project. The course is designed in part to simulate a real-life work environment, in which you are responsible for completion of a specific project, but your time is not as micro-managed as it is during a typical class.

Textbook and Required Materials
No textbook will be required. Occasional reading materials may be assigned and will either be handed out in class or posted on BB Learn.

Tentative Course Outline
Week 1: Course Introduction
Week 2: Project Methods – Discussions/lectures on specific methods to be used by one or more teams
Week 3: Project Methods - Discussions/lectures on specific methods to be used by one or more teams
Week 4: One-On-One or Team Meetings to Discuss Project progress (no class at regular time)
Week 5: Student Progress Reports and Group Discussion/Feedback*
Week 6: Student Progress Reports and Group Discussion/Feedback*
Week 7: Student Progress Reports and Group Discussion/Feedback*
Week 8: Student Progress Reports and Group Discussion/Feedback*
Week 9: One-On-One or Team Meetings to Discuss Project progress (no class at regular time)
Week 10: One-On-One or Team Meetings to Discuss Project progress (no class at regular time)
Week 11: Project work, instructor available for consultations
Week 12: Project work, instructor available for consultations
Week 13: Project work, instructor available for consultations
Week 14: Project work, instructor available for consultations
Week 15: Project presentations; reports due

*Approximately three presentations per class period.

Assessment of Student Learning Outcomes
Students will earn letter grades in the course based on the following graded activities:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Team Progress Reports and Discussion</td>
<td>10%</td>
</tr>
<tr>
<td>Final Capstone Project Report</td>
<td>40%</td>
</tr>
<tr>
<td>Final Capstone Presentation</td>
<td>25%</td>
</tr>
<tr>
<td>Peer Evaluations (3)</td>
<td>15%*</td>
</tr>
<tr>
<td>Participation in Meetings, Other Students’ Presentations</td>
<td>10%</td>
</tr>
</tbody>
</table>

*For individual projects, there points will be distributed evenly among the three assignments listed above this one.

Letter grades will be assigned based on traditional guidelines:
A= 90-100%
B=80-89%
C=70-79%
D=60-69%
F= below 60%.

Course Policy
Assignment deadlines: Failure to meet deadlines for the graded assignments usually will mean forfeiture of at least 50% of the points unless approved in advance by the instructor. Also, to pass this course, the Final Capstone Presentation and Report must be completed on time and must be deemed acceptable, regardless of the other points earned.
Attendance and participation: Class attendance is viewed as essential to student success in this course. Also, active participation in class discussions and presentation question and answer sessions is expected of all students.

Statement on plagiarism and cheating: Obvious occurrences of plagiarism and cheating by students in this course will be handled by assigning a grade of zero on the assignment to the offending student. Reoccurrence will result in assignment of a grade of F to the student for the entire course.

University policies: Attach the Safe Working and Learning Environment, Students with Disabilities, Institutional Review Board, and Academic Integrity policies or reference them on the syllabus. See the following document for policy statements: http://www4.nau.edu/avpaa/UCCPolicy/plcystmt.html.
APPENDIX E

School of Forestry Assessment Plan

2010 Assessment Report
Bachelors of Science in Forestry

Program Overview

Vision

The vision of the Bachelors of Science in Forestry (BSF) is to train Professional Foresters.

Program Description

The BSF degree program at Northern Arizona University was initiated in 1958. It is the only BS degree in Forestry in the Southwestern US that is accredited by the Society of American Foresters, and one of about 48 accredited BS degrees in forestry in the US. Students earning the BSF are expected to become:

- Professional foresters
- Managers of public or private forests
- Lifelong learners
- Critical thinkers

Assessment Plan

Development and Foundation

The learning outcomes expected for BSF graduates are strongly shaped by accreditation requirements of the Society of American Foresters, as well as the values and teaching and learning philosophies of the faculty of the NAU School of Forestry. Our BSF program is reviewed and accredited every 10 years. Our most recent review occurred in 2003, and accreditation was extended through the year 2013.

Identification of desired educational outcomes and assessment tools is a key component of the BSF program. In 1994, the faculty began a comprehensive review of the BSF degree with the goal of identifying key competencies required of all graduates. This review was completed in 1995 with the key results reported in a peer-reviewed article in 1996:


Next, we surveyed recent graduates of the BSF program and their employers about skills and abilities needed for success in forestry. The results of this survey were used to further refine learning outcomes and assessment tools, and were presented and published in a conference on teaching in 1998:

A similar review and refinement of competencies occurred in 1999-2000. Our development of learning outcomes is driven by the questions: “what do we want graduates of the BSF program to be?, what should they know?, and how can we assessment their knowledge and abilities?

The underlying educational philosophy of the BSF focuses on the integrated instruction of students in forest ecosystem science and management. Five forestry courses are required in the freshman and sophomore years and focus on basic training in plant identification, biogeography of forests, soil science, and forest measurements. Most courses taken in freshman and sophomore years are largely used to meet university liberal studies and diversity requirements, and to provide a background in mathematics, chemistry, biology, and writing needed to prepare students for entry into the professional forestry curriculum in the junior year. The professional curriculum uses a team-taught immersion approach in two 13-credit hour blocks of courses across two semesters in the junior year (FOR313-316, forest ecology and silviculture; FOR323-326, forest management) and two 6-credit-hour blocks of courses, one in each semester of the senior year (FOR413-414, forest ecosystem assessment; FOR423-424, forest ecosystem planning). Students are also required to choose one of six 12 hour focus areas to promote deeper learning in a specific forestry discipline.

**Purposes and Uses of Assessment**

The purposes of program evaluation and assessment of learning outcomes of the BSF are to: 1) provide feedback to the School of Forestry about refinement of coursework and the structure and content of the overall program; 2) provide information required for program accreditation by the Society of American Foresters, 3) demonstrate to students, stakeholders, cooperators, and administrators the efficacy of the program; 4) provide feedback to students about their progress in the program.

**Student Learning Outcomes**

We have articulated 155 specific competencies expected of graduates of the BSF program. Below we present these competencies for key portions of the pre-professional curriculum taken in the freshman and sophomore years, and the professional curriculum taken in the junior and senior years. Our assessment plan follows these competencies on page 10.

<table>
<thead>
<tr>
<th>Course</th>
<th>Competency</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR101 Introduction to Forestry</td>
<td>1. Understanding of the forestry profession: terminology, concepts, and current topics - broad and engaging. 2. Excitement about our profession. 3. Knowledge of the Forestry curriculum and focus areas.</td>
</tr>
<tr>
<td>FOR211 Forest Measurements</td>
<td>4. Knowledge and skills in sampling and inventory of natural resources  5. Skill in office data analysis, summary and interpretation</td>
</tr>
<tr>
<td>FOR213 Forest Soils</td>
<td>6. Knowledge and comprehension of basic geology,</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>FOR212 Trees and Forests of North America</td>
<td>7. Knowledge and comprehension of soil physical, chemical and biological properties</td>
</tr>
<tr>
<td>FOR220 Forest and Range Plants</td>
<td>8. Knowledge of basic principles of plant classification and taxonomy</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>9. Knowledge of the scientific and common names, range, physical appearance, and ecological and utilitarian characteristics of many important trees in North America</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>10. Knowledge of the major forest types in North America, their geographic location, and species composition of major forest types.</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>11. Knowledge, comprehension, and skill in forest and range plant identification</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>12. Knowledge and comprehension of taxonomy and basic autecology of plants</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>13. Knowledge/comprehension of land forces controlling forest vegetation</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>14. Knowledge/comprehension of the stages of forest stand dynamics and its manipulation</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>15. Knowledge/comprehension of basic tree morphology and plasticity and its manipulation – density, crowns &amp; boles</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>16. Knowledge/comprehension of tree physiological responses to silviculture – leaves and crowns</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>17. Knowledge/comprehension of site productivity and its manipulation – site index curves and equations</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>18. Knowledge/comprehension of stand density effects and its manipulation – SDI and density management diagrams</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>19. Knowledge/comprehension of the role of tree breeding programs – phenotypes (plus trees) and genotypes, seed orchards and grafting</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>20. Knowledge/comprehension of nurseries and nursery stock types – bare-root, containerized and combinations</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>21. Knowledge/comprehension of even-aged stand management: purpose, advantages, concepts and terminology – clearcut, seedtree and shelterwood</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>22. Knowledge/comprehension of multi-aged stand management: purpose, advantages, concepts and terminology – individual-tree and group selection, BDq</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>23. Knowledge/comprehension of site preparation and competition control tools and techniques – fire, mechanical, chemical and combinations</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>24. Knowledge/comprehension of stand density effects and its manipulation – SDI and density management diagrams</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>25. Knowledge/comprehension of artificial regeneration: purposes, advantages, concepts, tools and techniques – direct seeding and planting, seedling survival and spacing</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>26. Knowledge/comprehension of natural geomorphology and soil taxonomy</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>27. Knowledge/comprehension of prescribed fire and underburning - tools and techniques, fuel types and surveys, ecological restoration</td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>28. Knowledge/comprehension of thinning tools and techniques – marking guidelines (spacing and limits) and procedures, ecological restoration</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>29. Knowledge/comprehension of harvesting equipment and proper use – concepts, advantages and terminology</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>30. Knowledge/comprehension of prescriptions for various management objectives: timber production, forest health restoration and maintenance, agroforestry, wildlife habitat enhancement – micro- and macro-scale, watershed and riparian</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>31. Knowledge/comprehension of ecosystem management and community/urban forestry implications for silvicultural prescriptions</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>32. Knowledge/comprehension of dominant silvicultural themes in various regions of the United States</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>33. Comprehension of how environmental and genetic factors affect phenotypes, adaptation, and competition</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>34. Knowledge/comprehension of C3/C4 pathways, implications for range plant communities</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>35. Knowledge/comprehension of the use of population models in ecology</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>36. Knowledge of factors that influence population size</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>37. Knowledge and comprehension of predator-prey relationships</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>38. Knowledge and understanding of wildlife habitats and habitat relationships including the role and characteristics of ecotones</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>39. Knowledge and comprehension of wildlife and domestic ungulate impacts on vegetation</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>40. Knowledge and comprehension of biotic interactions in forests</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>41. Knowledge of definitions, measurement, and arguments about biodiversity</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>42. Knowledge and comprehension of factors that influence community biodiversity</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>43. Knowledge of management approaches for maintaining biodiversity</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>44. Knowledge and comprehension of definitions of disturbance</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>45. Knowledge of the concept of scale in disturbance, different types of disturbance and their effects on forest and range condition, evolutionary context of disturbance</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>46. Knowledge and comprehension of the implications of changing disturbance regimes</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>FOR 313-6, Silviculture</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>FOR 313-6, Silviculture</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>FOR 313-6, Silviculture</td>
</tr>
<tr>
<td>FOR 313-6, Silviculture</td>
<td>FOR 313-6, Silviculture</td>
</tr>
<tr>
<td>FOR 313-6, Ecology</td>
<td>FOR 313-6, Ecology</td>
</tr>
<tr>
<td>FOR 313-6, Ecology</td>
<td>FOR 313-6, Ecology</td>
</tr>
<tr>
<td>FOR 313-6, Ecology</td>
<td>FOR 313-6, Ecology</td>
</tr>
<tr>
<td>FOR 313-6, Ecology</td>
<td>FOR 313-6, Ecology</td>
</tr>
<tr>
<td>FOR 313-6, Ecology</td>
<td>FOR 313-6, Ecology</td>
</tr>
<tr>
<td>FOR 313-6, Ecology</td>
<td>FOR 313-6, Ecology</td>
</tr>
<tr>
<td>FOR 313-6, Ecology</td>
<td>FOR 313-6, Ecology</td>
</tr>
<tr>
<td>FOR 313-6, Ecology</td>
<td>FOR 313-6, Ecology</td>
</tr>
<tr>
<td>FOR 313-6, Ecology</td>
<td>FOR 313-6, Ecology</td>
</tr>
<tr>
<td>FOR 313-6, Ecology</td>
<td>FOR 313-6, Ecology</td>
</tr>
<tr>
<td>FOR 313-6, Ecology</td>
<td>FOR 313-6, Ecology</td>
</tr>
<tr>
<td>FOR 313-6, Ecology</td>
<td>FOR 313-6, Ecology</td>
</tr>
<tr>
<td>FOR 313-6, Ecology</td>
<td>FOR 313-6, Ecology</td>
</tr>
<tr>
<td>FOR 313-6, Products/wood Technology</td>
<td>FOR 313-6, Products/wood Technology</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>FOR 323-326, Forest management</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>FOR 323-326, Forest management</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>FOR 323-326, Forest management</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>FOR 323-326, Forest management</td>
</tr>
<tr>
<td>Course Code</td>
<td>Description</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>69. Understanding of the human-nature relationship as reflected in recreation and attitudes toward forest management</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>70. Understanding of the current demographics of recreation use of wildlands</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>71. Description and application of the prominent recreation management frameworks, including methods for inventorying recreation resources.</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>72. Description of the most widely used methods used to assess the economic value of recreation</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>73. Description of the predominant techniques used to assess visual quality</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>74. Understanding of the types of resource impacts associated with recreation use and can describe methods for mitigating impacts.</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>75. Understanding of the social impacts of recreation on local communities</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>76. Recognition of the significance of different spatial scales</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>77. Application of more sophisticated field methods to estimate forest growth</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>78. Application of theoretical and practical knowledge on empirical growth and yield modeling -- whole-stand, size-class and individual-tree stand-growth models -- Multi-stand modeling systems (FVS, LMS)</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>79. Understanding of the fundamental aspects of process-based growth modeling</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>80. Knowledge of goals that influence timber management decisions</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>81. Implementation of basic valuation and financial analyses, including timber sale appraisal</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>82. Calculation and interpretation of the physical and financial criteria used to determine optimal management regimes for timber stands</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>83. Students understand how silvicultural activities can be employed to enhance goal achievement at the forest level</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>84. Understanding of the functions of problem identification, goals, criteria, variables, constraints, and objective functions in decision analysis</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>85. Recognition of the need to incorporate risk and uncertainty in decision analysis</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>86. Understanding of the regulated forest concept and how to achieve regulation under both area and volume control,</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>87. Formulation of mathematical programming models, to apply these models in problem-solving, and to interpret solutions</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>88. Formulation of contemporary forest management models using linear programming,</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>89. Understanding of the concept of product definition and utilization, e.g., logs and log-rules, and their effect on valuation.</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>90. Demonstration of knowledge of the basic concepts of professional ethics</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>91. Demonstration of characteristics of effective leadership</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>92. Knowledge of the basic elements of road design, maintenance, closure, and rehabilitation and how these elements impact forested watersheds</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>93. Evaluation of the impacts of forest management alternatives on erosion and sediment yield, peak flow, and water yield</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>94. Knowledge and comprehension of how to manage the factors that affect the ability of animals to survive and reproduce</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>95. Knowledge and comprehension of how management of other resources affects wildlife populations</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>96. Knowledge and comprehension of how management of other resources affects wildlife populations</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>97. Knowledge and comprehension of how agencies manage wildlife</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>98. Understanding of wildlife as a commodity and of the impact of wildlife on other commodities</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>99. Understanding of single species and multi species approaches to management (ecological indicators, umbrella species, keystone species, functional groups, etc)</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>100. Understanding of how to inventory, evaluate, and monitor wildlife populations and their habitats</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>101. Ability to contrast wildlife and habitat management values by considering traditional ecological knowledge</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>102. Knowledge and comprehension of ethical issues in wildlife management</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>103. Knowledge and comprehension of key wildlife forestry issues and tools</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>104. Knowledge and comprehension of levels of decision-making: constitutional, social choice, and operational</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>105. Knowledge and comprehension of fundamental sources of values and ideas for the purposes of forest policy in the United States</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>106. Knowledge and comprehension of fundamental values and ideas with the periods of forest and range policy in the United States;</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>107. Recognition and understanding of two contrasting models for public decision-making in the United States, that of the “procedural republic” and “collaboration and politics of place.”</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>108. Description of the different ways to define community</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>109. Placement of major past and present policy direction in the US forest sector within one or the other of these two models.</td>
</tr>
<tr>
<td>FOR 323-326, Forest management</td>
<td>110. Description of the methods of dispute resolution in the procedural republic or local collaboration and</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>FOR 323-326</td>
<td>Forest management</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

359
130. Knowledge of effective Geographic Information Systems (GIS)

131. Ability to work effectively as part of a team

132. Ability to lead teams

133. Effective oral communication of technical material

134. Understanding of and ability to develop estimates of current forest condition

135. Understanding the process of goal formation through public participation.

136. Understanding of the process of how goals and objectives are modified through planning and public participation.

137. Understanding of the relationships between goals and objectives and management analysis.

138. Ability to specify forest management goals in terms of desired future conditions.

139. Ability to quantify desired future conditions.

140. Ability to translate forest management problems into mathematical models.

141. Ability to apply principles of timber, recreation, and wildlife management (e.g. economics, ROS and scenery management system, and wildlife habitat relationships) in developing and analyzing management activities.

142. Ability to select silvicultural prescriptions to accomplish specific forest goals.

143. Understanding of biotic factors that influence forest condition and sustainability as related to management goals.

144. Ability to develop stand-specific prescription/marking guide to address Dwarf Mistletoe concerns WRT goal

145. Advanced DSS skills, ability to analyze and interpret output of mathematical models.

146. Ability to analyze management plan results in terms of goals, goal criteria, and desired future conditions.

147. Ability to develop and analyze implementation
<table>
<thead>
<tr>
<th>Competence</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>361</td>
<td>Assessment and FOR 423-424 (Forest ecosystem planning) activities, ability to recognize need for revised planning analysis.</td>
</tr>
<tr>
<td>148</td>
<td>Ability to conduct revised planning analysis.</td>
</tr>
<tr>
<td>149</td>
<td>Ability to refine information needs (inventory and monitoring) based on planning and implementation analysis.</td>
</tr>
<tr>
<td>150</td>
<td>Effective business skills, ability to conduct business resource analysis.</td>
</tr>
<tr>
<td>151</td>
<td>Ability to write technically</td>
</tr>
<tr>
<td>152</td>
<td>Ability to manage individual time</td>
</tr>
<tr>
<td>153</td>
<td>Ability to make oral presentation, and understanding of presentation software</td>
</tr>
<tr>
<td>154</td>
<td>Understanding of effective GIS analytical skills</td>
</tr>
<tr>
<td>155</td>
<td>Understanding of and ability to conduct ecosystem management (multi-resource) trade-off analysis</td>
</tr>
</tbody>
</table>

**Implementation Assessment Plan Components**

One component of our assessment plan is difficult to put in tabular form, and will be described in this paragraph. We conduct a facilitated evaluation of each of the integrated courses in our professional program which are taken in students’ junior and senior years. At the end of the semester, we hire a skilled facilitator to elicit student responses to a serious of open-ended questions about overall course coordination, and learning and teaching approaches. At the end of the evaluation, students are free to provide other comments about the course. No faculty are present at the evaluation. The facilitator summaries all comments in a written document keeping the identity of each commenter anonymous. The document is provided to all Forestry faculty and administrators. We find this approach to course evaluation to be very valuable in providing detailed feedback about the efficacy of specific learning and teaching approaches. Such feedback is used to improve our teaching and learning strategies every year.

The following table summarizes assessment practices for the BSF degree. Assessment is focused on the desired outcome of our senior capstone course, FOR 423-424, Forest Ecosystem Planning, in which students complete their training to become Professional Foresters by prepare a management plan that requires use of all 155 competencies listed above. We list the indicators used to assess the outcome, and how data will be collected, analyzed, and reported. Last, feedbacks based on assessment are described.
### Mission
To train students to become Professional Foresters.

<table>
<thead>
<tr>
<th>Outcome: Professional forester</th>
<th>How/where is outcome learned?</th>
<th>Evidence/Indicator(s)</th>
<th>Collection Method(s)</th>
<th>Analysis Method(s)</th>
<th>Feedback Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The entire curriculum</td>
<td>Student preparation of a multi-resource management plan</td>
<td>Critique of management plans by instructors in FOR 423-424</td>
<td>% of plans that are acceptable</td>
<td>To students, the Coordinator of Academic Programs, and Director of the School of Forestry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accreditation by the Society of American Foresters</td>
<td>Critique of a random sample of management plans by Professional Foresters every five years (starting 2005)</td>
<td>% of plans that are favorably reviewed</td>
<td>To faculty, the Coordinator of Academic Programs, and Director of the School of Forestry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Graduates are successful Professional Foresters</td>
<td>Preparation of a self-study report and hosting the external review team</td>
<td>Accreditation report and recommendation</td>
<td>To faculty, the Coordinator of Academic Programs, and Director of the School of Forestry</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Graduate and employer surveys the 2 years prior to accreditation (2013 is the next scheduled accreditation review).</td>
<td>Open-ended questions about graduates’ performance as a Professional Forester</td>
<td>To faculty, the Coordinator of Academic Programs, Director of the School of Forestry, University Program Review Committee, University Provost, and University President</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Exit interviews with graduates the 2 years prior to accreditation (2013 is the next scheduled accreditation review)</td>
<td>Open-ended questions about efficacy of the degree program in training students to become Professional Foresters</td>
<td>To faculty, the Coordinator of Academic Programs, and Director of the School of Forestry</td>
</tr>
</tbody>
</table>
Northern Arizona University
University Assessment Committee
Office of Academic Assessment

Purpose: The purpose of the Annual Report on Degree Program Assessment of Student Learning is to provide information about progress in assessment efforts for each degree program within your academic unit. Only one report is requested of each academic unit, as this report will accommodate multiple degree plans. (You can still submit separate reports if you prefer.) The report will be made available publicly at the Office of Academic Assessment website and will be available to appropriate accrediting agencies. It is recommended that your unit use your assessment report and results to celebrate achievements of student learning as well as to identify potential areas for future curriculum improvement. The University Assessment Committee will review your report to provide constructive feedback, as well as to identify particular academic units for potential assessment awards and/or mini-grants to support continuing assessment efforts.

Please email this completed form as an attachment to d-oaa@jan.ucc.nau.edu.

CONTACT INFO:

Academic Unit: School of Forestry
Date: February 18, 2010
Name: James A. Allen
Title: Executive Director
Email: James.Allen@nau.edu
Phone: 523-5894
NAU Box: 15018
Degree Program(s) reported here: Forestry (B.S., M.F., M.S., and Ph.D.)

ASSESSMENT REPORT:

Instructions: Please answer the following five questions to the best of your ability for each degree program offered within your unit. You may use the table provided on the next page, or you may create your own report format.

1. Summarize your assessment activities during the past year for each degree program. (e.g. faculty discussions, new survey design, data collection, revised assessment plans or learning outcomes, etc.).

B.S. Program: We continue to operate under the general guidelines of our current assessment plan, which was submitted in October 2004.

The 155 competencies identified in the 2004 plan continue to be considered important, but are not addressed individually in our annual assessment. A key element of our assessment approach continues to be how students perform in their senior-level capstone course (FOR 423-424). This provides an integrated opportunity to assess student learning, including their knowledge of technical forestry skills and their skills in critical areas such as written and oral communication. FOR 423-424, as well as our other forestry courses, continue to be revised based on formal and informal assessment results.
Another key element of our B.S. program assessment continues to be the facilitated discussions (course evaluations by our students) held at the end of the semester in some of our professional program courses (Semester A, B, C, and D). The most recent such facilitated discussion was held at the end of Semester A, in December of 2009. These discussions are facilitated by an individual from outside the School of Forestry. The results of these discussions are available to the instructors and are used to help plan the following year's course.

An assessment effort we worked on over the past two years was a “Sunset Review” of our focus areas. Focus areas were implemented as a new requirement for the B.S. degree program in 2001. Our School of Forestry’s Strategic Plan calls for all focus areas to be reviewed after five years; although we missed this goal by one year, we began a review of the five original Focus Areas during the Fall 2007 semester. Our approach to this review was based on (1) a request to each Focus Area Coordinator to provide a summary report addressing issues such as current enrollment, delivery of the required courses, and amount of time required to serve as the coordinator and (2) a survey of recent graduates to solicit their opinions on how well the focus area requirement has contributed to their education and subsequent career development. Both of these were initiated in the fall of 2007. Discussions about the results of this work began in earnest during the 2008-2009 academic year; during that same year a number of new considerations related to the budget and the need to streamline programs became part of the discussion.

We also continued to implement our on-line exit survey for seniors. The survey asks undergraduates for a wide variety of feedback, including on the curriculum, the quality of various support services, extracurricular activities, etc.

In addition to our ongoing assessment efforts, we are scheduled for our next accreditation visit by the Society of American Foresters (SAF) in 2013. We will need to start planning for the self-study at least two years before that. SAF accreditation is critical to the continuing success of our B.S. degree program and provides a reasonable level of assurance that our program meets national-level standards for undergraduate forestry education. The SAF accreditation process is gradually evolving towards a more “outcomes based” approach and therefore is very much in line with NAU’s approach to assessment.

Graduate Programs (M.S., M.F., and Ph.D): The graduate programs continue to operate under the guidelines of their current assessment plans, which are specific to each degree program (although they also have much in common); all are dated October 2004. For each degree program, a table was produced which describes specific outcomes, how they are evaluated, and how each type of assessment information is “fed back” into the program. Each outcome is evaluated by an individual or individuals (e.g., the Graduate Coordinator, course instructors, the student’s committee and the Executive Director). The types of outcomes listed do not call for an annual discussion on the part of the faculty. Since much of the feedback comes to the Graduate Coordinator, that individual is expected to play a key role in identifying any major concerns that arise and sharing them with the faculty. Several discussions at Curriculum Committee or faculty meetings have been held as follow-ups to feedback received by the Graduate Coordinator.

In addition, a graduate student attends all faculty meetings and meetings of the school’s curriculum committee to provide feedback about graduate programs and policies to the faculty, and to facilitate communication of curricular and other pertinent issues to graduate students.

We also continued to implement our on-line exit survey for graduate students, which is similar to the one described above for undergraduates.

A seven-year review of our graduate programs will need to be initiated in 2010-2011, so planning for this will need to begin soon.

2. Describe specific assessment findings related to the learning outcomes assessed for each degree program, including any pertinent context surrounding the findings. Please
include the learning outcomes themselves. (e.g. 77% of seniors performed at the “proficient” level of competency in problem solving, which is where we aimed to be this year using a new scoring rubric...)

a. Please attach any tables, graphics, or charts to the end of this report.

B.S. Program:

The reports of the facilitated discussions after our professional program semesters continue to be a rich source of information. The information in those reports generally indicates that students are satisfied with the courses, support the team teaching approach used in these courses, and like the way the field and lecture elements of the courses build on each other. They also indicate some potential problems areas, which the faculty that form part of the team for a particular semester (e.g., “Semester A”) work to address for the following year. Despite the cost of these facilitated reviews (~$600 each), we continue to support them - especially for the first year (Semester A and B) - so that we can respond to the concerns and suggestions of each new cohort of students.

**Graduate Programs:** As mentioned above, the graduate level assessment plans do not call for annual data synthesis or review by the faculty. Given the type of feedback received recently by the Graduate Coordinator (e.g., quality of theses/dissertations and performance of students at their defenses) and through the regular teaching evaluations, it appears that quality of the program is still quite good. Some of the same broad concerns highlighted in the previous reports still remain as important concerns, however, including the need for more opportunities for students to gain teaching experience (especially for Ph.D. students), the lack of tuition waivers and low stipends. We have also identified some concerns about graduate student advising through our informal feedback mechanisms, which we are now working to address.

3. Describe how assessment feedback has been provided to students, faculty, and staff. (e.g. report for faculty, executive summary for the dean, web page for students, alumni newsletter, discussion with students in class or club event, etc.)

**B.S. Program:** Our on-line exit surveys are shared with key individuals such as the Executive Director, Graduate Coordinator, Student Services Coordinator, and IT Manager. We no longer post the results to our website due to the personal nature of some comments. Other types of assessment information (e.g., the results of the facilitated discussions after Semesters A, B, C and D) are not disseminated widely, but are available to SOF administrators and to the faculty who are involved in the specific courses.

**Graduate Programs:** There has been no formal dissemination of assessment results for our graduate programs in the last year, other than through sending the on-line exit survey to appropriate individuals and through discussions at curriculum committee and/or faculty meetings about specific issues raised about the program, mainly by our Graduate Coordinator.

4. In what ways have you used assessment findings to celebrate student achievements and/or to improve the curriculum this past year? (e.g. prizes to students, hosting student parties, changes to curriculum, student projects, learning goals, assessment strategies, etc.)

**B.S. Program:** The results of the facilitated discussions with students after Semesters A, B, C, and D are made available to the group of faculty responsible for teaching the course (both in the current year and for the next year). The group that teaches the course in the following year generally discuss the results in their pre-semester meetings and occasionally make adjustments of various types (e.g., how much to emphasize particular topics and how to avoid excessive redundancy). Beginning in the fall of 2008, several changes were made to Semester C that made the course more structured and challenging, which
is based to a large degree on comments received from students from the facilitated discussions and through other, more informal channels.

The most significant change in our curriculum since the last assessment report is the decision to eliminate almost all of our focus areas (8 out of 9) and replace them with a lower number of certificates (4 through the SOF and one that will be offered jointly with the Department of Biological Sciences). This was a direct result of the Sunset Review mentioned earlier and subsequent discussions of some of the information obtained through that review. These changes were submitted this academic year and recently approved by the UCC (the joint certificate is still pending), and will be implemented beginning in the fall of 2010.

**Graduate Programs:** Individual elements of the overall approach to assessment clearly are exercised on a regular basis. Perhaps the best example of this is the assessment of the learning outcomes as demonstrated by the quality of a student’s thesis or dissertation. It is not uncommon that students are required to improve these documents following their assessment by their graduate committees. A number of minor changes to the graduate curriculum have been made since the last assessment report, in part based on feedback received from students. For example, in the last year we have made the following improvements to the graduate curriculum and related assessment efforts based in part on assessment feedback from students: 1) A new evaluation form for graduate assistants was developed and is being regularly implemented; 2) An out-dated and under-enrolled graduate degree option (Master of Forestry – Tropical Field Studies) was deleted; 3) A proposal to help graduate students by reducing the number of thesis/dissertation units in the semester of graduation from three to one was developed by the Graduate Coordinator and proposed to the University Graduate Council for approval (pending).

Bigger picture assessment (beyond that of the individual student’s performance) of the graduate programs has been more limited recently, but with the next seven-year assessment due to begin by next spring, this will be changing soon.

5. Describe any changes to your assessment plans, or any challenges or educational experiences with the assessment process this past year that you would like to share.

   a. Please submit any revised/updated assessment plans to the Office of Academic Assessment along with this report.

No changes have been made to the existing assessment plans since the last report. We expect that some changes will be proposed beginning next year, when we begin to make use of the new three-year cycle for assessment. Upcoming seven-year reviews and accreditation cycles are also likely to help drive a refinement of our existing plans, all of which date to 2004.
# ALTERNATIVE TABLE FORMAT:

<table>
<thead>
<tr>
<th>Degree-Program Assessment Activities</th>
<th>Assessment Findings: How well are your students achieving the <strong>learning outcomes</strong> assessed?</th>
<th>Feedback: How have faculty, staff, students, and/or other stakeholders been informed about your findings?</th>
<th>Use of Findings: How have you used these assessment findings to celebrate successes and/or to improve curriculum?</th>
</tr>
</thead>
<tbody>
<tr>
<td>(For additional rows, place cursor within last box and hit “Tab”.)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


APPENDIX F

SAF Document C-1 Background Summary for Faculty Reporting to the Forestry Program Head

SAF Document D- Academic Summary for Faculty Reporting to the Forestry Program Head
Document C-1: **Background Summary for Faculty Reporting to the Program Head**

Institution Name:  Northern Arizona University  
Academic Year:  2012-2013  

Official Degree Program Title: Forestry  
Official Option Title: N/A

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Academic Rank</th>
<th>12mo./9mo.</th>
<th>Major Field</th>
<th>Highest Degree Held Degree/Yr./Inst.</th>
<th>Experience (years)</th>
<th>Present Inst.</th>
<th>Other Inst.</th>
<th>Non-Academic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen, James</td>
<td>Professor; Executive Director</td>
<td>12 month</td>
<td>Forest and Wetland Ecology</td>
<td>Ph.D./1994/ Louisiana State University</td>
<td>7</td>
<td>6</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Bowker, Matthew</td>
<td>Assistant Professor</td>
<td>9 month</td>
<td>Forest Soils and Ecosystem Ecology</td>
<td>Ph.D./2006/Northern Arizona University (Biology)</td>
<td>1</td>
<td>0</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Chambers, Carol</td>
<td>Professor</td>
<td>9 month</td>
<td>Wildlife Ecology</td>
<td>Ph.D./1996/ Oregon State University</td>
<td>17</td>
<td>8</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Covington, Wally</td>
<td>Regents’ Professor; Executive Director, ERI</td>
<td>9 month</td>
<td>Forest Ecology</td>
<td>Ph.D./1976/Yale University</td>
<td>38</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Faculty Member</td>
<td>Academic Rank</td>
<td>12mo./9mo.</td>
<td>Major Field</td>
<td>Highest Degree Held Degree/Yr./Inst.</td>
<td>Experience (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------</td>
<td>------------</td>
<td>-----------------------------------------------</td>
<td>-----------------------------------------------------------------</td>
<td>--------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dewhurst, Stephen</td>
<td>Associate Professor</td>
<td>9 month</td>
<td>Forest Management</td>
<td>Ph.D./1999/Northern Arizona University (Forestry)</td>
<td>15&lt;sup&gt;8&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fox, Bruce</td>
<td>Professor</td>
<td>9 month</td>
<td>Forest Management</td>
<td>Ph.D./1980/University of Michigan</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fulé, Pete</td>
<td>Professor</td>
<td>9 month</td>
<td>Ecological Restoration and Fire Ecology</td>
<td>Ph.D./1996/ Northern Arizona University</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gaylord, Monica</td>
<td>Assistant Research Professor</td>
<td>9 month</td>
<td>Forest Entomology and Forest Health</td>
<td>Ph.D./2009/Northern Arizona University</td>
<td>3.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hofstetter, Rich</td>
<td>Associate Professor</td>
<td>9 month</td>
<td>Forest Entomology and Forest Health</td>
<td>Ph.D./2004/Dartmouth College</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospodarsky, Denver</td>
<td>Associate Professor</td>
<td>9 month</td>
<td>Forest Sociology</td>
<td>Ph.D./1993/ Oregon State University</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Huang, Ching-Hsun</td>
<td>Assistant Professor</td>
<td>9 month</td>
<td>Forest Economics and Management</td>
<td>Ph.D./1999/ Stephen F. Austin University</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hunter, Molly</td>
<td>Assistant Research Professor</td>
<td>9 month</td>
<td>Fire Ecology</td>
<td>Ph.D./2004/Colorado State University</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kim, Yeon-Su</td>
<td>Assistant Professor</td>
<td>9 month</td>
<td>Natural Resource Economics</td>
<td>Ph.D./1998/ Oregon State University</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>8</sup> Includes 5 years as a Research Specialist.
<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Academic Rank</th>
<th>12mo./9mo.</th>
<th>Major Field</th>
<th>Highest Degree Held Degree/Yr./Inst.</th>
<th>Experience (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Present Inst.</td>
<td>Other Inst.</td>
</tr>
<tr>
<td>Knight, Sandra</td>
<td>Instructor</td>
<td>Part-Time</td>
<td>English, Technical Writing</td>
<td>B.B.A./2009/University of Texas at Austin; current M.A. student at NAU</td>
<td>1</td>
</tr>
<tr>
<td>Kolb, Tom</td>
<td>Professor</td>
<td>9 month</td>
<td>Forest Ecology and Tree Physiology</td>
<td>Ph.D./1988/ Pennsylvania State University</td>
<td>20</td>
</tr>
<tr>
<td>Lee, Martha</td>
<td>Associate Professor</td>
<td>9 month</td>
<td>Wildland Recreation</td>
<td>Ph.D./1991/ Oregon State University</td>
<td>22</td>
</tr>
<tr>
<td>Mathiasen, Robert</td>
<td>Associate Professor</td>
<td>9 month</td>
<td>Forest Health, Forest Pathology</td>
<td>Ph.D./1977/ University of Arizona</td>
<td>23</td>
</tr>
<tr>
<td>Moore, Margaret</td>
<td>Professor</td>
<td>9 month</td>
<td>Forest and Range Ecology, Landscape Ecology, GIS/Remote Sensing</td>
<td>Ph.D./1987/University of Minnesota</td>
<td>27</td>
</tr>
<tr>
<td>Sánchez Meador, Andrew</td>
<td>Assistant Professor</td>
<td>9 month, 51% FTE</td>
<td>Forest Biometrics and Ecosystem Modeling</td>
<td>Ph.D./2006/Northern Arizona University (Forestry)</td>
<td>1</td>
</tr>
<tr>
<td>Tecle, Aregai</td>
<td>Professor</td>
<td>9 month</td>
<td>Hydrology and Decision Systems Analysis</td>
<td>Ph.D./1988/ University of Arizona</td>
<td>25</td>
</tr>
<tr>
<td>Thode, Andrea</td>
<td>Assistant Professor</td>
<td>9 month</td>
<td>Fire Ecology</td>
<td>Ph.D./2005/University of California, Davis</td>
<td>8</td>
</tr>
<tr>
<td>Wagner, Michael*</td>
<td>Regents’ Professor Emeritus</td>
<td>9 month</td>
<td>Forest Entomology</td>
<td>Ph.D./1980/University of Wisconsin</td>
<td>33</td>
</tr>
</tbody>
</table>

* Retired, but still teach occasional sections of FOR 441.
<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Academic Rank</th>
<th>12mo./9mo.</th>
<th>Major Field</th>
<th>Highest Degree Held Degree/Yr./Inst.</th>
<th>Experience (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waring, Kristen</td>
<td>Assistant Professor</td>
<td>9 month</td>
<td>Silviculture, Forest Health</td>
<td>Ph.D./2006/University of California, Berkeley</td>
<td>7/2/0.5</td>
</tr>
<tr>
<td>Term</td>
<td>Faculty Member</td>
<td>Budgeted Time Allocation (%)</td>
<td>All Courses Taught</td>
<td>Required Credit/Contact Hours</td>
<td>Total Enrollment</td>
</tr>
<tr>
<td>------</td>
<td>----------------</td>
<td>------------------------------</td>
<td>-------------------</td>
<td>--------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Teaching</td>
<td>Research</td>
<td>Service</td>
<td>Other</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>Allen, James</td>
<td>5</td>
<td>5</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FOR 799 Dissertation</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FOR 360 Natural Resources Policy</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FOR 799 Dissertation</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FOR 697 Independent Study</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>Beier, Paul</td>
<td>40</td>
<td>40</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FOR 314 Forest Ecology II</td>
</tr>
<tr>
<td>Fa 2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FOR 599 Contemporary Developments</td>
</tr>
<tr>
<td>Fa 2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FOR 689 Professional Paper</td>
</tr>
<tr>
<td>Term</td>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
<td>Total Credits</td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>---------------------------------------------</td>
<td>---------</td>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 690</td>
<td>Research Methods</td>
<td>3</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 698</td>
<td>Graduate Seminar</td>
<td>1</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 799</td>
<td>Dissertation</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 504</td>
<td>Applied Conservation Biology</td>
<td>3</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 689</td>
<td>Professional Paper</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 698</td>
<td>Graduate Seminar</td>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 799</td>
<td>Dissertation</td>
<td>1</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

**Bowker, Matthew**

<table>
<thead>
<tr>
<th>Term</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fa 2012</td>
<td>FOR 313</td>
<td>Forestry Ecology I</td>
<td>4</td>
<td>55</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 314</td>
<td>Forest Ecology II</td>
<td>3</td>
<td>55</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 690</td>
<td>Research Methods</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 213</td>
<td>Ecology &amp; Mgt of Forest Soils</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 213</td>
<td>Ecology &amp; Mgt of Forest Soils</td>
<td>3</td>
<td>41</td>
</tr>
</tbody>
</table>

**Chambers, Carol**

<table>
<thead>
<tr>
<th>Term</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fa 2012</td>
<td>FOR 599</td>
<td>Contemporary Developments</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 697</td>
<td>Independent Study</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 698</td>
<td>Graduate Seminar</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 699</td>
<td>Thesis</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 799</td>
<td>Dissertation</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 323W</td>
<td>Forest Management I</td>
<td>3</td>
<td>49</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 325W</td>
<td>Forest Management III</td>
<td>3</td>
<td>49</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 693</td>
<td>Teaching Praticum</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 699</td>
<td>Thesis</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 799</td>
<td>Dissertation</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Dewhurst, Stephen</td>
<td>On sabbatical all of 2012-2013</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fox, Bruce</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 101 Forestry Introduction</td>
<td>Yes 3 35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 250 Arizona Forests and Wildlife</td>
<td>3 36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 250H Arizona Forests and Wildlife</td>
<td>3 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 413C Forest Ecosystem Assessment I</td>
<td>Yes 3 34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 414C Forest Ecosystem Assessment II</td>
<td>Yes 3 34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 485 Undergraduate Research</td>
<td>2 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 599 Contemporary Developments</td>
<td>3 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 222 Environmental Conservation</td>
<td>3 50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 222 Environmental Conservation</td>
<td>3 41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 323W Forest Management I</td>
<td>Yes 3 49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 485 Undergraduate Research</td>
<td>1 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fué, Pete</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 313 Forest Ecology I</td>
<td>Yes 4 55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 314 Forest Ecology II</td>
<td>Yes 3 55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 382 Ecological Restoration</td>
<td>3 16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 382H Ecological Restoration</td>
<td>3 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 697 Independent Study</td>
<td>1 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 485 Undergraduate Research</td>
<td>2 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 497 Independent Study</td>
<td>3 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 497 Independent Study</td>
<td>1 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 551 Fire Ecology and Management</td>
<td>3 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 582 Ecological Restoration App</td>
<td>3 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 697 Independent Study</td>
<td>3 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 697 Independent Study</td>
<td>3 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------</td>
<td>--------------------------------------------------------</td>
<td>-----</td>
<td>---</td>
</tr>
<tr>
<td>Fa 2012</td>
<td></td>
<td>FOR 699 Thesis</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Fa 2012</td>
<td></td>
<td>FOR 799 Dissertation</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 415 Forestry Developing Countries</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 485 Undergraduate Research</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 485 Undergraduate Research</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 515 Forestry Developing Countries</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 689 Professional Paper</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 697 Independent Study</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 697 Independent Study</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 699 Thesis</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 799 Dissertation</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaylord, Monica</td>
<td>95</td>
<td>FOR 212 Trees and Forests of N. America</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Fa 2012</td>
<td></td>
<td>FOR 212 Trees and Forests of N. America</td>
<td>Yes</td>
<td>2</td>
</tr>
<tr>
<td>Fa 2012</td>
<td></td>
<td>FOR 222 Environmental Conservation</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 222 Environmental Conservation</td>
<td></td>
<td>40</td>
</tr>
</tbody>
</table>

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hofstetter, Rich</td>
<td>60</td>
<td>FOR 485 Undergraduate Research</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Fa 2012</td>
<td></td>
<td>FOR 485 Undergraduate Research</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td></td>
<td>FOR 505 Forestry Seminars</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Fa 2012</td>
<td></td>
<td>FOR 692 Proseminar I</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Fa 2012</td>
<td></td>
<td>FOR 695 Advanced Studies in Forestry</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Fa 2012</td>
<td></td>
<td>FOR 699 Thesis</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 799 Dissertation</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 453 Forest Insects</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 485 Undergraduate Research</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 505 Forestry Seminar</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 553 Forest Entomology</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Semester</td>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
<td>Projects</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>--------------</td>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 699</td>
<td>Thesis</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 799</td>
<td>Dissertation</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hospodarsky,</td>
<td>70</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Denver</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 211</td>
<td>Forest Measurements</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 211</td>
<td>Forest Measurements</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 447</td>
<td>Forestry and Community</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 101</td>
<td>Forestry Introduction</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 101</td>
<td>Forestry Introduction</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 283</td>
<td>Forestry in the Wui</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 423C</td>
<td>Forest Ecosystem Planning I</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 424C</td>
<td>Forest Ecosystem Planning II</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 689</td>
<td>Professional Paper</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Huang, Ching</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 101</td>
<td>Forestry Introduction</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 500</td>
<td>Ecosystem Sci &amp; Mgt Principles</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 799</td>
<td>Dissertation</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 101</td>
<td>Forestry Introduction</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 324W</td>
<td>Forest Management II</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 324W</td>
<td>Forest Management II</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 326W</td>
<td>Forest Management IV</td>
<td>Yes</td>
<td>4</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 326W</td>
<td>Forest Management IV</td>
<td>Yes</td>
<td>4</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 799</td>
<td>Dissertation</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hunter, Molly</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 310</td>
<td>Forest Ecol for Professionals</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

377
<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fa 2012</td>
<td>FOR 310</td>
<td>Forest Ecol for Professionals</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 450</td>
<td>Fire Ecology for Professionals</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 450</td>
<td>Fire Ecology for Professionals</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Kim, Yeon-Su</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 222</td>
<td>Environmental Conservation</td>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 222</td>
<td>Environmental Conservation</td>
<td>3</td>
<td>55</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 255</td>
<td>International Wildlife Issues</td>
<td>3</td>
<td>60</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 799</td>
<td>Dissertation</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 423C</td>
<td>Forest Ecosystem Planning I</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 424C</td>
<td>Forest Ecosystem Planning II</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 633</td>
<td>Ecological Economics</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 699</td>
<td>Thesis</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 799</td>
<td>Dissertation</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Knight, Sandra</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n/a</td>
<td></td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 215</td>
<td>Writing in Forestry</td>
<td>Yes</td>
<td>2</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 215</td>
<td>Writing in Forestry</td>
<td>Yes</td>
<td>2</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 215</td>
<td>Writing in Forestry</td>
<td>Yes</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Kolb, Thomas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>50</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 313</td>
<td>Forestry Ecology I</td>
<td>Yes</td>
<td>4</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 313</td>
<td>Forestry Ecology I</td>
<td>Yes</td>
<td>4</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 314</td>
<td>Forest Ecology II</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 315</td>
<td>Silviculture Principles</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 316</td>
<td>Silviculture Applications</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 550</td>
<td>Forest Tree Ecophysiology</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 699</td>
<td>Thesis</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 799</td>
<td>Dissertation</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Term</td>
<td>Course Code</td>
<td>Course Title</td>
<td>Notes</td>
<td>Credits</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>--------------</td>
<td>-------</td>
<td>---------</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 212</td>
<td>Trees and Forests of N. America</td>
<td>Yes</td>
<td>2</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 454</td>
<td>Forest Health</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 554</td>
<td>Integrated Forest Health</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 695</td>
<td>Advanced Studies in Forestry</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 699</td>
<td>Thesis</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 799</td>
<td>Dissertation</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 101</td>
<td>Forestry Introduction</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 203</td>
<td>Project Learning Tree</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 207</td>
<td>Project Wet</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 444</td>
<td>Wilderness Mgt Professionals</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 445</td>
<td>Wilderness Management</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 445H</td>
<td>Wilderness Management H</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 689</td>
<td>Professional Paper</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 697</td>
<td>Independent Study</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 699</td>
<td>Thesis</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 203</td>
<td>Project Learning Tree</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 207</td>
<td>Project Wet</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 230</td>
<td>Multicult Prspcts Nat Res Mgt</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 325W</td>
<td>Forest Management III</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 325W</td>
<td>Forest Management III</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 326W</td>
<td>Forest Management IV</td>
<td>Yes</td>
<td>4</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 326W</td>
<td>Forest Management IV</td>
<td>Yes</td>
<td>4</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 689</td>
<td>Professional Paper</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 699</td>
<td>Thesis</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Name</td>
<td>Mathiasen, Robert</td>
<td>Miller, Cheryl</td>
<td>Moore, Margaret</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>-------------------</td>
<td>----------------</td>
<td>-----------------</td>
<td></td>
</tr>
<tr>
<td>Fall 2012</td>
<td><strong>FOR 101 Forestry Introduction</strong></td>
<td><strong>FOR 204 Project Wild</strong></td>
<td><strong>FOR 220 Intro to Forest/Range Plants</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes 3 47</td>
<td>1 16</td>
<td>2 21</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>FOR 452 Forest Pathology</strong></td>
<td><strong>FOR 220 Intro to Forest/Range Plants</strong></td>
<td><strong>FOR 220 Intro to Forest/Range Plants</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 7</td>
<td>Yes 2 24</td>
<td>Yes 2 21</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>FOR 452 Forest Pathology</strong></td>
<td><strong>FOR 220 Intro to Forest/Range Plants</strong></td>
<td><strong>FOR 220 Intro to Forest/Range Plants</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 7</td>
<td>Yes 2 24</td>
<td>Yes 2 21</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>FOR 552 Forest Tree Diseases</strong></td>
<td><strong>FOR 220 Intro to Forest/Range Plants</strong></td>
<td><strong>FOR 220 Intro to Forest/Range Plants</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 1</td>
<td>Yes 2 26</td>
<td>Yes 2 21</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>FOR 799 Dissertation</strong></td>
<td><strong>FOR 423C Forest Ecosystem Planning I</strong></td>
<td><strong>FOR 424C Forest Ecosystem Planning II</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9 1</td>
<td>Yes 3 32</td>
<td>Yes 3 32</td>
<td></td>
</tr>
<tr>
<td>Spring 2013</td>
<td><strong>FOR 101 Forestry Introduction</strong></td>
<td><strong>FOR 204 Project Wild</strong></td>
<td><strong>FOR 423C Forest Ecosystem Planning I</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes 3 90</td>
<td>1 26</td>
<td>Yes 3 32</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>FOR 250 Arizona Forests and Wildlife</strong></td>
<td><strong>FOR 424C Forest Ecosystem Planning II</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>FOR 454 Forest Health</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>FOR 554 Integated Forest Health</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>FOR 799 Dissertation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>9 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall 2012</td>
<td><strong>FOR 220 Intro to Forest/Range Plants</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes 2 21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>FOR 220 Intro to Forest/Range Plants</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes 2 24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>FOR 220 Intro to Forest/Range Plants</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes 2 21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>FOR 220 Intro to Forest/Range Plants</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes 2 22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring 2013</td>
<td><strong>FOR 204 Project Wild</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 26</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>FOR 423C Forest Ecosystem Planning I</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes 3 32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>FOR 424C Forest Ecosystem Planning II</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes 3 32</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

380
<table>
<thead>
<tr>
<th>Term</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Grading</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fa 2012</td>
<td>FOR 220</td>
<td>Intro to Forest/Range Plants</td>
<td>Yes</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 313</td>
<td>Forestry Ecology I</td>
<td>Yes</td>
<td>4</td>
<td>55</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 314</td>
<td>Forest Ecology II</td>
<td>Yes</td>
<td>3</td>
<td>55</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 697</td>
<td>Independent Study</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 799</td>
<td>Dissertation</td>
<td></td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 545</td>
<td>Rangeland Ecology &amp; Mgmt</td>
<td></td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 699</td>
<td>Thesis</td>
<td></td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 689</td>
<td>Professional Paper</td>
<td></td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 799</td>
<td>Dissertation</td>
<td></td>
<td>9</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sánchez-Meador, Andrew</th>
<th>30</th>
<th>15</th>
<th>5</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fa 2012</td>
<td>FOR 316</td>
<td>Silviculture Applications</td>
<td>Yes</td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 485</td>
<td>Undergraduate Research</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tecle, Aregai</th>
<th>50</th>
<th>30</th>
<th>20</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fa 2012</td>
<td>FOR 222</td>
<td>Environmental Conservation</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 222</td>
<td>Environmental Conservation</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 699</td>
<td>Thesis</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 799</td>
<td>Dissertation</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>On medical leave</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thode, Andrea</th>
<th>60</th>
<th>30</th>
<th>10</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fa 2012</td>
<td>FOR 251</td>
<td>Introduction to Wildland Fire</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>FOR 699</td>
<td>Thesis</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 251</td>
<td>Introduction to Wildland Fire</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>FOR 451</td>
<td>Fire Ecology and Management</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Semester</td>
<td>Instructor</td>
<td>Course</td>
<td>Year</td>
<td>Section</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------</td>
<td>-------------------------------</td>
<td>------</td>
<td>---------</td>
</tr>
<tr>
<td>Sp 2013</td>
<td>Wagner, Michael</td>
<td>FOR 699 Thesis</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Fa 2012</td>
<td>Waring, Kristen</td>
<td>FOR 689 Professional Paper</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Waring, Kristen</td>
<td>On sabbatical all of 2012-2013</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fa 2012</td>
<td>Yocom, Larissa</td>
<td>FOR 101 Forestry Introduction</td>
<td>Yes</td>
<td>3 31</td>
</tr>
<tr>
<td>Sp 2013</td>
<td></td>
<td>FOR 317 Silviculture And Fire Apps</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Adjunct Faculty Member</td>
<td>Highest Degree</td>
<td>Employer</td>
<td>Area of Expertise</td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>----------------</td>
<td>----------</td>
<td>------------------</td>
<td></td>
</tr>
<tr>
<td>Scott Abella</td>
<td>Ph.D., Northern Arizona University</td>
<td>University of Nevada Las Vegas</td>
<td>Ecological Restoration</td>
<td></td>
</tr>
<tr>
<td>Ernesto Alvarado</td>
<td>Ph.D., University of Washington</td>
<td>University of Washington</td>
<td>Wildland Fire Science, International Forestry</td>
<td></td>
</tr>
<tr>
<td>William Block</td>
<td>Ph.D., University of California, Berkeley</td>
<td>USDA Forest Service</td>
<td>Wildlife Ecology</td>
<td></td>
</tr>
<tr>
<td>Paul Bosu</td>
<td>Ph.D., Northern Arizona University</td>
<td>Ghana Forest Research Institute</td>
<td>Entomology</td>
<td></td>
</tr>
<tr>
<td>Peter Brown</td>
<td>Ph.D., Colorado State University</td>
<td>Rocky Mountain Tree-Ring Research Inc.</td>
<td>Forest Sciences, Watershed Management</td>
<td></td>
</tr>
<tr>
<td>Samuel Cushman</td>
<td>Ph.D., University of Massachusetts</td>
<td>USDA Forest Service</td>
<td>Landscape Ecology</td>
<td></td>
</tr>
<tr>
<td>Dennis Dye</td>
<td>Ph.D., University of Maryland</td>
<td>US Geological Survey</td>
<td>Geography (Remote Sensing and Biogeography/ Bioclimatology)</td>
<td></td>
</tr>
<tr>
<td>Lawrence Fisher</td>
<td>Ph.D., Cornell University</td>
<td>University of Arizona</td>
<td>Environmental Conflict resolution, Community Development</td>
<td></td>
</tr>
<tr>
<td>Paulette L. Ford</td>
<td>Ph.D., University of Arizona</td>
<td>USDA Forest Service</td>
<td>Disturbance/Ecosystem Ecology,</td>
<td></td>
</tr>
<tr>
<td>Joseph L. Ganey</td>
<td>Ph.D., Northern Arizona University</td>
<td>USDA Forest Service</td>
<td>Wildlife management, Zoology</td>
<td></td>
</tr>
<tr>
<td>Gerald J. Gottfried</td>
<td>Ph.D., University of Arizona</td>
<td>USDA Forest Service</td>
<td>Silviculture</td>
<td></td>
</tr>
<tr>
<td>Andrew Graves</td>
<td>Ph.D., University of Minnesota</td>
<td>USDA Forest Service</td>
<td>Entomology, Forest Management</td>
<td></td>
</tr>
<tr>
<td>Teryl G. Grubb</td>
<td>M.S., University of Washington</td>
<td>USDA Forest Service</td>
<td>Wildlife Biology</td>
<td></td>
</tr>
<tr>
<td>Ryan Hanavan</td>
<td>Ph.D., University of Idaho</td>
<td>USDA Forest Service</td>
<td>Entomology</td>
<td></td>
</tr>
<tr>
<td>Stephen C. Hart</td>
<td>Ph.D., University of California, Berkeley</td>
<td>University of California, Merced</td>
<td>Soil Science, Ecosystem Ecology</td>
<td></td>
</tr>
<tr>
<td>Karen Haubensak</td>
<td>Ph.D., University of California, Berkeley</td>
<td>NAU, Merriam-Powell Institute</td>
<td>Soil Science, Ecosystem Ecology</td>
<td></td>
</tr>
<tr>
<td>David W. Huffman</td>
<td>Ph.D., Northern Arizona University</td>
<td>Ecological Restoration Institute</td>
<td>Forest Restoration</td>
<td></td>
</tr>
<tr>
<td>Michael Ingraldi</td>
<td>Ph.D., Northern Arizona University</td>
<td>Arizona Game and Fish Department</td>
<td>Wildlife and Wetland Research, Survey, and Monitoring</td>
<td></td>
</tr>
<tr>
<td>Robert Keane</td>
<td>Ph.D., University of</td>
<td>USDA Forest Service</td>
<td>Wildland Fire Science</td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>Degree, University</td>
<td>Organization</td>
<td>Field</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------------------</td>
<td>-------------------------------------</td>
<td>--------------------------------</td>
<td></td>
</tr>
<tr>
<td>Daniel Laughlin</td>
<td>Ph.D., Northern Arizona University</td>
<td>University of Waikato</td>
<td>Plant Ecology</td>
<td></td>
</tr>
<tr>
<td>Christopher M. McGlone</td>
<td>Ph.D., Northern Arizona University</td>
<td>US Geological Survey</td>
<td>Fire Ecology, Invasive Species</td>
<td></td>
</tr>
<tr>
<td>Joel McMillin</td>
<td>Ph.D., Northern Arizona University</td>
<td>USDA Forest Service</td>
<td>Forest Health, Entomology</td>
<td></td>
</tr>
<tr>
<td>Mario Montes-Helu</td>
<td>Ph.D., New Mexico State University</td>
<td>Northern New Mexico College</td>
<td>Soil Physics, Tree Ecophysiology</td>
<td></td>
</tr>
<tr>
<td>Daniel G. Neary</td>
<td>Ph.D., Michigan State University</td>
<td>USDA Forest Service</td>
<td>Riparian and Wetland Ecosystems, Forest Soils, Fire Effects</td>
<td></td>
</tr>
<tr>
<td>Steven T. Overby</td>
<td>Ph.D., Northern Arizona University</td>
<td>USDA Forest Service</td>
<td>Soil Science</td>
<td></td>
</tr>
<tr>
<td>Steve Rosenstock</td>
<td>M.S., Colorado State University</td>
<td>Northern Arizona University</td>
<td>Wildlife Management</td>
<td></td>
</tr>
<tr>
<td>Carolyn Sieg</td>
<td>Ph.D., Texas Tech University</td>
<td>USDA Forest Service</td>
<td>Range and Wildlife Management</td>
<td></td>
</tr>
<tr>
<td>Robert Steidl</td>
<td>Ph.D., Oregon State University</td>
<td>University of Arizona</td>
<td>Wildlife Conservation and Management</td>
<td></td>
</tr>
<tr>
<td>Ines Talamantez</td>
<td>Ph.D., University of California, San Diego</td>
<td>University of California, Santa Barbara</td>
<td>Indigenous Cultures and Traditional Ecological Knowledge</td>
<td></td>
</tr>
<tr>
<td>John VanKat</td>
<td>Ph.D., University of California</td>
<td>Miami University of Ohio (Retired)</td>
<td>Plant Community and Landscape Ecology</td>
<td></td>
</tr>
<tr>
<td>Christina Vojta</td>
<td>Ph.D., Utah State University</td>
<td>USDA Forest Service</td>
<td>Wildlife Management</td>
<td></td>
</tr>
<tr>
<td>Amy Waltz</td>
<td>Ph.D., Northern Arizona University</td>
<td>Ecological Restoration Institute</td>
<td>Fire Ecology</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX H

SAF Document E- Individual Faculty Information

- JAMES A. ALLEN
- PAUL BEIER
- MATT A. BOWKER
- CAROL L. CHAMBERS-SPECIALIZATIONS
- WILLIAM W. COVINGTON
- STEPHEN M. DEWHURST
- BRUCE E. FOX
- PETER Z. FULE
- MONICA L. GAYLORD
- RICHARD HOFSTETTER
- DENVER C. HOSPODARSKY
- CHING-HSUN HUANG
- MOLLY E. HUNTER
- YEON-SU KIM
- THOMAS E. KOLB
- MARTHA E. LEE
- ROBERT L. MATHIASEN
- MARGARET M. MOORE
- ANDREW J. SANCHEZ-MEADOR
- AREGAI TECLE
- ANDREA E. THODE
- KRISTEN M. WARING
JAMES A. ALLEN
Executive Director – 12 month - Tenured
Date of Appointment: 2006 - Present
Specializations: Wetland Ecology & Management
Northern Arizona University-School of Forestry

EDUCATION:
1994 Ph.D. Forest Ecology, Louisiana State University, Baton Rouge, LA
Dissertation title: Intraspecific Variation in the Response of Baldcypress (Taxodium distichum) Seedlings to Salinity

1986 M.S. Natural Resource Policy and Planning, Cornell University, Ithaca, NY
Thesis title: Fuelwood Policies for Swazi Nation Land: Farm and Community Approaches for Fuelwood Production

1980 B.S. Forestry and Wildlife, Virginia Polytechnic Institute, Blacksburg, VA
A.A.S., Pre-Professional Forestry, 1978, Paul Smith's College, Paul Smiths, NY

PROFESSIONAL AND RESEARCH EXPERIENCE:
2006/Present Executive Director (7/08 - present); Interim Executive Director (3/07 - 6/08); Associate Director (7/06 - 3/07) Professor (8/08 - present); Associate Professor (7/06 - 2008) School of Forestry, Northern Arizona University, Flagstaff, AZ

2000/2006 Dean (7/00 – 6/06) Associate Professor (7/00 - 8/05); Professor (8/05 - 7/06) Forestry, Natural Resources and Recreation Division (now the School of Forestry and Natural Resources), Paul Smith’s College, Paul Smiths, NY

1996/2000 Research Ecologist/Forester
Institute of Pacific Islands Forestry, U.S.D.A. Forest Service, Honolulu, HI


1984/1986 Teaching Assistant Department of Natural Resources, Cornell University, Ithaca, NY

1981/1984 Peace Corps Volunteer (Forestry) Swaziland

TEACHING EXPERIENCE:
   PSC: Dendrology Lab 131
   PSC: Forest Health 221
   PSC: Introduction to Wildlife Management 232
   PSC: Capstone Planning 331
   PSC: New Paradigms in Forestry 331
   PSC: Advanced Silviculture 432
   NAU: Natural Resources Policy (FOR 360)
   NAU: Forestry in Developing Countries (FOR 415/515) (co-taught)
   NAU: Wetland Ecology and Management (FOR 560)

PUBLICATIONS: (Listed in reverse chronological order)

PEER-REVIEWED JOURNAL ARTICLES:


CONFERENCE PROCEEDINGS:


MISCELLANIOUS PUBLICATIONS:


- Acacia koa A. Gray (253-255)
- Laguncularia racemosa (L.) Gaertn. f. (537-539)
- Calophyllum inophyllum L. (357-359)
- Cocos nucifera L. (399-401)
- Metrosideros polymorpha Gaud. (569-571)
- Cordia subcordata Lam. (418-419)
- Rhizophora mangle L. (690-692)
- Hibiscus tiliaceus L. (508-510)
- Santalum freycinetianum Gaud. (705-707)


**SIGNIFICANT UNPUBLISHED PAPERS AND REPORTS:**


U.S. Fish and Wildlife Service. Undated. Guidelines for modifying the John Deere 7100 Max-Emerge planter to plant acorns. (This mimeographed document was prepared by J. Wessman, C. Carnathan, and myself as a handout for farmers and others interested in reforestation by direct seeding). 7 pp.

BOOK CHAPTERS:


BOOK REVIEWS:


Publications Managed Under Contract: (Served as project officer)


PRESENTATIONS: (Listed in reverse chronological order, presented by Allen unless indicated otherwise with an asterisk)

Invited:

Allen, J.A. 2011. How can universities and research institutions jointly advocate and advance excellence in forest resource education, research and outreach? Forestry Leaders Summit, University of British Columbia, Vancouver, Canada, April 27-29.


Allen, J.A. 1994. Initial performance of bottomland hardwood reforestation projects in the Lower Mississippi Valley. Special Symposium at the Southeastern Game and Fish Association Annual Meeting, Atlanta, GA.


Haynes, R.J. and J.A. Allen. 1990. Research needs for coastal forest restoration. No Net Loss and the Role of Restoration and Creation, Association of State Floodplain Managers Symposium, Jackson, MS, April 3-7. (Haynes and Allen both presented)


Howard*, R.J. and J.A. Allen. 1988. Streamside habitats in southern forested wetlands: Their role and implications for management. Southern Forested Wetlands Symposium (sponsored by the Forest Service), Orlando, FL, July 12-14. (Allen was invited but Howard presented)


Offered:


**RESEARCH FUNDING:** (Note: I have almost always had my research supported by base funds and have had little need to submit proposals for external funding).

<table>
<thead>
<tr>
<th>Project</th>
<th>Investigators</th>
<th>Sponsor</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-2013. Regeneration requirements and</td>
<td>Allen, J.A. (PI)</td>
<td>USDA Forest Service, Pacific</td>
<td>$19,961</td>
</tr>
<tr>
<td>genetic variability</td>
<td></td>
<td>Southwest Research Station</td>
<td></td>
</tr>
<tr>
<td><em>Terminalia carolinensis</em>-dominated</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>wetlands in Micronesia.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restoration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watershed Integrity</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PROFESSIONAL ACTIVITIES:

Professional Society Memberships:
Society of American Foresters (1987-present)
Society of Wetland Scientists (1987-present)

Offices Held and Board Memberships:
Policy Chair, Southwest Section of the Society of American Foresters (2013)
President-Elect, National Association of University Forest Resource Programs (NAUFRP, 2013-2014)
Congress Services Co-Chair, 2014 IUFRO Forest Congress (2012)
Education Chair, NAUFRP (2011-2012)
Chair, Southwest Section of the Society of American Foresters (2011)
At-Large Member, Executive Council, NAUFRP (2008-2011)
Board Member, American Conservation Experience (2008-present)
Member, Arizona State Forest Stewardship Committee (2008-present)
Chair, Northern Arizona Chapter of Society of American Foresters (2008)
Chair, Adirondack Chapter of New York Society of American Foresters (2004-2006)
Board Member, Northern Adirondack Chapter of the New York Forest Owners Association (2003-2006)
Board Member, Bioregional Advisory Council, National Community Forestry Center, Northern Forest Region (2000-2004)

PROFESSIONAL AND ACADEMIC RECOGNITION:
Fellow, Society of American Foresters, 2012
Alumnus of the Year, School of Renewable Natural Resources, LSU, 2009
USDA Forest Service, Region 3 Commendation, 2008 (for assistance in developing a training program at NAU for wildland fire managers in the GS-401 series)
Chair’s Commendation, New York Society of American Foresters, 2006
Xi Sigma Pi (Forestry Honor Society)
Phi Sigma (Biological Sciences Honor Society)

GRADUATE STUDENT ADVISING: (All are NAU students unless otherwise indicated; year of graduation is listed for students who have completed their degrees)

Committee Chair:
1 Student, Ph.D., Forestry, current
1 Student, M.A., Sustainable Communities, current
1 Student, M.F., Forestry, current
1 Student, M.F., Forestry, current
1 Student, M.S., Forestry, 2011

Committee Member:
1 Student, Ph.D., Biology, current
1 Student, M.S., Geology, 2011
1 Student, M.S., Forestry, 2011
1 Student, M.S., Environmental Science, 2011
1 Student, M.S., Forestry, 2010
1 Student, M.S., Forestry, 1997 (LSU)

M.F. Professional Paper Reviewer:
1 Student, 2012
1 Student, 2012
1 Student, 2012

UNIVERSITY SERVICE: (NAU only; does not include shorter-term types of service)

College and University Level:
Academic Chairs Council, 2006-present
University Curriculum Committee, 2006-2008
University Graduate Committee, 2006-2007
Environmental Caucus (2008-present)
Environmental Caucus Steering Committee (2012-present)
Merriam-Powell Research Station Advisory Committee (2007-present)
Search Committees: Dean, W.A. Franke College of Business (2011); Director, School of Earth Sciences and Environmental Sustainability (Chair, 2010-2011); Development Officer, College of Engineering, Forestry and Natural Sciences (2009-2010); Dean, College of Engineering, Forestry and Natural Sciences (2008-2009)

School of Forestry:
Curriculum Committee (Chair, 2006-present)
Landscaping Committee (2008-present)
50th Anniversary Planning/Implementation Committee (Chair, 2007-2008)
Search Committees: Assistant Professor, Wildland Fire Science (Chair, 2006-2007); Business Manager (2007 and 2010); Student Services Coordinator (Chair, 2008)
Document E: Individual Faculty Information

PAUL BEIER
Regents’ Professor – 9 month – Tenured
Date of Appointment: May 1992 - Present
Specializations: Science-based design of wildlife corridors
Northern Arizona University – School of Forestry

EDUCATION:


1973  B.A. Philosophy, Catholic University of America, Washington D.C.

PROFESSIONAL EXPERIENCE:

2012/Present  Regents Professor, Conservation Biology and Wildlife Ecology, Northern Arizona University, School of Forestry. (08/12-present)

2002/2012  Professor, Conservation Biology and Wildlife Ecology, Northern Arizona University, School of Forestry. (9/02-2012).

1992/2002  Associate Professor, (9/97-8/02); Assistant Professor, (5/92-8/97).


1985  Field Crew Leader. (05/85)-(05/85), under contract from California Fish and Game. Field surveys for endangered Truckee Barberry (Berberis sonnei), the introduced beaver (Castor canadensis), and the endemic Sierra Nevada mountain beaver (Aplodontia rufa californica). 3 refereed publications.


TEACHING EXPERIENCE:
2008/Present

BIO599 Genes to ecosystems
FOR240 Intro to Conservation Biology Semester A
FOR690 Research Methods
FOR504 Systematic Conservation Planning
FOR504 Climate-Savvy Conservation
FOR504 Conserving connectivity

REFERRED JOURNALS


**OTHER PUBLICATIONS** (§ indicates peer-reviewed book chapters)


PROFESSIONAL SOCIETIES
2011 Associate Editor, Journal of Wildlife Management
1990 Society for Conservation Biology (See Related Activities for details
1985 American Society of Mammalogists
1982 The Wildlife Society (Certified Wildlife Biologist)

RELATED ACTIVITIES
2010/Present Recovery Team for the northern jaguar, *Panthera onca*
2010/Present Science Advisory Council, Freedom to Roam
2010/Present Science Advisor to US Forest Service: Conserving marten, fisher, red fox, and wolverine in the Sierra Nevada and California Cascades
2009/Present Ecology & Transportation Committee of the Transportation Research Board of The National Academies, October 2009-present.
2004/Present Arizona Wildlife Linkage Workgroup, 2004-present. a collaboration among Arizona Game & Fish Department, Arizona Department of Transportation, Federal Highways Administration, US Forest Service, Bureau of Land Management, and others to maintain and restore wildland connectivity in Arizona.
2011/2014 Member at Large, US National Committee for DIVERSITAS.
2010/2012 Core Advisor, Yale Mapping Framework for Wildlife Conservation and Climate Change Adaptation
2010 Consultant to government of Bhutan. 2010. I developed a Framework for implementing Biological Corridors in Bhutan.
1999/2000 Fulbright Scholar, African Regional Research Program
2006/2007 Fulbright Scholar, African Regional Research Program
2003/2011 Recovery Team Member for the ocelot, *Felis pardalis*
2009-2015 Board of Governors, Society for Conservation Biology
2004 Chaired committee that developed SCB’s first Code of Ethics.
2005/2010 Chaired committee that made SCB the first professional ecological society to offset its impact on greenhouse gasses.
2001/2005 Conservation Chair of Colorado Plateau Chapter.
2008/2010 Consultant to California Department of Transportation and California Fish & Game Department. Our team produced a map and strategic plan for conserving connectivity throughout the state of California (Spencer et al. 2010, above) on time and on budget.
2005 Fellow, Aldo Leopold Leadership Program (2005). This programs trains 20 Fellows per year to become effective environmental leaders by developing skills
in collaboration, communicating with the media, and developing relationships with members of Congress.


**GRANTS**

Grants that were funded during August 2001-August 2011 (ten years). Grants are listed in chronological order starting in 2001. (Note: I started at NAU in May 1992. I did not retain records for 1992-2001; those years certainly had lower dollar amounts.)

<table>
<thead>
<tr>
<th>Grant Title</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape model of habitat use by Mexican spotted owls. US Forest Service Rocky Mountain Research Station</td>
<td>$29,000</td>
</tr>
<tr>
<td>Review of literature on the Florida Panther. Florida Fish and Wildlife Conservation Commission.</td>
<td>$57,386</td>
</tr>
<tr>
<td>Evaluation of 8 landscape linkages in the South Coast Ecoregion. South Coast Wildlands Project.</td>
<td>$19,685</td>
</tr>
<tr>
<td>Hippopotamus feeding ecology in northern Ghana. EarthWatch International. I authored this proposal on behalf of Nature Conservation Research Centre (Ghana), which received the award. The actual amount depended on subscriptions; $100K is a very conservative estimate. These dollars were a main source of income for the Wechiau Community Hippopotamus Sanctuary during 2000-2005.</td>
<td>$100,000</td>
</tr>
<tr>
<td>The South Coast Missing Linkages Project. The Wildlands Conservancy. I authored this proposal on behalf of South Coast Wildlands Project, which received the award.</td>
<td>$310,315</td>
</tr>
<tr>
<td>Bird predation, forest insects, and growth of ponderosa pine and Gambel Oak. Mission Research (McIntire-Stennis federal dollars to NAU)</td>
<td>$90,000</td>
</tr>
<tr>
<td>A survey for bare-headed rockfowl <em>Picathartes gymnocephalus</em> in Ghana. Tropenbos International.</td>
<td>$600</td>
</tr>
<tr>
<td>Conservation of elephants and antelopes in Ghana’s Red Volta River Valley. EarthWatch Institute. I authored this proposal on behalf of Nature Conservation</td>
<td>$100,000</td>
</tr>
</tbody>
</table>
Research Centre (Ghana), which received the award. The estimate is precise within about 10%. These dollars were a main source of income for this conservation project during 2005-2008.

<table>
<thead>
<tr>
<th>Description</th>
<th>Source/Grant</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bird predation, forest insects, and growth of cottonwoods.</td>
<td>National Science Foundation</td>
<td>$276,000</td>
</tr>
<tr>
<td>Dynamics of plague epizootics in prairie dog communities.</td>
<td>National Science Foundation</td>
<td>$99,094</td>
</tr>
<tr>
<td>Mountain plovers and burrowing owls nesting in Gunnison’s prairie dog colonies.</td>
<td>Arizona Game and Fish Department.</td>
<td>$65,000</td>
</tr>
<tr>
<td>Designing corridors for Arizona’s Missing Linkages.</td>
<td>Arizona Game and Fish Department,</td>
<td>$187,000</td>
</tr>
<tr>
<td>GIS tools for wildlife corridor design.</td>
<td>ERDENE TRIF (internal NAU dollars).</td>
<td>$75,000</td>
</tr>
<tr>
<td>Ecology and conservation of bare-headed rockfowl in Ghana</td>
<td>Fulbright Senior Scholar Program</td>
<td>$32,750</td>
</tr>
<tr>
<td>Developing a regional open space plan.</td>
<td>Southern California Association of Governments</td>
<td>$29,400</td>
</tr>
<tr>
<td>Evaluation tools for wildlife corridors.</td>
<td>ERDENE TRIF (internal NAU dollars).</td>
<td>$48,000</td>
</tr>
<tr>
<td>Designing corridors for a changing climate.</td>
<td>Mission Research (McIntire-Stennis federal dollars to NAU)</td>
<td>$37,000</td>
</tr>
<tr>
<td>Designing wildlife corridors for a changing climate.</td>
<td>USDA Forest Service National Competition.</td>
<td>$45,228</td>
</tr>
<tr>
<td>Rigorous estimates of landscape resistance to gene flow.</td>
<td>National Science Foundation.</td>
<td>$248,000</td>
</tr>
<tr>
<td>Impact of non-motorized recreation on wildlife.</td>
<td>Gordon and Betty Moore Foundation.</td>
<td>$430,000</td>
</tr>
<tr>
<td>Do conservation corridors work?</td>
<td>Gordon and Betty Moore Foundation.</td>
<td>$220,000</td>
</tr>
<tr>
<td>BLM Desert Connectivity project</td>
<td></td>
<td>$240,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$2,729,458</strong></td>
</tr>
</tbody>
</table>
MATTHEW A. BOWKER
Associate Professor – 9 month – Tenured
Date of Appointment: 2006 – Present
Specializations: Soil Ecosystem and Community Ecologist
Northern Arizona University – School of Forestry

EDUCATION

2006Northern Arizona University - Biological Sciences, Ph.D. with distinction
2004Northern Arizona University - Biological Sciences
1997University of Nevada-Las Vegas - Environmental Science 1997

PROFESSIONAL EXPERIENCE:

2012/Present Assistant Professor, School of Forestry, Northern Arizona University, Flagstaff, AZ
2010/Present Adjunct Faculty, Biological Sciences, University of Nevada, Las Vegas
2010/Present Adjunct Faculty, Biological Sciences, Northern Arizona University, Flagstaff, AZ
2010/2012 Ecologist, Southwest Biological Science Center, US Geological Survey, Flagstaff, AZ
2008/2010 Juan de la Cierva Fellow (post-doc), Universidad Rey Juan Carlos, Móstoles, Spain
2007/2008 Co-lecturer, Department of Biological Sciences, Northern Arizona University, Flagstaff, AZ
2007/2008 Research specialist, Center for Environmental Science and Education, Northern Arizona University, Flagstaff, AZ
2002/2006 Research assistant, Department of Biological Sciences, Northern Arizona University, Flagstaff, AZ
1996/1997 Research technician, Desert FACE facility, Nevada Test Site
1996/1996 Undergraduate teaching assistant, University of Nevada-Las Vegas

TEACHING EXPERIENCE:
2001/Present

FOR 313 Ecosystem Processes,
FOR 314 NAU undergraduate course
FOR 690 Research Methods, NAU graduate course (currently underway)
Lecturer, Biological soil crusts, Desert Institute Joshua Tree course
(Scheduled Feb 2012)
Guest-lecturer, Ecology, NAU undergraduate course
Guest-lecturer, Dryland restoration ecology, URJC graduate course
Guest-lecturer, Soil and water conservation, URJC undergraduate course
Guest-lecturer, Dryland restoration ecology, URJC grad. course
Teaching assistant, Conservation Biology, NAU grad. & undergrad. course
Guest Lecturer, Environmental Science of the San Juan River Basin NAU undergraduate course
Co-lecturer, Community genetics: tools of the trade, NAU grad. course
Co-lecturer, Environmental Science of the San Juan River Basin NAU undergrad. course
Guest Lecturer, Ecology, NAU undergrad. course
Guest Lecturer, Field Biology, CCC undergrad. course
Guest Lecturer & teaching assistant, Environmental Science of the San Juan River Basin, NAU undergrad. course
Guest lecturer, Mycology, NAU grad.-undergrad. course
Guest Lecturer & teaching assistant, Biological soil crust training seminar, Moab UT
Lecturer, Ecology of biological soil crusts, NAU grad. seminar
Workshop Instructor, Field identification of soil crust mosses & lichens, USGS training
Teaching assistant, Biological soil crust training seminar, GSENMI
Undergraduate Teaching Assistant, Principles of Modern Biology Laboratory, UNLV undergraduate course

JOURNAL PUBLICATIONS, BOOKS, & BOOK CHAPTERS

*In review:*


420


OTHER PUBLICATIONS

In review:
Bowker, M.A., Miller, M.E., Belote, R.T., and S.L. Garman. 201x. Ecological thresholds as a basis for defining management triggers for NPS vital signs – Case studies for dryland ecosystems. USGS OFR in review.


PRESENTATIONS AND POSTERS

*presenter listed first, all are oral presentations unless otherwise indicated*


Chiquoine, L., Bowker, M.A., Stark, L.R., Abella, S. 2011. Biological soil crust rehabilitation on disturbed gypsiiferous soil. 11th Biennial Conference of research on the Colorado Plateau, Flagstaff, AZ.


Bowker, M.A., Roth D. 2011. Modeling the niche of an endangered gypsophile plant (Arctomecon humilis, papaveraceae) to aid the discovery of new populations. Washington County Rare Plants Symposium, St. George Utah.


424


Will-Wolf, S. and M.A. Bowker. 2007. Lichens and biological soil crusts in ecological
restorations: where, when and why? ESA meeting, San Jose, CA.


Chaudhary, V.B., Bowker, M.A., Redman, A.E., Grace, J.B., and N.C. Johnson. 2007. Untangling the biological contributors to soil stability in semi-arid shrublands. ESA meeting, San Jose, CA


Bowker, M.A., Belnap J., Miller, M.E., Johnson, N.C., and T.D. Sisk. 2007. Spatial modeling of biological soil crusts to support range management and restoration. Departmental Seminar, Universidad Rey Juan Carlos, Area de Biodiversidad y Conservación, Móstoles, Spain (invited).


Bowker, M.A., Belnap J., and M.E. Miller. 2006. Using biological soil crusts as a rangeland health indicator and to prioritize restoration efforts. GSENM Learning from the land conference, Cedar City, UT.

Bowker, M.A. 2005. Predictive modeling of biological soil crusts as a tool for better range management. GSENM special session, Kanab, UT


Antoninka, A., Neal, S, Rauch, E. and Bowker, M.A. 2005. ORV disturbance in a riparian habitat: negative impacts and management implications for plants and arbuscular mycorrhizal communities. 8th Biennial Conference of research on the

Bowker, M.A. 2005. Structural equation modeling: a tool for better understanding linkages and interactions in soils. SES meeting, Argonne National Laboratory, IL.

Bowker, M.A. 2005. A broad overview of structural equation modeling. Presentation to Ecological Restoration Institute, Flagstaff, AZ.


Additional Training Courses:

2010 Learn the R statistical package by example (webcast by Paul Geissler), USGS-NPS online training course

2010 Structural equation modeling using Bayesian methods (Taught by James B. Grace), 1 day workshop, ESA Annual Meeting, Pittsburgh, PA

2009 Null model analysis with ECOSIM software (Taught by Nicholas J. Gotelli), 1 day workshop, Universidad Rey Juan Carlos, Móstoles, Spain

2007 A brief introduction to Bayesian and hierarchical Bayesian modeling in ecology (Taught by Kiona Ogle et al.), 1 day workshop, ESA Annual meeting, San Jose, CA

2006 Model Selection and multi-model Inference (taught by David Anderson), 2 day workshop, Northern Arizona University, Flagstaff, AZ

2005 An Introduction to Structural Equation Modeling (taught by James B. Grace), 1 day workshop, ESA Annual Meeting, Portland, OR

MENTORING

Graduate student advisees:
2012/Present 1 Student (M.S. Student, Dept. Biological Sciences, NAU)
**Graduate student committees:**

2010/Present  
1 Student (M.S. Student, School of Environment & Public Affairs, UNLV)

2010/Present  
1 Student (Ph.D candidate, Dept. Biological Sciences, NAU)

2012/Present  
1 Student (Ph. D. candidate, Dept. Biological Sciences, NAU)

**Undergraduate Interns:**

1 Student  
(B.S. Student, URM Scholar, School of Earth Sciences and Environmental Sustainability, NAU)

1 Student  
(B.S. Student, URM Scholar, Department of Biological Sciences, NAU)

**SERVICE, OUTREACH, & ENGAGEMENT IN SCIENTIFIC COMMUNITY**

Chair and organizer of conference sessions:


Consulting editor for *Plant & Soil.*

Reviewer of the Bureau of Land Management’s Colorado Plateau rapid ecoregional assessment.

Grant proposal reviews for the *American Chemical Society, Israeli-American Binational Science Foundation, Israeli Science Foundation, Biotechnology and Biosciences Research Council*

Spoke to two 7th grade classes at Flagstaff Middle School about soil ecology, desertification, and becoming a scientist.

Instruction/ design of biological soil crust course for general public at Desert Institute at Joshua Tree.

Present member of professional societies: British Ecological Society, Ecological Society of America

**GRANTS AND FELLOWSHIPS**
To be funded 2013  Barger, N., Belnap, J., Garcia-Pichel, F., Bowker, M.A., Reed, S.C., & M.C. Duniway. Achieving dryland restoration through the deployment of enhanced biocrusts to improve soil stability, fertility and native plant recruitment. SERDP. $ 2,122,689.


2011  Bowker, M.A. Are micronutrients the key to restoration of biocrust function in degraded drylands? Competitively awarded internal USGS base funds $18,218

2011  Bowker, MA. Bandelier National Park Natural Resource Condition Assessment Technical Assistance Agreement with NPS Inventory & Monitoring Program, $48,000

2010  Bowker, M.A., & Roth, D. Modeling the niche of an endangered gypsophile plant (Arctomecon humilis, papaveraceae) to aid the discovery of new populations. USGS-USFWS SSP Program. $50,181

2010  Johnson, NC, Sisk, TD, Sesnie, S, Dickson, B, Bowker, MA. Detecting the Impacts of Nitrogen Pollution on Vegetation and Soils in Grand Canyon National Park NPS Air Quality Division. $63,999

2010  Bowker, MA, Eldridge, DJ. Interactive effects of biological crusts and ecosystem engineering on arid ecosystem function. Technical assistance agreement with University of New South Wales, Australia $8,707


2008/2010  Bowker, MA. Juan de la Cierva contract, Ministry of Science & Education, Spain 70,686€


2003/2004  Bowker, M.A. Merriam-Powell Center for Environmental Research Fellowship. $7,000.

**AWARDS**

2011 Qualified for USGS Annual Employee Performance Award  
2010 USGS Annual Employee Performance Award  
2007 Emeritus Professor Outstanding Dissertation Award  
2006 Emeritus Professor Outstanding Graduate Student Award
CAROL L. CHAMBERS
Professor – 9 month – Tenured
Date of Appointment: 2007 - Present
Northern Arizona University – School of Forestry

EDUCATION:

1996  Ph.D., Oregon State University, Corvallis, Wildlife Sciences (Major), Forest Sciences (Minor)
       Dissertation Title: Response of Terrestrial Vertebrates to Three Silvicultural Treatments in the Central Oregon Coast Range
1989  M.S., University of Kentucky, Lexington, Forestry
       Thesis Title: Phenological Patterns of an East Kentucky Deciduous Forest
1979  B.S., University of Kentucky, Lexington, Biology

PROFESSIONAL EXPERIENCE:

2007/Present  Professor, School of Forestry, Northern Arizona University, Flagstaff, AZ
              Wildlife ecology and management instruction in the forestry undergraduate and graduate program (60%), research (30%) and service (10%).

2001/2007  Professor, School of Forestry, Northern Arizona University, Flagstaff, AZ
           Wildlife ecology and management instruction in the forestry undergraduate and graduate program (65 to 70%), research (20 to 25%) and service (10%).

1996/2001  Professor, School of Forestry, Northern Arizona University, Flagstaff, AZ
           Wildlife ecology and management instruction in the forestry undergraduate and graduate program (65%), research (25%) and service (10%).

1995/1996  Professor, Department of Forest Resources, Oregon State University, Corvalis, OR National Biological Service

1990/1995  Professor, Department of Forest Resources, Oregon State University, Corvalis, OR

1988/1989  Faculty Research Assistant, Department of Forest Resources, Oregon State University, Corvalis, OR

TEACHING EXPERIENCE:

2006/Present  Northern Arizona University
              FS 111 Ecology and Behavior of Bats Science
              FOR 204 Project WILD
FOR 250 Arizona Forests and Wildlife
FOR 255 International Wildlife Issues
FOR 325W Habitat Management, Forest Science B
FOR 423 Forest Management
FOR 506 Sustainability of Forest Ecosystems
FOR 514 Field Identification of Birds.
FOR 604 Wildlife Habitat Relationships.
FOR 693 Teaching Practicum
FOR 697 Scientific Writing and Publishing

Liberal studies course investigating global wildlife issues, 2001-2010, I developed this course. I also provide lectures on wildlife or habitat relationships for other courses.

Continuing Education Courses for Professionals
2008/2009 Wildlife Conservation and Management - Coordinator and instructor for USDA Forest Service Continuing Education short course
Fall 2006 International Seminar on Forest Administration and Management, Northern Arizona University School of Forestry and USDA Forest Service – Biodiversity
2001/2004 Wildlife Habitat and Plant Management - Coordinator for USDA Forest Service Continuing Education 2-week short course
1997/2007 Wildlife Habitat Analysis, USDA Forest Service Continuing Education in Ecosystem Management Module II
June 2001 Arizona Game and Fish Department School – Historic look at Arizona habitat, Parts I and II

REFERRED JOURNALS


Petriello, M. A., S. E. Hagell, and C. L. Chambers. Local ecological knowledge and environmental concerns in Nicaraguan tropical dry forest communities.


REFERRED CONFERENCE PROCEEDINGS


**GRADUATE STUDENT THESES AND DISSERTATIONS COMPLETED**


**Book Chapters**


(https://www.crcpress.com/product/isbn/9781439881354;jsessionid=bqH6h1c-760tXOOGQygwPgw_37626dd5-d89a-32c1-aef8-5f166039641c)


and socioeconomic responses to alternative silvicultural treatments. Research Contribution 46. Oregon State University, Corvallis.


Books Edited

Web Articles

Popular Articles


Research Results – Reports, Seminars, and Reviews
Large Forest Patches Increase Bat Species Diversity in a Fragmented Landscape in Nicaragua, Presentation for NAU Student Chapter of The Wildlife Society (35 attendees), (November 2012)

Bats and the Wildland Urban Interface II, Draft Final Report prepared for Arizona Game and Fish Department Arizona Bat Conservation Partnership (September 2012)

Bats, Our Nocturnal Neighbors, Presentation for Friends of Rio de Flag (25 attendees), (June 2012)

Member of 4-person peer review team commissioned by The Wildlife Society to review Restoration of Federal Forests in the Pacific Northwest (October 2011)

Federal Mine Safety and Health Act Training (August 2011)

Bats in our Backyard, Presentation for general public (20 attendees), The Arboretum at Flagstaff (May 2011)

Bats, Our Nocturnal Neighbors, Presentation for general public (35 attendees), Flagstaff-Coconino County Public Library (April 2011)
Bird Communities in Wildfire-burned Ponderosa Pine Landscapes 14 years Post Fire, Presentation for Arizona Bird Conservation Initiative (March 2011)

Bird Communities in Wildfire-burned Ponderosa Pine Landscapes 14 years Post Fire, Presentation for Kaibab National Forest (March 2011)

Bird Communities in Wildfire-burned Ponderosa Pine Landscapes 14 years Post Fire, Final Report prepared for Kaibab National Forest (March 2011)

Survey of bats, Rivas Isthmus, Nicaragua, Final Report prepared for Paso Pacífico (July 2010)

Use of artificial roosts to enhance bat habitat in wildland urban interface (WUI) areas, Final Report prepared for Arizona Game and Fish Department Arizona Bat Conservation Partnership (July 2010)

Bats: Meet Arizona Bats Live, Presentation for general public (50 attendees), Dairy Springs Campground (June 2010)

Roosting Habitat of Bats II, Final Report prepared for Arizona Game and Fish Department Heritage Project I08001 (June 2010)


Various television and newspaper articles on bats and rabies for lay audiences in northern Arizona (October-November 2009)

Wintering Bald Eagle Roosting Habitat, Final Report prepared for Arizona Department of Emergency and Military Affairs (October 2009)

Foraging and roosting ecology of sensitive bat species (spotted, Townsend’s big-eared, and big free-tailed bats) in and around Canyon de Chelly, Arizona, Final Report prepared for Canyon de Chelly National Monument (August 2009)

City Bats and Country Bats, Presentation for general public (82 attendees), Pine Grove Campground (July 2009)

City Bats and Country Bats, Presentation for general public (80 attendees), Dairy Springs Campground (June 2009)

Roosting Habitat of Bats, Final Report prepared for Arizona Game and Fish Department Heritage Project I07008 (May 2009)

Bats, Presentation for Northern Arizona University Student Chapter of The Wildlife Society (October 2008)

Solvesky, B. and C. L. Chambers. Bat roost inventory and monitoring project for Arizona Game and Fish Department Region 2. Final Report prepared for Arizona Game and Fish Department (August 2007)


Foraging and roosting ecology of 5 bat species, Presentation for Arizona Game and Fish Department, Region 2 (July 2006)

Foraging and roosting ecology of 5 bat species (spotted, Allen’s lappet-browed, Townsend’s big-eared, big free-tailed, and greater western mastiff bats) in northern Arizona, Final Report prepared for Arizona Game and Fish Department State Wildlife Grant (June 2006)

Charismatic Microfauna, Heritage Fund Advisory Committee (June 2006)

Bird in burns and bats in rat middens: a book in progress, School of Forestry Sabbatical Seminar (November 2005)

Use of Wildlife Water Developments by Birds in Southwest Arizona during Migration, Report prepared for Arizona Game and Fish Department (June 2005)

Importance of cover at desert wildlife water developments to migrating birds, Final report prepared for Arizona Birds Conservation Initiative (June 2005)

Using Mogollon vole (Microtus mogollonensis) sign to predict Mogollon vole capture rate or presence in northern Arizona, Final Report prepared for Kaibab National Forest (January 2005)

Restoration and Wildlife, Ecological Restoration Institute Seminar (April 2004)

Spotted bats (Euderma maculatum) in eastern Grand Canyon: mummified remains, marathon summer foraging patterns, and migration, School of Forestry Seminar (December 2003)

Snag dynamics of fire-killed trees on Pumpkin and Horseshoe Hochderffer Fires: What happens in the early years after wildfire, Ecological Restoration Institute Seminar (November 2003)

Status and Habitat Use of Oaks, Final Report prepared for Arizona Game and Fish Department Heritage Project I98012 (July 2002)

Literature Review of Select Arizona Rare Plants, and the Kit Fox in the Southwest prepared for North Kaibab Ranger District (January 2001)


Policy analysis of Northern Spotted Owl Recovery Plan salvage guidelines presented to Northern Spotted Owl Recovery Team (May 1992) and Willamette National Forest (June 1992)

Review of Oregon State University College of Forestry Integrated Research Project (CFIRP), coordinator (March 1992)

Field trips (about 30) to Oregon State University McDonald-Dunn Research Forest to display alternative silvicultural treatments for agencies (BLM, FS), OSU classes, and Continuing Education groups (1990-1996)

PROFESSIONAL MEETINGS – STUDENT PRESENTATIONS

2011
E. D. Mering and C. L. Chambers, Bat use of artificial roosts in ponderosa pine forest, Arizona/New Mexico Chapters of The Wildlife Society 44th Joint Annual Meeting (February), Presentation

M. A. Petriello, M. E. Lee, and C. L. Chambers, There’s a bat in my umbrella: Public perceptions, knowledge of and willingness to conserve bats in a Wildland-Urban Interface, Arizona/New Mexico Chapters of The Wildlife Society 44th Joint Annual Meeting (February), Presentation

2010
B. Vizcarr, V. Frary, L. Piest, T. Olson, C. L. Chambers and A. Calvert, Monitoring of four bat species for the Lower Colorado River Multi-Species Conservation Plan, 40th Annual Symposium of the North American Society for Bat Research (October), Presentation
E. D. Mering and C. L. Chambers, *Bat use of artificial roosts in ponderosa pine forests*, 40th Annual Symposium of the North American Society for Bat Research (October), Presentation


E. L. Kalies, B.G. Dickson, C.L. Chambers, and W.W. Covington, *Small mammal community responses to ecological restoration treatments in southwestern ponderosa pine forests, northern Arizona*, Arizona/New Mexico Chapters of The Wildlife Society 43rd Joint Annual Meeting (February), Presentation (Won Best Student Paper Award)


Petriello, M. A., S. E. Hagell, and C. L. Chambers, *The use of local ecological knowledge to enhance conservation efforts in tropical dry forests: a case study from Nicaragua*, Arizona/New Mexico Chapters of The Wildlife Society 43rd Joint Annual Meeting (February), Presentation


**2009**


Kalies, E.L., C.L. Chambers, and W.W. Covington, *Meta analysis indicates thinning and burning treatments have positive effects on wildlife densities in southwestern conifer forests*, 10th Biennial Conference Integrating Science and Management on the Colorado Plateau (October), Poster

E.D. Mering and C.L. Chambers, *Bat activity increases during summer in ponderosa pine forests in northern Arizona*, 10th Biennial Conference Integrating Science and Management on the Colorado Plateau (October), Presentation


E.D. Mering and C.L. Chambers, *Use of scent detection dogs to locate bat roosts in ponderosa pine snags*, Arizona/New Mexico Chapters of The Wildlife Society 42nd Joint Annual Meeting (February), Presentation *(Won Best Student Paper Award)*


2008

B.G. Solvesky and C.L. Chambers, *Roosts of Allen’s lappet-browed bat in northern Arizona*, Arizona/New Mexico Chapters of The Wildlife Society 41st Joint Annual Meeting (February), Presentation *(Won Best Student Paper Award)*

S. Johnson and C.L. Chambers, *Effects of forest restoration on bats in northern Arizona*, Arizona/New Mexico Chapters of The Wildlife Society 41st Joint Annual Meeting (February), Presentation


2007


S. Johnson and C.L. Chambers, *Effects of forest restoration on bats in northern Arizona*, The Wildlife Society 14th Annual Conference (September), Poster-in-Progress

2006

Frequent Fire Landscapes in the West: Linking Science, Collaboration, and Practice (October), Presentation

R. Jason M. Corbett, Carol L. Chambers, Michael J. Herder, and Elaine F. Leslie, Foraging Patterns and Roosting Sites for Female Big Free-tailed Bats (Nyctinomops macrotis) in Northern Arizona, Arizona/New Mexico Chapters of The Wildlife Society 39th Joint Annual Meeting (February), Presentation

2005
R. Jason M. Corbett, Carol L. Chambers, Michael J. Herder, and Elaine F. Leslie, Foraging Patterns and Roosting Sites for Female Big Free-tailed Bats (Nyctinomops macrotis) in Northern Arizona, Eighth Biennial Conference of Research on the Colorado Plateau (November), Presentation

R. Jason M. Corbett, Carol L. Chambers, Michael J. Herder, and Elaine F. Leslie, Foraging Patterns and Roosting Sites for Female Big Free-tailed Bats (Nyctinomops macrotis) in Northern Arizona, North American Symposium on Bat Research (October), Presentation

Stuart R. Tuttle, Tad C. Theimer and Carol L. Chambers, Effect of modified water troughs on bat use, Arizona/New Mexico Chapters of The Wildlife Society 38th Joint Annual Meeting (February), Presentation

Janet C. Lynn, Steven S. Rosenstock and Carol L. Chambers, Use of wildlife water developments by migrating songbirds in southwestern Arizona, Arizona/New Mexico Chapters of The Wildlife Society 38th Joint Annual Meeting (February), Presentation

2004
Stuart R. Tuttle, Tad C. Theimer and Carol L. Chambers, Effect of modified water troughs on bat use, North American Symposium on Bat Research (October), Presentation

Stuart R. Tuttle, Tad C. Theimer and Carol L. Chambers, Effect of modified water troughs on bat use, Wildlife Water Developments Workshop (September), Presentation

Janet C. Lynn, Steven S. Rosenstock and Carol L. Chambers, Use of wildlife water developments by migrating songbirds in southwestern Arizona, Wildlife Water Developments Workshop (September), Presentation

R. Fenner Yarborough and Carol L. Chambers, Using Mogollon vole runways to measure Mogollon vole abundance in northern Arizona, Arizona/New Mexico Chapters of The Wildlife Society 37th Joint Annual Meeting (February), Presentation

2003

Mikele. L. Painter, Carol L. Chambers, and Melissa S. Siders, *Foraging ecology of spotted bats (Euderma maculatum) on the Kaibab Plateau, Arizona*, 2nd Four Corners Regional Bat Conference (January), Presentation

Mikele L. Painter, Carol L. Chambers, and Melissa S. Siders, *Foraging ecology of spotted bats (Euderma maculatum) on the Kaibab Plateau, Arizona*, Arizona/New Mexico Chapters of The Wildlife Society 36th Joint Annual Meeting (February), Presentation

B.G. Solvesky and C.L. Chambers, *A comparison of Mexican Vole (Microtus mexicanis) runway densities in dry meadow and wet meadow habitat in northern Arizona*, Arizona/New Mexico Chapters of The Wildlife Society 36th Joint Annual Meeting (February), Poster

2002


Angela Gatto, Teryl Grubb, and Carol L. Chambers, *Prey species of red-tailed hawks (Buteo jamaicensis): an indication of competition with a sensitive raptor, northern goshawks (Accipiter gentiles), on the Kaibab Plateau, Arizona*, Arizona/New Mexico Chapters of The Wildlife Society 35th Joint Annual Meeting (February), Poster

2001

Debra Bernardos and Carol L. Chambers, *Use of ponderosa pine-Gambel oak forests by bats in northern Arizona*, The Wildlife Society 8th Annual Conference (September), Presentation


**2000**

Shaula J. Hedwall, Carol L. Chambers, and Robert L. Mathiasen, *Bird and mammal use of dwarf mistletoe-induced witches’ brooms in Douglas-fir in the Southwest*, The Wildlife Society 7th Annual Conference (September), Presentation


Debra Bernardos, Carol L. Chambers, and Michael J. Rabe, *Use of ponderosa pine/Gambel oak forests by bats in Northern Arizona*, Arizona/New Mexico Chapters of The Wildlife Society 33rd Joint Annual Meeting (February), Presentation


Victor Alm, Carol L. Chambers, and Michael J. Rabe, *Response of northern Arizona forest bats and bat roosting habitat to ecological restoration of ponderosa pine forests and artificial roosts*, Arizona/New Mexico Chapters of The Wildlife Society 33rd Joint Annual Meeting (February), Poster


Daniel P. Mummert, David H. Ellis, and Carol L. Chambers, *A reintroduction experiment involving mated pairs of adult parent-reared sandhill cranes in Arizona*, The Eighth North American Crane Workshop (January), Presentation

**1999**

Heather A. Shanes, Carol L. Chambers, Ken D. Abbott, and W. Wallace Covington, *Hantavirus in rodent populations of ponderosa pine forest restoration sites*, Society for Ecological Restoration (September), Poster
Daniel P. Mummert, David H. Ellis, and Carol L. Chambers, *The use of sandhill cranes as a surrogate species to create disjunct migratory populations of whooping cranes*, Arizona/New Mexico Chapters of The Wildlife Society 32nd Joint Annual Meeting (February), Presentation

Heather A. Shanes, Carol L. Chambers, Ken D. Abbott, and W. Wallace Covington, *Hantavirus in rodent populations of ponderosa pine forest restoration sites*, Arizona/New Mexico Chapters of The Wildlife Society 32nd Joint Annual Meeting (February), Presentation

Michael J. Rabe and Carol L. Chambers, *Bat habitat use in pinyon-juniper and grassland habitats in northern Arizona*, Arizona/New Mexico Chapters of The Wildlife Society 32nd Joint Annual Meeting (February), Presentation

1998


GRANTS AND AWARDS

2012:

Bats and gates: How Chiroptera respond to gating roost sites, Bat Conservation International, $100,000 (Pending)

Bats and wind development in northern Arizona, Arizona Game and Fish Department / NextEra, $150,000 (Pending)

Predicting viral emergence: a host shift of rabies virus from bats to carnivores in Arizona, National Science Foundation – Ecology of Emerging Infectious Diseases, $?? (Pending) (Co-PI with Dr. Gerardo Chowell-Puente, Arizona State University; Dr. Melanie Culver, University of Arizona; Dr. Tad Theimer, NAU)

Bats in Burns: Response of Chiroptera to wildfire in high elevation forests, USDA McIntire-Stennis, (Funded)

Occurrence of small mammals (bats) in high elevation forests and meadows, USDA Forest Service, Apache-Sitgreaves National Forests, $55,000 (Funded)

Genetic diversity and population status of bats in northern Arizona, National Park Service, $10,000 (Funded)

Bridging the gap between renewable energy solutions and bat conservation in Arizona, FY2013 Technology and Research Initiative Fund (TRIF), Support for Post-Doctoral Associates (SPA) Program, $100,000 (Funded)

Comparing Nicaraguan bat (Order: Chiroptera) communities in native and non-native forests, Bat Conservation International, $9,000 (Funded)
2011:
Bats and the Wildland Urban Interface – Phase II, Arizona Game & Fish Department Heritage IIAPM Program, $49,867 (Not funded)

Bats and the Wildland Urban Interface – Phase III, Arizona Game & Fish Department Heritage Urban Program, $23,984 (Not funded)

Occurrence of small mammals in high elevation forests and meadows, USDA Forest Service, Apache-Sitgreaves National Forests, $61,000 (Funded)

Translating forest science for global practitioners, National Institute of Food and Agriculture, $251,500 (Funded) (Co-PI with PI Dr. Thomas E. Kolb and others)

Bats and uranium mines: How Chiroptera tolerate exposure to radiation, Bat Conservation International, $96,000 (Funded)

2010:
Predicting viral emergence: a host shift of rabies virus from bats to carnivores in Arizona, National Science Foundation – Ecology of Infectious Diseases, $2,499,813 (Not Funded) (Co-PI with Dr. Gerardo Chowell-Puente, Arizona State University; Dr. Melanie Culver, University of Arizona; Dr. Tad Theimer, NAU)

Predicting viral emergence: a host shift of rabies virus from bats to carnivores in Arizona, Arizona Biomedical Research Commission, $171,174 (Funded) (Co-PI with Dr. Gerardo Chowell-Puente, Arizona State University and Dr. Tad C. Theimer, NAU)

Genetic analysis of small mammals, USDA Forest Service, $30,000 (Funded)

Bat survey of Fossil Creek, USDA Forest Service, $10,000 (Funded)

Effects of restoration treatments on small mammal communities in pinyon-juniper woodlands, USDA Forest Service, $10,000 (Funded)

Bats in the Burns: How Chiroptera respond to wildfire in ponderosa pine forests, USDA McIntyre-Stennis, (Not Funded)

Managing the carbon resource and providing forest ecosystem services through ecological forestry at Camp Navajo in Arizona, Department of Defense, $635,274 (Not Funded) (Co-PI with Dr. Ching-Hsun Huang and Dr. Kristen Waring)

2009:
Predicting viral emergence: a host shift of rabies virus from bats to carnivores in Arizona, National Science Foundation – Ecology of Infectious Diseases, $2,499,813 (Not funded) (Co-PI with Dr. Gerardo Chowell-Puente, Arizona State University; Dr. Melanie Culver, University of Arizona; Dr. Tad Theimer, NAU)

Genetic Diversity and Population Status of Bats in Northern Arizona, Arizona Game & Fish Department Heritage IIAPM Program, $70,665 (Program cancelled due to state budget issues)
Habitat and genetic connectivity for small mammal populations in pinyon-juniper woodlands, NAU Faculty Grant Program, $17,344 (Not funded)

Developing microsatellite markers for spotted bats: applications for monitoring and conserving populations, Arizona Bat Conservation Partnership, Arizona Game and Fish Department, $8883 (Funded but funding withdrawn due to state budget issues)

Effects of restoration treatments on small mammal communities in pinyon-juniper woodlands, USDA Forest Service, $35,000 (Funded)

Bird communities in wildfire-burned ponderosa pine landscapes 14 years post fire, USDA Forest Service, Kaibab National Forest, $14,300 (Funded)

Occurrence of Small Mammals in High Elevation Forests and Meadows, USDA Forest Service, Apache-Sitgreaves National Forest, $55,500 (Funded)

2008:
Bats and the Wildland Urban Interface – Phase II, Arizona Game & Fish Department Heritage Urban Program, $44,406 (Funded)

Bats in the Wildland-Urban Interface: Understanding Resident Perceptions, Knowledge, and Support for Conservation, USDA McIntire-Stennis, (Funded) (Co-PI with Dr. Martha Lee)

Use of artificial roosts to enhance bat habitat in wildland urban interface (WUI) areas. Arizona Game & Fish Department, $9840 (Funded)

2007:
Developing forest management recommendations for restoring the small mammal community in ponderosa pine forests in Arizona. Arizona Game & Fish Department, $30,373 (Funded). Co-Principal Investigator: Elizabeth Kalies, Ph.D. Candidate.

2006:
Bat Roosts – Phase II, Arizona Game & Fish Department Heritage IIAPM Program, $13,138 (Funded)

Bats and the Wildland Urban Interface, Arizona Game & Fish Department Heritage Urban Program, $48,465 (Funded)

Wintering Bald Eagle Roosting Habitat, USDA McIntire-Stennis, $18,000 (Funded)

RUI: Biogeographical impacts of recent bark beetle epidemics on cavity-nesting birds in Arizona, National Science Foundation, $137,757 (Funded) (Co-PI with Dr. Joy N. Mast)

Field test of bat roost survey techniques, USDA Forest Service, $28,000 (Funded)

Monitoring bats at a potential wind farm site, NAU and Foresight Wind, $5000 (Funded)

Snag Resurvey – Bridger-Knoll Fire, North Kaibab Ranger District, Kaibab National Forest, $3000 (Funded)
Wintering Bald Eagle Roosting Habitat, State of Arizona, Department of Emergency and Military Affairs, $15,000 (Funded)

Wintering Bald Eagle Roosting Habitat – Supplemental Funding, State of Arizona, Department of Emergency and Military Affairs, $7,035 (Funded)

Wintering Bald Eagle Roosting Habitat, Kaibab National Forest, $3,000 (Funded)

Wintering Bald Eagle Roosting Habitat, State of Arizona, US Fish & Wildlife Service, $3,000 (Funded)

2005:
Roosting habitat of bats, Arizona Game & Fish Department Heritage IIAPM Program, $21,711 (Funded)

Effects of forest restoration treatments on bat communities in a wildland urban interface, USDA McIntire-Stennis, $36,416 (Funded)

Effects of forest restoration treatments on bat communities in a wildland urban interface, Arizona Game & Fish Department, $40,000 (Funded)

Effects of forest restoration treatments on bat communities in a wildland urban interface, Forest Service, $25,000 (Funded)

2004:
Foraging ecology of four bat species, Arizona Game & Fish Department Heritage Program, $33,193 (Withdrawn – funding for this project was received from Arizona Game & Fish Department)

Foraging and roosting ecology of 5 bat species (spotted, Allen’s lappet-browed, and Townsend’s big-eared bats, big free-tailed and western mastiff bats) in northern Arizona, Arizona Game & Fish Department, $35,130 (Funded)

Ecology of spotted bats (Euderma maculatum) in the Southwestern United States as determined from living and mummified bats, National Geographic Society, Proposal, $14,998 (Not funded)

Roosting ecology of spotted bats in northern Arizona, Bat Conservation International, $4,951 (Not funded)

Bat Roost Inventory in Region 2, Arizona Game and Fish Department, $35,000 (Funded)

Importance of cover at desert wildlife water developments to migrating birds, Arizona Birds Conservation Initiative, $9,996 (Funded)

Importance of desert wildlife water developments to migrating passerine birds, Arizona Game & Fish Department, Addendum, $10,000 (Funded)

The importance of wildlife water developments to migrating songbirds in southwestern Arizona USDA McIntire-Stennis, $16,725 (Not funded)
Roost locations of spotted bats in northern Arizona, NAU Intramural Grant Program, $5,500 (Funded)

Foraging and roosting habitat of spotted bats and Allen’s lappet-browed bats in northern Arizona, Arizona Game and Fish Department, $15,633 (Not funded)

2003:
Importance of desert wildlife water developments to migrating passerine birds, Arizona Game & Fish Department, $60,000 (Funded)

Foraging and habitat use of spotted bats near Grand Canyon, Arizona, Arizona Game & Fish Department, $28,071 (Not funded)

Summer movements and genetics of spotted bats in eastern Grand Canyon, Arizona, NAU Intramural Grant Program, $7,545 (Funded)

2002:
Effects of ungulate grazing on Mexican voles in northern Arizona, Kaibab National Forest, $8,000 (Funded)

Effects of ungulate grazing on Mexican voles in northern Arizona, USDA McIntire-Stennis, $16,725 (Funded)

Modeling Diurnal Breeding Bird Use in Wildfire-Burned Ponderosa Pine Landscapes, Coconino National Forest, $29,545 (Not funded)

Modeling Diurnal Breeding Bird Use in Wildfire-Burned Ponderosa Pine Landscapes, Kaibab National Forest, $9,931 (Not funded)

2001:
Effects of prescribed fire on Mexican spotted owl prey, Prescott National Forest, $74,000 (Not funded)

Using dead wood as monitoring indicators for wildlife, Southwest Fire Initiative, Bureau of Land Management, $69,834 (Funded)

Effects of ungulate grazing on small mammals in cold temperate wetlands, USDA Forest Service, $17,600 (Funded)

2000:
Impacts of forest management and grazing on Mexican spotted owl prey, Arizona Game and Fish Department Heritage Program, $25,899 (Not funded)

Effects of ungulate grazing on small mammals in cold temperate wetlands, USDA Forest Service, $5000 (Funded)

Relating Decay Rate to Cavity-Nesting Bird Use of Ponderosa Pine Snags, NAU Intramural Grant Program, $9000 (Funded)
Wildlife habitat relationships on the North Kaibab Ranger District, Kaibab National Forest, $20,000 (Funded)

Forest restoration in the Sierra Madre Occidental, Mexico, National Science Foundation, $803,871 (Co-PI with Drs. Peter Z. Fulé and W. Wallace Covington) (Not funded)

Foraging ecology of red-tailed hawks sympatric with northern goshawks on the Kaibab Plateau, Arizona, USDA Forest Service, $7000 (Funded)

Bird diversity in dwarf mistletoe-infested and uninfested ponderosa pine forests in northern Arizona, USDA Forest Service, $25,140 (Continuation of project) (Co-PI with Dr. Robert Mathiasen) (Funded)

Characteristics of Gambel Oak Roosts Used by Reproductive Bats in Northern Arizona, USDA Forest Service, $2,000 (Funded)

Effects of ungulate grazing on small mammals and amphibians in cold temperate wetlands, USDA Forest Service, $2000 (Funded)

1999:
Snag dynamics in ponderosa pine ecosystems of northern Arizona, NRICGP, $121,172 (Co-PI with Dr. Joy Nystrom Mast) (Not funded)

Influence of habitat quality on Abert squirrel fitness, dispersal, and habitat selection in ponderosa pine ecosystems, USDA McIntire-Stennis and USDA Forest Service, $28,000 (Funded)

Wildlife use of dwarf mistletoe-induced witches’ brooms in ponderosa pine forests in northern Arizona, USDA McIntire-Stennis and USDA Forest Service, $28,000 (Co-PI with Dr. Robert Mathiasen) (Funded)

Snag Dynamics in Ponderosa Pine Ecosystems of Northern Arizona, Organized Research, Northern Arizona University, $11,090 (Funded)

Influence of Habitat Quality on Abert’s Squirrels in a Ponderosa Pine Ecosystem, USDA Forest Service, $7000 (Funded)

Use of the TreeTop Peeper II to Measure Abert’s Squirrel Fecundity, Christensen Designs, Co-PI on a Student Equipment Grant awarded to Matthew Sieg, Equipment loan valued at $4000 (Funded)

Snag Dynamics, Use, and Associated Bird Communities in Wildfire-Burned Ponderosa Pine Landscapes, USDA Forest Service, $8900 (Funded)

Bird diversity in dwarf mistletoe-infested and uninfested ponderosa pine forests in northern Arizona, USDA Forest Service, $33,595 (Co-PI with Dr. Robert Mathiasen) (Funded)

1998:
Forest Restoration in the Sierra Madre Occidental, Mexico, National Science Foundation, $362,086 (Co-PI with Drs. Peter Z. Fulé and W. Wallace Covington) (Not funded)
Characteristics of Gambel Oak Roosts Used by Reproductive Bats in Northern Arizona, Bat Conservation International, $3,661 (Funded)

Modeling Bird Habitat Use in Wildfire-Burned Ponderosa Pine Landscapes, Organized Research, Northern Arizona University, $11,000 (Funded)

Historic Reconstruction of Pinyon-Juniper Forests on the Colorado Plateau using GIS and Image Processing, Organized Research, Northern Arizona University, $17,230 (Co-PI with Dr. Joy Nystrom Mast) (Funded)

Bird Diversity in Dwarf Mistletoe-Infested and Uninfested Ponderosa Pine Forests, USDA McIntire-Stennis, $28,000 (Co-PI with Dr. Robert Mathiasen) (Funded)

Wildlife Use of Dwarf Mistletoe-Induced Witches’ Brooms in Douglas-fir, USDA Forest Service, $2500 (Co-PI with Dr. Robert Mathiasen) (Funded)

Changes in Pinyon Pine-Juniper Forests since Euro-American Settlement, Long Term Ecological Program, National Science Foundation, $252,000 (Co-PI with Drs. Joy Nystrom Mast and others) (Not funded)

1997:
Modeling Snag Dynamics for Wildlife Habitat, POWRE Program, National Science Foundation, $74,992 (Not funded)

Status and Habitat Use of Oaks, Arizona Game and Fish Department Heritage Program, $40,250 (Funded)

Characteristics of Gambel Oak that Contribute to Use by Wildlife, Organized Research, Northern Arizona University, $12,905 (Funded)

Snag Dynamics, Use, and Associated Bird Communities in Wildfire-Burned Ponderosa Pine Landscapes. USDA McIntire-Stennis, $54,000 (Funded)

Ecological and Socioeconomic Aspects of Alternative Silvicultural Treatments, College of Forestry Integrated Research Project, Oregon State University, $17,000 (Funded)

Bird and Mammal Use of Dwarf Mistletoe-Induced Witches’ Brooms in the Southwest, Co-authored with Dr. Robert Mathiasen, USDA McIntire-Stennis, $54,000 (Funded)

Bat Habitat Use in Pinyon-Juniper and Grassland Habitats in Northern Arizona, Co-PI on a Student Grant awarded to Michael J. Rabe, $2500 (Funded)

1996:
Use of Artificially-Created Douglas-Fir Snags by Cavity-Nesting Birds, College of Forestry Integrated Research Project, Oregon State University, $33,000 (Funded)

Small Mammal and Amphibian Diversity and Abundance in Cold Temperate Wetland and Riparian Habitat, Arizona Game and Fish Department Heritage Program ($93,680) (Not funded)
Professional Meetings, Symposia, Conferences, and Workshops

2012
North American Symposium on Bat Research (October), Speaker, *Large forest patches increase bat species diversity in a fragmented landscape in Nicaragua*

2011
Eleventh Biennial Conference of Research on the Colorado Plateau (October), Speaker, *Bird communities in wildfire-burned ponderosa pine forest*

New Mexico Chapter of The Wildlife Society, (October), Speaker, *Bird communities in wildfire-burned ponderosa pine forest*


E. L. Kalies, C. L. Chambers, and S. R. Rosenstock, *Multi-season occupancy modeling: applications to avian-habitat relationships*. Arizona/New Mexico Chapters of The Wildlife Society 44th Joint Annual Meeting (February), Presentation

Arizona/New Mexico Chapters of The Wildlife Society 44th Joint Annual Meeting (February), Speaker, *Small mammals in pinyon-juniper woodlands and grasslands in northern Arizona*

2009
Association of American Geographers 2009 Annual Meeting (March), Mast, J. N. and C. L. Chambers, *Biogeographical impacts of bark beetle epidemics in the Southwest*

Arizona/New Mexico Chapters of The Wildlife Society 42nd Joint Annual Meeting (February), Invited Speaker, Telemetry Workshop, *Bat and VHF Telemetry*

2007
Western Bat Working Group (April), Poster, *A habitat model for the spotted bat in Arizona*

2006
North American Symposium on Bat Research (October), Speaker, *Movement Areas for Spotted Bats (Euderma maculatum), Northern Arizona*

Arizona/New Mexico Chapters of The Wildlife Society 39th Joint Annual Meeting (February), Speaker, *Foraging areas for female and male spotted bats (Euderma maculatum), northern Arizona*

Wakonse Teaching Retreat (May 2006); 4-day faculty retreat for outstanding teachers in higher education
2005
Eighth Biennial Conference of Research on the Colorado Plateau (November), Invited Speaker, Long-term cave roosting and diet of spotted bats (Euderma maculatum) in northern Arizona as indicated by stable isotopes from mummified remains and live bats

Eighth Biennial Conference of Research on the Colorado Plateau (November), Speaker, Foraging areas for female and male spotted bats (Euderma maculatum), northern Arizona

Eighth Biennial Conference of Research on the Colorado Plateau (November), Herder, M. J., C. L. Chambers, R. J. M. Corbett, and J. W. Prather. Roosting sites of spotted bats (Euderma maculatum) in northern Arizona

Western Bat Working Group (March), Speaker, Foraging and roosting sites for male spotted bats (Euderma maculatum), northern Arizona

2004
North American Symposium on Bat Research (October), Speaker, Foraging Distances of Spotted Bats (Euderma maculatum) at Marble Canyon, Northern Arizona

The Wildlife Society 11th Annual Conference (September), Speaker, Foraging and roosting sites for male spotted bats (Euderma maculatum), northern Arizona

The Wildlife Society 11th Annual Conference (September), Poster, Diet of live and mummified spotted bats in northern Arizona as indicated by stable isotopes

Ecological Society of America 89th Annual Meeting (August), Hayes, J. P., M. A. Stoddard, and C. L. Chambers. Influence of alternative silvicultural practices on songbirds in western Oregon

Ecological Society of America 89th Annual Meeting (August), Poster, Diet of live and mummified spotted bats in northern Arizona as indicated by stable isotopes

Arizona/New Mexico Chapters of The Wildlife Society 37th Joint Annual Meeting (February), Speaker, Foraging Distances of Spotted Bats (Euderma maculatum) at Marble Canyon, Northern Arizona

Arizona/New Mexico Chapters of The Wildlife Society 37th Joint Annual Meeting (February), Poster, Diet of live and mummified spotted bats (Euderma maculatum) as indicated by stable isotopes

Arizona/New Mexico Chapters of The Wildlife Society 37th Joint Annual Meeting (February), Poster, Mummified remains of spotted bats (Euderma maculatum) indicating historic roosting habitat in eastern Grand Canyon, Arizona

2003
33rd Annual North American Symposium on Bat Research (October), Poster, Mummified remains of spotted bats (Euderma maculatum) indicating historic roosting habitat in eastern Grand Canyon, Arizona

Southwest Fire Initiative Conference (April), Speaker, Dead wood, wildlife habitat, and forest management
2002
Society for Range Management Ecological Restoration in the Southwest Ponderosa Pine Forests Symposium (August), Invited Speaker, *Effects of Restoration on Animal Species*

2001
Arizona/New Mexico Chapters of The Wildlife Society 34th Joint Annual Meeting (February), Speaker, *Effects of ungulate grazing on small mammals in cold temperate wetlands in northern Arizona*

2000
Arizona/New Mexico Chapters of The Wildlife Society 33rd Joint Annual Meeting (February), Speaker, *Forest Management and the Dead Wood Resource in Ponderosa Pine Forests: Effects on Vertebrates*

1999

Arizona/New Mexico Chapters of The Wildlife Society 32nd Joint Annual Meeting (February), Speaker, *Developing Forest Restoration Plans to Include Wildlife Objectives*

1998
Long Term Silvicultural Research Sites Workshop (October), Speaker, *CFIRP: The First 10 Years*

The Wildlife Society 5th Annual Conference (September), Invited Speaker, *Setting Restoration Objectives for Wildlife: What do we need to know?*

1997
Uneven-aged Management – Concepts and Applications (September), Invited Speaker, *Implications of Alternative Silvicultural Systems for Wildlife*

IUFRO Interdisciplinary Uneven-Aged Silviculture Symposium & Field Tour (September), Speaker, *Converting from Even- to Uneven-Aged Stand Structure in Pacific Northwest Coniferous Forests – Implications for Wildlife*

1995
Managing Forest Stands and Landscapes for Ecosystem Values (March), Invited Speaker, *Species Habitat Considerations; Responses of Wildlife to Silvicultural Systems*

Society for Northwestern Vertebrate Biology (March), Invited Speaker, *Diurnal Breeding Bird Response to Alternative Stand Management in the Central Oregon Coast Range*

1994
Society for Northwestern Vertebrate Biology (March), Invited Speaker, *Interpreting Bird Response to Stand-Level Alternative Silvicultural Treatments*
1993
Western Forestry and Conservation Association (September), Invited Speaker, with John Tappeiner, *Stand Management Alternatives for Multiple Resource Values*

Master Woodland Manager Mini-College (September), Invited Speaker, *Practical Strategies for Ecosystem Management on Small Woodland Properties: Wildlife and Forest Management*

Uneven-Aged Methods for Ecosystem Management: Forest Health, Fire, Wildlife (June), Invited Speaker, *Wildlife, Biodiversity, Fragmentation*

1992
Habitat Futures 1992, USDA Forest Service, British Columbia Ministry of Forests and Ministry of Environment, Lands, and Parks (October), Invited speaker, *Biodiversity Planning and Management: Local/Stand Scale*


Regional Alternative Silviculture Meeting (May), Organizer

The Wildlife Society (February), Invited speaker, *Response of Terrestrial Vertebrate Communities to Three Alternative Silvicultural Systems in the Oregon Coast Range*

1991
Regional Alternative Silviculture Meeting (November), Invited Speaker, *Response of Bird Communities to Three Alternative Silvicultural Systems in the Oregon Coast Range*

1990
Northwest Scientific Association (March), Speaker, *Terrestrial Vertebrate Communities of Red Alder in the Oregon Coast Range*

PROFESSIONAL SERVICES

Wildlife Roundtable Discussion Co-Chair, 4th International Wildlife Management Congress, Durban, South Africa (2010-2011)
Arizona Chapter of The Wildlife Society, Techniques Workshop, Presentation and hands-on training for students from Arizona State University, Northern Arizona University, and University of Arizona (March 2011) *Wildlife Telemetry and Handheld GPS Techniques* (36 student attendees)
Wildlife Program and Local Arrangements Chair, Arizona/New Mexico Chapters of The Wildlife Society 43rd Joint Annual Meeting (2009-2010)
Associate Editor for Journal of Wildlife Management (2004-2006)
Wildlife Program Chair, Arizona/New Mexico Chapters of The Wildlife Society 39th Joint Annual Meeting (2005-2006)
Board Member, Arizona Chapter of The Wildlife Society (2000-2001)
Faculty Advisor, Northern Arizona University Student Chapter The Wildlife Society (2005-2008)
Northern Arizona University Student Chapter The Wildlife Society, Invited Speaker (April 2001)
Hantavirus, Rabies, and Plague – Avoiding Death in Arizona
Mexican Spotted Owl Upper Gila Mountains Recovery Unit Working Team Member (Alternate for Dr. Paul Beier 1998-1999; Team Member 1999-2001)
Vertebrate Monitoring Workshop, Sonoran Desert Institute, Tucson (July 2003), Panel to develop parameters for ecological monitoring
Consortium Member, Great Basin Biological Research Conference (1999-2000)
Grand Canyon National Park, Presentation for Interpretive Staff (May 2003) Small Mammals and Hantavirus and Bats of Arizona and the Grand Canyon National Park
University of Arizona, Invited Speaker (March 2001) Wildlife, Forestry, and Disturbing Events
Sigma Xi, Invited Speaker (April 2000) The Dangers of Wildlife Work in Arizona (or How to Die in the Southwest)
Sensitive Bat Species Project, Grand Staircase-Escalante National Monument, Utah (July 2003, Summer 2004)
Greater Western Mastiff Bat Roosting Habitat Project, Kaibab Plateau, North Kaibab Ranger District, Arizona (1999)
Board Member, Northern Arizona Audubon Society (2000-2001)
Audubon Society (1997) Assisted with program development; arranged for scheduling of several School of Forestry students to present research at Audubon meetings

University
Institutional Animal Care and Use Committee (July 2007-June 2013)
CEFNS Strategy Committee (2012-13)
Associate Vice President for Research Search Committee (2011)
Provost’s Academic Computing Advisory Council (2005-2008)
Northern Arizona University Intramural Grant Program (formerly Organized Research Committee) (1997-2003, 2005-06, 2007-08)
Center for Environmental Sustainability Committee (1999)

School of Forestry
Semester B Coordinator (2013)
Faculty Status Committee (2011-2012)
Curriculum Committee (2011-2012)
Curriculum Review Committee (2011-2012)
Annual Review Committee (2009-2011)
Ecosystem Ecology Search Committee (2008)
Forest Management Search Committee (2007)
Information Technology (Chair) (2005-present)
Strategic Plan (2003-2004)
Native American Advisory Committee (2003-2004)
Faculty Status Committee (2001-2002)
Mission Research Board, School of Forestry (1997, 2000-2001)
Chair’s Advisory, School of Forestry (1997-1998, 1999-2000)
Faculty Workload Committee, School of Forestry (1999)
School of Forestry Seminar Series on Sustainability (Fall 1998) (I organized a 12 speaker series; approximately 700 attended; two courses used this seminar series as part of their class schedule)
School of Forestry Seminar Series (Spring 1998) (I served as student advisor for a group of 4 students who organized and conducted the 14-speaker seminar series; approximately 350 attended)
School of Forestry Seminar Series on Ecological Restoration (Fall 1997) (I organized a 12 speaker series; approximately 1000 attended; two courses used this seminar series as part of their class schedule)

PROFESSIONAL SOCIETIES

Western North American Naturalists (2008 – present)
Southwestern Association of Naturalists (2005 – present)
Western Bat Working Group (2005 – present)
Cooper Ornithological Society (1990 – 2005)

HONORS

Registry of Distinguished Students, College of Agriculture, Oregon State University, 1995
The Wildlife Society Oregon Chapter Advanced Graduate Student Scholarship, 1995
Phi Eta Sigma, Freshman Honor Society

ADVISING EXPERIENCE:

High School Student Research Projects
2004  1 Student, Bats in northern Arizona (completed)

Undergraduate Student Research Projects
2011  1 Student, REU Program, Use by bats of artificial roosts in ponderosa pine forests (completed)
2009  1 Student, Does prey diversity enhance predator diversity in a ponderosa pine forest food web? (completed)
2003  1 Student, A comparison of Mexican vole (Microtus mexicanus) runway densities in dry meadow and wet meadow habitat in northern Arizona (completed)
2000  1 Student, Effect of roads on Gambel oak habitat availability (completed)
1999  1 Student, Bat use of artificial bark in ponderosa pine forests in northern Arizona (completed and published) Shawn Knox, Habitat association of the sagebrush lizard (Sceloporus graciosus): Potential responses of an ectotherm to ponderosa pine forest restoration (completed and published)
1998  1 Student, Hantavirus in rodent populations of ponderosa pine forest restoration (completed)

Graduate Students
Students for whom I have served or now serve as major professor:

<table>
<thead>
<tr>
<th>Degree Completion (or projected year)</th>
<th>1 Student, MF *</th>
<th>1 Student, MS</th>
<th>1 Student, PhD</th>
<th>1 Student, MS</th>
<th>1 Student, MS</th>
<th>1 Student, PhD</th>
<th>1 Student, MS</th>
<th>1 Student, MS</th>
<th>1 Student, MS</th>
<th>1 Student, MS</th>
<th>1 Student, MS</th>
<th>1 Student, MS</th>
</tr>
</thead>
</table>
1 Student, MS *  2003
1 Student, MS *  2002
1 Student, MS    2002
1 Student, MS    2002
1 Student, MS    2001
1 Student, MS *  2001
1 Student, MS    2001
1 Student, PhD   2001
1 Student, MS*   2000
1 Student, MS *  2000
1 Student, MS*   2000
1 Student, MS    1999
1 Student, MS    1998
1 Student, MS (not completed)
1 Student, MS (not completed)
* = co-adviser

Students for whom I have served or now serve as committee member:

Degree Completion (or projected year)

1 Student, MS (Biology) -- (2015)
1 Student, MS (Biology) -- (2014)
1 Student, MS (Biology) -- (2014)
1 Student, MS (Biology) -- (2013)
1 Student, PhD -- (2013)
1 Student, PhD -- (2013)
1 Student, MS (Arizona State University) (2013)
1 Student, MS (Biology) 2012
1 Student, MS (Biology) 2012
1 Student, MS (Texas Tech University) 2012
1 Student, PhD 2012
1 Student, PhD (Biology) 2011
1 Student, PhD 2010
1 Student, MS 2007
1 Student, MS 2006
1 Student, MS (Biology) 2005

1 Student, PhD (Biology) 2004
1 Student, MS (Biology) 2003
1 Student, MS 2003

1 Student, MS 2002

1 Student, MS (Biology) 2001
1 Student, PhD 2000
1 Student, PhD (Biology) 2000
1 Student, MS 1998
1 Student, MS 1998
1 Student, MS (not completed)
WILLIAM W. COVINGTON
Regents’ Professor and Executive Director – 9 month – Tenured
Date of Appointment: 1997 – Present
Northern Arizona University - Ecological Restoration Institute

EDUCATION:


PROFESSIONAL EXPERIENCE:
1997/Present Executive Director and Founder, The Ecological Restoration Institute, Northern Arizona University, Flagstaff, AZ
1995/Present Regents’ Professor of Forest Ecology, Northern Arizona University
1987/1995 Professor of Forest Ecology, Northern Arizona University
1979/1987 Associate Professor of Forest Ecology, Northern Arizona University
1985 Land Management Planning Analyst, USDA Forest Service
1983/1984 Research Forester, Rocky Mountain Research Station, USDA Forest Service
1975/1979 Assistant Professor of Forest Ecology, Northern Arizona University
1972/1975 Graduate Research Specialist, Hubbard Brook Ecosystem Study, Yale University
1970/1972 Graduate Research Assistant, Tesuque Watershed Ecosystem Study, University of New Mexico
SELECT RECENT REFERRED PUBLICATIONS:


**PRESENTATIONS**


**Current Research Interests**

- Ecological Restoration
- Fire ecology and Management
- Ecological Modeling
- Ecosystem Management
- Sustainable Forestry

**Related Professional Activities and Recognition**

- 2012/Present Member representing the scientific community, USFS Planning Rule National Advisory Committee.
- 2004/Present Arizona Governor’s Forest Health Advisory Council.
- 1994-Present Invited testimony before Congressional Committees.
- 2009 Society for Ecological Restoration International (SERI), Theodore M. Sperry Award, for meritorious achievement and service.
2000/2003  National Commission on Science for Sustainable Forestry, NCSE, Charter
Commission Member.
1996/2003  Co-Chair, Science and Policy Working Group, Society for Ecological Restoration
(SERI).
1998      Lead author on interagency restoration ecology synthesis paper.
1999      Governor’s Pride in Arizona Award for Environmental Leadership.
1972-1975  Sterling Graduate Fellow, Yale University.
1982/1989/  Outstanding Teaching Scholar Award, Northern Arizona University
1997
Document E: Individual Faculty Information

STEPHEN M. DEWHURST
Associate Professor-Tenured 9 Month
Date of Appointment: 2003 - Present
Northern Arizona University - School of Forestry

EDUCATION:
1996 Ph.D. School of Forestry, Northern Arizona University. Dissertation Title: A Decision Support Approach for Hierarchical Forest Ecosystem Management.
1985 B.A., Double Major: Geography and Anthropology, University of California, Santa Barbara. Graduation with Highest Honors (GPA 3.89 on 4.0 scale)
1982 A.A., Freshman/Sophomore-level University Preparatory Program, Santa Rosa Junior College, California

PROFESSIONAL EXPERIENCE:
2007/Present Associate Professor, School of Forestry, Northern Arizona University.
2003/2007 Assistant Professor, School of Forestry, Northern Arizona University.
1995/2003 Assistant Professor, Forestry Programme, University of Northern British Columbia.
1995/1996 Lecturer, Forestry Programme, University of Northern British Columbia.
1990/1995 Senior Research Specialist, School of Forestry, Northern Arizona University.
1988/1990 GIS Applications Specialist, TYDAC Technologies Corporation, Washington DC, USA and Ottawa Canada
1988 Instructor, University of Minnesota. Teaching Responsibility for FR5262, Remote Sensing of Natural Resources, a graduate-level survey course covering a range of remotes sensing and GIS topics.
1987 Teaching Assistant, University of Minnesota. Lab Instructor for FR5200, Air Photo Interpretation.
1985/1988 Research Assistant, University of Minnesota. Support for faculty and staff research activities in the Remote Sensing Laboratory, College of Forestry.
Field Assistant, Environmental Studies Program, University of California, Santa Barbara. Field data collection (plant identification, measurements, field survey, etc…) for ecosystem remote sensing project conducted by NASA/Johnson Spaceflight Center near Ely, Minnesota.

PAPERS (PEER REVIEWED)


GUIDEBOOKS (PEER REVIEWED)


PRESENTATIONS


Dewhurst, S.M..(1999) Strategic forest planning: why do it?. Silviculture Institute of British Columbia, Module 5, Strategic-Level Forest Analysis. Prince George, BC.


**PROFESSIONAL AFFILIATIONS**

Society for Range Management

**FELLOWSHIPS**

1986/1988 NASA Graduate Student Researcher, Earth Resources Branch, Goddard Spaceflight Center, Greenbelt, MD, USA.

**GRANTS RECEIVED**


(2006) NAU/TRIF. Making a more viable business of land stewardship contracting through improved information and analysis. $25,000. Status: Not Funded


- Amount Requested: $15,000 per year for 4 years ($60,000 total)
- Status: Approved, Project in Progress.


- Amount Requested: $181,000 over 2 years
- Status: Approved, project completed


- Amount Requested: $192,000 over 2 years
- Status: Approved, project completed


- Amount Requested: $10,000
- Status: Approved, project completed

(1998) Infrastructure Proposal to Canada Foundation for Innovation (High Performance Computing)

- Amount Requested: $541,000 (total value $1,200,000 with partnership/matching funds)
- Status: Funded


- Amount Requested: $262,000
- Status: Approved, project completed


- Amount Requested: endowment to return $161,000 per annum
- Status: *Revised Proposal Funded*

(1997) Letter of Intent to Forest Renewal BC – Endowed Chair in Forest Growth and Yield

- Amount Requested: endowment to return $161,000 per annum
- Status: *Funded, Position Filled*


- Amount requested: $201,884
- Status: *Approved, Project Completed*
Document E: Individual Faculty Information

BRUCE E. FOX
Professor of Forest Management – 9 month – Tenured
Date of Appointment: 1998 – Present
Northern Arizona University – School of Forestry

EDUCATION AND CERTIFICATION:


1975  Bachelor of Science, Forestry (with honors). University of California, Berkeley.

1996/Present  Registered Professional Forester, California.

PROFESSIONAL EXPERIENCE:


2001/2002  Chair, School of Forestry. Northern Arizona University.

1999/2001  Interim Chair. Leadership and administrative responsibility for School of Forestry.

1998/Present  Professor, Forest Management, July 1998 to present; Associate Professor, August


1986/Present  Consultant. 1986 to present. Forestry and corporate management consultant, forest products and aerospace industries.
TEACHING EXPERIENCE:

2008/Present  Professor, School of Forestry, Northern Arizona University, Flagstaff, AZ
    FOR 215 WRITING IN FORESTRY
    FOR 101 FORESTRY INTRODUCTION
    FOR 215 WRITING IN FORESTRY
    FOR 222 ENVIRONMENTAL CONSERVATION
    FOR 324W FOREST MANAGEMENT II (Biometrics Module)
    FOR 423C FOREST ECOSYSTEM PLANNING I (Team taught)
    FOR 424C FOREST ECOSYSTEM PLANNING II (Team taught)
    FOR 250 ARIZONA FORESTS AND WILDLIFE
    FOR 250H AZ FORESTS & WILDLIFE-HONORS
    FOR 413C FOREST ECOSYSTEM ASSESSMENT I (Team taught)
    FOR 414C FOREST ECOSYSTEM ASSESSMENT II (Team taught)
    FOR 485 UNDERGRADUATE RESEARCH (Team taught)
    FOR 599 CONTEMPORARY DEVELOPMENTS (Team taught)
    FOR 485 UNDERGRADUATE RESEARCH (Team taught)

REFEREED PUBLICATION:


SERVICE (selected list):

School/Department of Forestry
2011/Present  Curriculum Committee.
2011/2012  Chair, Forest Biostatistics Faculty Search Committee.
2009/2013  Faculty Status Committee.
1999  Chair, Coordinator of Recruitment, Retention, and Placement Search Committee.
1997/2002  Member, Curriculum Review Committee.
1996  Co-chair, Silvicultural Operations Faculty Search Committee.
1994/1999  Coordinator of Academic Programs.
1994  Chair, Departmental Chair Search Committee.
1993/1999  Coordinator of Graduate Studies.

University
2013  Acting Chair
2012  Vice Chair
2012  Chair, Director of Liberal Studies Search Committee.
2011/2013  Faculty Status Committee, CFENS.
2010/Present Libera l Studies Committee.
2010/Present Chair, Assessment Committee.
2010 Summer Assessment Committee
2010 Summer Subcommittee.
2009/Present University Assessment Committee.
2008/2011 Faculty Senate
2008/2009 Graduate Committee.
                  Faculty Development Advisory Committee

COMMUNITY AND PROFESSIONAL SERVICE (selected):

2010/Present Member, Flagstaff Open Space Commission.
2012-2013 Chair
2005/Present Editorial Board Member (Founding). Honors in Practice
1988/Present Referee for manuscripts submitted for publication to Environmental Management,
1988/Present Southern Journal of Applied Forestry, 1983 to present; Journal of Forestry,
2009/Present Western Journal of Applied Forestry, 2009-present; USDA Forest Service
                  Intermountain Forest and Range Experiment Station, 1994 to present; National
                  Biological Survey, 1996 to present; Forest Science 2009-present
PETER Z. FULE
Professor – 9 month – Tenured
Date of Appointment: 1996 – Present
Northern Arizona University – School of Forestry

EDUCATION:

1996 Ph.D. Forest Ecology Northern Arizona University, Flagstaff AZ (with
distinction). Dissertation: Fire Disturbance Regimes and Forest Structure in Pine
Ecosystems of Arizona, U.S.A., and Durango, Mexico.

1990 M.S. Forestry Northern Arizona University, Flagstaff AZ (with distinction).
Thesis: Predicting forest floor fuel loading under ponderosa pine at Grand
Canyon National Park, Arizona.

1986 B.A. Chemistry Vassar College, Poughkeepsie NY (with honors).
Thesis: Crystal and molecular structure of rotenone.

PROFESSIONAL EXPERIENCE:

2010/Present Professor, School of Forestry, Northern Arizona University P.O. Box 15018,
Flagstaff AZ.

2004/2010 Associate Professor, School of Forestry and Director of Research and
Development, Ecological Restoration Institute (Associate Director 2004-2008),
Northern Arizona University, P.O. Box 15018, Flagstaff AZ.

2005/2006 Senior Fulbright Scholar, Departament d’Ecologia, Facultat de Biologia,
Universitat de Barcelona. Avenida Diagonal 645, 08028 Barcelona, Catalunya,
Spain.

2000/2004 Assistant Professor, School of Forestry and Associate Director for Ecological
Research (2002-2004), Ecological Restoration Institute, Northern Arizona
University, P.O. Box 15018, Flagstaff AZ.

1998/2000 Assistant Research Professor, School of Forestry and Staff Director, Ecological
Restoration Institute, Northern Arizona University, P.O. Box 15018, Flagstaff
AZ.

1992/1998 Sr. Research Specialist, School of Forestry, Northern Arizona University, P.O.
Box 15018, Flagstaff AZ.

Box 26567, Albuquerque NM.

1990  Forester, Southern Ute Agency, Bureau of Indian Affairs, Ignacio CO.

1988/1990  Graduate Research Assistant, Forestry, Northern Arizona University, Flagstaff AZ.

1989  Firefighter/Prescribed Fire, Grand Canyon National Park, AZ.

1983/1988  Construction Foreman/Carpenter, Sierra Vista Construction, Chama NM.

TEACHING EXPERIENCE:

1997/Present  Economic and Ecological Impacts of Non-Native Forest Pests and Pathogens (Distributed Graduate Seminar, National Center for Ecological Analysis and Synthesis)
   FOR 282
   FOR 380
   FOR 380H
   FOR 398
   FOR 506
   FOR 580

   Ecological Restoration
   FOR 382, 382H, and 582
   FOR 298/506
   FOR 299/399/506
   FOR 298/506

   Fire Ecology and Management
   FOR 451 and 551
   FOR 451 and 551
   FOR 497
   FOR 499/506

   Fire Monitoring & Modeling
   FOR 351
   FOR 506

   Ecosystem Science and Management
   FOR 500

   Forest Science (Semester A)
   FOR 313-316
Forestry in Developing Countries
FOR 415/515

Dendroecology
FOR 506
FOR 517
FOR 599
GGR 599

REFERRED JOURNALS:


**PEER-REVIEWED GOVT PUBLICATIONS AND CONFERENCE PROCEEDINGS:**


OTHER PUBLICATIONS:


Crouse, J.E., and P.Z. Fulé. 2001. Species and canopy cover map development using Landsat 7 Enhanced Thematic Mapper Imagery for Grand Canyon National Park. *Putting the Pieces*


**BOOK CHAPTERS:**


THESES:


REPORTS:


PRESENTATIONS, LECTURES, POSTERS:


Fulé, P.Z. Yellow Belly Ponderosa. Presentation on forest restoration to Flagstaff Arts & Leadership Academy high school creative writing class developing a restoration-based theatrical production. October 10, 2012.


Klaas, D., and P.Z. Fulé. Climate-fire relationships in a rare high elevation forest. UGRaDS Undergraduate Research and Design Symposium, April 27, 2012, Northern Arizona University, Flagstaff, AZ.

Fulé, P.Z. Fuego en bosques del suroeste de EEUU y noroeste de México. Presentation to CONAFOR staff, Delegación Tlaxcala, March 20, 2012, Tlaxcala, México.

Fulé, P.Z., J. Crouse, J. Roccaforte, and E. Kalies. Do thinning and/or burning treatments in western USA ponderosa or Jeffrey pine-dominated forests help restore natural fire behavior? Southwest Fire Ecology Conference, February 27-March 1, 2012, Santa Fe, NM.


Ireland, K., A. Stan, and P. Fulé. Bottom-up control of a northern Arizona ponderosa pine forest fire regime in a fragmented landscape. Southwest Fire Ecology Conference, February 27-March 1, 2012, Santa Fe, NM.


Fulé, P.Z. Forest fires and climate from local to global scales. Science on Tap seminar series, Flagstaff, AZ, February 16, 2012.

Fulé, P.Z. Climate and fire in northern Mexico. Invited presentation to the Geography Department Colloquium Series, University of Nevada, Reno, NV, February 8, 2012.

Fulé, P.Z. Forest and fire ecology. Presentation to two A.P. Environmental Science classes, Northland Preparatory Academy, Flagstaff, AZ, January 30, 2012.


Fulé, P.Z. Land-based resources: Issues and Opportunities. Presentation to the Southwest Tribal Climate Change Workshop, Flagstaff, AZ. September 14, 2011.


Fulé, P.Z. Fire and forest ecology in México: Unique opportunities for international research and management. Seminar presentation, School of Forestry, Northern Arizona University, April 13, 2011.


Fulé, P.Z. What is research telling us about future fire regimes in southwestern forests? Ponderosa Pine Vegetation Session, Southwest Interagency Fuels Workshop, Flagstaff AZ. Two presentations, March 8 & 9, 2011.


Fulé, P.Z. Presentation on forest restoration to Flagstaff Arts & Leadership Academy high school creative writing class developing a restoration-based theatrical production. October 15, 2010.


Fulé, P., J. Korb, and R. Wu. Changes in forest structure of a dry mixed conifer forest in Southwestern Colorado, USA. 10th Biennial Conference of Research on the Colorado Plateau, October 5-8, 2009, Flagstaff AZ.


Fulé, P.Z. Régimenes de fuego en bosques del suroeste de los Estados Unidos y noroeste de México: una comparación. Presentation to the División de Ciencias Forestales, Universidad Autónoma Chapingo, Chapingo, México. April 21, 2009 (75 participants).

Fulé, P.Z. Fire and restoration ecology. Field trip to Fort Valley Experimental Forest, Wildlife Short Course (Continuing Education), 17 participants, April 16, 2009.


Springer, Judith D., David W. Huffman and Peter Z. Fulé. Long-term responses of Penstemon cluteii (Sunset Crater beardtongue) to root trenching and prescribed fire: clues for population persistence. Changing Landscapes in the Southwest: Fifth Southwest Rare Plant Conference. March 16-20, 2009, Salt Lake City, UT.


Fulé, P.Z. Reference ecosystems and characteristic assemblages and disturbance regimes - is there a right answer? Annual Meeting, Ecological Society of America and Society for Ecological Restoration, San José, CA, August 6, 2007.


Fulé, P.Z. Field tour of Flagstaff restoration and fire sites for Professor Joe Feller and law school class, Arizona State University. May 21, 2007. Flagstaff, AZ.


Fulé, P.Z. Incendios forestales de España: changing fire regimes and implications for Mediterranean ecosystems. School of Forestry Seminar Series, December 6, 2006, Flagstaff, AZ.


Fulé, P.Z. Field trip leader, Fort Valley Forest Restoration. October 25, 2006, Flagstaff, AZ.


Fulé, P.Z. Restoration of fire-adapted forests in the American Southwest. May 29, 2006, Swiss Federale Institute WSL [Forest, Snow, Landscape], Birmensdorf, Switzerland. 19 attendees.

Fulé, P.Z. Restauración de bosques adaptados a incendios frecuentes. Seminar presentation, CREA (Centre de Recerca Ecologica i Aplicacions Forestals), Universitat Autonoma de Barcelona, Bellaterra (Barcelona). March 8, 2006, Catalunya, Spain. 25 attendees.


Fulé, P.Z. (moderator). Fulbright grantees location (Barcelona) and discipline (scientific research). September 6-7, 2005, Madrid, Spain.

Fulé, P.Z. Field tour of Mt Trumbull restoration project for law school students from Arizona State University, Professor J. Feller, May 19, 2005 (12 participants).


Fulé, P.Z. Fire and forest restoration. Forest Restoration Workshop, Jobs and Biodiversity Coalition, April 21, 2004, Silver City, NM.

Audience: Fifth Biennial Conference on University Education in Natural Resources, March 14-17, 2004, Flagstaff, AZ.


Grand Canyon forest fires: past, present, and future. P.Z. Fulé. School of Forestry seminar, Northern Arizona University, Flagstaff, October 1, 2003.


Fire ecology and forest restoration at Grand Canyon, with a detour to Mexico. P.Z. Fulé. Tree Ring Talk (seminar series), Laboratory of Tree-Ring Research, University of Arizona, Tucson, May 8, 2002.


Festival of Science In-School Talk, South Beaver School (4th grade), Flagstaff, AZ, September 25, 2001.


Reducing Fire Behavior. Ponderosa Fire Advisory Council, November 6, 2000, Flagstaff AZ.

Forest Restoration. Presentation to Arizona Project CENTRL, October 20, 2000, Flagstaff AZ.

Joint Fire Science Program, Principal Investigators Workshop, October 3-5, 2000, Reno, NV.


Ecological Reference Conditions in Forest Ecosystems Case Study: La Michilía Biosphere Reserve, Durango, Mexico. Presented at the Society for Ecological Restoration annual meeting, Austin, TX, September 30, 1998.

Fire regimes on an environmental gradient in a dry Sierra Madre forest. Presented to the annual meeting of the Southwestern Association of Biologists, Camp Tontozona, AZ, October 11, 1997.


Adaptive Ecosystem Restoration in Ponderosa Pine. Presented at the Genetics/Silviculture session at the SAF National Convention held at Albuquerque, NM, on November 12, 1996.

Restoration of Southwestern Ponderosa Pine Ecosystems. Presented to the Arizona Native Plant Society, annual meeting, August 24, 1996, Flagstaff, AZ.

Ecological Restoration of the Gus Pearson Natural Area. Presented to the Arizona Agricultural Extension Agents, annual meeting, July 18, 1996, Flagstaff, AZ.

Geonauts Program (Educational television programming for elementary school students): Filmed segments on fire ecology of *Penstemon clutei* (July 10, 1995) and restoration ecology (March 26, 1996).

Forest Ecosystem Restoration. Presented to the Western Legislative Council, Annual Meeting, October 10, 1995, Salt Lake City, UT.

Restoring Western Forest Health. Presented to the Western Legislative Council, June 24, 1995, Lake Tahoe, NV.


**RESEARCH FUNDING:**

<table>
<thead>
<tr>
<th>Project</th>
<th>Investigators</th>
<th>Sponsor</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012/2013 Ecological Monitoring for Ponderosa Forest Restoration within the Centennial Forest at Rogers Lake,</td>
<td>Fulé, P.Z., and C. Miller</td>
<td>The APS Leadership Fund</td>
<td>$4,988</td>
</tr>
<tr>
<td>Coconino County</td>
<td>Fulé, P.Z., and L.L. Yocom</td>
<td>National Park Service, Research Reserve Fund</td>
<td>$98,400</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------------------</td>
<td>----------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>2012/2013 Forest Inventory, Camp Navajo, AZ</td>
<td>Fulé, P.Z.</td>
<td>Arizona Department of Emergency and Military Affairs</td>
<td>$32,635</td>
</tr>
<tr>
<td>2012/2014 Post-fire fuel loading and predicted fire behavior on two 2000 wildfires</td>
<td>Hunter, M.E., and P.Z. Fulé</td>
<td>USDA Forest Service</td>
<td>$50,000</td>
</tr>
<tr>
<td>2011/2012 Peace Corps Strategy Recruiter</td>
<td>Fulé, P.Z.</td>
<td>U.S. Peace Corps</td>
<td>$16,800</td>
</tr>
<tr>
<td>Translating forest science for global practitioners</td>
<td>Kolb, T.E., P.Z. Fulé, P. Friederici, P. Beier, C. Chambers, C. Hsun Huang, A. McGiveny, K. Waring</td>
<td>USDA NIFA NFF</td>
<td>$251,500</td>
</tr>
<tr>
<td>2011/2013 Adapting Forest Ecosystems on Southwestern Tribal Lands to Variations in Climate and Fire with Integrated Research, Education, and Extension</td>
<td>Stan, A.B, (P.Z. Fulé, postdoctoral mentor)</td>
<td>National Institute of Food and Agriculture/USDA</td>
<td>$130,000</td>
</tr>
<tr>
<td>2011/2015 Southwestern Forest Dynamics: Interactions of Climate and Other</td>
<td>Fulé, P.Z., and M.M. Moore</td>
<td>USDA Forest Service Rocky Mountain Research Station</td>
<td>$29,930</td>
</tr>
<tr>
<td>Year</td>
<td>Project Title</td>
<td>Investigator(s)</td>
<td>Funding Agency</td>
</tr>
<tr>
<td>------</td>
<td>---------------</td>
<td>-----------------</td>
<td>---------------</td>
</tr>
<tr>
<td>2010/2013</td>
<td>Post-fire fuel loading and predicted fire behavior on two 2000 wildfires</td>
<td>Hunter, M.E., and P.Z. Fulé</td>
<td>USDA Forest Service</td>
</tr>
<tr>
<td></td>
<td>Exploring climatic and human drivers of fire regime in a high-elevation Mexican forest</td>
<td>Yocom, L.L., and P.Z. Fulé</td>
<td>National Science Foundation</td>
</tr>
<tr>
<td>2010/2014</td>
<td>Forest fires under climate, social and economic changes in Europe, the Mediterranean and other fire-affected areas of the world (FUME). Collaborative Project: (ii). Large-scale integrating project. Work programme topics: Activity 6.1 Climate Change,</td>
<td>Moreno, J.M., and 31 partners (P.Z. Fulé is partner 29)</td>
<td></td>
</tr>
</tbody>
</table>
pollution and risks; Sub-Activity 6.1.3 Natural Hazards; Area 6.1.3.1 Hazard assessment, triggering factors and forecasting; ENV.1.3.1.1 Forest fires in the context of climate and social changes. Seventh Framework Programme for Research and Technological Development, European Union.

<table>
<thead>
<tr>
<th>Date</th>
<th>Project Title</th>
<th>Principal Investigator(s)</th>
<th>Funding Agency</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Range</td>
<td>PI/Co-PI</td>
<td>Funding Agency</td>
<td>Amount</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>--------------------------------</td>
<td>-----------------------------------------------------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>7/1/2008-6/30/2012</td>
<td>Fulé, P.Z.</td>
<td>Mission Research program, School of Forestry, Northern Arizona University</td>
<td>$94,376</td>
<td></td>
</tr>
<tr>
<td>2/1/2007-1/31/2012</td>
<td>Fulé, P.Z., P.M. Brown, D.A. Falk, J. Villanueva-Díaz, E. Cornejo-Oviedo</td>
<td>National Science Foundation, DEB-Ecosystem Science Cluster, #DEB-0640351</td>
<td>$703,000</td>
<td></td>
</tr>
<tr>
<td>2006-2007</td>
<td>Springer, J.D., and P.Z. Fulé</td>
<td>Public Lands Institute, University of Nevada, Las Vegas</td>
<td>$28,000</td>
<td></td>
</tr>
</tbody>
</table>

**PENDING (PROPOSALS NOT FUNDED)**


Fulé, P.Z., L.L. Yocom, J. Villanueva, D. Rodríguez-Trejo, D.A. Falk. Fire, Climate, and Carbon Dynamics in High-Elevation Tropical Forests. DOE Office of Biological & Environmental Research, DE-FOA-0000536. $914,163.


Fulé, P.Z. Wildfire Research in Mexico with U.S. Peace Corps. Lucking Family Faculty Award Endowed Fund, Northern Arizona University. $6,550.


Fulé, P.Z. Adapting Wildfire Management for Climate Change at Grand Canyon National Park. FY2013 Technology and Research Initiative Fund (TRIF), Support for Post-Doctoral Associates (SPA) Program, Northern Arizona University. $150,000.


Fulé, P.Z. Wildfire and climate interactions in French forests: implications for climate change adaptation. Fulbright Senior Scholar proposal.

University Lectures:


Dendroecology. October 9, 2012. Quaternary Paleoecology QS/ENV 671

Selecting appropriate research methods: strength of inference, October 4, 2012, FOR 690 Research Methods

Ecosystem processes (lecture and field trip), November 7-8, 2011, FOR 350 Forest Ecology for Professionals.

Selecting appropriate research methods: strength of inference, October 6, 2011, FOR 690 Research Methods

Fire and Forests in the American Southwest. April 11, 2011. ENV 181


Crown Fire Behavior, February 14, 2011, FOR 351 Fire Monitoring and Modeling

Fuels and Fuel Moisture, February 3 & 8, 2011, FOR 251 Introduction to Wildland Fire

Selecting appropriate research methods: strength of inference, October 19, 2010, FOR 690 Research Methods

Overview of Dendrochronology. Quaternary Paleoecology QS/ENV 671

Fire and Forests in the American Southwest. October 12, 2009. ENV 181


Selecting appropriate research methods: strength of inference, October 21, 2008, FOR 690 Research Methods

Ecological Restoration, guest lecture FOR 250 AZ Forests & Wildlife, April 1, 2008

Selecting appropriate research methods: strength of inference, October 10, 2007, FOR 690 Research Methods

Fire Management, Semester D, February 8 and March 2, 2005.

Ecological Restoration, February 5, 2005, Continuing Education in Ecosystem Management, professional shortcourse, Northern Arizona University.


Ecological Restoration, February 1, 2003, Continuing Education in Ecosystem Management, professional shortcourse, Northern Arizona University.

Fire and sustainability, October 21, 2002, FOR 298, Northern Arizona University.

Ecological Restoration, February 8, 2002, Continuing Education in Ecosystem Management, professional shortcourse, Northern Arizona University.

(1) Range of Natural Variability, (2) Restoration Silviculture, and (3) Field Tour, October 17-19, 2001, Continuing Education in Wildlife Habitat and Plant Management, professional shortcourse, Northern Arizona University.


Ecological Restoration, February 9, 2001, Continuing Education in Ecosystem Management, professional shortcourse, Northern Arizona University.

Fire Ecology & Management, April 11, 2001, October 3, 2000, FOR 101 Introduction to Forestry

Landscape Fire Modeling, March 14, 2000, ENV 544 Landscape Ecology

Ecological Restoration, February 11, 2000, Continuing Education in Ecosystem Management, professional shortcourse, Northern Arizona University

Ecological Restoration, November 2, 1999, FOR 398 Indigenous Conservation Knowledge

Restoration Treatments, October 26, 1999, FOR 421 Forest Science

Ecological Restoration, February 12, 1999, Continuing Education in Ecosystem Management, professional shortcourse, Northern Arizona University

Ecological Restoration, February 13, 1998, Continuing Education in Ecosystem Management, professional shortcourse, Northern Arizona University


Ecological Restoration, February 12, 1998, Continuing Education in Ecosystem Management, professional shortcourse, Northern Arizona University

Ecological Restoration, February 14, 1997, Continuing Education in Ecosystem Management, professional shortcourse, Northern Arizona University

Ecological Restoration, October 15-17, 1996, FOR 695 Conservation Biology

Fire and Ecosystem Management, October 14-16, 1996, FOR 500

Fire Ecology and Management, April 24-26, 1995, FOR 102 Introduction to Forestry

**Outside Courses:**

Summer Institute on Environmental Stewardship for European Student Leaders, July 17-August 20, 2011, Flagstaff AZ.


Restauración Ecológica Basada en Procesos Naturales, February 4-8, 2008. Universidad de Alicante, Spain.


Fire effects on flora, February 15, 2000, RX340 Introduction to Fire Effects (Interagency training course), Whiteriver AZ.
Fire effects on flora, March 30, 1999, RX340 Introduction to Fire Effects (Interagency training course), Prescott Fire Center, Prescott AZ.

PROFESSIONAL SERVICE:

Mission Research Board, School of Forestry, 2012-2013.
Annual Review Committee, School of Forestry, 2012-2013.
Invited presenter, Yellow Belly Ponderosa project (high school student play on fire ecology), Flagstaff Arts and Leadership Academy, October 10, 2012.
Member, Undergraduate Research Advisory Council (URAC), 2012-13.
Invited reviewer for tenure and promotion, Texas Tech University, August, 2012.
Coordinator of International Forestry Programs, School of Forestry, 2011-present.
Program Committee member and Session Moderator, Southwest Fire Ecology Conference, February 27-March 1, 2012, Santa Fe, NM.
Review panel member, Joint Fire Science Program, panel meeting Boise, ID, January 26, 2012.
Mission Research Board, School of Forestry, 2011-2012.
Faculty Status Committee, School of Forestry, 2011-2012.
Member, Coconino Parks and Open Space Science Advisory Committee, Coconino County Parks and Recreation Department. 2011-2012.
Proposal review panel member, Task 3, Evaluating the effectiveness of mitigation activities in the wildland urban interface (WUI), Joint Fire Science Program, Boise ID. January 26, 2011.
Invited orientation for creative writing students developing a play on forest restoration. Flagstaff Arts & Leadership Academy, Greater Flagstaff Forests Partnership. October 15, 2010.
Invited reviewer for tenure and promotion, Colorado State University, October, 2010.
Mission Research Board, School of Forestry, 2010-2011.
Faculty Status Committee, School of Forestry, 2009-2010.
Chair, Mission Research Board, School of Forestry, 2009-2010.
Kaibab Forest Health Focus, collaborative group assisting the Kaibab National Forest in prioritizing forest treatments, 2009.
Curriculum committee, School of Forestry, 2008-2009.
Curriculum development committee (ad hoc committee), School of Forestry, 2008-2009.
Faculty Status Committee, School of Forestry, 2008-2009.
Soil science/ecosystem ecology faculty search committee, School of Forestry, 2008-2009.
Member of Review Council, Revista Ciencia Forestal en México (“Forest Science in Mexico Journal”), 2008-2010.
National Science Foundation review panel, Ecosystem Science, Washington, D.C. April 8-11, 2008.
Global Education Task Force and Faculty Subcommittee, Northern Arizona University, 2008-2009.

Peace Corps recruitment presentation, December 5, 2007.


Invited reviewer for tenure and promotion, Case Western Reserve University, September, 2007.

Curriculum committee, School of Forestry, 2007-2008.

Curriculum development committee (ad hoc committee), School of Forestry, 2007-2008.

Faculty Status Committee, School of Forestry, 2007-2008.

Session chair for “Fire and Restoration” session, Fire in the Southwest conference (January 2008), Association for Fire Ecology.


Associate Editor, Canadian Journal of Forest Research, 2007-2010.


Curriculum committee, School of Forestry, 2006-2007.

Scholarship committee, School of Forestry, 2006-2007.


Invited reviewer for tenure and promotion, The Ohio State University, September 2006.


American Representative to Fulbright Commission for candidate interviews, Fulbright/Generalitat de Catalunya Visiting Scholars Program, June 1, 2006.


Chair, Fire science faculty search committee, School of Forestry 2004-2005.

Strategic planning committee, School of Forestry 2004-2005.

Organizing committee, Southwestern/Intermountain Section Meeting, Society of American Foresters, Spring 2005.

Chair, Society of American Foresters, Northern Arizona Chapter, 2004.


Field trip presentation on fire ecology, interdisciplinary goshawk management team, North Kaibab Ranger District, October 24, 2003.

Southwestern forest tour leader, Vassar College, Biology class, October 22-23, 2003.


Peer panel reviewer for Forest Service research scientist, September 16, 2003.


Faculty advisor, Student Association for Fire Ecology, 2003-2004.


Summer reading group leader, NAU freshmen, August 23, 2002.
Judge, Braun/Buell awards, Ecological Society of America annual meeting, August 4-9, 2002.
Leader, Forest Restoration Field Trip, combined meetings of the Ecological Society of America/Society for Ecological Restoration, August 1-4, 2002.
Symposium coordinator, Forest Restoration Symposium, combined meetings of the Ecological Society of America/Society for Ecological Restoration, August 4-9, 2002, Tucson, AZ.
Chair, search committee for research specialist, 2001.
Graduate Studies Committee, School of Forestry, 2001-2004.
Instructor, International Dendroecology Field Week, August 12-17, 2001, Saltillo, Coahuila, Mexico.
Co-chair, review panel for $1.4 million funding program, ERI, January-May, 2001.
Latin America/CESM committee, 2001-2002
Mentorship 101 (Tuba City High School), March 1, 2001, November 8, 2000.
Centennial Forest (NAU) technical advisory committee, 2000-2003.
Coordinator, Forest Science Panel, Steps Toward Stewardship conference, April 2000
Chair, College of Ecosystem Science and Management enrollment/distance learning committee, 2000.
Member, Faculty Council on Planning & Budget (2000-01).
Consultation: advice on forest management, Kachina Village Improvement District (Coconino County) and the Arboretum at Flagstaff, 2000.
Search committee for administrative assistant, 2000.
Search committee for program representative, 2000.
Search committee for marketing specialist, 2000.
Search committee for research technician, 1999.
Chair, search committee for School of Forestry technical support position, 1999.
Search committee for administrative assistant, 1999.
Flagstaff Festival of Science, Ecological Restoration field trip, September 27, 1997.
Organizing committee, joint meeting of the Society of American Foresters, Southwestern Section, and the Asociación Mexicana de Profesionales Forestales, September 17-20, 1997.

PROFESSIONAL DEVELOPMENT WORKSHOP:
Inclusive Design/Inclusive Pedagogy Community of Practice, Spring semester, 2011.
Classroom Civility, November 14, 2001, Northern Arizona University, Flagstaff
The Art and Craft of Teaching, January 10, 1996, Northern Arizona University, Flagstaff
PROFESSIONAL SOCIETIES

Society of American Foresters
Society for Ecological Restoration International
Association for Fire Ecology

RECOGNITION

Researcher of the Year, School of Forestry, Northern Arizona University, 2007-2008
Teaching Scholar Award, Northern Arizona University, 2005
Xi Sigma Pi, Forestry Honor Society, 2005
Recognized as influential faculty member by Aaron Green, NAU Golden Axe Award recipient, 2002
Phi Beta Kappa, Vassar College, 1986
DeGolier Prize, Vassar College, 1986

ADVISING EXPERIENCE:

Undergraduate Research (FOR 485)
2012 Fall: 1 Student
2011 Spring: 1 Student
2010 Fall: 1 Student
2010 Spring: 1 Student
2009 Fall: 1 Student
2009 Spring: 1 Student
2008 Spring: 1 Student
2007 Fall: 1 Student
2007 Spring: 1 Student
2006 Fall: 4 Students
2005 Fall: 2 Students
2005 Spring: 1 Student
2004 Fall: 5 Students
2003 Fall: 1 Student
2002 Fall: 2 Students
2002 Spring: 3 Students
2001 Fall: 3 Students
2000 Fall: 2 Students
2000 Spring: 4 Students

Undergraduate Internship/Practicum (FOR 408)
2011 Fall: 4 Students
2010 Fall: 5 Students
2010 Spring: 1 Student
2009 Fall: 2 Students
2009 Spring: 1 Student
2008 Fall: 5 Students
2007 Fall: 1 Student
2007 Spring: 1 Student
2006 Fall: 5 Students
2006 Spring: 1 Student
2005 Fall: 1 Student
2005 Spring: 1 Student
2004 Fall: 3 Students
2004 Spring: 1 Student
2003 Fall: 7 Students
2003 Spring: 3 Students

**Independent Study (FOR 697 or 497)**

2012 Fall (Mainpat India): 1 Student;
2012 Fall (Peace Corps Technical Training): 1 Student
2011 Fall (International Development Seminar): 2 Students
2002 Fall: 1 Student
2002 Spring: 1 Student
2002 Spring (Fire Ecology): 4 Students

**Independent Study (FOR 299)**

2007 Spring: 1 Student

**Special skills:**
Fluent in Spanish and native (but rusty) speaker of Hungarian, learning French.
Cross-cultural experience: living and working in Hispanic, Native American, and European communities in North and South America and Europe.

**Graduate Students Advised**
1 Student, M.F., PCMI (chair)
1 Student, Ph. D. (co-chair with Bruce Hungate)
1 Student, Ph.D. (chair)
1 Student, M.S., PCMI (chair)
1 Student, M.F. (co-chair with Andi Thode)
1 Student, M.F. (co-chair with Andi Thode)

**Graduate committee member**
1 Student, Ph.D.
1 Student, M.S. (U. Arizona)
1 Student, M.S. (Environmental Science and Policy)
Graduated:
1 Student, Ph.D. (graduated 1999)
1 Student, M.S. (2000)
1 Student, M.S. (2000)
1 Student, M.S. (2001)
1 Student, M.S. (2001)
1 Student, M.S. (co-chair w/ Wally Covington, 2001). Forest roads in northern Arizona: recovery after closure and revegetation techniques.
1 Student, M.S. (2001)
1 Student, Ph.D. (2001)
1 Student, M.S. (co-chair w/ Wally Covington, 2002). Plant community and arbuscular mycorrhizal dynamics have implications for determining ponderosa pine reference conditions.
1 Student, M.S. (2002)
1 Student, M.S.(co-chair w/ Carol Chambers, 2003) Ponderosa pine restoration treatment effects on pinyon mice and deer mice in northwestern Arizona.
1 Student, M.S. (2003)
1 Student, M.S. (2003)
1 Student, M.S. (2003)
1 Student, M.S. (2003)
1 Student, M.S. (2003)
1 Student, M.S. (co-chair with Carolyn Sieg, 2004). Dalmation toadflax (Linaria damatica) response to wildfire and native species regeneration in ponderosa pine forest.
1 Student, M.A. (Liberal Studies) (2004)
1 Student, M.S. (2004)
1 Student, M.S. (2004, Colorado State University)
1 Student, M.S. (chair, 2005). Comparing methods of reconstructing fire history using fire scars in a southwestern ponderosa pine forest.
1 Student, Ph.D. (2005)
1 Student, M.S. (2005)
1 Student, M.S. (2005)
1 Student, M.S. (co-chair with Margaret Moore, 2005). Fuels and fire behavior modeling using remotely sensed data on the San Francisco Peaks, Arizona.
1 Student, M.F. (chair, 2005). Professional paper: Assessment of various methods of canopy cover estimation that yield accurate results with field repeatability.
1 Student, M.S. (co-chair w/ David Ostergren, Environmental Science and Policy, 2005).
1 Student, M.S. (chair, 2005). Pre-fire treatment effects and post-fire forest dynamics on the Rodeo-Chediski burn area, Arizona.
1 Student, M.S. (co-chair with P.J. Daugherty, 2005). Smoke, risk, and intergenerational equity in Flagstaff, Arizona’s wildland-urban interface.
1 Student, M.S. (co-chair with Carol Chambers, 2005). Snag and woody debris dynamics following severe wildfires in northern Arizona ponderosa pine forests.
1 Student, M.S. (chair, 2005). Monitoring landscape-scale forest structure and fire behavior changes following ponderosa pine restoration treatments.
1 Student, M.S. (2006).
1 Student, M.S. (2006)
1 Student, Ph.D. (2006)
1 Student, M.S. (co-chair with Carolyn Sieg, 2006). Pre-fire treatment effects and understory plant community response on the Rodeo-Chediski fire, Arizona.
1 Student, M.S., Colorado State University (2007)
1 Student, M.S. (2008)
1 Student (co-chair w/ Tina Kennedy, Geography, 2008). Comparing ecological restoration and northern goshawk management guidelines treatments in a southwestern ponderosa pine forest.
1 Student, M.S. (Biology) (2009)
1 Student, M.S. (Biology) (2009)
1 Student, M.S. (co-chair w/ Carolyn Sieg, 2009). Effects and effectiveness of seeding following high-severity wildfire in northern Arizona ponderosa pine forests.
1 Student, M.S. (chair, 2009). Evidence-based review of seeding in post-fire rehabilitation and native plant market feasibility.
1 Student, M.S. (2010)
1 Student, M.S. (chair, 2010). Modeling forest change, bird communities, and management alternatives on a restored ponderosa pine ecosystem.
1 Student, M.S. (co-chair with Alan Lew, Geography, 2010). Simulating the effects of climate change and ecological restoration on wildfire behavior in southwestern ponderosa pine forests.
1 Student, M.S. (2011)
1 Student, M.S. (2011)
1 Student, M.S. (2011)
1 Student, M.S. (2011)
1 Student, M.F. (2011)
1 Student, M.S. (2011)
1 Student, Ph.D. (chair, 2011). Influence of climate and local factors on fire in high-elevation forests of Mexico. (NAU 2011 Most Promising Graduate Student Researcher)
1 Student, M.S. (2012)
1 Student, M.S. (co-chair w/ Carolyn Sieg, 2012). Pre-fire treatments have persistent effects on post-fire plant communities.
1 Student, Máster en Gestión y Restauración del Medio Natural, Universidad de Alicante, Spain (co-tutor w/ Jordi Cortina, 2012). *Simulando trayectorias de sucesión post-incendio bajo alternativas de clima y gestión: caso de estudio Bosque Nacional de Apache-Sitgreaves, Arizona.*
Document E: Individual Faculty Information

MONICA L. GAYLORD
Assistant Research Professor – 9 month
Date of Appointment: 2001 - Present
Northern Arizona University – School of Forestry

EDUCATION:

2009    Ph.D. Forestry: Northern Arizona University, Flagstaff, AZ 86011
2004    M.S. Forestry: Northern Arizona University, Flagstaff, AZ 86011
1992    B.A. in Biology, Minor in Chemistry: Lewis and Clark College, Portland, OR 97219

PROFESSIONAL EXPERIENCE:

2010/Present Assistant Research Professor, Northern Arizona University, School of Forestry
2009/2010 Post-doctoral research associate, Northern Arizona University, School of Forestry
2006/2008 Forest Entomology Teaching Assistant, Northern Arizona University, School of Forestry
2001/2008 Graduate Research Student, Northern Arizona University, School of Forestry
2000    Research Assistant, University of Minnesota, Department of Forestry, St. Paul, MN
1993/1998 Forestry Technician/Supervisory Forestry Technician, Flathead National Forest, Kalispell, MT

TEACHING EXPERIENCE:

FOR212 Trees and Forests of North America
FOR222 Environmental Conservation

PUBLICATIONS:


PRESENTATIONS:

Invited presentations:

May 2011: North American Forest Insect Work Conference, Portland, OR
The carbon starvation hypothesis: relationship to host defense theory
Monica L. Gaylord, Thomas E. Kolb, Nate G. McDowell, William T. Pockman

March 2008: Western Forest Insect Work Conference, Boulder, CO
Impacts of thinning ponderosa pine on pine bark beetles in northern Arizona
Monica L. Gaylord, Richard W. Hofstetter and Michael R. Wagner

January 2008, Association for Fire Ecology, Tucson, AZ
Impacts of thinning ponderosa pine on pine bark beetles in northern Arizona
Monica L. Gaylord, Richard W. Hofstetter and Michael R. Wagner

Other presentations:
August 2012: Ecological Society of America, Portland, OR
Talk: Drought and insect attacks cause decline of piñon-juniper woodlands.
Monica L Gaylord, Thomas E Kolb, Alison K Macalady, Robert E. Pangle, Jennifer A Plaut, William T Pockman, Enrico A Yepez, and Nate G McDowell

April 2010, Western Forest Insect Work Conference, Flagstaff, Arizona
Talk: Does drought predispose piñon pine trees to insect attack?
Monica L. Gaylord, Thomas E. Kolb, Nate McDowell, Will Pockman, Enrico Yepez, and Jen Plaut

August 2009, Ecological Society of America, Albuquerque, New Mexico
Poster: Does drought predispose piñon pine trees to insect attack?
Monica L. Gaylord, Thomas E. Kolb, Nate McDowell, Will Pockman

July 2008, International Union of Forest Research Organization, Pretoria, South Africa
Talk: Relationship between monoterpenes, silvicultural treatments, and bark beetles in ponderosa pine in northern Arizona
Monica L. Gaylord, Richard W. Hofstetter and Michael R. Wagner

July 2008, International Congress of Entomology, Durban, South Africa
Talk: Impacts of thinning ponderosa pine forests on pine bark beetles: implications for mitigating climate change
Monica L. Gaylord, Richard W. Hofstetter and Michael R. Wagner

March 2007: Western Forest Insect Work Conference, Boise ID.
Talk: Impacts of thinning ponderosa pine on pine bark beetles in northern Arizona
Monica L. Gaylord, Richard W. Hofstetter and Michael R. Wagner

Poster presentation: Flight temperature thresholds for southwestern ponderosa pine bark beetles
Monica L. Gaylord, Kelly Williams, Richard W. Hofstetter, Joel D. McMillin, Tom DeGomez and Michael R. Wagner

October 2005, Western Bark Beetle Initiative, Midland, UT
Poster presentations: Flight temperature thresholds for Southwestern ponderosa pine bark beetles
Monica L. Gaylord, Richard Hofstetter, Michael R. Wagner, and Joel D. McMillin
And Thinning guidelines to prevent ponderosa pine bark beetle outbreaks in the Southwest
Monica L. Gaylord, Richard Hofstetter, Michael R. Wagner, and Joel D. McMillin
And Influence of host volatiles as pheromone synergists for the southern and western pine beetle in Arizona.
Richard W. Hofstetter, Zhong Chen, Monica L. Gaylord, and Michael R. Wagner

March 2005, Western Forest Insect Work Conference, Victoria, BC Canada
Talk: Mechanistic understanding of the impacts of thinning ponderosa pine on pine bark beetles
Monica L. Gaylord and Michael R. Wagner
April 2004, Western Forest Insect Work Conference, San Diego, CA
Poster: Seasonality of Bark Beetles (Coleoptera: Scolytidae) and associated predators in a ponderosa pine forest in northern Arizona.
Monica L. Gaylord, Thomas E. Kolb, Eric L. Smith, Michael R. Wagner, and Kimberly F. Wallin

November 2003, Western Forest Insect Work Conference, Guadalajara, Mexico
Talk: Seasonal dynamics of bark beetle flight and tree growth and resin defenses in a northern Arizona ponderosa pine forest; 2002-2003.
Monica L. Gaylord, Thomas E. Kolb, Eric L. Smith, Michael R. Wagner and Kimberly F. Wallin

October 2003, International Union of Forest Research Organization bark beetle working group, Blodgett, CA.
Monica L. Gaylord, Michael R. Wagner, Thomas E. Kolb and Kimberly F. Wallin

November 2002, Entomological Society of America, Ft. Lauderdale, FL
Poster: Seasonal dynamics of bark beetle flight and tree growth and physiology in a northern Arizona ponderosa pine forest.
Monica L. Gaylord, Michael R. Wagner, Thomas E. Kolb and Kimberly F. Wallin

June 2002, International Union of Forest Research Organization, Flagstaff, Arizona
Talk: Preliminary findings on bark beetle flight and ponderosa pine physiology and growth near Flagstaff, Arizona.
Monica L. Gaylord, Michael R. Wagner, Thomas E. Kolb and Kimberly F. Wallin

March 2002, Western Forest Insect Work Conference, Whitefish, MT.
Talk: Preliminary findings on bark beetle flight and ponderosa pine physiology and growth near Flagstaff, Arizona.
Monica L. Gaylord, Michael R. Wagner, Thomas E. Kolb and Kimberly F. Wallin

PROFESSIONAL AND VOLUNTEER ACTIVITIES:

March 2012, October 2012, Volunteer guest lecturer for Master Gardener Class, University of Arizona Extension Agency
February 2012, National Science Foundation Grant Review Panel
May 2011, Volunteer judge for Graduate Student Poster Competition at North American Forest Insect Work Conference
April 2011 & 2012, Volunteer judge for Undergraduate Research Poster Competition at Northern Arizona University
June 2010 – present: Member of Raymond Foundation, a philanthropic organization dedicated to providing scholarships to students in Coconino County.
April 2010-present:  Chair for the Western Forest Insect Workshop Conference, Scholarship Fundraising Committee
June 2003 – present:  Member of the Arizona bark beetle task force.
January 2003- May 2009:  Active member of the Forestry Seminar Coordination Committee and Forestry Graduate Student Association.
August 2005 – December 2008:  Graduate student liaison to the faculty for the Forestry Graduate Student Association.
August 2005, Volunteer guest lecturer for BIO 109 at Coconino Community College
June 2005, Volunteer guest lecturer at the Junior Forester Academy, Northern Arizona University
January 1999 – May 2000:  Volunteer with the Nature Conservancy, Minnesota Chapter, Minneapolis, MN

AWARDS:

2008 Entomological Society of America Travel Award to attend the International Conference of Entomology in South Africa
2007 Western Forest Insect Work Conference Memorial Scholarship award winner
2007 NAU, School of Forestry, General Scholarship
2002 Entomological Society of America Student Poster Competition, Honorable Mention.

AWARDED GRANTS:


PEER REVIEWER FOR:

Agricultural and Forest Entomology, eXtension Community of Practice on Climate, Forests and Woodlands, Forest Ecology and Management, National Science Foundation, Oikos, PLoS ONE, Physiological Entomology, Tree physiology and Western Journal of Forestry.
RICHARD HOFSTETTER
Associate Professor – 9 month – Tenured
Date of Appointment: 2005 – Present
Northern Arizona University – School of Forestry

EDUCATION:

2004  Ph.D. Ecology and Evolution
       Dartmouth College Hanover, New Hampshire

1996  M.S, Entomology
       University of Wisconsin-Madison Madison, Wisconsin

1992  B.S., Population Biology
       University of Wisconsin-Madison Madison, Wisconsin

PROFESSIONAL AND RESEARCH EXPERIENCE:

2011/Present  Associate Professor of Forest Entomology, School of Forestry, Northern Arizona
              University, Flagstaff, Arizona

2008/2011  Assistant Professor of Forest Entomology. School of Forestry, Northern Arizona
           University, Flagstaff, Arizona

2005/2008  Assistant Professor-Research. School of Forestry, Northern Arizona University,
           Flagstaff, Arizona

RESEARCH

2005/2008  Assistant Professor - Research. School of Forestry, NAU Population dynamics,
           community associations, and plant-insect interaction involving bark beetles in
           western North America.

2004  NSF Post-Doctoral Fellowship. Dept. of Biol. Sciences, Dartmouth College
       Community interactions and population dynamics of the Mexican and southern
       pine beetle.

           Ph.D. Research. Studying the role of antagonism, commensalism and mutualism
           in the southern pine beetle community.

           Provided technical assistance in chemical ecology research. Studies included
           codling moth orientation to apple volatiles, electro-antennogram responses of
codling moth to food odorants, developing yellow jackets lures, repellents for codling moths, Colorado potato beetle foraging behavior, and effects of methyl jasmonate on plant defenses and herbivore attraction.

1996 Research Specialist, Department of Forestry, University of Wisconsin. Studied the distribution of spring ephemerals in old growth forests of northern Wisconsin and upper Michigan.

1993/1996 Research Assistantship, Department of Entomology, University of Wisconsin. M.S. Research. Studied the effects of gypsy moth diet on the behavior, performance and fecundity of the egg parasitoid *Ooencyrtus kuvanae*.


TEACHING EXPERIENCE:

2005/Present Associate and Assistant Professor, School of Forestry, Northern Arizona University, Flagstaff, AZ

- BIO 599 Genes to Environment
- BIO 698 Mutualism Theory
- ENV 698 Mutualism Theory
- FOR 443/553 Forest Entomology
- FOR 698 Mutualism Theory

Other Courses:

Semester A: Forestry Ecology (Ent. and Path. Section)
Proseminar (Graduate course in presenting research)
Undergraduate Research Studies
Freshman Seminar Series: Sex, bugs and rock-n-roll (creator of course, new)
Tropical Forest Insect Ecology, International course in Nicaragua (creator of course, new)
(FOR441/BIO499/599)
Mutualism Theory (FOR698/BIO698/ENV698)
Distributed Grad. Sem.: Econ./Ecol. Impacts of Non-natives (new course)
Forest Health

Courses in San Ramon, Costa Rica with USAC Visiting Faculty
Courses in Rocky Mountain Research Station and School of Forestry, NAU
Bark Beetle Workshop, 5 day course for students and professionals

**REFERRED JOURNALS**

Acta Zooligica  
Agriculture and Forest Entomology  
Biological Journal of the Linnean Society  
Canadian Entomologist  
Canadian Journal of Forest Research Ecology  
Ecological Entomology  
Ecological Monographs  
Ecology  
Ecology and Forest Management  
Ekologija  
Entomologica Fennica  
Entomological News  
Environmental Entomology  
European Journal of Entomology Forest Science  
Florida Entomologist  
Industry Crops and Products  
Journal of Applied Entomology  
Journal of Applied Forestry  
Journal of Chemical Ecology  
Journal of Insect Science  
Kuwait Journal of Science and Engineering  
Microbial Ecology  
Naturwissenschaften  
Mycology  
Oecologia  
Oikos  
Western North America Naturalist  
Zoologischer Anzeiger

*Reviewed from August 2012-2013: Environmental Entomology (3), Ecological Monographs (1)*

**REFEREED ARTICLES:**


Garcia, A., S. Smith, and R.W. Hofstetter. Effects of fire seasonality and fire-caused tree injury on the susceptibility and resistance of Pinus ponderosa var. ponderosa to bark beetles. Agriculture and Forest Entomology.


Reboletti, D., R. Hofstetter, E. Aldan & J.C. Moser. Phoretic mites and fungi associated with the Western Balsam Bark Beetle, Dryocoetes confusus in Arizona. Western Naturalist.


REFERRED JOURNALS:


REFERRED ARTICLES AND BOOK CHAPTERS:
In review


Mercado, J. and R.W. Hofstetter. Ectobionts (external fauna) associated with the mountain pine beetle. Journal of Forest Science (to submit January 2013)


BOOK CHAPTERS:


OTHER PUBLICATIONS:


GENERAL PRESENTATIONS, INTERVIEWS, & PUBLICATIONS


Willow Bend Science Education Program – Bark beetles and Ponderosa pine forests, Willow Bend Education Center October 2012.

Science & Engineering Day at NAU – Bark beetle biology and acoustics, High Country Conference Center 2012.

Arizona Game and Fish Department Regional Meeting – Bark Beetle Research, March 2012.

Science & Engineering Day at NAU – Bark beetle biology and control, High Country Conference Center 2011.

Description of beetle research in Grow Magazine – Wisconsin’s Magazine for the Life Sciences 2011.


Interactions between bark beetles, fire, drought affecting ponderosa pine mortality in the west. KNAU TV station February 2009.

Organizer, developer and teacher of Bark Beetle Workshop. Five day workshop/course during summer offered to professionals, entomologists, foresters and students. Started August 2010.

PRESENTATIONS (*- Invited)


Author, not presenter


Hoffman, C., R. Hofstetter, R.P. Hanavan, A. Grady, and J. Anhold. Development of a monitoring program to better understand the ecological impacts of wildfire under warmer, dryer conditions on a potentially major forest defoliator. Forest Health Monitoring meeting. Tucson, AZ. April 2012.


PROFESSIONAL AFFILIATIONS AND INVOLVEMENT

1993/Present Ecological Society of America (ESA)
1992/Present Society of American Foresters (SAF)
1992/Present Entomological Society of America (ESA)
2001/Present Mycological Society of America (MSA)
2005/Present America Institute of Biological Sciences (AIBS)
2005/Present American Association for the Advancement of Science (AAAS)
2008/Present Arizona-Nevada Academy of Science (ANAS)
2005/Present Member of Bark Beetle Task Force Committee
2012/Present Member of the RMRS Lab Coordinating Committee (LLCC)
2012/Present Organizer and Moderator for Forest Entomology Symposium at Entomological Society of America National Meeting
2012 Applicant reviewer for Stellenbosch University, South Africa
2010/2013 President (Chair) of Western Forest Insect Work Conference
2011 Judge of Student Competition Presentations at NAFIWC
2006/2011 Session coordinator at professional meetings (WFIWC, NAFIWC)
2006/2011 Moderator at professional meetings (WFIWC, NAFIWC)
2010 Grant reviewer for Czech Science Foundation
2010 Committee and proceedings organizer for WFIWC meeting (Flagstaff, AZ)
2009 Committee and local organizer for BBTWG meeting (October, Tucson, AZ)
2009 Grant reviewer for National Research Foundation of South Africa
2007 Judge of Student Competition Presentations at E.S.A. Pacific Branch Meeting
2006 External reviewer for Full professor appointment at Univ. of Montana

PROFESSIONAL DEVELOPMENT

2012 Workshop: Innovation Bootcamp; specialized NAU workshop for faculty innovators
2008 Course: Promoting Critical Thinking in the Classroom
2007 Course: Essentials of Good Grantsmanship

**School of Forestry Service**
- 2012/Present Scholarship Committee
- 2011/Present Graduate Coordinator
- 2011/Present Curriculum Review Committee
- 2011/Present Curriculum Review Subgroup
- 2010/Present Faculty advisor for Forestry Sigma Xi Honors Society
- 2008/Present Library Representative
- 2012 Administrative Assistant Search Committee
- 2008/2009 Mission Research Committee
- 2008/2011 Adjunct Faculty Status Review Committee
- 2008 Asst. Professor Search Committee (replacement for S. Hart)
- 2007 Student Enrollment Improvement Grant Submitted to SRR Grant Committee

**Nau University Service**
- 2011/Present University Graduate Committee
- 2008/Present Ad Hoc Dissertation/Defense Subcommittee within UGC
- 2008/Present Member of the IGERT oversight Committee
- 2010/2012 Faculty Senator
- 2007/2011 Imaging and Histology Core Facility Committee (IHCF)
- 2010/2011 Task Force for Indirect Policies and Centers
- 2010/2011 NAU Athletic Strategic Planning Committee
- 2008/2009 Chair of Governance and Compliance Committee Subcommittee of the Intercollegiate Athletics Committee (IAC)
- 2006/2009 Member of Intercollegiate Athletics Committee (IAC)
- 2009/2011 Judge for CEFNS Celebration of Undergraduate Research and Design
- 2008 SFAz Review Committee
- 2008 Reviewer for Tenure promotion (Biology Department)
- 2007/2008 Faculty Representative on Governance and Compliance Committee Subcommittee of the Intercollegiate Athletics Committee (IAC)
- 2007/2008 Faculty Representative on Equity and Student Well-being Committee Subcommittee of the Intercollegiate Athletics Committee (IAC) NAU-NCAA Recertification Self-Study Committee appointed by J.D. Haeger
- 2007/2008 Governance and Commitment to Rules Compliance Subcommittee

**RECOGNITION AND REWARDS**

2013 *Exemplary Faculty* in School of Forestry Northern Arizona University
2012 *Teacher of the Year*; Xi Sigma Pi Chapter Northern Arizona University
2011/2012 *Researcher of the Year*: School of Forestry Northern Arizona University
2010 Bark beetle recordings used by Olympic Museum in Lausanne, Switzerland for display in Olympic winter games (Vancouver Canada Feb. 2010)
2008/2012 Multiple radio, newspaper and TV interviews relating to acoustic research
2009/2010 Nominated for 2009 and 2010 Research and Creative Activity Award for ‘Most Promising New Scholar’ at Northern Arizona University
2008/2009 Researcher of the Year: School of Forestry Northern Arizona University
2008 New mite species named in my honor: Petalomium hofstetteri (Moser)

OTHER TEACHING EXPERIENCE AND ADVISING

**Guest Lectures**
- Forest Health (FOR554): Insects and Forests 2007
- Landscape Ecology (Professional Program): Insect patterns 2011
- Sechrist Elementary School – Entomology to 1st graders 2011
- Sechrist Elementary School – Earth Day Science Fair 2011
- Mt. Elden Middle School – 3 biology courses 2011
- Sedona High School – Biology field course 2010
- Bark Beetle Workshop – Student and Professional 5-day course 2010
- Mutualism with Insects (Univ. of New Brunswick, Canada) 2008
- Disturbance Ecology: Role of Insects and Pathogens (FOR399) 2008
- CEEM (Continuing Education in Ecosystem Management)
  Topic: Forest Health & Interactions with Insects and Pathogens 2007
- ISFAM (International Seminar on Forest Administration and Management)
  Forest Health 2006/2008
  Invasive Species 2006
- Field Studies Program in Costa Rica (Dartmouth College)
  BioStatistics 2002
  Entomology 2002
  Coevolution 2002
  Social Insects 2002
- Field Studies Program in Jamaica (Dartmouth College)
  Coral Reef Geology 2002
  Algal Induced Resistance 2002
- Introduction to Environmental Studies (Dartmouth College)
- Bark Beetle Ecology 1999, 2001
- Symbioses among Insects (University of Wisconsin-Madison) 1995
- Role of Phoretic Mites and Fungi in Bark Beetle Dynamics 1995
- Teaching Assistant, Dartmouth College, Hanover, NH. 1998/2003
- Vertebrate Anatomy, Tropical Field Ecology *in Costa Rica & Jamaica* Introduction to Environmental Studies, Ecosystem
  Ecology, Introductory Ecology
- Teaching Assistant, University of Wisconsin, Madison, WI. 1995/1996
- Evolution, Genetics and Ecology (Biocore Dept.), Ornithology
  Field Course

*Undergraduate Supervisor*
NAU undergraduate research projects in School of Forestry (13), Biology (3), and Engineering (1) 2005/Present
2 students, Undergraduate student Hooper Award Recipients: 2011/2013
1 student, NAU Interns-to-Scholars (I2S) intern: 2012
1 student, Undergraduate Research Mentoring (URM) Scholars: 2011/2012
1 student, Senior Thesis, University of New Brunswick 2009/2010
3 students Supervisor for REU undergraduate; Native American students 2008/2010
4 students in Women in Science Program at Dartmouth College 1999/2004
3 seniors honors theses at Dartmouth College 2000/2004
1 senior thesis at University of Wisconsin 1995

**Graduate Student Advisor**

<table>
<thead>
<tr>
<th>Students</th>
<th>School</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>NAU</td>
<td>2012/Present</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2010/Present</td>
</tr>
<tr>
<td>2</td>
<td>NAU</td>
<td>2009/Present</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2009/2011</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2008/2011</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2010</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2008-2010</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2008-2009</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2006/2009</td>
</tr>
<tr>
<td>3</td>
<td>NAU</td>
<td>2006/2008</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2006/2007</td>
</tr>
</tbody>
</table>

**Graduate Student Committee Member**

<table>
<thead>
<tr>
<th>Students</th>
<th>School</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>NAU</td>
<td>2013</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2012</td>
</tr>
<tr>
<td>2</td>
<td>NAU</td>
<td>2012</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2011/2013</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2010/2012</td>
</tr>
<tr>
<td>2</td>
<td>NAU</td>
<td>2008/2012</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2010/2011</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2009/2011</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2009/2010</td>
</tr>
<tr>
<td>2</td>
<td>NAU</td>
<td>2008/2010</td>
</tr>
<tr>
<td>2</td>
<td>NAU</td>
<td>2009</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2007/2009</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2005/2009</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2005/2008</td>
</tr>
<tr>
<td>1</td>
<td>NAU</td>
<td>2006/2008</td>
</tr>
<tr>
<td>1</td>
<td>Geology, NAU</td>
<td>2006/2008</td>
</tr>
</tbody>
</table>

**SERVICE**

**SUBJECT EDITOR**

Subject Editor for Symbioses Section in *Environmental Entomology* 2009/2013
This is extremely time-consuming, approximately 25 hours a month

**FUNDED GRANTS (LAST FIVE YEARS)**

<table>
<thead>
<tr>
<th>PROJECT</th>
<th>INVESTIGATORS</th>
<th>SPONSOR</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013/2015 Mission Research Grant</td>
<td>Soil-insect food webs (PI)</td>
<td>MS funding</td>
<td>$42,860</td>
</tr>
<tr>
<td>2013/2015 RIF-NAU Postdoctoral Grant</td>
<td>Insect Acoustics (PI)</td>
<td>NORTHERN ARIZONA UNIVERSITY</td>
<td>$100,000</td>
</tr>
<tr>
<td>2012/2013 Hooper Undergraduate Research Award (HURA)</td>
<td>1 Student, R. Hofstetter</td>
<td>NORTHERN ARIZONA UNIVERSITY</td>
<td>$3180</td>
</tr>
<tr>
<td>2012/2013 Hooper Undergraduate Research Award (HURA)</td>
<td>1 STUDENT, R. HOFSTETTER</td>
<td>NORTHERN ARIZONA UNIVERSITY</td>
<td>$2968</td>
</tr>
<tr>
<td>2010/2013 USDA-EM Development of early warning system for Pandora Moth</td>
<td>Co-PI, R. Hofstetter</td>
<td></td>
<td>$78,000</td>
</tr>
<tr>
<td>2010/2015 Mission Research Grant; Bark beetle-tree-genetics</td>
<td>PI</td>
<td>PhD funding</td>
<td>$93,000</td>
</tr>
<tr>
<td>2011/2012 NSF Do bark beetles need fungi to be successful</td>
<td>co-PI</td>
<td>NATIONAL SCIENCE FOUNDATION</td>
<td>$150,000</td>
</tr>
<tr>
<td>2011/2012 Hooper Undergraduate Research Award (HURA)</td>
<td>1 Student</td>
<td>NORTHERN ARIZONA UNIVERSITY</td>
<td>$3486</td>
</tr>
<tr>
<td>2011/2012 Hooper Undergraduate Research Award (HURA)</td>
<td>1 Student</td>
<td>NORTHERN ARIZONA UNIVERSITY</td>
<td>$3394</td>
</tr>
<tr>
<td>2011/2012 USDA Coop Agreement Experiential Outreach Program for Forestry Students</td>
<td>PI</td>
<td>Southern Research Station Asheville</td>
<td>$8,400</td>
</tr>
<tr>
<td>2011 TRIF grant: Using acoustic technology to control bedbugs</td>
<td>PI</td>
<td>TRIF grant</td>
<td>$28,491</td>
</tr>
<tr>
<td>Date</td>
<td>Grant Description</td>
<td>Role</td>
<td>Title/Institution</td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------------------------------------------------------</td>
<td>----------</td>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>2010/2011</td>
<td>TRIF grant: Using acoustic technology to control wood infesting insects</td>
<td>PI</td>
<td>TRIF GRANT</td>
</tr>
<tr>
<td>2009/2011</td>
<td>USDA JV Agreement; Management, climate change, bark beetles</td>
<td>PI</td>
<td>USDA</td>
</tr>
<tr>
<td>2009/2010</td>
<td>Hooper Undergraduate Research Award (HURA)</td>
<td>1 Student</td>
<td>NORTHERN ARIZONA UNIVERSITY</td>
</tr>
<tr>
<td>2009/2010</td>
<td>USDA Emerald Ash Borer Study with Deb McCullough</td>
<td>Co-PI</td>
<td>Michigan State University</td>
</tr>
<tr>
<td>2009</td>
<td>IGP-NAU Sound perception and production by bark beetles</td>
<td>PI</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>IGERT Undergraduate Program: Role of bacteria associated with bark beetles</td>
<td>1 Student</td>
<td>IGERT</td>
</tr>
<tr>
<td>2007/2008</td>
<td>ERDENE-SEED Grant Acoustic emissions to control bark beetles</td>
<td>PI</td>
<td></td>
</tr>
<tr>
<td>2006/2008</td>
<td>USDA Coop Agreement-Pineville; Pheromone project</td>
<td>PI</td>
<td>USDA</td>
</tr>
</tbody>
</table>

**PENDING GRANTS**

- 2013/2014 USDA-EM Seed and cone predators of Ponderosa pine in Arizona  $45,892
- 2013/2015 USDA-EM Seed and cone predators of southwestern white pine  $78,180
- 2013/2015 USDA-STDP Improved Western Pine Beetle Pheromone Technologies  $26,224

**NON FUNDED GRANTS**

- 2013/2016 USAID/Indonesia: Annual Program Statement (APS) Number Indonesia APS-497-11-000001 “Supporting Universities to Partner Across the Pacific; CO-PI $999,639
- 2013/2016 USDA-EM Natural enemies and climate effects on Pandora moth  $62,831
Lindbergh Foundation: Balancing technology and the Environment. Using acoustics to protect trees from insect attack. (PI) $10,186.

**PATENTS AND IPD’S**


Full Patent: No. PCT/US2011/063838. Use of Acoustics to Disrupt and Deter Wood-Infesting Insects and Other Invertebrates from and within trees and wood products. NAU10-002 PCT  2011

Provisional Patent: Use of acoustics to disrupt and deter wood-infesting insects from and within trees #26814.008  2010


Intellectual Property Disclosure (IPD # NAU 8-008): Bark Beetle Trap Technological Enhancement  2007
DENVER C. HOSPODARSKY
Associate Professor
Date of Appointment: 1993 – Present
Specializations: Certified Forester #3142

Northern Arizona University – School of Forestry

EDUCATION:

1993 Ph.D., College of Forestry, Oregon State University; Resource and Community Development (emphasis area)
1982 M.S., College of Forest Resources, University of Washington; Natural Resources Policy and Planning (emphasis area)
1978 B.S., School of Forestry, Mississippi State University; Forest Management (emphasis area)

PROFESSIONAL EXPERIENCE:

1999/2001 Coordinator, Environmental Management Emphasis Area, College of Ecosystem Science and Management, Northern Arizona University
1998/Present Associate Professor, School of Forestry, Northern Arizona University; Human dimensions in forest management specialization; 9-month appointment
1992/1998 Assistant Professor, School of Forestry, Northern Arizona University
1993/1997 Director, Parks and Recreation Management Program, Northern Arizona University

TEACHING EXPERIENCE:

1990/Present RLS (PRM) 447: Research and Evaluation Methods
RLS (PRM) 374: Program Planning and Marketing
RLS 308: Practicum in Recreation and Leisure Services
PRM 208: Practicum in Parks and Recreation
FOR 311: Forest Science - A (team-taught)
RLS (PRM) 360: Interpretation for Recreation
RLS (PRM) 220: Leisure and Society
PRM 408: Senior Internship
FOR 430: Environmental Leadership  
PRM 460: Advanced Interpretation  
PRM 498: Senior Seminar  
FOR 101: Introduction To Forestry  
FOR 211: Forest Mapping and Measurements  
FOR 283: Forestry in the Wildland-Urban Interface  
FOR 423C/424C: Forest Ecosystem Planning I & II (team taught and as Coordinator)  
FOR 325W/326W: Forest Management III & IV (team taught)  
FOR 447: Forestry and Community  
FOR 499: Regional Planning for Natural Resources and Recreation (team taught)  
FOR 590: Economic and Social Issues in Forest Recreation Development (co-taught)  
FOR 690: Graduate Research Methods (team taught)  

ADMINISTRATION  
2008/Present  Coordinator, Human Dimensions certificate area, School of Forestry, Northern Arizona University  
1999/2001  Coordinator, Environmental Management Emphasis Area, College of Ecosystem Science and Management  
1993/1997  Director, Parks and Recreation Management Program (formerly, Recreation and Leisure Services Program), School of Forestry  
1990/1992  Coordinator, Contracted Research for the Arizona Office of Tourism  

PUBLICATIONS, ARCHIVAL, & EQUIVALENT (since 2004):  

RESEARCH REPORTS:  

PRESENTATIONS (since 2004):

Hospodarsky, D. 2010. Where Has all the SPNM Gone?: A Case Study of regional ROS Planning. ROS/BEIG Workshop, October 26, duBois Center, Flagstaff, AZ.


Hospodarsky, D. 2003. Toward Indicators and Standards for the Integration of Biophysical and Social Variables in NPS Backcountry Management. Invited paper at the National Park service, Backcountry impacts Research Symposium, Doubletree Hotel, September 16-19, Seattle, WA.


Hospodarsky, D. Fostering Professionalism in Student Foresters – We Can Do Better! Poster presented at the Society of American Foresters National Convention, Pittsburgh Convention Center, October 18-22, Pittsburgh, PA.

Hospodarsky, D. and M. Lee. 2007. Conclusions About Visitor and Resource Incidence at Petrified Forest National Park, Arizona. Paper accepted for presentation at the 9th Biennial Conference of Research on the Colorado Plateau, duBois Conference Center, October 29-November 1, Northern Arizona University. (Note: A scheduling error on the part of conference organizers precluded the opportunity for the authors to make the oral presentation of this paper.)
PROFESSIONAL SERVICE:

Chair, Northern Arizona Chapter, Society of American Foresters. 2004.
School of Forestry Faculty Representative to the Society of American Foresters. (2003-present)
National Forester (CEO) Xi Sigma Pi (forestry national honorary scholastic fraternity). 2004-2006
Advisory Board Member, Greater Flagstaff Forest Partnership. 2005-2006
Member, Board of Directors and Vice President, Arizona Natural History Association. 2003-2005.
Chair, Membership Committee, Society of American Foresters Southwestern Section. 2005-2010.
Author, organizer and co-presenter of professional roundtable at Portland, Reno and Orlando National SAF Conventions (2007-09) on fostering student leadership.
Chair, Southwestern Society (New Mexico and Arizona), Society of American Foresters. 2012 calendar year.
Peer reviewer to several professional journals

MEMBERSHIPS:

Society of American Foresters
Xi Sigma Pi
Gamma Sigma Delta

RESEARCH ACTIVITIES:

Note: In 2004 my teaching and service assignments increase substantially, while my research appointment was reduced to 10%. These appointment levels, maintained since 2004, effectively put my research productivity on a four-year evaluation basis regarding publications, presentations, and grants categories (viz., 0.25/year or 1/four-years, minimum).

Recent Unfunded Research Activity: (Principal Investigator)
2011/Present  Certification Review Board. Surveys of forestry undergraduate students, recent graduates, and forestry faculty advisors and administrators to identify and overcome barriers to participation in the SAF Candidate Certified Forester Program. Society of American Foresters. Pro Bono. (SAF has committed approximately $6,000 as in-kind contributions to the project.)

Hospodarsky, D. 2011  The Identification and Diminishment of Barriers to Participation in the SAF Candidate Certified Forester Program. Submitted to the Certification Review Board, SAF. Proposal accepted and research has been implemented Pro Bono.

2004  Grants and Contracts Funded: (Principal Investigator unless otherwise indicated)


Petrified Forest National Park Wood Theft Monitoring Project, Phase II and III. National Park Service. $58,000. (Co-principal investigator).

Proposals Submitted - unfunded (since 2004)

Combrink, T. and D. Hospodarsky. 2004. The Impact of Forest Management Interest Groups on Forest Health Restoration in the Southwest. Submitted to the Community Forestry Research Fellowships Program, USDA.

Hospodarsky, D. 2004. Social Impacts on Communities from Exposure to Various Levels of Wildfire Risk as a Result of Forest Restoration. Submitted to the NAU School of Forestry Mission Research Board.


ADVISING:

Faculty advisor to the NAU Society of American Foresters Student Chapter and NAU Forestry Club, 2002-present. The NAU Student Chapter SAF was recognized as the “Outstanding Student Chapter in North America – First Place in both 2008-09 and 2011-12, and Third Place in 2010-11 (among 74 SAF Student Chapters throughout North America).

Faculty advisor to the NAU Logging Sports Team, 2006-present. Revived the team after a 20-year hiatus and since have lead the team to five annual competitions (conclaves) of the Association of Western Forestry Clubs (AWFC).
Currently mentor about 90 Forestry student members of the Forestry Club, NAU Student Chapter SAF, and NAU Logging Sports Team.

Recognized as an Educator of Influence by NAU Gold Axe recipient Erin Saunders, 2008-09.

During the 2000-01, 2001-02, and 2002-03 AYs, I advised and mentored 70, 62, and 28 students, respectively, in the PRM, Forestry, and Environmental Management programs.


Faculty advisor to the R.E.A.L. Association, the Parks and Recreation Management student club, 1994 – 1997
Document E: Individual Faculty Information

CHING-HSUN HUANG, Ph.D.
Associate Professor – 9 month – Tenured
Date of Appointment: 2007 - Present
Northern Arizona University – School of Forestry

EDUCATION:

1999 Ph.D. Forest Economics, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, Texas

1993 M.S. Environmental Management, University of Houston-Clear Lake, Houston, Texas

1990 B.S. Forestry, Chinese Culture University, Taipei, Taiwan.

PROFESSIONAL AND RESEARCH EXPERIENCE:

2012/Present Associate Professor in Forest Economics and Forest Management, School of Forestry, Northern Arizona University, Flagstaff, Arizona

2007/2012 Assistant Professor in Forest Economics and Forest Management, School of Forestry, Northern Arizona University, Flagstaff, Arizona

2006/2007 Assistant Professor in Natural Resources Economics, Department of Agronomy and Resource Sciences, College of Agriculture and Human Sciences, Texas A&M University-Kingsville, Texas

2003/2006 Research Scientist in Forest Economics and Management, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, Texas

2000/2002 Post Doctorate Research Associate in Forest Economics and Management, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, Texas

1996/1999 Research Assistant, Forest Economics, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, Texas

1993/1994 Taiwan EPA Research Assistant, Department of Public Health, Taipei Medical College/Taiwan Environmental Protection Administration (EPA).

TEACHING EXPERIENCE:
2008/Present
FOR 101 Forestry Introduction
FOR 324W  Forest Economics (lectures and labs)
FOR 326W  Forest Management (lectures and labs)
FOR 493  Natural Resource Economics (online)
FOR 500  Ecosystem Science and Management Principles
FOR 593  Natural Resource Economics (online)
FOR 505  Forestry Seminar Series

Courses Taught at Texas A&M University-Kingsville
AGBU 2317 Agricultural Economics (3 credits)
AGBU 3380 Environmental Economics (3 credits)
AGBU 4325/5390 Range Economics (undergraduate and graduate) (3 credits)
AGECON 2223 International Agribusiness Marketing (3 credits)

New Courses Developed:
AGBU 2317 Agricultural Economics
AGBU 3380 Environmental Economics
AGBU 4325/5390 Range Economics

REFERRED JOURNALS: (with Impact Factors and Google Scholar Citations)


NON-REFERRED JOURNAL ARTICLES:


REFERRED ARTICLES IN PREP:


¹Graduate student

**SCIENTIFIC PRESENTATIONS:** Principle Presenter and Lead Author

Huang, C., and Sorensen¹, C. 2011. The economic value of selling carbon credits from restored forests: a case study from the Navajo Nation’s tribal forests. The 11th Biennial Cultural and Natural Resource Management on the Colorado Plateau: Science and Management at the Landscape Scale, Flagstaff, AZ, October 26, 2011


Author (Not Presenter)


Waring, K.M., D.M. Reboletti\textsuperscript{1}, L.A.. Mork\textsuperscript{1}, M. Li, C. Huang, R.W. Hofstetter, A.M. Garcia\textsuperscript{1}, P.Z. Fule, T.S. Davis\textsuperscript{1}. 2008. Southern and Mexican pine beetles and climate change: An assessment of potential ecological and economic effects of a range shift. Ecological Society of America 93\textsuperscript{rd} Annual Meeting. August 3-8, 2008, Milwaukee, WI.


1Graduate student

ADVISING
Undergraduate Student Advisor
1 student, School of Forestry, Northern Arizona University 2011-2012

Graduate Student Advisor
1 student, Environmental Science and Policy, Northern Arizona University 2012-present
2 students, School of Forestry, Northern Arizona University 2011-present
1 student, School of Forestry, Northern Arizona University 2008-2011
2 students, School of Forestry, Northern Arizona University 2009-2010
College of Agriculture and Human Sciences, Texas A&M University-Kingsville 2006-2007

Graduate Student Committee Member
1 student, School of Forestry, Northern Arizona University 2011-2012
1 student, School of Forestry, Northern Arizona University 2010-2011
1 student, College of Social and Behavioral Sciences, Northern Arizona University 2010-2011
1 student, School of Forestry, Northern Arizona University 2009-2011
1 student, School of Forestry, Northern Arizona University 2009-2010
1 student, School of Forestry, Northern Arizona University 2008-2010
1 student, School of Forestry, Northern Arizona University 2008-2009
1 student, School of Forestry, Northern Arizona University 2007-2009
2 students, College of Forestry and Agriculture
Stephen F. Austin State University 2004-2006
1 student, College of Forestry and Agriculture, Stephen F. Austin State University 2003-2005
2 students, College of Forestry and Agriculture, Stephen F. Austin State University 2002-2004
1 student, College of Forestry and Agriculture,
Stephen F. Austin State University
1 student, College of Forestry and Agriculture,
Stephen F. Austin State University
College of Forestry and Agriculture,
Stephen F. Austin State University

PROFESSIONAL SERVICE ACTIVITIES:

As a full panelist serving on the FY 2012 Food and Agricultural Sciences National Needs Graduate and Postgraduate Fellowship (NNF) Grants Program Review Panel for the USDA National Institute of Food and Agriculture (NIFA)
Selected to review proposals submitted to the 2011 NASA Applied Science RFP titled “Wildland Fires”
2011 As a full panelist serving on the FY 2011 Higher Education Challenge Grants Program Review Panel for the USDA National Institute of Food and Agriculture (NIFA)
2011 Nominee for serving on an EPA Science Advisory Board (SAB) Panel on Accounting for Carbon Dioxide (CO2) Emissions from Biogenic Sources
Reviewer of a textbook, “Managing the Environment” by Barlowe
2006 External project proposal reviewer for Forest and Wildlife Research Center at Mississippi State University

NAU, COLLEGE, AND UNIVERSITY SERVICE:
2012-present Member of the CEFNS Curriculum Committee
2012-present Forestry Library Liaison Member of the Search Committee for Instructors of Mathematics, Mathematics and Statistics Department
2011-present Member of the Information Technology Committee
2010-present Member of the Annual Review Committee
2011-2012 Presented scholarships at Honors Convocation
2011-2012 Judge for College of Engineering, Forestry & Natural Sciences (CEFNS)

Undergraduate Research and Design Symposium (UGRADS)
2009-2012 Member of the Faculty Grants Committee
2009-present Member of the SWFSC Landscape Committee
Member of the Mission Research Board
Member of the Ad Hoc Adjunct Faculty Status Review Committee
Forestry Graduate Student Association faculty advisor
Presented scholarships at Honors Convocation

584
COMMUNITY SERVICE:
Attended Landscape Restoration Working group for the Four Forest Restoration Initiative (4FRI) as a forest economics/utilization advisor and provided comments regarding the outline of 4FRI Utilization, Economics and Ecosystem Services in 2010.
Provided assistance in the calculation of herbage production for range management to the 4FRI team in January 2012.
Gave a talk to the Boy Scouts of America in their badges series on citizenship in the world, teaching the boy scouts about different world organizations and the role government plays globally on February 29, 2012.
Provided forest economics and forest management advice to KOMAZA, “a non-profit social enterprise committed to reducing rural poverty by connecting smallholder farmers with high-value markets”, on April 9, 2012

SPECIALIZED TRAINING:
USDA Forest Service (Region 3) Project Level Economic Training for Range, April 24-25, 2012
Document E: Individual Faculty Information

MOLLY E. HUNTER
Professor – 9 month – Tenured
Date of Appointment: 2007 – Present
Specializations: Fire Science
Northern Arizona University – School of Forestry

EDUCATION:

PROFESSIONAL EXPERIENCE:
2011/Present Assistant Research Professor, School of Forestry, Northern Arizona University, Flagstaff, AZ. Courses taught: Fire Ecology; Forest Ecology; Fire Monitoring and Modeling; Fuel Treatments and Modeling.

2007/2010 Assistant Clinical Professor, School of Forestry, Northern Arizona University, Flagstaff, AZ. Courses developed and taught: Introduction to Wildland Fire; Fire Ecology; Forest Ecology; Fire Monitoring and Modeling; Fuel Treatments and Modeling; Graduate Seminar.

2007 Instructor, School of Life Sciences, University of Nevada at Las Vegas. Courses developed and taught: Ecosystem Management; Biogeography.

2005/2007 Research Associate, Dept. of Forest, Rangeland and Watershed Stewardship, Colorado State University, Fort Collins, CO.


PEER-REVIEWED PUBLICATIONS:


**INVITED PAPERS:**


**REPORTS:**


## GRANTS AND CONTRACTS:

<table>
<thead>
<tr>
<th>Project</th>
<th>Investigator</th>
<th>Sponsor</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011-2012 Buffelgrass eradication and outreach</td>
<td>PI</td>
<td>Southern Arizona Buffelgrass Coordination Center</td>
<td>$14,114</td>
</tr>
<tr>
<td>2011-2012 Historical and current fire management practices in two southwestern wilderness areas: Saguaro National Park and Gila National Forest</td>
<td>PI</td>
<td>Rocky Mountain Research Station</td>
<td>$22,249</td>
</tr>
<tr>
<td>2010-2013 Developing a Southwest Fire Science Consortium</td>
<td>Co-PI</td>
<td>Joint Fire Science Program</td>
<td>$878,612</td>
</tr>
<tr>
<td>2009-1010 (preproposal) Developing a Southwest Fire Science Consortium</td>
<td>Co-PI</td>
<td>Joint Fire Science Program</td>
<td>$90,881</td>
</tr>
<tr>
<td>2011 Fuel Reserve Fund; Assessment and Guidelines for Determining Effectiveness and Longevity of Buffelgrass treatments in Southern Arizona</td>
<td>PI</td>
<td>National Park Service</td>
<td>$30,758</td>
</tr>
<tr>
<td>2009-2010 Video Image Library of Fuel Treatment Practices</td>
<td>Collaborator</td>
<td>Joint Fire Science Program</td>
<td>$28,000</td>
</tr>
<tr>
<td>2009-2012 Forest Vegetation Simulator (FVS) modeling project</td>
<td>Co-PI</td>
<td>Grand Canyon National Park</td>
<td>$40,220</td>
</tr>
<tr>
<td>2008- 2009 Post-wildfire seeding in forests of the Intermountain West: trends, costs, effects, use of native seed</td>
<td>Co-PI</td>
<td>Joint Fire Science Program</td>
<td>$137,405</td>
</tr>
<tr>
<td>2008 Monitoring</td>
<td>PI</td>
<td>Joint Fire Science Program</td>
<td>$82,624</td>
</tr>
<tr>
<td>Effectiveness of Prescribed Fire and Wildland Fire Use in the Gila National Forest, New Mexico</td>
<td>Program</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008 Treatment Effectiveness Monitoring for the Dakota Hill Complex Burned Area Rehabilitation Treatments</td>
<td>Co PI Zion National Park $344,156</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PROFESSIONAL AFFILIATIONS:**

Association for Fire Ecology  
Ecological Society of America  
Society of American Foresters

**SERVICE:**

2011/Present Writer and Editor: Joint Fire Science Program.  
2011 Program committee: Association for Fire Ecology and Southwest Fire Science Consortium Regional Conference.  
2007 Program committee: Association for Fire Ecology Regional Conference.  
2002 Board member and student co-chair: Association for Fire Ecology.

**REVIEWER:**  
Applied Geography  
Biological Invasions  
Fire Ecology  
Forest Ecology and Management  
International Journal of Wildland Fire  
Journal of Arid Environments  
Rangeland Ecology and Management  
Restoration Ecology  
The Journal of Applied Ecology  
USDA Forest Service, Rocky Mountain Research Station
YEON-SU KIM  
Associate Professor – 9 month – Tenured  
Date of Appointment: 1998 – Present  
Specializations: Economics  
Northern Arizona University – School of Forestry

EDUCATION:

1998  Doctor of Philosophy in Forest Resources, Oregon State University, Corvallis, OR. Specializing in Economics with a Ph.D. minor in Statistics

1994  Master of Science in Forest Resources, Seoul National University, Seoul, South Korea. Specializing in Economics and Recreation

1992  Bachelor of Science in Forestry, Seoul National University, Seoul, South Korea

PROFESSIONAL EXPERIENCE:

2012/Present  Affiliated Scientist, Ecological Restoration Institute, Northern Arizona University, Flagstaff, AZ.

2012/Present  Professor; 2004 – 2012: Associate Professor; 1998 –2004: Assistant Professor, School of Forestry, Northern Arizona University, Flagstaff, AZ.

2011/2013  External Researcher, Center for International Forestry Research (CIFOR), Bogor, Indonesia

TEACHING EXPERIENCE:

1999/Present  Associate Professor, Department of Forestry, Northern Arizona University, Flagstaff, AZ

FS 141 First Year Seminar: Local Environments and the Land  
FOR 222 Environmental Conservation, two 8-week sessions  
FOR 255 International Wildlife Issues  
PRM 346 Wildland Recreation Management  
PRM 301 Recreation Economics (in class and web-based)  
FOR 423C/424C Forest Ecosystem Planning I & II  
FOR 440 Benefit-Cost Analysis  
FOR 493/593 Natural Resource Economics Fall semester of 1999  
FOR 499 Resource Planning for Natural Resources and Recreation  
FOR 505 Forestry Seminar Series  
FOR 506 Special Topics: Econometrics  
FOR 590 Economic and Social Issues in Forest Recreation Development (web-based)  
FOR 633 Ecological Economics
FOR 690 Research Methods
FOR 697 Independent Study (Non-Market Valuation)
UC 101 The University Colloquium

Other Courses:
2000/2007

Economics and Planning Unit, Institute for Ecosystem Management for Continuing Education in Ecosystem Management (IEM-CEEM)

REFERRED JOURNALS:


591


OTHER PUBLICATIONS:


BOOK CHAPTERS:


PRESENTATIONS, LECTURES, AND POSTERS:


Kim, Y.-S. 2012. Navigating through the perils and promises of Payments for Environmental Services for sustainable development. Invited Speaker. The Fourth International Conference on
Science and Technology for Sustainable Development of the Greater Mekong Sub-region (4th STGMS), Jan 23-24. Khon Kaen, Thailand


Kim, Y.-S. 2010. Ecological Restoration as Economic Stimulus: Potential Regional Economic Impacts of the Southwestern Ponderosa Pine restoration in the U.S. Poster presentation XXIII
International Union of Forest research Organizations (IUFRO) World Congress, August 2010, Seoul, South Korea.


### RESEARCH FUNDING:

<table>
<thead>
<tr>
<th>Project</th>
<th>Investigators</th>
<th>Sponsor</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-2014 The Impacts of the USDA Forest Service Woody Biomass Utilization Grants Program in the White Mountains Stewardship Area and Eastern Oregon.</td>
<td>Kim, Y.-S.</td>
<td>Glacier Land Research and Development/USFS Forest Products Lab</td>
<td>$55,000 for two years</td>
</tr>
<tr>
<td>2012-2014 The Feasibility Analysis of a REDD+ Pilot Project in Lombok, Indonesia: Reference Emissions Level (REL) and Results-Based Compensation</td>
<td>Kim, Y.-S</td>
<td>Korea Forest Research Institute</td>
<td>$80,000 for two years</td>
</tr>
<tr>
<td>2012-2014 Assessing Effectiveness of the Joint Fire Science Program Publications</td>
<td>Lee, M., and Y.-S. Kim</td>
<td>Joint Fire Science Program</td>
<td>$82,000 for two years</td>
</tr>
<tr>
<td>2011-2011 Tipping Point: The Number of Acres that Require Treatment in Order for Fire Behavior and the Cost of Suppression to be Subdued</td>
<td>Kim, Y.-S., R. Fitch</td>
<td>USDA Forest Service (via Ecological Restoration Institute)</td>
<td>$8,307</td>
</tr>
<tr>
<td>2008-2010 Economic Feasibility of Tamarisk Utilization</td>
<td>Kim, Y.-S</td>
<td>USDA-MacIntire-Stennis</td>
<td>$25,264</td>
</tr>
<tr>
<td>Title</td>
<td>Author(s)</td>
<td>Institution/Government</td>
<td>Funding</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>------------------------</td>
<td>-------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>2007 Economic Feasibility of Tamarisk Utilization</td>
<td>Kim, Y.-S.</td>
<td>Arizona Water Institute Faculty Incentive Award</td>
<td>$6,000</td>
</tr>
<tr>
<td>2007 Economic Feasibility Study for a Hopi Biomass Plant to Utilize Tamarisk</td>
<td>Kim, Y.-S.</td>
<td>NAU Academic Diversity and Equity Research Program</td>
<td>$6,000</td>
</tr>
<tr>
<td>2003-2007 Understanding the Role of Forest Health Restoration in Relationships Between Community Socioeconomic Conditions and Wildfire Management in the Ponderosa Pine Region of the Southwest: Assessment of Community Economies</td>
<td>Kim, Y.-S., E.E. Hjerpe</td>
<td>USDI-MacIntire-Stennis</td>
<td>$55,000</td>
</tr>
</tbody>
</table>

**PROFESSIONAL SERVICES**

Current: Faculty Grant Program Proposal Review; Global Science and Engineering Program (GSEP) Career Panel Discussion (Jan. 2012); Interdisciplinary PhD Council, College of Engineering Forestry and Natural Sciences.

Past committees: Program and Dissertation Committees for two Ph.D. students at Politics and International Affairs (2012), Biostatistics Faculty position search committee (2012), Global Learning Initiative Committee (2010-2012) Teaching Evaluation Committee (2010-2012), Faculty Status Committee (2009-2010), Mission Research Review Committee (chair in 2010), UGRaDS 2010 Judge, University Assessment Committee, Academic Standard Committee, School of Forestry Undergraduate Curriculum Committee, Ethnic and Cultural Diversity Committee, School of Forestry Graduate Studies Committee, PRM strategic planning committee, the University's Assessment Council, International Hot Team, International Office Director Search Committee, Information Technology Across the Curriculum (ITAC) committee, several Faculty Search Committee, Support System Analyst Search Committee, International Emphasis Committee, Enrollment Committee, and several Adjunct Faculty Application Review Committees.
I helped initiating an exchange program between NAU and Woosong University in Korea in 2001.

I worked as a campus host for a Chinese exchange scholar from Yunnan University, Kunming, China from August 2007 to July 2008; for Adcharaporn Pagdee.(former student) from Khon Kaen University, Khon Kaen, Thailand in April 2010.

Joint Fire Science Program Research Proposal Review Panel; Economics of Fuel Treatments (Spring 2013).

Editorial board for the Korean Journal of Forest Economics and Forest Science and Technology


Open Spaces Commission for the City of Flagstaff. May 2009-May 2012 (3-year term).


Chapter Chair, the Northern Arizona Chapter of Society of American Foresters in 2003.

Secretary/treasurer, the Northern Arizona Chapter of Society of American Foresters from 2000 to 2002.

ORGANIZATION MEMBERSHIPS:
Society of American Foresters
International Society for Ecological Economics

RECOGNITION:
Teacher of the Year, School of Forestry, Northern Arizona University 2011
Duling Grants award, International Society of Arboriculture, 1996
Document E: Individual Faculty Information

THOMAS E. KOLB
Professor- 9 month- Tenured
Date of Appointment: 2002 - Present
Specialization: Professor of Forest Ecophysiology
Northern Arizona University - Department of Forestry

EDUCATION:

1988    Ph.D. Forest Resources
        Department of Forestry, Pennsylvania State University

1984    M. S. Forest Resources
        Department of Forestry, Pennsylvania State University

1982    B. S. Forest Resource Management
        Department of Forestry, University of Tennessee

PROFESSIONAL RESEARCH AND TEACHING EXPERIENCE:

2002/Present  Professor of Forest Ecophysiology, School of Forestry, Northern Arizona
              University, Flagstaff, AZ

1997/2002    Associate Professor of Forest Ecophysiology, School of Forestry,
              Northern Arizona University, Flagstaff, AZ

1993/1997    Assistant Professor of Forest Ecophysiology, School of Forestry,
              Northern Arizona University, Flagstaff, AZ

1989/1992    Research Associate, School of Forest Resources, Pennsylvania State University

1989/1989    Instructor in Forest Ecology and Silvics, School of Forest Resources,
              Pennsylvania State University

1982/1988    Graduate Research Assistant, School of Forest Resources, Pennsylvania State
              University

TEACHING EXPERIENCE:

1993/Present  Professor, Department of Forestry, Northern Arizona University
              ENV 101 - Environmental Sciences, Guest Lecturer, 1993
              FOR 101 - Forestry Introduction, Guest Lecturer, 1993, 2010
              FOR 201 - Foundations of Forestry – Silvics, 1994-1995
              FOR 212 - Trees and Forests of North America
              FOR 220 – Introduction to Forest and Range Plants
              FOR 250 - Arizona Forests and Wildlife
              FOR 311 - Dendrology/Plant Taxonomy
FOR 313/FOR 314 - Forest Ecology
FOR 398 - Forest Plant Taxonomy
FOR 408 – Undergraduate Field Work
FOR 454/554 - Integrated Forest Health
FOR 485 – Undergraduate Research
FOR 506 – Forest Sustainability
FOR 550 - Forest Tree Ecophysiology
FOR 599 – Dendroecology, guest lecturer
FOR 601 - Southwest Forest Ecosystems
FOR 612 - Forest and Range Ecology
FOR 690 - Research Methods
FOR 692 – Proseminar
FOR 695 – Advanced Studies in Forestry – Silviculture
FOR 698 – Forest Ecosystem Ecology/Ecophysiology
UC101 – University Colloquium

1987/1989  Professor, Department of Forestry, Pennsylvania State University
Dendrology
Silvics
Spring Field Tour

REFERRED JOURNALS/PUBLICATIONS

Book Chapters


**Symposia Edited**


Refereed Publications (lead author: *=graduate student advisee, **=undergraduate student advisee)


OTHER TECHNICAL PUBLICATIONS:
(Non-Refereed Proceedings, Abstracts, Reports; lead author, *=graduate student, **=undergraduate student)


PRESENTATIONS:

Invited


“Impacts of pear thrips on sugar maple.” Northern Arizona University Department of Biological Sciences Seminar, March 5, 1993, Flagstaff, AZ.

“Forest health - a doctor's diagnosis.” October meeting of the Society of American Foresters Peaks Chapter, October 21, 1993, Flagstaff, AZ.


“An ecophysiological approach to assessing the impact of insect herbivory on forest ecosystems.” Western Forest Insect Work Conference/Western International Forest Disease Working Conference, March 8, 1994, Albuquerque, NM.

“Concepts of forest health.” Southwest Section, Society of American Foresters, 1994 Spring Sectional Meeting, April 21, 1994, Flagstaff, AZ.

“Restoration ecology research - G. P. Pearson Natural Area.” Southwest Section, Society of American Foresters, 1994 Spring Section Meeting, April 22, 1994, Flagstaff, AZ.

“Native trees of Arizona.” Northern District Meeting of the Arizona Flower and Garden Clubs, June 4, 1994, Flagstaff, AZ.

“Size- and age-related variation in ozone impacts to black cherry trees.” Northern Arizona University Department of Biological Sciences Seminar, Nov. 28, 1994, Flagstaff, AZ.

“Concepts of forest health.” January meeting of the Society of American Foresters White Mountain Chapter, January 26, 1995, Showlow, AZ.


“Native trees of Arizona.” April meeting of the Alpine Garden Club, April 11, 1995, Flagstaff, AZ.

“Forest health from different viewpoints.” Keynote address at the 1995 United States Department of Agriculture Forest Service National Silviculture Workshop, May 8, 1995, Mescalero, N. M.

“Planting the right tree in the right spot.” Northern Arizona Urban and Community Forestry Workshop, May 19, 1995, Flagstaff, AZ.

“Etiology of sugar maple decline in Pennsylvania.” United States Department of Agriculture Forest Service Sugar Maple Decline Workshop, June 6, 1995, Coudersport, PA.

“What is forest health?” Presentation to the Coconino National Forest, East Clear Creek Ecosystem Partnership, February 30, 1996, Flagstaff, AZ.

“What is forest health?” 1996 Spring Meeting of the Grand Canyon Section of the Air and Waste Management Association, May 17, 1996, Flagstaff, AZ.

Testimony on “Forest Health in the Southwest” to the United States Senate Subcommittee on Forests and Public Land Management, Committee on Energy and Natural Resources, July 30, 1996, Washington, D. C.

“Physiology of Pruning” 1997 Fourth Annual Flagstaff Community Trees and Landscape Workshop, July 26, 1997, Flagstaff, AZ.

“Remarks from the Centennial Teacher of the Year.” Commencement address at the College of Ecosystem Science and Management Graduation Recognition Ceremony, December 13, 1997, Flagstaff, AZ.


“Ageing as an Influence on Tree Response to Ozone: Theory and Observations.” Keynote address at the EUROSILVA Workshop on Development and Ageing in Forest Trees, September 20, 2000, Florence, Italy.


“Structuring your early career as a graduate student in Health Professions or Forestry and Environmental Sciences: Things I wish someone had told me at the start.” New Graduate Student Orientation, Northern Arizona University, August 23, 2001.


Testimony on “Crisis on the National Forest: Containing the Threat of Wildland Fire to the Environmental and Communities” to the United States House of Representatives Subcommittee on Forests and Forest Health, Committee on Resources, March 7, 2003, Flagstaff, Arizona.


“PhD Program Assessment in the NAU School of Forestry.” 2005 NAU Assessment Fair, April 6, 2005, Flagstaff, Arizona.


“Carbon flux research at the NAU Centennial Forest.” Northern Arizona University School of Forestry Alumni Reunion Field Trip, October 20, 2006, Flagstaff, Arizona.

“Carbon flux research at the NAU Centennial Forest.” Western International Forest Disease
Work Conference Field Trip, October 18, 2007, Flagstaff, Arizona.

“Carbon dioxide and energy exchange in disturbed southwestern ponderosa pine forests.” 9th

“Carbon flux research at the NAU Centennial Forest.” 2008 Western Research Forest Managers
Meeting Field Trip, September 23, 2008, Flagstaff, Arizona.

“The carbon balance of Arizona ponderosa pine forests.” Arizona Governor’s Forest Health

“Maintaining tree health during climate change.” Annual Meeting of the Western Chapter of the

“Carbon and water balance implications of forest restoration treatments.” United States
Department of Agriculture-National Institute of Food and Agriculture-National Research
Initiative Managed Ecosystems Annual Awardee Meeting, November 3, 2009, Pittsburg,
Pennsylvania.

“Carbon and water fluxes from ponderosa pine forests disturbed by wildfires and thinning.”
January meeting of the Northern Arizona Chapter of the Society of American Foresters, January

“Carbon and water balances of northern Arizona ponderosa pine forests.” Northern Arizona
University, School of Forestry, Seminar Series, February 23, 2011, Flagstaff, Arizona.

“Carbon and water balances implications of restoration thinning.” USDA AFRI/NRI Managed

“Carbon and water balances of southwestern ponderosa pine forests.” Southwestern Fire Science

“Urban forestry.” University of Arizona, Coconino County, Master Gardener Program, March 7,
2012, Flagstaff, Arizona.

“Urban forestry.” University of Arizona, Coconino County, Master Gardener Program, October

“Forest carbon workshop.” Willow Bend Environmental Education Center, November 10, 2012,
Flagstaff, Arizona.

Volunteered Professional Presentations (oral and poster; only presentations delivered by Kolb
listed for brevity)
“Cold tolerance variation in loblolly pine needles from different branch types, families, and environments.” Southern Forest Tree Improvement Conference. May 21-23, 1985, Long Beach, MS.

“Effects of shade and herbaceous vegetation on first-year germination and growth of direct-seeded northern red oak, white ash, white pine, and yellow-poplar.” Central Hardwood Forest Conference. March 5-8, 1989, Carbondale, IL.

“Competitive ability and growth allocation of planted northern red oak and yellow-poplar seedlings.” Central Hardwood Forest Conference. March 5-8, 1989, Carbondale, IL.


“An ecophysiological analysis of shade effects on Clematis hirsutissima var. arizonica.” Second Southwestern Rare and Endangered Plant Conference, September 13, 1995, Flagstaff, AZ.

“Size- and age-related variation in ozone impacts to black cherry trees.” Northern Arizona University School of Forestry Seminar, November 17, 1995, Flagstaff, AZ.


“Differences in leaf gas exchange and water relations among species and tree sizes in an Arizona pine-oak forest.” Northern Arizona University Department of Biological Sciences Seminar, Jan. 21, 2000, Flagstaff, AZ.

“Core education for forestry graduate students at Northern Arizona University.” Third Biennial Conference on University Education in Natural Resources, March 27, 2000, Columbia, Missouri.


“Water use by Tamarix and native riparian trees.” Northern Arizona University, School of Forestry Seminar Series, February 5, 2003, Flagstaff, Arizona.

“Ponderosa pine water stress and oleoresin production in three forest conditions in northern Arizona” (poster). 54th Western Insect Work Conference, Guadalajara, Mexico, Nov. 3-6, 2003.


“Teaching writing within forestry.” Seventh Biennial Conference on University Education in Natural Resources, March 14, 2008, Corvallis, Oregon.


633


PROFESSIONAL AFFILIATIONS:

Ecological Society of America
Society of American Foresters
The Nature Conservancy

PROFESSIONAL SERVICE

Journal Manuscript Reviewer

1993  Canadian Journal of Forest Research (2 papers)
      Forest Science (1 paper)

1994  American Journal of Botany (1 paper)
      Proceedings of the Central Hardwood Forest Conference (1 paper)
      Tree Physiology (1 paper)

1995  Environmental Entomology (1 paper)
      Ghanaian Journal of Forestry (1 paper)
      Journal of Applied Ecology (1 paper)
      Trees - Structure and Function (1 paper)

1996  Ecology (1 paper)
      Canadian Journal of Forest Research (2 papers)

1997  Ecological Applications (1 paper)
      Journal of Chemical Ecology (1 paper)
      Journal of Tropical Forest Science (1 paper)
      Tree Physiology (1 paper)
United States Department of Agriculture, Forest Service, Rocky Mountain Research Station (1 paper, pre-submission review)

1998
Forest Science (1 paper)
Journal of Arid Environments (1 paper)
Tree Physiology (1 paper)
Trees - Structure and Function (2 papers)
United States Department of Agriculture, Forest Service, Northeastern Experiment Station (1 paper, pre-submission review)

1999
Ecology (1 paper)
Ecoscience (1 paper)
Environmental Entomology (1 paper)
Forest Science (1 paper)
Tree Physiology, Editorial Review Board

2000
Ecology (1 paper)
Environmental Pollution (1 paper)
Forest Science (1 paper)
Journal of the American Society of Horticultural Science (1 paper)
United States Department of Agriculture, Forest Service, Rocky Mountain Experiment Station, Proceedings of the meeting: Steps Towards Stewardship: Ponderosa Pine Ecosystems Restoration and Conservation (2 papers)
Trees - Structure and Function (1 paper)
Trends in Plant Science (1 paper)

2001
Ecology (1 paper)
Northern Journal of Applied Forestry (1 paper)
Tree Physiology (3 papers)
Wetlands (1 paper)

2002
Canadian Journal of Plant Science (1 paper)
Tree Physiology (2 papers)
Tree Physiology, Editorial Review Board

2003
Forest Science (1 paper)
Tree Physiology, Editorial Review Board
Tree Physiology (1 paper)

2004
Tree Physiology, Editorial Review Board
Tree Physiology (4 papers)
Paleobiology (1 paper)
Oecologia (2 papers)
Restoration Ecology (1 paper)
Journal of Arid Environments (1 paper)
Journal of Chemical Ecology (1 paper)
Canadian Journal of Forest Research (1 paper)
Ecological Applications (1 paper)

2005
Tree Physiology, Editorial Review Board
Tree Physiology (2 papers)
Forest Ecology and Management (3 papers)
Canadian Journal of Forest Research (1 paper)
Forest Science (1 paper)
Functional Plant Biology (1 paper)
Hydrological Processes (1 paper)
New Forests (1 paper)
Global Change Biology (1 paper)

2006
Annals of Forest Science (1 paper)
Ecological Applications (1 paper)
Environmental Management (1 paper)
Forest Ecology and Management (3 papers)
Forest Science (1 paper)
New Forests (1 paper)
New Phytologist (1 paper)
Plant Ecology (1 paper)
Tree Physiology (1 paper)
Trees – Structure and Function (1 paper)
US EPA technical manuscript review (1 paper)

2007
Forest Ecology and Management – Editorial Board
Forest Ecology and Management (8 papers)
Plant Ecology (2 papers)
Southern Journal of Applied Forestry (1 paper)
Forest Science (2 papers)
Canadian Journal of Forest Research (2 papers)
New Forests (1 paper)
Tree Physiology (2 papers)

2008
Agricultural and Forest Entomology (1 paper)
Agroforestry systems (1 paper)
Canadian Journal of Forest Research (2 papers)
Ecohydrology (1 paper)
Frontiers in Ecology and the Environment (1 paper)
Forest Ecology and Management (13 papers; Editorial Board)
Forest Science (2 papers)
Geophysical Research Letters (2 papers)
Journal of Geophysical Research – Biogeosciences (1 paper)
Tree Physiology (4 papers)
University of Arizona, Cooperative Extension Publication (1 paper)

2009
Annals of Forest Science (2 papers)
Environmental Pollution (1 paper)
European Journal of Forest Research (1 paper)
Fire Ecology (1 paper)
Forest Ecology and Management (5 papers, Editorial Board)
Forest Science (1 paper)
Frontiers in Ecology and the Environment (1 paper)
Geophysical Research Letters (2 papers)
Global Change Biology (1 paper)
International Journal of Plant Sciences (1 paper)
Photosynthetica (1 paper)
Trees – Structure and Function (1 paper)

2010
Agricultural and Forest Entomology (1 paper)
Annals of Botany (1 paper)
Ecology (1 paper)
Forest Ecology and Management (5 papers, Editorial Board)
Functional Ecology (1 paper)
International Journal of Wildland Fire (2 papers)
Natural Areas Journal (1 paper)
Tree Physiology (2 papers)

2011
Agricultural and Forest Entomology (1 paper)
Applied Vegetation Science (1 paper)
Austral Ecology (1 paper)
Climatic Change (1 paper)
Ecological Applications (1 paper)
Ecology (1 paper)
Environmental Entomology (1 paper)
Forest Ecology and Management (4 papers, Editorial Board)
Journal of Wildlife Management (1 paper)
New Forests (1 paper)
Oecologia (1 paper)
Tree Physiology (1 paper)
Western Journal of Applied Forestry (1 paper)

2012
Applied Vegetation Science (1 paper)
Canadian Journal of Forest Research (2 papers)
Conservation Biology (1 paper)
Dendrochronologia (2 papers)
Ecological Applications (1 paper)
Forest Ecology and Management (7 papers, Editorial Board)
Forest Science (1 paper)
Frontiers in Ecology and the Environment (1 paper)
Journal of Ecology (1 paper)
Journal of Sustainable Forestry (1 paper)
Nature Geosciences (2 papers)
Tree Physiology (2 papers)
Western Journal of Applied Forestry (2 papers)
Wiley-Blackwell Life Science Book Proposal (1)

**Book Reviewer**


**Proposal Reviewer**

1994/2009

United States Department of Agriculture National Research Initiative Competitive Grants Program (1 proposal)

Northern Arizona University School of Forestry Mission Research Program (6 proposals)

United States Department of Agriculture, Forest Service, Coconino National Forest, Mormon Lake Ranger District; review of proposed research on a sensitive plant (Clematis hirsutissima var. arizonica) (1 proposal)

Northern Arizona University School of Forestry Mission Research Program (6 proposals)

National Science Foundation Ecological and Evolutionary Physiology Program (1 proposal)

United States Department of Agriculture National Research Initiative Competitive Grants Program - Forest/Rangeland/Crop/Aquatic Ecosystems Program (2 proposals)

National Science Foundation Ecological and Evolutionary Physiology Program (2 proposals)

United States Department of Agriculture National Research Initiative Competitive Grants Program - Forest/Rangeland/Crop/Aquatic Ecosystems Program (1 proposal)

National Science Foundation Ecosystem Studies Program (1 proposal)

National Science Foundation Ecological and Evolutionary Physiology Program (1 proposal)

United States Department of Agriculture National Research Initiative Competitive Grants Program - Forest/Rangeland/Crop/Aquatic Ecosystems Program (1 proposal)
National Science Foundation Ecological and Evolutionary Physiology Program (1 proposal)
United States Department of Agriculture National Research Initiative Competitive Grants Program – Managed Ecosystems Research Program (1 proposal)
National Science Foundation Ecological and Evolutionary Physiology Program (1 proposal)
United States Department of Agriculture National Research Initiative Competitive Grants Program – Managed Ecosystems Research Program (1 proposal)
National Science Foundation Long Term Ecological Research Program (1 proposal)
National Science Foundation Ecological and Evolutionary Physiology Program (2 proposals)
Intramural Grants Program, Northern Arizona University
National Science Foundation, Ecological Biology (2 proposals) and Integrated Biology (1 proposal)
National Science Foundation, Population and Evolutionary Biology (3 proposals)
National Science Foundation, Ecosystem Studies Program (1 proposal)
NASA, Carbon Cycle Science (1 proposal)
NSF, RUI collaborative research (1 proposal)
National Science Foundation, IOS –Organism-environment Interactions Program (1 proposal)
National Institute for Climatic Change Research (1 proposal)
Tahoe Science Consortium (4 proposals)
National Science Foundation, Division of Environmental Biology – Ecosystem Cluster (2 proposals)
USDA Managed Ecosystems Integrated Program Panelist (15 proposals)
Kearney Foundation of Soil Science (1 proposal)
Tahoe Science Consortium (9 proposals)
Deutsche Forschungsgemeinschaft (German Research Foundation) (1 proposal)
National Science Foundation, IOS Organism-Environment Interactions Program (1 proposal)
Tahoe Science Consortium (10 proposals)
Earthwatch Institute (1 proposal)
National Science Foundation, IOS Organism-Environment Interactions Program (2 proposals)
Natural Sciences and Engineering Research Council of Canada (1 proposal)
National Science Foundation, Division of Environmental Biology – Ecosystem Studies (1 proposal)

USDA NIFA Small Business Innovation Research (SBIR) program (1 proposal)

**Invited Program Reviewer**
Invited technical reviewer of USDA Forest Service Work Unit RM-4152, Impact of Natural Ecological Disturbances on Western Conifers, Flagstaff.
Invited technical reviewer of USDA Forest Service Work Unit RM-4152, Impact of Natural Ecological Disturbances on Western Conifers, Flagstaff.
Invited technical reviewer of USDA Forest Service Work Unit W1187, Interactions of emerging threats and bark beetle-microbial dynamics in forest ecosystems

**Invited External Promotion and Tenure Reviewer**
University of Kentucky, Department of Entomology, 2001, 2002.
The Pennsylvania State University, School of Forestry, 2001.
The University of Montana, School of Forestry, 2006.
Oregon State University, Department of Forest Science, 2007.
University of Wisconsin, College of Agricultural and Life Sciences, 2009.
Mississippi State University, Department of Forestry, 2010.

**Conference Work**
Poster session co-chairperson for the Conference on Sustainable Ecological Systems, July 12-15, 1993, Northern Arizona University, Flagstaff, AZ.
Co-moderator for the oral paper session, “What is a Healthy Forest?,” for the joint meeting of the Western Forest Insect Work Conference/Western International Forest Disease Working Conference, March 8, 1994, Albuquerque, NM.
Moderator for the oral paper session, “Plant Demography,” for the Second Southwestern Rare and Endangered Plant Conference, September 13, 1995, Flagstaff, AZ.
Technical paper and poster coordinator for the XVI Biennial Reunion: Southwestern Society of American Foresters/Asociacion Mexicana de Profesionales Forestales, September 17-21, 1997, Flagstaff, AZ.
Moderator for the oral paper session, “Employment and Forestry Curriculum,” the Third Biennial Conference on University Education in Natural Resources, March 27, 2000, Columbia, MO.
Program Chair for the 5th Biennial Conference on University Education in Natural Resources, March 14-17, 2004, Flagstaff, Arizona.
Invited participant in the Summit on Forest Research for the 21st Century: Defining Strategic Directions and Rebuilding Capacity, January 4-6, 2006, Shepherdstown, West Virginia.
Invited participant in the workshop “Evaluating Current Methods to Predict and Confirm Tree Mortality Following Fire, July 25-26, 2006, Bend, Oregon.
Moderator for the oral paper session, “Living on the Edge in the Southwest,” the 61st Western Forest Insect Work Conference, March 6, 2010, Flagstaff, AZ.

Professional Society Service
1999/2003
Newsletter Editor/Communications Chair – Southwest Society of American Foresters
Chair of a Review Committee on the Fort Valley Project Environmental Assessment - Southwest Society of American Foresters
Representative to the Grand Canyon Forest Partnership - Southwest Society of American Foresters
Newsletter Editor – Southwest Society of American Foresters
Representative to the Grand Canyon Forest Partnership - Southwest Society of American Foresters
Newsletter Editor – Southwest Society of American Foresters
Representative to the Grand Canyon Forest Partnership - Southwest Society of American Foresters
Newsletter Editor – Southwest Society of American Foresters
Representative to the Grand Canyon Forest Partnership - Southwest Society of American Foresters
Newsletter Editor – Southwest Society of American Foresters
Representative to the Greater Flagstaff Forest Partnership - Southwest Society of American Foresters

641
Advisory Boards
Flagstaff, Arizona, Tree Board, 1995-2000
Member of the Science Planning and Integration Team, Grand Canyon Forests Partnership, 1998
Chair of the Science Planning and Integration Team, Grand Canyon Forests Partnership, 1999
President, Board of Directors, Greater Flagstaff Forests Foundation, Inc., 2002-4
Invited participant in the Science Roadmap Delphi for Natural Resources, The Board on Natural Resources, the Board on Oceans, Atmosphere, and Climate, and the Association of Public and Land-Grant Universities, 2012

UNIVERSITY SERVICE
Committees - Northern Arizona University
1993/1994
Ad-hoc Adjunct Faculty Committee (Chair) - School of Forestry
Ph.D. Implementation Committee - School of Forestry
Department Chair Advisory Committee - School of Forestry
Department Chair Search Committee - School of Forestry
Review Committee on Teaching Requirements - School of Forestry
Graduate Studies Committee - School of Forestry
Mission Research Board - School of Forestry
Coordinator of the Northern Arizona Arboretum - School of Forestry
Review Committee for Forestry 311 (Chair) - School of Forestry

1994/1995
Graduate Studies Committee - School of Forestry
Mission Research Board - School of Forestry
Coordinator of the Northern Arizona Arboretum - School of Forestry
Review Committee for Forestry 311 (Chair) - School of Forestry
Silviculturist Search Committee (Chair) - School of Forestry

1995/1996
Graduate Studies Committee - School of Forestry
Silviculturist Search Committee (Chair) - School of Forestry
Forest Ecosystem Health Search Committee - School of Forestry
Curriculum Committee - School of Forestry
Mission Research Review Committee - School of Forestry

1996/1997
Graduate Studies Committee - School of Forestry
Forest Ecosystem Health Search Committee - School of Forestry
Curriculum Committee - School of Forestry
Mission Research Review Committee - School of Forestry
Scholarship Committee - School of Forestry
Adjunct Faculty Committee - School of Forestry
Committee on Faculty Status - School of Forestry
University Campus Improvement and Beautification Committee
Dean’s Advisory Council – College of Ecosystem Science and Management
1997/1998
Curriculum Committee - School of Forestry
Scholarship Committee - School of Forestry (Chair)
University Campus Improvement and Beautification Committee
Dean’s Advisory Council – College of Ecosystem Science and Management
Professional Program Review Committee – School of Forestry
Committee on Faculty Status - School of Forestry

1998/1999
Curriculum Committee - School of Forestry
Committee on Faculty Status - School of Forestry
Scholarship Committee - School of Forestry
University Campus Improvement and Beautification Committee
Dean’s Advisory Council – College of Ecosystem Science and Management
Professional Program Review Committee – School of Forestry
Review Committee of the Native American Forestry Program – School of Forestry (Chair)

1999/2000
University Campus Improvement and Beautification Committee
University Organized and Applied Research Task Group
Coordinator – College of Ecosystem Science and Management Adopt-A-Plot Effort

2000/2001
University Campus Improvement and Beautification Committee
Southwest Forest Science Complex Landscape Beautification Committee (Chair)
Promotion and Tenure Committee – College of Ecosystem Science and Management
Coordinator - College of Ecosystem Science and Management Adopt-A-Plot Effort
Dean Search Committee - College of Ecosystem Science and Management
Merriam-Powell Center for Environmental Research, Research Steering Committee

2001/2002
University Campus Improvement and Beautification Committee
Southwest Forest Science Complex Landscape Beautification Committee (Chair)
Graduate Studies Coordinator – School of Forestry
Research Steering Committee - Merriam-Powell Center for Environmental Research
Research Permit Committee (Chair) - Merriam-Powell Center for Environmental Research

2002/2003
University Campus Improvement and Beautification Committee
Graduate Studies Coordinator - School of Forestry
Mission Research Board (Chair) - School of Forestry
Promotion and Tenure Committee - College of Ecosystem Science and Management
Research Permit Committee (Chair) - Merriam-Powell Center for Environmental Research
University Graduate Committee

2003/2004
Graduate Studies Coordinator – School of Forestry
Research Permit Committee (Chair) - Merriam-Powell Center for Environmental Research
University Graduate Committee

2004/2005
Research Permit Committee (Chair) - Merriam-Powell Center for Environmental Research
Centennial Forest Research Committee
Curriculum Committee (Chair) - School of Forestry
Strategic Planning Committee (Chair) - School of Forestry
Workload and Performance Criteria Review Committee - School of Forestry
University Academic Associate Deans Council
University Curriculum Committee
University Intramural Grants Program – Reviewer

2005/2006
Curriculum Committee (Chair) - School of Forestry
University Academic Chairs Council
University Curriculum Committee
Student Services Specialist Search Committee (Chair) - School of Forestry
Mission Research Committee - School of Forestry
Silviculture Faculty Position, Search Committee - School of Forestry
ARCS (Achievement Rewards for College Scientists) Foundation – Application Reviewer
Executive Committee - Merriam-Powell Center for Environmental Research

2006/2007
Faculty Status Committee - School of Forestry,
Executive Committee - Merriam-Powell Center for Environmental Research
University Vice President for Research, Search Committee
Forest Economics/Policy Faculty Position, Search Committee - School of Forestry

2007/2008
University Vice President for Research, Search Committee
University Graduate Committee (Graduate College representative for five dissertation defenses)
Graduate Coordinator - School of Forestry,
Curriculum Committee - School of Forestry
Faculty Status Committee (Chair) - School of Forestry

2008/2009
University Graduate Committee - representative from the College of Engineering, Forestry, and Natural Sciences (Graduate College representative for five dissertation defenses)

Graduate Coordinator - School of Forestry
Curriculum Committee - School of Forestry
Faculty Status Committee - School of Forestry
Mission Research Committee - School of Forestry

2009/2010
Promotion and Tenure Committee - College of Engineering, Forestry, and Natural Sciences

University Graduate Committee - representative from the College of Engineering, Forestry, and Natural Sciences; Policy subcommittee member (Graduate College representative for three dissertation defenses)

Graduate Coordinator – School of Forestry
Curriculum Committee – School of Forestry

2010/2011
Promotion and Tenure Committee - College of Engineering, Forestry, and Natural Sciences

University Graduate Committee - representative from the College of Engineering, Forestry, and Natural Sciences (Graduate College representative for two dissertation defenses)

Graduate Coordinator – School of Forestry
Curriculum Committee – School of Forestry

Committee on Faculty Status – School of Forestry

2011/2012
Soils/Ecosystem Ecology Faculty Search Committee (Chair) – School of Forestry

2012/2013
Curriculum Committee – School of Forestry

Student Groups


Special University Service Projects

Organizer and co-author of a poster for graduate student recruitment for the Northern Arizona University School of Forestry sent to 200 universities in North America, 1994.

Arbor Day Tour Leader - Led a tour for the public on the trees of the Northern Arizona University Campus, April 26, 1997.

Board on Natural Resources Ecology Section - National Association of State Universities and Land Grant Colleges - Delegate from Northern Arizona University, 1999.

Volunteer participant at the “Paying Attention to Retention” Workshop, Northern Arizona University, November 28, 2000.

“Team Leader” for a student tree planting project, Northern Arizona University, May 31, 2001.

Volunteer leader of knapweed weeding project on the NAU campus in cooperation with the Coconino Country, Arizona, Juvenile Detention Center, July 7, 2001.

Gave a talk titled “Structuring your early career as a graduate student in Health Professions or Forestry and Environmental Sciences: Things I wish someone had told me at the start” in the New Graduate Student Orientation, Northern Arizona University, August 23, 2001.


Evaluator of applications for “Outstanding Graduate Teaching Assistant,” Northern Arizona University, March 22, 2002

Presenter to new students and parents about the School of Forestry at summer orientation, May 30 to June 8, 2006 (five presentations)

Poster judge for the 16th annual Celebration of Undergraduate Research and Design, Northern Arizona University, College of Engineering, Forestry, and Natural Sciences, April 23, 2009.

Taught high school students about forest carbon balance in the Northern Arizona University, Centennial Forest Climate Change Challenge Course, July 6, 2010.

ACADEMIC ADVISING

High School 2008

Honors course Research Mentor for Sinaqua High School for 1 student. I provided the student with information about the NAU carbon flux project, allowed the student “shadow” me at work, and took the student on a tour of research sites.

Undergraduate 1993/2004

Advised an average of eight undergraduate forestry students per semester at Northern Arizona University.

Undergraduate Research Mentoring

Mentor to 1 student, recipient of a Hooper Undergraduate Research Award, Northern Arizona University, 2005 ($1,700).
Co-mentor 1 student, participant in the NSF-funded Environmental Sciences Research Experience for Undergraduate Students, Northern Arizona University, 2006.

Co-faculty mentor to 1 student, recipient of a Hooper Undergraduate Research Award, Northern Arizona University, 2008 ($4,500).

Co-mentor to 1 student, participant in the NSF-funded Environmental Sciences Research Experience for Undergraduate Students, Northern Arizona University, 2008.

Mentor to 1 student, recipient of a Hooper Undergraduate Research Award, Northern Arizona University, 2009 ($4,500), and recipient of the 3rd Place Award for the Best Research Poster, Northern Arizona University, College of Engineering, Forestry, and Natural Sciences, 2010 Undergraduate Research Symposium.

Co-mentor to 1 student, participant in the NSF-funded Environmental Sciences Research Experience for Undergraduate Students, Northern Arizona University, 2012.

**Graduate Students – Committee Chair**


1 student . M.S. (1997), Forestry, Northern Arizona University. Thesis: Old-growth ponderosa pine physiology, growth, and insect resistance mechanisms following thinning and burning

1 student . M.S. (1998), Forestry, Northern Arizona University. Thesis: Western spruce budworm as a regulator of resources, physiology, and growth of Douglas-fir seedlings


1 student Ph.D. (2000), Forestry, Northern Arizona University. Dissertation: Relationships between depth to ground water and Southwestern riparian tree physiological condition (co-advised with S.C. Hart)


1 student. M.S. (2005), Forestry, Northern Arizona University. Thesis: Host physiological condition positively affects dwarf mistletoe shoot growth: Arceuthobium vaginatum subsp. cytopodum on Pinus ponderosa

1 student. M.F. (2005), Forestry, Northern Arizona University. Professional Paper: Hydrological and ecological implications associated with the introduction and removal of small dams

1 student. M.S. (2005), Forestry, Northern Arizona University. Thesis: Long-term effects of thinning and prescribed burning on ponderosa pine water stress and bark beetle resistance in northern Arizona


1 student. M.S. (2010), Forestry, Northern Arizona University. Thesis: Riparian tree response to variation in climate and altered stream flow among the Dolores River, Colorado


Graduate Students – Committee Member
3 students, Ph.D. (1997) Forestry, Northern Arizona University.
3 Students, M.S. (1999) Biology, Northern Arizona University.
1 student, Ph.D. (1999) Forestry, Northern Arizona University.
1 student, Ph.D. (2005) Forestry, Northern Arizona University.
1 student, M.S. (2005) Forestry, Northern Arizona University.
1 student, Ph.D. (2005) Forestry, Northern Arizona University.
2 students, M.S. (2005) Forestry, Northern Arizona University.
1 student, Ph.D. (2007) Forestry, Northern Arizona University.
1 student, M.S. (2009), Biology, Northern Arizona University.
2 students, Ph.D. (2009) Forestry, Northern Arizona University.
2 students, M.S. (2009) Forestry, Northern Arizona University.
2 students, Ph.D. (2009) Forestry, Northern Arizona University.
1 student, M.S. (2010) Biology, Northern Arizona University.
4 students, M.S. (2011) Forestry, Northern Arizona University.
2 students, Ph.D. (in progress), Forestry, Northern Arizona University.
1 student, M.S. (in progress) Biology, Northern Arizona University.
1 student, Ph.D. (in progress) Biology, Northern Arizona University.
1 student M.S. (in progress) Forestry, Northern Arizona University.

Postdoctoral Sponsor
1 student (2002)
1 student (2005-2011)
1 student (2009)
1 student (2002-2003)
1 student (2009)
1 student (2000-2001)

GRANTS

<table>
<thead>
<tr>
<th>Project</th>
<th>Investigators</th>
<th>Sponsor</th>
<th>Amount</th>
</tr>
</thead>
</table>

649
<table>
<thead>
<tr>
<th>Year</th>
<th>Project Title</th>
<th>Principal Investigators/Co-Principal Investigators</th>
<th>Funding Agency</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>MRI: Acquisition of a scanning electron microscope for multi-disciplinary research and training at Northern Arizona University</td>
<td>T. Kolb, J. Ingram, K. Nishikawa, N. Johnson, D Sterns</td>
<td>US National Science Foundation</td>
<td>$612,560</td>
</tr>
<tr>
<td>2011</td>
<td>Tree death from bark beetles: carbon starvation or hydraulic failure?</td>
<td>T. Kolb, McIntire Stennis</td>
<td>Mission Research Program</td>
<td>$98,800</td>
</tr>
<tr>
<td>2011</td>
<td>Translating forest science for global practitioners</td>
<td>T Kolb, P. Fule, P. Freiderici, C. Chambers, C. Huang, A. McGinvey, and K. Waring</td>
<td>National Needs Fellowship Program</td>
<td>$251,500</td>
</tr>
<tr>
<td>2011</td>
<td>Potential impacts of climate change on insect and pathogen resistance in southwestern riparian hardwoods: Implications for assisted migration and restoration</td>
<td>with K. Grady, and T. Whitham</td>
<td>USDA Forest Service Forest Health Protection Environmental Monitoring Program</td>
<td>$18,158</td>
</tr>
<tr>
<td>2009</td>
<td>Native tree regeneration and health on the lower Dolores River</td>
<td>T. Kolb</td>
<td>Dolores Water Conservancy District</td>
<td>$20,000</td>
</tr>
<tr>
<td>Year</td>
<td>Project Title</td>
<td>Collaborators</td>
<td>Funding Agency</td>
<td>Funding Amount</td>
</tr>
<tr>
<td>------</td>
<td>---------------</td>
<td>---------------</td>
<td>----------------</td>
<td>---------------</td>
</tr>
<tr>
<td>2008</td>
<td>The economic value of carbon sequestration in southwestern ponderosa pine forests</td>
<td>with A. Finkral and C. Huang</td>
<td>USDA Forest Service, Rocky Mountain Research Station, Joint Venture Agreement</td>
<td>$59,518</td>
</tr>
<tr>
<td>2008</td>
<td>Management influences on carbon sequestration in Southwest ponderosa pine forests</td>
<td>with G. Koch</td>
<td>Science Foundation Arizona, Competitive Advantage Award</td>
<td>$164,622</td>
</tr>
<tr>
<td>2008</td>
<td>Verification Methodology for Forest Carbon Sequestration</td>
<td>with A. Finkral, C. Huang, M. Montes-Helu, J. Smith, G. Koch, M. Hurteau, and D. Spalding</td>
<td>Northern Arizona University, Environmental Research, Development, and Education for the New Economy</td>
<td>$87,780</td>
</tr>
<tr>
<td>2007</td>
<td>The leading edge of climatic change impacts: Causes and consequences of tree mortality in Arizona mixed conifer forests</td>
<td>T. Kolb</td>
<td>Mission Research Program/McIntire Stennis</td>
<td>$89,412</td>
</tr>
<tr>
<td>2007</td>
<td>Impacts of forest thinning on water balance</td>
<td>with D. Breshears, M. Montes-Helu, and P. Flikkima</td>
<td>Arizona Water Institute</td>
<td>$50,000</td>
</tr>
<tr>
<td>2007</td>
<td>MRI: Acquisition of off-axis integrated-cavity output spectroscopy instruments for ecological research and training at Northern Arizona University</td>
<td>with G.W. Koch, B.A. Hungate, D.S. Kaufman, E. Schwartz</td>
<td>US National Science Foundation</td>
<td>$161,440</td>
</tr>
<tr>
<td>2007</td>
<td>Bugs ‘n’ burns: Effects of fire on ponderosa pine bark beetles</td>
<td>with T. DeGomez</td>
<td>USDA Forest Service Evaluation Monitoring Program</td>
<td>$113,000</td>
</tr>
</tbody>
</table>
MARTHA E. LEE  
Professor – 9 month – Tenured  
Date of Appointment: 1996 - Present  
Specializations: Wildland Recreation  

Northern Arizona University – School of Forestry

EDUCATION:

1975 B.S., Utah State University, Outdoor Recreation
1982 M.S., Oregon State University, Forest Management/Resource Recreation
1991 Ph.D., Oregon State University, Forest Recreation (Psychology, Marketing, Tourism, and Research Methods, supporting areas)

PROFESSIONAL EXPERIENCE:

2004/Present Professor, School of Forestry, Northern Arizona University
1996/2004 Associate Professor, School of Forestry, Northern Arizona University.
1990/1996 Assistant Professor, School of Forestry, Northern Arizona University
1986/1990 Research Assistant (half-time), Ph.D Student, Oregon State University
1982/1986 Research Assistant (full-time), Oregon State University
1980/1982 Graduate Research Assistant, Department of Resource Recreation Management, Oregon State University
1975/1980 Senior Department Clerk Typist, Department of Forestry and Outdoor Recreation, Utah State University
1973/1975 Research Technician, Institute for Outdoor Recreation and Tourism, Utah State University

TEACHING EXPERIENCE:
1986/Present
- FOR 101 Introduction to Forestry
- FOR 203 Project Learning Tree
- FOR 207 Project WET
- FOR 230 Multicultural Perspectives on Natural Resource Management
- FOR 325W Forest Management
- FOR 421 Forest Science
- FOR 445 Wilderness Management
- FOR 444 Wilderness Management for Professionals (on-line class)
- FOR 697 Environmental Interpretation
- FOR 500 Ecosystem Science and Management Principles
FOR 573 Human Dimensions of Natural Resource Management
FOR 692 Proseminar
FOR 506 Directed Study
FOR 689 Professional Paper
FOR 697 Independent Study
PRM 346 Wildland Recreation Management

Teaching Prior to NAU
Tourism Marketing and Research (18 students). Undergraduate course taught 1 quarter at Oregon State University.

Microcomputer Applications: An Introduction for Resource Managers (co-taught). Oregon State University. (10-30 students/session; 2-3 sessions/year)

PUBLICATIONS

REFERRED:


REVIEWED PUBLICATIONS:


REPORTS


Hancock, P. H. and M. Lee. 2007. Fossil Creek resident survey. School of Forestry, Northern Arizona University, Flagstaff.


Hancock, P.; M. Lee; K. McDaniels; and J. Hockersmith. 2007. 2004-2006 Fossil Creek visitor survey. School of Forestry, Northern Arizona University, Flagstaff.


Hancock, P.; K. McDaniels; and M. Lee. 2006. Fossil Creek campsite condition rating study. School of Forestry, Northern Arizona University, Flagstaff.

M. Lee was one of 22 contributing authors. 2005. Fossil Creek state of the watershed report: Current conditions of the Fossil Creek watershed prior to return of full flows and other decommissioning activities. Northern Arizona University.

Lee, M., P. Hancock, and A. Mullen. 2005. Short- and long-term management, stewardship, and education/outreach needs for Fossil Creek. School of Forestry, Northern Arizona University. 14 pp.


PRESENTATIONS


Hancock, P. (presenter) and M. Lee. 2007. Fossil Creek: Fostering stewardship and engaging local residents as partners. Ninth Biennial Conference of Research on the Colorado Plateau, October 29-November 1, Flagstaff, AZ.

Hospodarsky, D. (presenter) and M. Lee. 2007. Conclusions about visitor and resource incidence at Petrified Forest National Park, Arizona. Paper accepted for presentation at the Ninth Biennial Conference of Research on the Colorado Plateau, October 29-November 1, Northern Arizona University. A scheduling error on the part of conference organizers precluded the opportunity for the authors to make the oral presentation of the paper.


Lee, M.E. 1986. Survey of visitors to Oregon Pavilion at EXPO-86. Governor's Tourism Conference, Seaside, OR.

PROFESSIONAL SERVICE

Professional
Member of planning team, U. S. Forest Service national training session, “ROS/SMS/BEIG training: Reviving the Embers,” October 26-28, 2010, Flagstaff, AZ.

Board of Directors, Friends of Northern Arizona Forests. 2009-

Invited consultant to Diablo Trust on summer 2008 recreation survey; trained Diablo Trust volunteer interviewers

Invited session moderator and presenter, “Constitution Day: Engaging students.”


Secretary, Board of Directors, Arizona Natural History Association Board. 2003-


Invited facilitator, SAF Southwest Section Meeting, “Foresters—‘Do we still matter?’” November 7-9, 2002, Payson, AZ.


Invited participant, workshop on the application of visitor carrying capacity frameworks to management and protection of non-renewable resources. September 14-16, 1999, Flagstaff, AZ.


Consult regularly with Coconino and Kaibab National Forest managers on social science research needs as part of ecosystem management planning process. 1997-


Invited participant, Zion National Park VERP planning meeting. July 9-11,1996, Zion National Park, UT.

Invited member, carrying capacity research advisory team, Arizona State Parks. 1996.


Chair of social science session at the Biennial Conference of Research on the Colorado Plateau, Northern Arizona University. October 1995.


Facilitator and organizer of ROS (Recreation Opportunity Spectrum) Implementation through Silviculture and Visual Management Workshop jointly hosted by NAU School of Forestry and Southwest Region of U.S. Forest Service. 1991.

Reviewed research proposals for University of Wyoming Cooperative Park Studies Unit. 1991.

Review journal articles--Society and Natural Resources, J. Forestry, Environmental Management, and for USFS.


University
Member, American Democracy Project Steering Committee. 2007-09
Member, Colorado Plateau Cooperative Ecosystem Studies Unit Advisory Committee. 2006
Coordinator, American Democracy Project. 2005-07.
Member, Search Committee, CPCESU Director. 2006.
Member, Search Committee, Vice Provost for Research and Graduate Studies and Dean of the Graduate School. 2000-01.
Member, Faculty Senate. 1999-2004.
Member, Faculty Senate Elections Committee. 2003-2004.
Member, Faculty Senate Executive Committee. 2000-01.
Member, Academic Standards, Curriculum and Student Life Faculty Senate Council. 1999-01.
Invited to be part of a faculty group representing NAU to the Working Group from Dept. of Interior agencies regarding establishment of a Cooperative Ecosystem Studies Unit. 1998.
Member, Anthropology Department faculty search committee. 1996-97.
Member, NAU NCAA Accreditation Self-Study Team, Subcommittee on NAU Mission and Purpose. 1996-97.
Member, NAU Faculty Senate Council on Faculty Rights and Responsibilities. 1996-97.
Member of the Higher Learning Coalition sub-group of the Colorado Plateau Forum. 1995
Member, President's Commission on the Status of Women. 1993-5.
Review research proposals for National Park Service Cooperative Park Studies Unit at NAU. 1993.
Member, committee to look at a Land Management master's program. 1992.
Member, NAU Recreation and Tourism Study Group. 1992.
Participant and planning committee member, committee to organize a conference on "Research protocols for working in national parks." 1992.
Guest lecturer, RLS 447-Research and Evaluation Methods, School of Health and Physical Education. Spring 1991.

**College of Engineering, Forestry, and Natural Science**
College Representative, University Library Committee. 2010

**College of Ecosystem Science and Management**
Member, College Promotion and Tenure Committee. 1997-98.
Member, Dean's Advisory Council. 1997-98.
Member, Professional Research Support Committee. 1995.
Member, Ph.D. Implementation Committee. 1993-94.
Chair, Five-Year Recreation Program Planning Committee. 1992-93.
Member, Geography Program Planning Committee. 1992.
Chair, search committee for policy assistant professor position, 1992.
Member of planning committee for the merger of the Department of Geography and Public planning and the School of Forestry, 1992
Member of Scholarship Committee, 1991-94.
Member of search committee for wildlife-forestry assistant professor position, 1991.

**School of Forestry**
Member, Forestry Curriculum Review Committee. 2010-
Chair and Member, Mission Research Board. 2010.
Member, Annual Review Committee. 2009.
Member, Forestry Curriculum Change/New Programs Committee, 2008.
Member, Forestry Organizational Alternatives Committee, 2007-08
Member, Forest Entomology Assistant Professor Search Committee. 2007-08
Member, Associate Director, School of Forestry Search Committee. 2005-06.
Member, Silviculture Assistant Professor Search Committee. 2005-06.
Member, Annual Review Committee. 2004-2007
Member, Curriculum Committee. 2004–2012.
Member, Scholarship Committee. 2004–2012.
Member, Forest Management/Operations Search Committee. 2004-05.
Member, School of Forestry Dean Search Committee, 2003.
Member, Director’s Advisory Committee, 2003-2005.
Member, Strategic Planning Committee, 2003-
Forestry Honors Advisor, 2003-
Chair, Community/Commercial Assistant Professor Search Committee, 2001.
Member, Professional Program Review Committee. 1998-2000
Member, COFS Committee. 1998-99, 1999-00.
Coordinator, FOR 312 (Semester B). 1997-2000
Member, Scholarship Committee. 1997-99, 2004
Member, Curriculum Committee. 1997-99, 2004-
Member, Wildland Recreation Economist Search Committee. 1997-98.
Member, Forestry Chair's Advisory Committee. 1995-97. 1999-00.
Member, Dept. of Forestry Graduate Studies Committee. 1994-97.
Chair, Research Assistant Search Committee. 1996.
Member, Dept. of Forestry Chair Search Committee. 1994.
Member, Dept. of Forestry Advisory Committee. 1993-94.
Member, Dept. of Forestry Teaching Loads Committee. 1993-94.
Member, Mission Research Board. 1992-94.
Attend club functions and otherwise support Forestry Club.
Attend spring awards and graduation ceremonies and socials.

Membership in Professional Organizations
Society of American Foresters
Phi Kappa Phi
Alpha Zeta
Xi Sigma Pi
The Nature Conservancy
Arizona Association for Environmental Education

Community Service
Organized and participated in School of Forestry, “Kids for Conservation” activities at the Coconino County Fair. 2004 -
Partnered with Arizona Game and Fish to do fly tying for kids at 2003 Coconino County Fair.
Member, Coconino County Parks and Recreation Commission Member. 2003-04.
Chair, Coconino County Fair Committee. 2003-04.
Coconino County Fair Committee Member. 2001-04.

PROFESSIONAL DEVELOPMENT AND PRESENTATIONS
Attended Project Learning Tree Facilitator Retreat, October 15, 2011, Flagstaff, AZ
Attended e-learning classes on BbLearn – summer 2011.
Attended e-learning classes on Vista and Dreamweaver – summer 2007.
Sabbatical, fall semester 2001.
Attended writing workshop sponsored by English Department, 1996.
Attended the Native American cultural awareness workshop sponsored by the Faculty Development Office in 1991.
Attended the video-conference and follow-up workshop on writing across the curriculum sponsored by the Office for Professional Development in 1991.

TEACHING AWARDS RECEIVED
NAU School of Forestry 2008-2009 Teacher of the Year.
Award presented by the Coconino National Forest for the FOR 445 Wilderness Management Class on-going partnership. Fall 2008.
NAU School of Forestry 2006-07 Teacher of the Year.
NAU Consortium of Professional Schools 2006-07 Teacher of the Year.
Xi Sigma Pi Forestry Honor Fraternity, NAU Alpha Pi Chapter Teacher of the Year 2004
Xi Sigma Pi Forestry Honor Fraternity, NAU Alpha Pi Chapter Teacher of the Year 1993

ADVISING:

Undergraduate Advisement
Currently mentor approximately 5-7 Forestry undergraduates.

Graduate Student Advisement

<table>
<thead>
<tr>
<th>Number of Students</th>
<th>Degree</th>
<th>Completion Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M.S.</td>
<td>1991</td>
</tr>
<tr>
<td>1</td>
<td>M.S.</td>
<td>1993</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>2</td>
<td>M.S.</td>
<td>1994</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>--</td>
</tr>
<tr>
<td>2</td>
<td>M.S.</td>
<td>1996</td>
</tr>
<tr>
<td>1</td>
<td>M.S.</td>
<td>--</td>
</tr>
<tr>
<td>1</td>
<td>M.S.</td>
<td>--</td>
</tr>
<tr>
<td>3</td>
<td>M.S.</td>
<td>1999</td>
</tr>
<tr>
<td>1</td>
<td>M.S.</td>
<td>2001</td>
</tr>
<tr>
<td>1</td>
<td>M.S.</td>
<td>2003</td>
</tr>
<tr>
<td>1</td>
<td>M.S.</td>
<td>2004</td>
</tr>
</tbody>
</table>
1 student, M.S.        2006
1 student, M.F.        2005
2 students, M.S.        2007
1 student, MF        2009
5 students, MS        2011
1 student, MS        2012
1 student, M.S.        --
1 student, M.S.        --
1 student, M.S.        1992
1 student, M.S.        1993
2 students, M.S.        1995
1 student, M.S.        1998
1 student, M.S.        2000
1 student, M.S.        --
1 student, M.S.        1997
1 student, M.S.        2004
1 student, M.S.        2001
1 student, Ph.D.        2003
1 student, M.S.        2003
1 student, M.S.        2002
1 student, M.S.        2005
1 student, M.S.        2006
1 student, M.L.S.        2006
1 student        2010
7 students        2007
### SCHOLARSHIP/RESEARCH ACTIVITIES

<table>
<thead>
<tr>
<th>Project</th>
<th>Investigators</th>
<th>Sponsor</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-2014. Assessing effectiveness of the Joint Fire Science Program Publications</td>
<td>Co-Principal Investigator</td>
<td>Joint Fire Science Program</td>
<td>$82,000</td>
</tr>
<tr>
<td>2011-2012. Fossil Creek visitors preference and trend report</td>
<td>PI</td>
<td>U.S. Forest Service</td>
<td>$15,302</td>
</tr>
<tr>
<td>2009-2012. Middle Fossil Creek water quality improvement project</td>
<td>PI</td>
<td>U.S. Forest Service</td>
<td>$121,620</td>
</tr>
<tr>
<td>2009-2011. Bats in the wildland-urban interface: Understanding resident perceptions, knowledge, and support for conservation</td>
<td>Co-PI with Carol Chambers</td>
<td>School of Forestry Mission Research</td>
<td>$33,680</td>
</tr>
<tr>
<td>2009-2014. Middle Fossil Creek riparian habitat protection and restoration</td>
<td>PI</td>
<td>U.S. Forest Service</td>
<td>$19,530</td>
</tr>
<tr>
<td>2009-2010. Synthesis of existing data on Fossil Creek visitors</td>
<td>PI</td>
<td>U.S. Forest Service</td>
<td>$11,598</td>
</tr>
</tbody>
</table>
Document E: Individual Faculty Information

ROBERT L. MATHIASEN
Professor – 9 month – Tenured
Date of Appointment: 1981 - Present
Specializations: Forestry/Biology
Northern Arizona University – School of Forestry

EDUCATION:

1977  Ph.D., Plant Pathology University of Arizona Tucson, AZ
1984  M.A., Community College Northern Arizona University Flagstaff, AZ
1974  M.S., Plant Pathology Colorado University
1972  B.A., Biology California State University - Stanislaus

RESEARCH EXPERIENCE:

1990/1997  State Forest Pathologist, Idaho Department of Lands, Coeur d'Alene
1990/1996  Adjunct Professor, North Idaho College, Coeur d'Alene
1986/1988  Adjunct Professor and Research Fellow, School of Forestry, Northern Arizona University Arizona University, Flagstaff, AZ
1986  Visiting Professor, Department of Biology, Southern Oregon College, Ashland, OR
1981/1986  Adjunct Professor and Research Fellow, School of Forestry, Northern Arizona University, Flagstaff, AZ
1981  Forestry Research Assistant, USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO
1980  Lecturer, Department of Forestry, Humboldt State University, Arcata, CA
1979/1981  Research Associate, Department of Plant Pathology, University of Arizona, Tucson, AZ
1978  Assistant Professor, Department of Botany and Plant Pathology, Michigan State University, East Lansing
1978  Forestry Technician, USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO

1975/1976 Graduate Teaching and Research Assistant, Department of Plant Pathology, University of Arizona, Tucson, AZ

1972/1974 Graduate Teaching Assistant, Department of Botany and Plant Pathology, Colorado State University, Fort Collins

1973/1974 Forestry Technician, USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO

1972 Research Assistant/Lab Technician, Colorado State Forest Service, Insect and Disease Laboratory, Fort Collins, CO

TEACHING EXPERIENCE

1997 / Present

FOR 101 - Introduction to Forestry
FOR 254 - Introduction to Forest Health.
FOR 452/552 - Forest Tree Diseases
FOR 454/554 - Integrated Forest Health

REFERRED JOURNALS


PROFESSIONAL PUBLICATIONS (In Press or Review)


USDA FOREST SERVICE PUBLICATIONS (Refereed by USDA Forest Service)


USDA Forest Service, Pacific Southwest Region, Forest Insect and Disease Leaflet 179, 7 p.


ARTICLES (Non-referred, service-oriented publications)


PRESENTATIONS AND POSTERS


Daugherty, C. M., and R. L. Mathiasen. 2009. The distribution of red fir and noble fir based on infection by Pacific silver fir dwarf mistletoe. Poster presented at the 57th Western


Mathiasen, R. L. 2001. Mistletoes parasitizing pines in Central America. Invited seminar given on April 21, 2000 at the University of Arizona, Tucson, AZ.


RESEARCH PROPOSALS FUNDED (2007 - Present)

<table>
<thead>
<tr>
<th>Project</th>
<th>Investigator</th>
<th>Sponsor</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009 Identification and habitat type relationships of the fungi associated with Armillaria root disease in Arizona and New Mexico</td>
<td>Dr. Robert Mathiasen</td>
<td>NAU School of Forestry Mission Research Board</td>
<td>$36,000 for two-year project</td>
</tr>
<tr>
<td>2007 Surface fuel loading in Douglas-fir dwarf mistletoe-infested mixed conifer forests in Arizona</td>
<td>Dr. Robert Mathiasen</td>
<td>NAU School of Forestry Mission Research Board</td>
<td>$36,000 for two-year project</td>
</tr>
</tbody>
</table>

RESEARCH PROPOSALS NOT FUNDED (1997 - Present)

Relationships of dwarf mistletoes parasitizing ponderosa pine in the western United States. Submitted to NAU Faculty Grants Program in 2010. Principal Investigator: Dr. Robert Mathiasen. Funding requested: $7433.00.

Effects of lodgepole pine dwarf mistletoe on surface fuel loading in lodgepole pine stands in central Oregon. USDA Forest Service. Funding requested: $150,000.00.

Distribution and impact of mistletoes and bark beetles in piñon-juniper woodlands on tribal lands in northeastern Arizona. Submitted to the School of Forestry Mission Research program. Principal Investigator: Dr. Robert Mathiasen. Funding requested: Masters student funding.

Host susceptibility of true firs parasitized by hemlock dwarf mistletoe in the Pacific Northwest. Submitted to the NAU Intramural Grants program. Principal Investigator: Dr. Robert Mathiasen. Funding requested: $12,600.

PROFESSIONAL MEMBERSHIPS

California Botanical Society
American Phytopathological Society
Western International Forest Disease Work Conference
MARGARET M. MOORE  
Professor – 9 month – Tenured  
Date of Appointment: 1992 – Present  
Specializations: Forest and range plant community ecology; restoration ecology; historical ecology  
Northern Arizona University - School of Forestry

EDUCATION

1982 North Dakota State University, Fargo, North Dakota, M.S. degree, Range Ecology and Natural Resource Management  
1980 Valley City State University, Valley City, North Dakota, B.A. degree, General Biology and Earth & Environmental Science – double major (summa cum laude)  
1977 Southside Virginia Community College, Alberta, Virginia, General Science

PROFESSIONAL EXPERIENCE

1999/ Present School of Forestry, Northern Arizona University, Flagstaff, AZ. Undergraduate and graduate teaching and research responsibilities in forest/range community ecology, plant identification, and landscape ecology.  
1992/1999 Associate Professor, School of Forestry, Northern Arizona University, Flagstaff, AZ. Undergraduate and graduate teaching and research responsibilities in forest/range ecology, plant identification, remote sensing and GIS.  
1986/1992 Assistant Professor, School of Forestry, Northern Arizona University, Flagstaff, Undergraduate and graduate teaching and research responsibilities in forest/range ecology, plant identification, remote sensing and GIS.  
1985/1986 Instructor, Department of Forest Resources, University of Minnesota, St. Paul, Minnesota, St. Paul, MN. Taught an upper-division course in Aerial Photograph Interpretation; and Lectures and field exercises in vegetation classification, mapping, and sampling for the Department's 10-week senior capstone field session (Cloquet, MN).  
1985 Instructor, Department of Forest Resources, University of Minnesota, St. Paul, MN. Taught an upper-division course in Range Ecology and Management.  
1982/1986 Graduate Research/Teaching Assistant, Department of Forest Resources, University of Minnesota, St. Paul, MN. Research involved image processing of multi-temporal satellite data (Landsat TM and MSS) and GIS for forest cover type classification in north-central Minnesota. Also, instructed upper-division Aerial Photograph Interpretation labs (3 yrs.).
1982 Research Field Assistant, Botany/Biology Department, North Dakota State University, Fargo, ND, and the Minnesota Chapter of the Nature Conservancy, Minneapolis, MN. Sampling design & inventory of Maple-Basswood forest communities in Ottertail Co., MN.

1980/1982 Graduate Teaching Assistant, Botany/Biology Department, North Dakota State University, Fargo, ND. Instructed lab courses in General Biology, two Introductory Botany Courses, and Environmental Science.

1980/1981 Graduate Research Assistant, Botany/Biology Department, North Dakota State University, Fargo, ND, and the North Dakota State Land Department, Bismarck, Conducted range inventory and condition analysis research on the North Dakota State School Lands. Primary tasks included recording plant composition on specific range sites, and determining the range condition for establishing stocking rates. Also evaluated riparian areas and extent of noxious weeds.


TEACHING EXPERIENCE

1987/Present

FOR 211 Forest Measurements
FOR 220 Introduction to Forest and Range Plants
FOR 311
FOR 312
FOR 313 Forest Ecology I
FOR 314 Forest Ecology II
FOR 323W Forest Management I
FOR 326W Forest Management IV
FOR 501
FOR 524 Aerial Photo Interpretation
FOR 525 GIS and Spatial Techniques in Forestry
FOR 544 Landscape Ecology
FOR 601
FOR 695 Advanced Studies in Forestry
ENV 544 Landscape Ecology

REFERRED


691


BOOK CHAPTERS


REPORTS AND PRESENTATIONS


presentation at the 87th Annual Meeting of the Ecological Society of America, Tucson, AZ. August, 2002.


**SPONSORED RESEARCH (Last 5 years)**

**NOTE:** **M. M. Moore is Principal Investigator (PI) unless otherwise indicated. Co-Investigators (Co-PIs) are listed where applicable. All proposals listed are/were FUNDED (unless indicated as pending or not funded).**

<table>
<thead>
<tr>
<th>Project</th>
<th>Investigator</th>
<th>Sponsor</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2012): Is Recent Aspen Mortality Linked to Extreme Drought Events?</td>
<td>Moore, M. M.</td>
<td>NAU CEFNS and Lucking Family Award</td>
<td>$7,500</td>
</tr>
<tr>
<td>2011 Southwest forest dynamics: Interactions of climate and other disturbances.</td>
<td>Moore, M. M., P. Z. Fulé</td>
<td>USFS Rocky Mountain Research Station, Research Joint Venture Agreement</td>
<td>$17,930</td>
</tr>
<tr>
<td>2010 Rapid aspen decline on the southwestern edge of its range</td>
<td>Moore, M. M., P. Z. Fulé, and M. Fairweather</td>
<td>USFS Forest Health Protection</td>
<td>$26,445</td>
</tr>
<tr>
<td>2009 “Rapid aspen decline on the southwestern edge of its range”</td>
<td>Moore, M. M., P. Z. Fulé, and M. Fairweather</td>
<td>USFS Forest Health Protection</td>
<td>$22,353</td>
</tr>
<tr>
<td>2009 Long-term response of northern Arizona grasses to climate and land-use</td>
<td>Moore, M. M</td>
<td>Mission Research Board, School of Forestry</td>
<td>$93,000</td>
</tr>
<tr>
<td>change</td>
<td>Moore, M. M., J. D. Bakker, and D. C. Laughlin</td>
<td>USDA-NRI Competitive Grants Program</td>
<td>$399,774</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-----------------------------------------------</td>
<td>-------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>2007 Controls on conifer regeneration patterns (1909-2011) and implications for future stand development (2012-2062) in southwestern forests</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**RESEARCH SUPERVISION AND ACADEMIC ADVISING**

**Undergraduate**
I also advise undergraduate students in FOR497 Independent Study or FOR485 Undergraduate Research (~1 student per year, respectively for example, 2005-08, I’ve advised four students in FOR485).

**Graduate**
Major professor: 6 Ph.D. students; 13 M.S. students, 2 M.F. students. The Ph.D. program in Forestry began in July, 1994, and since that time I have served as major professor for six Ph.D. students (1 of these – in progress). Since the summer of 1987, I have served as major professor for fourteen M.S. graduate students (thesis option; 2 in progress), and two M.F. students (1 in progress). I have generated funding for all of my graduate students with either McIntire-Stennis funds, NAU School of Forestry’s Bureau of Forestry Research funds or with external grants.

Thesis and non-thesis committee member. Since the spring of 1987, I have served on an average of 2-4 M. S. thesis committees per year, 1 M. F. non-thesis committee per year, and ~ 1 Ph.D. committees per year (Forestry or Biology or Environmental Science).

**Workshops and Short Courses**
Instructor, CEEM Module II workshop, USFS, USDI continuing education
February 2000 (Landscape Analysis Techniques)
Instructor, TREES workshop, U.S. Forest Service program to certify specialists in Silviculture. Northern Arizona University.
October 1986 (Plant Ecology); - October 1987 (Range Ecology);
September 1987 - 1989 (GIS and basic statistics)

**SERVICE ACTIVITIES**
School of Forestry and College-level

Member, SoF Search Committee for Forest Soils position, 2011-12
Member, College (CEFNS) Promotion and Tenure Committee, 2008-09
Member, Curriculum Committee, 1988-1991; 2009-2010; 2010-2011, 2011-12
Member, SoF Curriculum Review Committee, 2010-2011; 2011-12
Member, Scholarship Committee, 2001-2002 (Chair); 2009-2010, 2010-2011, 2011-12
Member, Research Faculty Committee, 2009-2010
Member, Search Committee for Associate Dean, School of Forestry, 12/05-5/06.
Member, FSC/COFS, Committee on Faculty Service, College-level, 2002-2003 (Chair)
Member, Search Committee for Fire Science faculty position, 12/04-5/05.
Member, Information Technology Committee, 5/99 – 7/00 (Chair); 2003-04, 2004-2005 (Chair)
Member, College Committee, Dept. of Geography GIS Certificate Program; fall, 1999.
Member, Search Committee for Forest Biometrician faculty position, 1/98 - 10/98.
Member, Search Committee for Forest Ecosystem Health faculty position, 4/96 - 2/97.
Member, Search Committee for Forest Wildlife Ecology faculty position, 10/95 - 5/96.
Member, Ph.D. Planning Committee (1988-90) & Ph.D. Implementation Committee (1990-93)
Member, Search Committee for Ecophysiology faculty position, 3/92.
Member, Search Committee for Forest Wildlife Biologist/Management faculty position, 10/91.
Member, Search Committee for Forest Recreation Management faculty position, 3/90.

University-level

Member, Undergraduate Admissions Advisory Council, fall, 1999
Member, Undergraduate Liaison Program (Admissions), appointed, fall, 1997
Member, Undergraduate Admissions Advisory Council, appointed 1995-1997
Member, Search Committee for Environmental Science/Ecology Faculty position (College of Arts and Science), 10/95-4/96.

Outside the University

Reviewer, manuscripts submitted for publication for the following journals (1987-present):
Forest Science, Ecology, Ecological Applications, Forest Ecology and Management,
Plant Ecology
Reviewer, proposals for National Science Foundation (2007); USDA-National Research Initiative (NRI) competitive grants (2001-present); National Fish and Wildlife Foundation (2006)
Judge, Buell/Braun Student Awards, Ecological Society Meetings, Tucson, AZ; Aug.2002
Member, Interagency and University Review Team, to examine the initial results of a
community stewardship and land management effort in SW Colorado called “The Ponderosa
Program Chair, International Association for Landscape Ecology - U.S. Chapter; for two
Member, Interagency Task Force to examine hazardous fuels Grand Canyon National Park; 9/94.
Member, Peer Evaluation Team (3 persons), evaluated the remote sensing and GIS techniques
used by the USFS Region 5 (northern California) and Region 6 (Pacific Northwest) for
Member, Program Committee, Peaks Chapter of the Soc. of American Foresters, 1989-1991.

PROFESSIONAL RECOGNITION

“Most Effective Research Mentor Award”, Honorable Mention, Northern Arizona University’s
Research and Creativity Awards, 2010-2011.

“Researcher of the Year” Award, School of Forestry, Northern Arizona University, 2010-2011
academic year

“Teacher of the Year” Award, School of Forestry, Northern Arizona University, 2005-2006
Academic year

on my historical permanent plot research

Semi-finalist, NAU’s 9th Annual “Woman of the Year” award (Teaching, Research, Service),
2003

LOUIE Award, 2002, Teaching, Northern Arizona University

“Teacher of the Year” - Xi Sigma Pi Chapter award; School of Forestry, Northern Arizona
University; 1999-2000 academic year

Co-recipient of the "Contributing to Forestry Award" for Distinguished Professional Forest
Resource Management in the Southwest; presented by the Southwest Section of The Society of
American Foresters; received Jan. 1998.

Presented testimony before Senate Subcommittee on Forest and Public Land Management;
Senate Committee on Energy and Natural Resources (on Restoration of Forest Ecosystem
Health), Flagstaff, AZ, 8/29/95; S.HAG 104-182 (P+2), pp. 189-208.

ACADEMIC HONOR SOCIETIES

Gamma Sigma Delta National Agriculture Honor Society
Sigma Xi National Research Honorary

704
Xi Sigma Pi (Delta Chapter) National Forestry Honor Society
Alpha Chi (Beta Chapter) National Honor Society

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Society of American Foresters
Ecological Society of America
Society for Range Management
The Nature Conservancy
Document E: Individual Faculty Information

ANDREW J. SÁNCHEZ MEADOR
Assistant Professor – 9 month - Tenured
Date of Appointment: 2012 – Present
Specializations: Forest Biostatistics and Quantitative Ecology
Northern Arizona University – School of Forestry

EDUCATION:

2006  Doctor of Philosophy, Forest Science;  
       Northern Arizona University (NAU), Flagstaff, AZ

2002  Master of Science, Forestry;  
       Mississippi State University (MSU), Starkville, MS,

1999  Bachelor of Science, Forestry;  
       Mississippi State University, Starkville, MS

PROFESSIONAL EXPERIENCE:

2012/Present  Assistant Professor of Biostatistics and Quantitative Ecology,  
              School of Forestry, NAU, Flagstaff, AZ

2012/Present  Program Director of Biometrics and Forest Mgmt.,  
              Ecological Restoration Institute, NAU, Flagstaff, AZ

2010/2012  Forest Restoration Program Manager Lincoln National Forest,  
           US Forest Service, Alamogordo, NM

2007/2010  Biometrician Forest Mgmt. Service Center,  
           US Forest Service, Washington Office, Fort Collins, CO

2002/2006  Graduate Research Assistant/Ph.D. Research,  
           School of Forestry, NAU, Flagstaff, AZ

1999/2001  Graduate Research Assistant/M.S. Research,  
           School of Forestry, MSU, Starkville, MS

           Jasper, AL

TEACHING EXPERIENCE:

1999/Present  
FOR 315/316 - Principles/Application of Silviculture  
FOR 315 - Forest Resources Sampling Module (2-week session)  
FOR 485 – Repeat Photography in Forestry
RESEARCH AND TEACHING INTERESTS

Forest biometrics, statistics and applied sampling • Spatial and temporal analysis techniques • Vegetation dynamics, simulation, and process modeling • Applications of R and information design • Ecological restoration and quantitative ecology • Demographic modeling • Computer vision techniques

PEER-REVIEWED


**IN REVIEW**


**REPORTS AND OTHER PUBLICATIONS**


PRESENTATIONS


**SPONSORED RESEARCH GRANT ACTIVITY**

<table>
<thead>
<tr>
<th>Project</th>
<th>Investigators</th>
<th>Sponsor</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012. Modeling snag fall and downed log decay rates in southwestern</td>
<td>Sánchez Meador, A.J</td>
<td>McIntire-Stennis, Mission Research</td>
<td>$86,000</td>
</tr>
<tr>
<td>ponderosa pine forests.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sánchez Meador, C. Seielstad, and R.E. Keane</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2008. Controls on historical and contemporary tree regeneration patterns (1909-2009) and implications for future stand development (2010-2060) in southwestern forests


USDA National Research Initiative (NRI) Competitive Grants Program, USDA

$399,774

2005. A conceptual framework of vegetation dynamics in ponderosa pine forest ecosystems of the Southwest


Integrative Environmental Research Program, Merriam-Powell Center for Environmental Research

$1,717

In Review


Unsuccessful


**Scientific Journal Reviews**
Forest Ecology & Management (7)
Canadian Journal of Forest Research (3)
Forest Science (3)

**Mentor**
Hooper Undergraduate Research Program, NAU, Flagstaff, AA
Co-Advised (w/ M. Moore) 2 students August 2005 - December 2006

**SERVICES**
Southwest Fire Science Consortium - Review & Evaluation Committee Member, (August 2011 - present)

Society of American Foresters - Board Member (Western Regional), Forest Science and Technology Board, (January, 2013 - Present)

Board Member (Natural Resources), Forest Science and Technology Board, (October 2011 - 2013)

A1 Working Group Chair (Inventory and Biometrics), Forest Science and Technology Board, (October 2008 - October 2010)

Invited Panel Participant: 2011 Southwest Interagency Fuels Workshop, Southwest Fire Science Consortium (March 2011)
University/Academic Representative: Southwestern Region Silviculture Certification Panel, Forest Service (Spring 2010 - present)

Statistical Consultant: Provide statistical advice and assistance to various research staff, students, and manager/biologists including experimental design, sampling, statistical modeling development and selection, and software/programming design/implementation (January 2002 - present)

Invited Author/Participant: Old-growth writing workshop, “Managing old growth in frequent-fire forests of the West”, conducted by the National Commission on Science for Sustainable Forestry, the Ecological Restoration Institute, and the Southwestern Ecological Restoration Institutes (April 2006)

Student-Faculty Representative and Chair: NAU Forestry Graduate Student Association (August 2003 – December 2004)

President: MSU College of Forest Resources Dean’s Council (August 1996 – July 1998)


AWARDS

Outstanding Contribution to Forestry Award; Society of American Foresters SW Chapter (2012)

PROFESSIONAL ACTIVITIES

Professional Memberships

Society of American Foresters (1998-Present)
Xi Sigma Pi Honor Society (inducted in 1999)
Western Mensurationists (2005-2010)
Ecological Society of America (2002-2008)
Registered Foresters of Mississippi; #02078 (2000-2002)
AREGAI TECLE  
Professor – 9 month – Tenured  
Date of Appointment: 2000 – Present  
Specializations: Hydrology and Decision Systems Analysis  
Northern Arizona University – School of Forestry  

EDUCATION:  
1988  Ph.D., University of Arizona Hydrology/Decision Agric. Econ. Tucson, Arizona Systems and Analysis  
1986  M.S., University of Arizona Tucson, Arizona. Hydrology  
1979  M.S., Ball State University, Muncie, Indiana, Natural Res/Energy. Geology  
1980  Ph.D. program, Ball State University Muncie, Indiana  
1969  Ahmadu Bello University, Zaria, Nigeria. Pre-veterinary medicine  
1968  Addis Ababa University, Addis Ababa, Ethiopia. Pre-medicine  

PROFESSIONAL EXPERIENCE  
2000/Present  Professor of Hydrology and Decision Systems Analysis, NAU  
2000/Present  Professor of hydrology and decision systems analysis with teaching and research focus on hydrology, water quality, riparian area and watershed restoration and multicriterion/multi-objective decision-making and conflict resolution in natural resources management  
2009/2010  Visiting Professor, Graduate program in Environmental Science, Addis Ababa University  
2009/2010  Research Fellow, Africa Union Headquarters in Addis Ababa, Ethiopia  

TEACHING EXPERIENCE:  
2008/Present  FOR 222 Environmental Conservation  
FOR326W Watershed Management  
FOR 340 & FOR 340H Environmental Hydrology  
FOR 340 & FOR 340L Environmental Hydrology Laboratory  
FOR 465 Watershed restoration  
ENSC 731 Urban Environmental Systems Analysis (in Ethiopia)  
ENSC 612 Water Resources Management (in Ethiopia)  
FOR 563 Watershed Hydrology  
FOR 565 Watershed restoration
Non-Credit teaching experience during 2003 – 2011

2008/2009 Workshop organized on Navajo Nation Hydrology Capacity Building
2006/2009 Seminar presentation at the 22nd International seminar on forest
Administration and management in Flagstaff, Arizona, October 1 – 22, 2006.

REFERRED ARTICLES:
rainfall-runoff model for Black Creek Watershed, Navajo Nation. Hydrology and Water
Resources in Arizona and the Southwest, Vol. 42.


Dai, I. and A. Tecle. 2012. An attempt at water yield modeling in the Centennial forest in

multiobjective forest management. Hydrology and Water Resources in Arizona and the
Southwest, Vol. 41.


Poff, Boris A.; Tecle, Aregai; Neary, Daniel G.; Geils, Brian. 2010. Compromise Programming

Ogbaharya, D. and A. Tecle. 2010. comparative analysis of community-based natural resources

Buschmann, S. and A. Tecle. 2009. Weir removal and riparian restoration to improve parts of
the Issel River in Northwestern Germany. Hydrology and Water Resources in Arizona and the
Southwest 39:27-34.

Perez-Verdin, Gustavo, Yeon-Su Kim, Denver Hospodarsky, and Aregai Tecle. 2009. Factors
Driving Deforestation in Common-Pool Resources in Northern Mexico. Journal of

Perez-Verdin, Gustavo, Hernandez diaz, Jose Ciro, Marquez-Linares, Marco Antonio , Aregai
Tecle. 2009. Aplicación de técnicas multicriterio en el manejo integral forestal en Durango,


OTHER PUBLICATIONS:

PUBLISHED BOOK CHAPTERS:


RESEARCH RESULTS AND OTHER REPORTS:


Boris Poff.. 2007. Modeling the ponderosa pine forest ecosystem in a dynamic multiobjective
decision-making framework on a landscape scale, a Ph.D. dissertation submitted in partial fulfillment of the requirement for the degree of Doctor of Philosophy in Forest Science, Northern Arizona University, Flagstaff, AZ.

Jackson leanard. 2007. The influence of parent material on vegetation response 15 years after the Dude Fire, Arizona, a Master’s thesis submitted in partial fulfillment of the requirement for the degree of Master of Science in Forestry, Northern Arizona University, Flagstaff, AZ.

PRESENTATIONS:


Tecle, A. 2010. The role and responsibilities of universities to promote environmental protection and safety, an invited talk given at the 2010 World Environment Day celebration workshop held in the College of Natural Sciences, Addis Ababa University.


Tecle, A. 2010. The Role of the African Union on Effective Conflict Management in Africa. An invited talk given to students and staff from Seton Hall University in the United States who were visiting Ethiopia at the time.


Tecle, A. 2008. Global Climate Change Effects on Natural Resources: Challenges and Possible Solutions. Presented at the 2008 Focus the Nation at Northern Arizona University, Flagstaff, in AZ.


Tecle, A. 2007. Sustainable natural resources management in an era of global climate change. Presented at the Oxford Round Table on Global Warming and Sustainable Development: Governing a Crisis, an Interdisciplinary Perspective at Saint Anne’s College, Oxford University in August 12-17.


Gustavo Perez-Verdin, Yeon-Su Kim, Denver Hospodarsky, and Aregai Tecle. 2007. Factor Driving deforestation in common-pool resources in Durango, Mexico. Presented at the 2007 SOFEW global change and forestry: economic and policy implications conference in Mississippi State University, March 4-6, 2007.


RESEARCH AND OTHER GRANTS FUNDED

<table>
<thead>
<tr>
<th>Project</th>
<th>Investigator</th>
<th>Sponsor</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011 Travel support for 4 students to attend and present papers at the 53rd Annual Meeting of the Arizona</td>
<td>PI</td>
<td>Nevada Academy of Science at Glendale College in Glendale, AZ</td>
<td>$150.00</td>
</tr>
<tr>
<td>2009 -2013. Wildfire and fire prevention vegetation treatment impacts on forest hydrology</td>
<td>PI</td>
<td>BFR funding, School of Forestry, Northern Arizona University</td>
<td>$98,000</td>
</tr>
<tr>
<td>2009- 2010 ). To teach at Addis Ababa University and do research at Africa Union in addis Ababa, Ethiopia</td>
<td>PI</td>
<td>US Department of State Arizona and the Council for International Exchange of Scholars (Fulbright Scholar Program).</td>
<td>$119,360.00</td>
</tr>
<tr>
<td>2007-2009 Hydroclimate capacity building in the Navajo Nation</td>
<td>PI</td>
<td>Arizona Water Institute</td>
<td>$50,000</td>
</tr>
<tr>
<td>2007. Request to</td>
<td>PI</td>
<td>USDA Forest</td>
<td>$3,401.00</td>
</tr>
</tbody>
</table>
fund a weather station and two stream gauge sheds

Service Rocky Mountain Research Station

MAJOR PROFESSIONAL SELF-IMPROVEMENT ACTIVITIES

2012 – Sustainability Commission working procedures and responsibilities training, Flagstaff City Hall, on April 21.

2012 – Faculty Grievance Committee Training, Cline Library, Northern Arizona University, March 24.

2007 - Received a certificate for participation in a Oxford Round Table on Global Warming and Sustainable Development: Governing a Crisis, an Interdisciplinary Perspective at saint Anne’s College, University of Oxford in August 12-17.

2007 - Received a certificate for participation in a workshop on an Institute on Educating Beyond our Borders: Race, Ethnicity, Identity, and Privilege at the National Conference on Race and Ethnicity in San Francisco, CA on May 29 –June 2.

CONFERENCES, MEETINGS, AND WORKSHOPS

2012 - Arizona Nevada Academy of Sciences 56th Annual meeting. Held at Glendale College in Glendale Watershed restoration 3, AZ on April 14.


2011 – Arizona Hydrological Society 24th Annual Symposium held at the High Country Conference Center in Flagstaff, AZ., Sept. 18-20.

2011 – Workshop on Water management and climate change in Northern Arizona. Held at the High country conference Center in flagstaff, Az on June 8.

2011 – Arizona Nevada Academy of Sciences 55th Annual meeting. Held at Glendale College in Glendale, AZ on April 9.


2010 – First symposium on Mainstreaming environment and Sustainability Education in Ethiopian universities. Participants in the symposium include presidents of 19 Ethiopian universities, University of Juba administrators, leaders of private colleges in Addis Ababa, civil society leaders and donor agency representatives. Held on May 6-7, 2010.
2010 - A stakeholders’ consultative workshop on the proposed PhD in Environmental Science in the Graduate Program in Environmental Science at Addis Ababa University on May 11.

2010 - A workshop to celebrate World Earth Day in which I was also the facilitator. It convened in the College of Natural Sciences, Addis Ababa University, June 4, 2010.


2008 – Colorado River Basin Science and resources Management Symposium on Coming Together: Coordination of Science and Restoration Activities for the Colorado River Ecosystem at the Doubletree Resort Hotel, Scottsdale, AZ., November 18-20.


2008 - Focus the Nation at Northern Arizona University, Flagstaff, AZ


2007 - Oxford Round Table on Global Warming and Sustainable Development: Governing a Crisis, an Interdisciplinary Perspective at saint Anne’s College, University of Oxford, England in August 12-17.

2007 - Arizona Nevada Academy of Sciences 51st Annual Meeting held at Northern Arizona University in Flagstaff, AZ, March 31.

2007 - A conference on the Tuareg Culture and Society at Stanford University, on June 2.

ADVISING/MENTORING

Graduate student theses and dissertations supervised or supervising
Graduate students in progress- 3
Graduate students completed- 3
Thesis and dissertation committee member for 25 other students
Undergraduate students: 5 - 12 students each year.

**Administrative, adult education, and extension responsibilities last five years**

**University committees**

**Activities**

- NAU Grievance Committee member
  - Time of Service: 2010 – to date
- Faculty Search Committee, NAU Physics and Astronomy Department
  - Time of Service: 2010 - 2011
- Advisory Board member, Arizona Water Institute (NAU part)
- New faculty mentor, NAU Faculty Development Program
- Elected Chair – NAU Commission on Ethnic Diversity
- NAU CED Minority Student Recruitment & Retention Committee
  - Time of Service: 2004 – to date
- NAU Liberal Studies Committee
- NAU Commission on Ethnic Diversity (CED)
  - Time of Service: 1996–to date
- NAU Commission on Ethnic Diversity Executive Board Member
  - Time of Service: 1997–to date

**School of Forestry Service Activities:**

- Member Soil and Ecosystem Ecology faculty recruiting committee
  - Time of Service: 2011-2012
- Member – Adjunct 4 faculty application review committee
  - Time of Service: 2011-2012
- Chair – Academic Review Committee
  - Time of Service: 2010 – to date
- Member, Forest Health /Entomology faculty recruiting committee
  - Time of Service: Spring 2008
- Forestry Organizational Alternatives Committee (FOAC)
- Coordinator - Water and Watershed restoration focus area
  - Time of Service: 2006 – to date
- Chair – Ethnic and Cultural Diversity Program Committee
  - Time of Service: 2005 – to date
- Faculty Status Committee
- Forestry Club member,
  - Time of Service: 1988 - to date

**SPECIAL PROFESSIONAL RECOGNITION**

Provost’s Award for Excellence in Global Learning for 2011 given by Northern Arizona University’s Office of International Studies

Senior Fulbright Fellow to work at Africa Union Commission Headquarters in Addis Ababa, Ethiopia and at Addis Ababa University in Addis Ababa, Ethiopia

Outstanding Service Award, Arizona Nevada Academy of Sciences

Member 24th Annual Conference Organizing Committee, AHS

Member Fulbright Program Alumni Association
Represented NAU at the invitation to NBC News/Discover Town Hall and Reception at ASU in Tempe, AZ on August 25.

Invited participant in the Coconino County group discussion for University of Arizona Extension weather and climate project in the School of Forestry at NAU on July 26.

US Department of Stated invited presenter at the 2011 Pre-departure Orientation for US Fulbright Scholars and Students going to Sub-Saharan Africa, at the Hyatt Regency in Washington D.C. June 19-21

Invited NSF IGERT Proposal Review Panelist in Washington D.C., June 25 and 27

Occasional reviewer of proposals submitted to USGS, NSF, EPA & others

Reviewed about 100 journal articles submitted to 16 different journal articles; and

I reviewed 15 additional book chapters.

**Professional license**

1991/Present  Certified Professional Hydrologist (P.H.) by the American Institute of Hydrology

**Offices held in Professional Organizations**

2012/Present  Elected member, Sustainability Commission of the City of Flagstaff, Arizona

2010/2011  Member organizing committee, Annual Symposium of the Arizona Hydrological Society held at the High Country conference Center in Flagstaff

2010  Co-organizer of a symposium on Mainstreaming Environment and Sustainability Education in Ethiopian and South Sudanese universities.

2010/Present  Director Northern Arizona Section of the Arizona Nevada Academy of Sciences


2004/Present  Board of governors Member, Arizona-Nevada Academy of Science (ANAS)

1991/Present  Chairman, Corporate Scholarship Committee, Arizona Hydrological Society. Developed rules, criteria and a procedure to select winners for the award. The award consists of 3 – $3000.00 and 3 plaques given to 3 winners annually. Every year I select three referees to help evaluate applicants and select the winners.

**Offices held in Private and Voluntary Organizations**

2005/2009  Advisory Board Member, Colorado Plateau Technical Water Advisory Board
2002/Present  Advisory Board Member, Aspen Telecommunications, LLC.

2001/Present  Appointed member, Colorado Plateau Water Resources Advisory Board.

2000/2009  Advisory Board member, Verde Watershed Research and Education Program.

**Editorial Responsibilities**

2003/2009  Newsletter Review Board member, Arizona Hydrological Society

2000/Present  Associate Editor for hydrology and water resources of the Journal of the Arizona Nevada Academy of Sciences

**Membership in Professional Organizations**

2002/Present  Member, European Academy of Sciences

1981/Present  Member, American Water Resources Association (AWRA)

1987/Present  Member, American Society of Agricultural Engineers (ASAE)

1988/Present  Member, Arizona Hydrological Society (AHS)

1989/Present  Member, Arizona-Nevada Academy of Science (ANAS)

1989/Present  Member, International Union of Forestry Research organization (IUFRO), Hydrology Working Group

1989/Present  Member, International Water Resources Association (IWRA)

1989/Present  Member, Society of American Foresters (SAF)

1993/Present  Member, the Institute of Management Science & Operation Research Society

1996/Present  Member, International Society of Multiple Criteria Decision Making

1994/Present  Member, Institute for Operations Research and the Management Science

1987/Present  Member, American Society of Civil Engineers (ASCE)

1983/Present  Member, American Geophysical Union (AGU)
Document E: Individual Faculty Information

ANDREA E. THODE
Assistant Professor – 9 month – Tenured
Date of Appointment:
Specializations: Fire Ecology
Northern Arizona University – School of Forestry

EDUCATION:

2005 University of California, Davis, Ph.D. Ecology
1996 University of California, Davis, B.S. Environmental Biology & Management

PROFESSIONAL EXPERIENCE:

2011/Present Associate Professor, School of Forestry, Northern Arizona University
2005/2011 Assistant Professor, School of Forestry, Northern Arizona University
2003/2005 Fire Ecologist/Sierra Nevada Fire and Fuels Monitoring Team Leader, Forest Service Region 5 - Tahoe National Forest
2001/2003 Fire Ecologist, Forest Service Region 5 - Eldorado National Forest
2001 Fire Ecologist, Forest Service Region 5 - Fire and Aviation Management
1997/2001 GIS Analyst, Information Center for the Environment, Dept. of Environmental Science and Policy University of California, Davis

TEACHING EXPERIENCE

NAU Courses
2006/Present
FOR251-Introduction to Wildland Fire.
FOR351-Fire Monitoring and Modeling.
FOR351-Fire Monitoring and Modeling – Hybrid 7 week course.
FOR505-Current Topics in Fire Ecology.
FOR506-Forestry Seminar.
FOR399/310-Applied Forest Ecology – Hybrid 5 week course.
FOR 551-Fire Ecology and Management.

Other University Courses
Co-Instructor of a UC Davis Fire Ecology Class, University of California, Davis (Winter Quarter 2001-2003).
Co-Coordinator of a Graduate Student Statistics Course, University of California, Davis. (Spring 2001)
Co-Coordinator of a Fire Ecology Seminar, University of California, Davis (Spring Quarter 2000).
GIS Applications Class Student Teaching Assistant. UC Davis, Davis, CA. Fall Quarter 1996.


*University Guest Lectures*


*Outside Courses*


Thode, A.E. Ecological and Historical Role of Fire. Rx-410: Forest Service Smoke Management Techniques Class. 2004. USFS Region 5, McClellan airforce base, CA.

**PUBLICATIONS**
PEER REVIEWED REFEREED JOURNALS

Brisbin, H1, A. Thode, M. Brooks. Post-fire restoration treatment effects on the soil seed bank of a pinyon-juniper woodland in Zion National Park, Utah, USA. Weed Technology. In Revision.


Submitted

Garmoe, M1, A. Thode, M. Hunter. Understory vegetation response to a post-fire Imazapic herbicide application in Zion National Park, Utah, USA. Rangeland Ecology and Management.

In preparation


**PROCEEDINGS**


**Reports**


**Other**


BOOKS AND BOOK CHAPTERS


POSTERS (First author is the presenter unless otherwise noted)


Flying, M2., M. McMaster1, A. Thode. Changes in fuel loads after a fire and by fire severity. Poster presented at the Undergraduate Research and Design Symposium (UGRADS). April, 2010. NAU, Flagstaff, AZ.


Weber, K., A. Thode, M. Brooks, K. Fuhrmann, and C. Decker. Effectiveness of native seeding and landscape scale herbicide application at controlling cheatgrass in Zion National Park: First season of Data. Poster presented at the International Association for Wildland Fire’s The ’88 Fires: Yellowstone and Beyond; Sep 22-27, 2008. Jackson Hole, WY. **Also presented in: Society for Range Management’s Wildfire and Invasive Plants in Western Deserts; Dec 9-11; Reno, NV.


PRESENTATIONS (First author is the presenter unless otherwise noted)


McMaster, M1., A. Thode. Effects on native plant regeneration and understory community response after post-fire seeding with Lolium multiflorum in a ponderosa pine forest in northern


INVITED PRESENTATIONS


GRADUATE STUDENTS

Advised or Co-Advised

1 student, M.F. May 2007. Using the Relative delta Normalized Burn Ratio (RdNBR) two years post-fire to determine burn severity for the Peppin fire in south central New Mexico.

1 student, M.S. August 2009, co-advisor. Understory vegetation response to 30 years of interval prescribed burning in two ponderosa pine sites.

1 student, M.F. December 2009. Supplemental Ponderosa Pine Sites to the Photo Series for Quantifying Forest Residues in the Southwestern Region

1 student, M.S. August 2010. Post-fire restoration treatment effects on the soil seed bank of a pinyon-juniper woodland in Zion National Park, Utah, USA.

1 student, M.S. August 2010, co-advisor. Effects of post-fire imazapic herbicide applications to reduce cheatgrass in Zion National Park, USA.
1 student, M.S. August 2010, co-advisor. Effects of fire and post-fire seeding on plant communities in a ponderosa pine forest in northern Arizona.

1 student, M.S. May 2011, co-advisor. The effects of burn entry and burn severity on stand structure and composition in grand canyon national park


1 student, M.F. December 2011. Using the Forest Vegetation Simulator to determine proposed restoration treatment effectiveness and maintenance interval: an analysis of the Four Forest Restoration Initiative

1 student, M.S. expected May 2013, co-advisor.

1 student, M.F. expected May 2014, co-advisor.

1 student, M.F. expected May 2014.

Committee Member (Forestry Students unless otherwise noted)


1 student, M.F. August 2007. Analysis of Current and Historical Surface Flows and Hydrologic Response to Restoration Treatments in the Upper Lake Mary Watershed, Arizona

UNDERGRADUATE STUDENT RESEARCHERS


1 student, Hooper Sustainability Undergraduate Research Award. Fuel Loading Changes after the Warm Fire by Burn Severity. Academic Years 2008 and 2009.

1 student, Hooper Sustainability Undergraduate Research Award. Effects of nutrients and the herbicide Imazapic on cheatgrass germination potential. Academic Years 2009 and 2010.

PROFESSIONAL ACTIVITIES

Society Experience

Association for Fire Ecology (AFE)
Education Committee Member (2005-Present)
Education Committee Chair (2010)
Education Committee Chair Elect (2008-2009)
Board Member (2001-2007)
Treasurer (2003-2005)
Founding Board Member (2000)
Website Coordinator and Website Committee (2000-2002)
Outreach Coordinator and Outreach Committee (1999-2005)

**Student Section of the Association for Fire Ecology (SAFE)**

Co-Founder (2001)
Founding Co-Chair (2001-2002)
Board Member for UC Davis (2001-2005)
Co-coordinator, Mentor Lunch at “Fire Conference 2002: Managing Fire and Fuels in the Remaining Wildlands and Open Spaces of the Southwestern United States”
Helped coordinate student poster and presentations competition at “Fire Conference 2002: Managing Fire and Fuels in the Remaining Wildlands and Open Spaces of the Southwestern United States”

**Society Memberships**

*Association for Fire Ecology*
*International Association of Wildland Fire*
*International Association for Landscape Ecology*
*Tall Timbers Research Station*
*Ecological Society of America*

**Participation in Technical Conferences and Workshops**


**Program Committee Chair**, “Fire, Landscapes, Wildlife and People: Building Alliances for Restoring Ecosystem Resilience”. Feb 27-Mar 1, 2011. Santa Fe, AZ.


**Workshop Steering Committee and Program Committee Member**, 2011 Interagency Fuels Workshop. 2011. Flagstaff, AZ.


**Special Session Committee Member**, “Challenges and Opportunities for Educating Future Fire Professionals” at The ’88 Fires: Yellowstone and Beyond, Sep 22 -27, 2008. Jackson Hole, WY.


Special Session Chair, “Applications of Remotely Sensed Burned Area and Severity Data” for the Third International Fire Ecology and Management Congress. Nov 13-17, 2006. San Diego, CA


SERVICE

Co-development of a wildland fire science focus area within the School of Forestry at NAU. Development and Administration of the Undergraduate Fire Ecology and Management Certificate within the School of Forestry at NAU. This is targeted at current fire professionals with training and experience that lack an educational component in their career. It is based on hybrid distance learning courses.

Chair, Developing Future Fire Professionals in the Southwest Taskforce. The Taskforce addresses the challenges of developing a diverse cadre of fire professionals with the training, education, and experience needed for effective fire management. The focus of the group is to design a new approach to wildland fire education in the Southwest, based on practical, experiential learning.

Funded a Diversity Recruitment/Fire Program Coordinator Position to integrate educational and management programs in fire in the Southwest

University Committee Work
2005-2006: Fire Program Committee, Integrative Graduate Education and Research Trainee (IGERT) Committee
2006-2007: IGERT Committee, Geospatial Research and Information Laboratory (GRAIL) Advisory Committee, Mission Research Committee, Fire Program Committee, Fire Science Faculty Search Committee.
2007-2008: IGERT Committee (Fall), Attended Consortium for the Status of Women meetings (Spring), Annual Review Committee, Ad-hoc Curriculum Development Committee Chair
2008-2009: Consortium for the Status of Women, Annual Review Committee, Curriculum Development Committee Chair
2009-2010: Annual Review Committee, Fire/Diversity Program Coordinator Search Chair
2010-2011: Mission Research Committee, Curriculum Review Committee, Faculty Senate

Community Service Related To My Profession
Taught Fire Ecology to the Youth Conservation Corps in the field. Jun 22, 2006. Centennial Forest, Flagstaff, AZ
National Public Radio Interview on Wildland Use Fires. 2006
Talked with Home Owners Association about fire preparedness education. 2007

Manuscript/Proposal Reviews
12/05 Review for the University of Arizona Extension
01/06 Review for the Tall Timbers Fire Ecology Conference Proceedings
01/07 Review for International Journal of Wildland Fire
07/07 Review for International Journal of Wildland Fire
08/07 Review for Forest Ecology and Management
10/07 Review for Rangeland Ecology and Management
11/07 Review for Forest Ecology and Management
04/09 Review for International Journal of Wildland Fire
05/09 Review for Forest Ecology and Management
06/10/Present Associate Editor for Fire Ecology (5 reviews)
02/11 Proposal reviewer for the Joint Fire Science Program - Graduate Research Innovation Program (GRIN)
02/12 Proposal reviewer for the Joint Fire Science Program - Graduate Research Innovation Program (GRIN)

AWARDS
Association for Fire Ecology Dedication and Service Award. Jan 2008.
USFS Leadership Award. Developing and providing college courses for Forest Service wildland fire managers. Apr 2008.

OTHER SIGNIFICANT INFORMATION
National Interagency Prescribed Fire Training Center, Student (Mar 2002). This is a hands-on month long training in Florida. We traveled all over Florida lighting and managing prescribed fires. Through this training I acted as holding boss, ignition specialist and burn boss on different prescribed fires.

Volunteer Prescribed Fire Crew-Member, University of California, Davis, Solano County Land Trust, The Nature Conservancy, and Audubon Society (04/00–12/05) Crew member of a cooperative prescribed fire team to help with ecologically based prescribed fires.

RESEARCH GRANTS/FUNDING

<table>
<thead>
<tr>
<th>Project</th>
<th>Investigators</th>
<th>Sponsor</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Aug 2012): Monitoring the Treatment Effectiveness of Recent Southwest Wildfires</td>
<td>PI: Jose Iniguez, RMRS; Co-PIs: Carolyn Sieg, Mike Battaglia, and Paula Fornwalt, RMRS; Andrea Thode and Molly Hunter, NAU; Don Falk, U of A</td>
<td>RMRS Fire Plan Money</td>
<td>$336,000 (Pending)</td>
</tr>
<tr>
<td>(July 2012): Rapid ecosystem shifts are triggered by interactions of severe landscape disturbance and climate variability</td>
<td>Don Falk, U of A; Co-PIs: Rachel Loehman, Rocky Mountain Research Station, Missoula, MT; Andrea Thode, NAU; Jonathan Overpeck, U of A</td>
<td>NSF, Division of Environmental Biology, Ecosystems full proposal</td>
<td>$654,996 ($176,990 NAU Portion)</td>
</tr>
<tr>
<td>(November 2011): Untangling the Las Conchas web: how effective were mechanical and fire treatments in changing fire behavior and reducing fire severity?</td>
<td>PI, Alexander Evans, Forest Guild; David Gori and Anne Bradley, The Nature Conservancy; Jose Iniguez, RMRS; and Don Falk, U of A</td>
<td>Joint Fire Science Program</td>
<td>$430,661 ($280,876 NAU Portion)</td>
</tr>
<tr>
<td>(November 2011): Regional landscape analysis of fuel treatment effectiveness in the 2011 Southwest fires</td>
<td>Jose M Iniguez; Co-PIs: Ellis Margolis, U of A; Andrea Thode, NAU; and Don Falk, U of A</td>
<td>Joint Fire Science Program</td>
<td>$193,474 ($15,710 NAU Portion)</td>
</tr>
<tr>
<td>Date</td>
<td>Project Description</td>
<td>PI/Co-PIs</td>
<td>Funding Agency</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>(July 2010)</td>
<td>Past, Present, and Future Forest Distributions and Disturbance Regimes on Tribal Lands in the Southwest</td>
<td>PI: Pete Fulé; Co-PIs: Amanda Stan, Steven Sesnie and Andrea Thode, NAU; Marnie Carroll, Diné College</td>
<td>NASA ROSES 2010</td>
</tr>
<tr>
<td>(February 2011)</td>
<td>Southwest Fire Science Consortium (Extended One Year)</td>
<td>Co-PIs: Molly Hunter and Pete Fulé, NAU; Jose M. Iniguez, RMRS; Alexander Evans, Forest Guild</td>
<td>Joint Fire Science Program</td>
</tr>
<tr>
<td>(August 2008)</td>
<td>Forest Vegetation Simulator Modeling - Completion</td>
<td>PI Co-PI Molly Hunter, NAU</td>
<td>Colorado Plateau Cooperative Ecosystem Studies Unit proposal to Grand Canyon National Park</td>
</tr>
<tr>
<td>(February 2010)</td>
<td>Developing a Southwest Fire Science Consortium</td>
<td>PI Co-PIs: Molly Hunter and Pete Fulé, NAU; Jose M. Iniguez, RMRS; Alexander Evans, Forest Guild</td>
<td>Joint Fire Science Program</td>
</tr>
<tr>
<td>(November 2009)</td>
<td>Mastication in a Southwest ponderosa pine system: what are the fire behavior and ecological implications?</td>
<td>PI Co-PIs: Karen Haubensak, NAU; Jose M. Iniguez, RMRS; Tessa Nicolet, USFS R3</td>
<td>Joint Fire Science Program</td>
</tr>
<tr>
<td>(August 2009)</td>
<td>Developing a Southwest Fire Science Consortium</td>
<td>PI Co-PIs: Molly Hunter, NAU; Jose M. Iniguez, RMRS; Alexander Evans, Forest Guild</td>
<td>Joint Fire Science Program</td>
</tr>
<tr>
<td>(November 2007)</td>
<td>Effects of the Warm Fire on understory vegetation and</td>
<td>PI</td>
<td>NAU Intramural Grants Program</td>
</tr>
<tr>
<td>Project Description</td>
<td>PI</td>
<td>Principal Investigator/Cooperative Ecosystem Studies Unit proposal to Grand Canyon National Park</td>
<td>Funding Amount</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------</td>
<td>--------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>(August 2008): Burn Severity Research Project</td>
<td>PI</td>
<td>Colorado Plateau Cooperative Ecosystem Studies Unit proposal to Grand Canyon National Park</td>
<td>$144,000</td>
</tr>
<tr>
<td>(August 2008): Forest Vegetation Simulator Modeling</td>
<td>PI</td>
<td>Colorado Plateau Cooperative Ecosystem Studies Unit proposal to Grand Canyon National Park</td>
<td>$40,220</td>
</tr>
<tr>
<td>(December 2007): Evaluating the effectiveness of landscape scale seeding and herbicide use on the Kolob Fire</td>
<td>PI</td>
<td>Joint Fire Science Program</td>
<td>$324,798 ($203,654 NAU Portion)</td>
</tr>
</tbody>
</table>

**Pre-NAU Funding**

- Forest Service Region 5, Fire and Aviation Program: 2004 Fire and Fuels Monitoring ($230,000)
- Forest Service Region 5, Sierra Nevada Frameworks: 2003 Fire and Fuels Study Plan ($290,000)
- Forest Service Region 5, Sierra Nevada Frameworks: 2002 Fire and Fuels Study Plan ($320,000)
- 2002 Switzer Environmental Fellowship Recipient ($13,000)

**CURRICULUM DEVELOPMENT FUNDING**

US Forest Service Fire and Aviation Workforce Diversity Proposals (Internal to the USFS) (April 2010): Collaborative Efforts for Developing Fire and Aviation

NAU was invited to submit a proposal with the Kaibab and Coconino National Forests. I was the lead overall. Others from NAU SOF included Kristen Waring and James Allen. Federal FY 2011-2014 $511,108 ($126,004 NAU portion) Funded for $150,000.

US Forest Service Southwestern Region (September 2009): USDA Forest Service Upper Division Fire Management Project.
PI – New proposal but brought in as a modification to the previous agreement.
$88,000 (Funded)

US Forest Service Southwestern Region (July 2009): USDA Forest Service Wildland Fire Professional Development Course Tuition
I led the effort to secure this funding.
Sep 2009 – May 2012
$60,000 (Funded) The USFS and Distance Learning could not work out a way for this money to be passed in an agreement so it was lost.

NAU Distance Learning, Course Development Program (December 2008): Undergraduate Fire Ecology Certificate
I wrote a proposal to fund the development of one distance learning hybrid courses
FY 2008
$5,000 (Funded)

US Forest Service Fire and Aviation Workforce Diversity Proposals (Internal to the USFS) (April 2007): Collaborative Efforts for Developing Fire and Aviation
NAU was invited to submit a proposal with the Kaibab and Coconino National Forests
I was the lead overall. Others from NAU SOF included Kristen Waring and Aregai Tele.
Federal FY 2008-2011
$596,711 ($85,838 NAU portion) (Not funded)

NAU Distance Learning, Course Development Program (May 2007): Undergraduate Fire Ecology Certificate
I wrote one proposal to fund the development of five distance learning hybrid courses and a teaching fee
FY 2008
$17,600 (Funded)

PI
Jul 2007 – Jun 2011
$7,000 (Funded)

NAU Distance Learning, Proposition 301 (October 2006): School of Forestry Fire Ecology and Fire Science Program
I took the lead on this and worked with the current Dean, David Patton
Aug 2007 – June 2010
$489,169 (Funded for $186,000 for 1 faculty member for three years, funding was cut the last two years)
KRISTEN M. WARING
Associate Professor – 9 month – Non Tenured
Date of Appointment: August 2006
Specializations: Silviculture

Northern Arizona University – Department of Forestry

EDUCATION

2005 Ph.D. Silviculture and Forest Health
University of California, Berkeley, CA

2000 M.S. Forest Entomology
University of Montana, Missoula, MT
1997 B.S. Forest Resources Management, Minor: Wildlife Biology
University of Montana, Missoula, MT

PROFESSIONAL AND RESEARCH EXPERIENCE

2012/Present Associate Professor of Silviculture, Department of Forestry, Northern Arizona University, Flagstaff, Arizona

2006/2012 Assistant Professor of Silviculture, Department of Forestry, Northern Arizona University, Flagstaff, Arizona

2005/2006 Postdoctoral Scholar, Forest Ecology, University of California, Berkeley, California

2000/2005 Graduate Student Researcher, Silviculture, University of California, Berkeley, California

2001 Research Volunteer, Forest Pathology, University of California, Berkeley, California

1998/2000 Graduate Research Assistant, Forest Entomology, University of Montana, Missoula, Montana

1998/1999 Research Technician, Silviculture, Seasonal, University of Montana, Missoula, Montana

1997 Forestry Technician, Silviculture Crew, USDA Forest Service, Powell Ranger District, Clearwater National Forest, Powell, Idaho

1995 Forestry Technician, Forest Inventory and Analysis, USDA Forest Service, Flathead National Forest, Kalispell, Montana

TEACHING EXPERIENCE

2006/Present Associate and Assistant Professor, Silviculture,
Northern Arizona University, Flagstaff, AZ

FOR 315: Silviculture: Principles Fall 2006-2011
FOR 316: Silviculture: Applications Fall 2006-2011
FOR 317: Silviculture and Fire Applications (online)
FOR 318: Fuel Treatments and Modeling (co-developer, online)
FOR 454/554: Forest Health Spring 2009-2012, co-taught
FOR 498/698: Senior/Graduate Seminar in International Silviculture Spring 2007
FOR 499: Women in Natural Resources Seminar Spring 2010, co-taught
FOR 506: Graduate Seminar in Forest Ecology Spring 2008
FOR 506: Economic and Ecological Effects of Introduced Forest Pests Fall 2007, co-taught
FOR 510: Multiple Resources Silviculture Fall 2007, Spring 2009, Spring 2011
FOR 520: Applied Forest Stand Dynamics Spring 2008-2011, co-taught; Spring 2012

Graduate Student Instructor University of California, Berkeley, CA
Multiple Resources Silviculture, Fall 2004
The Biosphere, Fall 2003
Introduction to Environmental Science, Spring 2003

Teaching Assistant, University of Montana, Missoula, MT
Forest Insects and Disease, Spring 2000
Forest Mensuration, Spring 1999
Multiple Resources Silviculture, Spring 1999

Reader/grader, University of Montana, Missoula, MT
Multiple Resources Silviculture, Fall 1999

REFERRED JOURNALS


In review

In revision
Erickson, C.C. and K.M. Waring. Old ponderosa pine growth and mortality responses to restoration treatments at Mt. Trumbull, AZ. Applied Vegetation Science. Accepted with revisions.

OTHER TECHNICAL PUBLICATIONS AND ABSTRACTS


Other

PROCEEDINGS


MISCELLANEOUS PUBLICATIONS AND RESEARCH REPORTS


PRESENTATIONS


An Inconvenient Pest! Assessing the spread of a non-native bark beetle. National Center for Ecological Analysis and Synthesis Distributed Graduate Seminar Synthesis Meeting, February 4-8 2008, Santa Barbara, CA.  *Presenters


INVITED PRESENTATIONS / SESSION MODERATOR


UNDERGRADUATE STUDENT ADVISOR
1 Student, Mentor, School of Forestry, Northern Arizona University, Summer 2009

1 student, Senior Thesis Advisor, School of Forestry, Northern Arizona University May 2010.
GRADUATE STUDENTS
1 student, Doctor of Philosophy, School of Forestry, Northern Arizona University May 2015.
1 Student, Master of Science, School of Forestry, Northern Arizona University May 2009.
1 Student, Master of Science, School of Forestry, Northern Arizona University May 2011.
1 Student, Master of Science, School of Forestry, Northern Arizona University May 2011.
1 Student, Master of Science, School of Forestry, Northern Arizona University August 2011.
1 Student, Master of Science, School of Forestry, Northern Arizona University May 2011.
1 Student, Master of Science, School of Forestry, Northern Arizona University May 2012.
1 Student, Master of Science, School of Forestry, Northern Arizona University May 2014.
1 Student, Master of Forestry, School of Forestry, Northern Arizona University May 2009.
1 Student, Master of Forestry, School of Forestry, Northern Arizona University May 2012.
1 Student, Master of Forestry, School of Forestry, Northern Arizona University Dec 2013.
1 Student, Master of Forestry, School of Forestry, Northern Arizona University May 2014.
1 Student, Master of Forestry, School of Forestry, Northern Arizona University May 2014.

Committee Member, Ph.D. students
1 Student, School of Forestry, Northern Arizona University December 2008.
1 Student, School of Forestry, Northern Arizona University May 2009.
1 Student, School of Forestry, Northern Arizona University May 2011.
1 Student, School of Forestry, Northern Arizona University May 2012.

Committee Member, MS students
1 Student, School of Forestry, Northern Arizona University August 2009.
1 Student, School of Forestry, Northern Arizona University December 2010.
2 Students, School of Forestry, Northern Arizona University May 2011.
1 Student, School of Forestry, Northern Arizona University May 2012.

MF professional paper reader
1 Student, School of Forestry, Northern Arizona University December 2008.
1 Student, School of Forestry, Northern Arizona University May 2009.
2 Students, School of Forestry, Northern Arizona University December 2010.
1 Student, School of Forestry, Northern Arizona University December 2011.

PROFESSIONAL AFFILIATIONS
Society of American Foresters
Xi Sigma Pi
Ecological Society of America
Arizona-Nevada Academy of Science

PROFESSIONAL HONORS AND OFFICES HELD
Named Most Influential Faculty by Gold Axe Award Recipient, Ryan Thomas, 2011
PROFESSIONAL SERVICE
Northern Arizona University Committees
Search Committee, Forest Soils and Ecosystem Ecology  Spring 2012
School of Forestry Landscape Committee  AY 09/10-11/12
IGERT Internal Oversight Committee  AY 08/09-11/12
Curriculum Review Committee, School of Forestry  AY 10/11
School of Forestry “#1” Committee  AY 09/10
NAU Faculty Senator  AY 08/09-10/11
Elections subcommittee  AY 08/09
Faculty Senate Representative
to the Undergraduate Curriculum Committee  AY 09/10-10/11
Chair, Assistant Professor of Forest Entomology Search Committee  Spring 2008
Cultural and Ethnic Diversity Committee, School of Forestry  2007-2009
Annual Review Committee  AY 07/08-09/10  AY 11-12

Curriculum Development Committee  AY 07-08
Ad Hoc Committees to review Adjunct Faculty
Peter Brown (Fall 2007), John Vankat (Spring 2009)
Dennis Dye (Fall 2009), Christina Vojta (Spring 2010)

University of California, Berkeley Committees
Graduate Programs Committee, Student Member  2003
Forest Science Graduate Applications Review Committee,
Student Member  2003
Faculty Search Committee, Forest Watershed Management,
Student Representative  2002

GRANTS RECEIVED (last five years)

<table>
<thead>
<tr>
<th>Project</th>
<th>Investigators</th>
<th>Sponsor</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-2015 Surveying cone and seed insect predators of southwestern white</td>
<td>Richard Hofstetter (PI); **Kristen</td>
<td>USDA Forest Health Protection Evaluation</td>
<td>$78,180</td>
</tr>
<tr>
<td>pine: identification and assessment of impact</td>
<td>Waring (co-PI); Joel McMillan and</td>
<td>Monitoring Program</td>
<td></td>
</tr>
<tr>
<td></td>
<td>John Anhold (USFS Cooperators)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012-2013 Southwestern white</td>
<td><strong>Kristen Waring</strong> (PI); Mary Lou</td>
<td>USDA Forest Service, Washington Office</td>
<td>$28,000 (1.5 yrs)</td>
</tr>
<tr>
<td>pine monitoring and</td>
<td>Fairweather and Brian Geils</td>
<td>Forest Health</td>
<td></td>
</tr>
<tr>
<td>Project Title</td>
<td>PI(s)</td>
<td>Funding Agency</td>
<td>Amount/Life Span</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------------</td>
<td>-----------------------------------------------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>2012-2014 Stand response to western spruce budworm defoliation and mortality in New Mexico</td>
<td><strong>Kristen Waring</strong></td>
<td>Mission Research Program, NAU</td>
<td>$47,000 (2 yrs)</td>
</tr>
<tr>
<td>2012-2017 Translating forest science for Global Practitioners</td>
<td>PI: Tom Kolb; co-PI's: Pete Fulé, Peter Friederici, Paul Beier, Carol Chambers, Ching-Hsung Huang, Annette McGivney, and <strong>Kristen Waring</strong></td>
<td>USDA National Institute of Food and Agriculture (NIFA) National Needs Graduate and Postgraduate Fellowships Program (NNF)</td>
<td>$251,500 (5 yrs)</td>
</tr>
<tr>
<td>2011-2015 White pine blister rust in the Southwest: implications for mixed conifer stand structure and the regeneration of white pine</td>
<td><strong>Kristen Waring</strong></td>
<td>Mission Research Program, NAU</td>
<td>$91,000 (4 yrs)</td>
</tr>
<tr>
<td>2010-2013 Fire and aviation management workforce diversity</td>
<td>NAU School of Forestry: Andrea Thode (lead), <strong>Kristen Waring</strong>, James Allen USDA Forest Service: Russ Copp (Coconino NF), Dave Mertz (Kaibab NF)</td>
<td>USDA Forest Service Internal Proposal</td>
<td>$511,108 (requested, 3 yrs) (award amount $150,000, NAU portion $126,004)</td>
</tr>
<tr>
<td>2009-2012 White pine blister rust in the Southwest: monitoring the health of southwestern white pine</td>
<td><strong>Kristen Waring</strong>, Mary Lou Fairweather</td>
<td>USDA Forest Health Protection evaluation monitoring program</td>
<td>$137,201 (3yrs)</td>
</tr>
<tr>
<td>2009-2011 Effectiveness of prescribed fire treatments in meeting management objectives: An analysis of Fire Monitoring Handbook</td>
<td>PI: <strong>Kristen Waring</strong>; co-PI: Mark Miller, NPS</td>
<td>National Park Service Reserve Fuels Fund</td>
<td>$15,867 (2yrs)</td>
</tr>
<tr>
<td>Year(s)</td>
<td>Project Description</td>
<td>PI/Co-PI</td>
<td>Funding Agency/Program</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td>------------------------------------------------------------</td>
</tr>
<tr>
<td>2009-2011</td>
<td>Old ponderosa pine at Mt. Trumbull, AZ: Assessing landscape-scale mortality trends</td>
<td>Kristen Waring</td>
<td>Mission Research Program, NAU</td>
</tr>
<tr>
<td></td>
<td>and snag characteristics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009-2011</td>
<td>Grand Canyon National Park Burn Severity Research Topics</td>
<td>Andrea Thode; Co-PI, <strong>Kristen Waring</strong></td>
<td>National Park Service and Grand Canyon National Park.</td>
</tr>
<tr>
<td>2008 Travel</td>
<td>Ecological Society of America Annual Meeting in Milwaukee, WI.</td>
<td>Kristen Waring</td>
<td>Employee Development Support Funds, NAU</td>
</tr>
<tr>
<td>award for</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008-2009</td>
<td>Ponderosa pine tree growth and crown characteristics associated with attack by the</td>
<td>Kristen Waring</td>
<td>Intramural Grant Program, NAU</td>
</tr>
<tr>
<td></td>
<td>roundheaded pine beetle (Coleoptera: Scolytidae)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007-2011</td>
<td>Restoring sugar pine in the Tahoe Basin: Regeneration ecology and recruitment</td>
<td>Kristen Waring and Kevin O’Hara</td>
<td>USDA Forest Service PSW Research Station</td>
</tr>
<tr>
<td></td>
<td>dynamics of sugar pine under various stand structures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007-2009</td>
<td>Effect of thinning on crown architecture of southwestern ponderosa pine and its</td>
<td>Kristen Waring</td>
<td>Mission Research Program, NAU</td>
</tr>
<tr>
<td></td>
<td>relationship to tree physiology and bark beetle attacks</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX I

School of Forestry Faculty Publications, 2004-Present


759

2013


2012


2011


**2010**


2009


**2008**


Proceedings RMRS-P-53CD. USDA Forest Service, Rocky Mountain Research Station, Fort Collins, CO.


### 2007


---

**2006**


2004


790


APPENDIX J

SAF Document F-Forestry Graduate Employment Summary
### Document F: Forestry Graduate Employment Summary

**Institution Name:** Northern Arizona University  
**Academic Year:** 2012-2013

**Official Degree Program Title:** Forestry  
**Official Option Title:** N/A

#### NUMBER OF GRADUATES FOR PAST FIVE YEARS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
<td>#</td>
<td>%</td>
<td>#</td>
</tr>
<tr>
<td>Employed permanent:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forestry</td>
<td>2</td>
<td>17%</td>
<td>4</td>
<td>33%</td>
<td>3</td>
<td>25%</td>
<td>0</td>
<td>0%</td>
<td>3</td>
<td>25%</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forestry-related</td>
<td>0</td>
<td>0%</td>
<td>3</td>
<td>50%</td>
<td>2</td>
<td>33%</td>
<td>1</td>
<td>17%</td>
<td>0</td>
<td>0%</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other employed</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td>1</td>
<td>100%</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed temporary:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forestry</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td>2</td>
<td>50%</td>
<td>1</td>
<td>25%</td>
<td>1</td>
<td>25%</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forestry-related</td>
<td>0</td>
<td>0%</td>
<td>1</td>
<td>33%</td>
<td>2</td>
<td>67%</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other employed</td>
<td>1</td>
<td>25%</td>
<td>1</td>
<td>25%</td>
<td>1</td>
<td>25%</td>
<td>0</td>
<td>0%</td>
<td>1</td>
<td>25%</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate Study:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0%</td>
<td>1</td>
<td>20%</td>
<td>3</td>
<td>60%</td>
<td>0</td>
<td>0%</td>
<td>1</td>
<td>20%</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed:</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td>1</td>
<td>100%</td>
<td>0</td>
<td>0%</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Number and Percentage of Graduates</td>
<td>3</td>
<td>8%</td>
<td>10</td>
<td>28%</td>
<td>13</td>
<td>36%</td>
<td>3</td>
<td>8%</td>
<td>7</td>
<td>19%</td>
<td>36</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Thirty six total respondents of 126 mailed surveys (29%).
APPENDIX K

SAF Document G - Student Data Summary
### Document G: Student Data Summary

Institution Name: Northern Arizona University

Official Degree Program Title: Forestry

Official Option Title: N/A

<table>
<thead>
<tr>
<th>STUDENTS ENROLLED</th>
<th>Freshman</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
<th>Total Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Current Enrollment</td>
<td>14</td>
<td>61</td>
<td>11</td>
<td>49</td>
<td>18</td>
</tr>
<tr>
<td>Last Year</td>
<td>14</td>
<td>61</td>
<td>11</td>
<td>49</td>
<td>18</td>
</tr>
<tr>
<td>Two Years Ago</td>
<td>13</td>
<td>36</td>
<td>9</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>Three Years Ago</td>
<td>9</td>
<td>18</td>
<td>4</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STUDENTS ENROLLED</th>
<th>Total Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>African Amer</td>
</tr>
<tr>
<td>Current Enrollment</td>
<td>1</td>
</tr>
<tr>
<td>Last Year</td>
<td>0</td>
</tr>
<tr>
<td>Two Years Ago</td>
<td>0</td>
</tr>
<tr>
<td>Three Years Ago</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Projected Total Enrollment for Next Three Years</th>
<th>Year: 2013</th>
<th>Year: 2014</th>
<th>Year: 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>256</td>
<td>258</td>
<td>261</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GRADUATING CLASS</th>
<th>TOTAL NUMBER OF GRADUATING STUDENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
</tr>
<tr>
<td>Current Graduating Class</td>
<td>8</td>
</tr>
<tr>
<td>Last Year</td>
<td>5</td>
</tr>
<tr>
<td>Two Years Ago</td>
<td>3</td>
</tr>
<tr>
<td>Three Years Ago</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Projected Total Graduates for Next Three Years</th>
<th>Year: 2013</th>
<th>Year: 2014</th>
<th>Year: 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>33</td>
<td>44</td>
<td>40</td>
</tr>
</tbody>
</table>
APPENDIX L

Cline Library Report
Northern Arizona University’s Cline Library is committed to providing a physical environment for intellectual discovery, collaborative research projects, and computing, and an equally rich online learning environment that is fully accessible to students, faculty and staff regardless of location. The library strives to align its efforts to institutional and college initiatives and priorities while responding to the rapidly changing expectations of students and faculty.

A major renovation project currently underway at the library will enrich the student learning experience through the transformation of spaces in which students actively learn, collaborate, and create. A research commons, a 50-60 seat experimental classroom, and a digital media lab will meet the demands of today’s students and promote the university’s current and future approaches to teaching, learning, and the integration of technology and online content.

At a time when many university libraries are reducing the ways in which staff directly interact with students, Cline Library is committed to efficiently utilizing staff in ways that encourage and support the students who need us, while providing the spaces and tools that allow more self-directed learners to be successful.

The renovations in the library, one of the most heavily used buildings on campus, demonstrate its commitment to providing what students need to successfully meet a variety of learning experiences and coursework requirements and exceed the expectations that move them forward to graduation.

Overview:  Resources | Services | Facility
Support for Forestry:  Students | Faculty | Program
Cline Library Overview

Resources

- More than 1.2 million volumes, including over 550,000 books and over 123,000 e-books. Other formats include government documents, maps, microforms, sound recordings, films and other media, and bound periodical volumes.
- Access to over 175 databases and to the articles in over 60,000 e-journals and newspapers.
- Special Collections and Archives holds 8 million unique items focused on the Colorado Plateau and Northern Arizona. Over 95,000 are accessible in the online Colorado Plateau Archives (archive.library.nau.edu), which enjoys nearly 6 million visits each year.
- The library website (nau.edu/library) is available both via a standard interface and also a web interface for mobile users.

Services

- Document delivery service (free to NAU users) borrows or obtains items not in our collections.
- Research assistance and consultations via text, live chat, email, phone or in person.
- Mac and PC laptops available for student checkout.

Facility

- Open 108.5 hours per week, including until 2 a.m. five nights a week for Fall and Spring semesters.
- Largest computing lab on campus, with robust Wireless N Network available to NAU and public users. Technology-rich media studios and group study rooms available for student checkout. 154 computers available to NAU users. Growing number of energy-saving virtual desktop computers. Assistive technology equipment. Scanners allow users to scan books, microforms and more directly to email, printers, usb and home drives, and other options. Free scans save students money while reducing paper consumption.
- 400-seat Assembly Hall for classes and events.
- Designated spaces for quiet study and computing and silent study.
- Individual study rooms provide focused space for solo study.
- (Anticipated 2013) State-of-the-art model 50-60 seat active-learning classroom that doubles as a collaborative area open to students outside of scheduled class times, and Open Studios with expanded programming for digital media creation and editing by individuals and groups.
Support for Forestry Students

The library is committed to helping students develop the research skills they need. The library provides research assistance in person, and via chat, e-mail or phone. Students can contact the library’s academic programs librarians directly for focused, in-depth research help, including assistance with advanced search strategies and the use of highly specialized databases. Academic programs librarians also provide guidance in the use of RefWorks, an online bibliographic citation management tool available to all University-affiliated users.

Librarians and archivists help Forestry students learn how to search for and use primary sources. These may be online resources in the library catalog and Colorado Plateau Archives, or physical resources in the Cline Library’s Special Collections and Archives. At the library Forestry students can use materials in a variety of formats, from archival materials to microforms, from maps to government documents, and from print to media. Students interested in oral histories can go beyond viewing them to creating their own in our multimedia studios.

Academic programs librarians provide one-on-one research consultations for students at all levels. This could be a quick meeting or a lengthy consultation. Librarians can meet with students online, and students can access library resources regardless of location – even when studying abroad. Examples of recent needs related to undergraduate forestry classes include looking for articles on hazard fuel reduction in the Ponderosa Pine and locating digital versions of environmental assessments for the Four Corners region.

Forestry students can take advantage of library programming, including free programs co-sponsored by the library, such as exhibits in Special Collections and Archives, the Native American and Indigenous film series and the College of Arts and Letters Film Series.
Support for Forestry Faculty

As teaching and learning methods have evolved, so has the library’s approach to proactively providing resources and services in support of courses and programs. Staff across the library partner with faculty in all disciplines to design, deliver, assess and continuously improve an active, 24/7 learning environment that allows students to be self-directed and successfully achieve an instructor’s stated student learning outcomes.

The library’s academic programs librarians collaborate with Forestry faculty to:

- Design or redesign curriculum at the course or program level
- Integrate library resources and services directly into courses, especially Blackboard Learn course shells
- Design effective research assignments that align library resources, services and activities to specific learning outcomes in a course and make the research experience more productive and successful for students
- Provide content or instruction, either in-person or virtually, to help students develop information-seeking skills that address specific course or program needs, including the effective and appropriate use of information across formats
- Identify relevant resources that support course or programmatic objectives

Some recent examples of collaborations include working with:

- Yeon-Su Kim/FOR255. Librarian, along with instructional technologist from the E-Learning Center, assisted in the development of this online class, including media integration, identification of textbook alternatives, and inclusion of information literacy concepts.
- Rich Hofstetter/FOR499. Librarian identified field guides and other online resources that could be used for field identification during a course trip to the Smoky Mountains in North Carolina.
- Bruce Fox/FOR101. Librarian identified online resources and active learning content related to forestry.

As textbook costs continue to rise, the library is working with the growing number of faculty opting to provide electronic reserves materials instead of requiring their students to purchase expensive textbooks. The library delivers electronic reserves, which can include articles, e-books, and other resources, via Blackboard Learn course shells. Faculty members fill out an online course reserve form; from there the library makes the resources available quickly and takes care of copyright compliance. For the 2012 fiscal year, nearly 1,500 items were digitized for electronic reserves.

Reserves has provided electronic readings for Forestry faculty members, and when necessary, has worked with Document Delivery Services to acquire materials from other institutions to be used in Forestry coursework.
Support for the Forestry Program

The library’s academic programs librarians work with Forestry faculty to ensure that core and emerging subjects, as well as teaching or research methods, are covered in the library collections. Where possible, the library focuses on electronic content that is available to all users 24/7, including e-books, e-journals, streaming media, full-text databases and more.

Due to the cross-disciplinary nature of forestry research, specific library materials for forestry are supplemented by materials in biological sciences, physical sciences, geography, political science and many other subject areas. The depth and breadth in the collection of materials relating to forestry, in combination with the library’s emphasis on collecting materials relating to the Colorado Plateau, has made the materials in the areas of the library supporting Forestry programs a particularly strong segment of the library’s collection.

Because of the way information providers bundle content in databases, it is not possible to separate out the specific costs of databases or periodicals supporting Forestry research and curricula. Among the key databases used by Forestry students are:

- Biological Sciences (Proquest)
- BioOne Complete
- Environmental Science Collection (Proquest)
- EIS: Digests of Environmental Impact Statements (Proquest)
- Forest Science Database (CABI, CABdirect)
- Forestry Compendium (CABI)
- Plant Science (Proquest)
- Web of Knowledge (Thomson Reuters)

The library also provides access to online reference sources such as the Encyclopedia of Soil Science, Encyclopedia of Water Science, and Birds of North America Online.

The library’s subscription to Films on Demand, a source for streaming media, provides access to over 12,000 streaming media titles, primarily documentaries. For example, at present Films on Demand provides 562 titles in its Environmental Science section (including 173 titles in a Natural Resources category) and 1,138 in its Biology section. A subscription to Filmakers Library Online provides access to over 1,000 documentaries that present points of view and historical and current experiences from diverse cultures and traditions worldwide.

The library offers services for the digitization and delivery of streaming media for class use. Streaming media is one of our fast-growing and well-received services; last year the library made over 1,300 streaming films available for course support. Forestry faculty Yeon-Su Kim and Bruce Fox are users of the library’s streaming services.

In addition, the library’s media collection includes an extensive collection of DVDs and videocassettes directly related to the Forestry curricula, from documentaries to feature films. Users can also access 81,000 streamed sound recordings through the Naxos and DRAM databases.

Cline Library has struggled to manage a cumulative $1 million dollar reduction in its capital/acquisition budget since FY2001. Unfortunately, these budget challenges do not allow the library to allocate amounts to departments for monograph purchases. Instead, in recent years the library has made a limited number of monograph purchases focused on items that address specific course needs, and a select number of purchases based on user-driven demand that meet a set of purchase criteria. Examples include:
• *Invasive Species Management: A Handbook of Principles and Techniques* edited by Mick N. Clout and Peter A. Williams
• *Biological Diversity: Frontiers in Measurement and Assessment* edited by Anne Magurran and Brian McGill
• *Mapping Species Distributions: Spatial Inference and Prediction* by Janet Franklin
• *Conifers of the World: The Complete Reference* by James Eckenwalder
• *To Harvest, to Hunt: Stories of Resource Use in the American West* edited by Judy Li
• *Harnessing Farms and Forests in the Low-Carbon Economy: How to Create, Measure and Verify Greenhouse Gas Offsets* edited by Zach Willey and Bill Chameides

In addition, records for over 45,000 electronic book titles that are available for purchase have been loaded in the library’s catalog. Users can browse and view these titles, some of which are ultimately purchased for the library’s e-book collection.

During FY2011 the library received a significant boost of more than $700,000 in one-time funding from the President and the Provost. The bulk of these funds were devoted to acquiring, providing access to and maintaining research content for students and faculty. The library purchased book and media items requested by faculty, two journal collections to reduce the need for document delivery of articles, and numerous e-book collections; we also added to our account for user-driven purchases. The library also renewed and expanded access to resources such as JSTOR and Project Muse; extended subscriptions to Films on Demand, Web of Knowledge, Dissertations and Theses Full Text and campus access to *The Chronicle of Higher Education*; and added Journal Citation Reports (JCR).

We are hopeful that future budgets and funding opportunities will bring additional opportunities to further strengthen library collections and access. In the meantime, the library has invested substantially in document delivery services staffing, tools and partnerships in order to effectively borrow or buy content on demand when the University’s access to licensed and purchased content fails to meet expressed student and faculty user needs. For the 2012 fiscal year, the library filled over 28,000 requests from University users for books and articles. The library is one of 200 participants in the RAPID ILL resource sharing consortium, whose members provide scanned materials directly to users in an average 24-hour turnaround time.

In recent years, the library has focused on increasing the University’s investment in subscription e-content (and leveraged funds for licensed e-content through consortium arrangements) for a net gain in quantity and quality of information available to the NAU community. The library aggressively negotiates with vendor partners to limit cost increases while balancing user needs. In 2011 the library provided users with access to JSTOR collections encompassing 900 journals. With over 120,000 uses of JSTOR during the year, the cost per use was on average only $.02.

Users may also find Special Collections and Archives materials relevant to Forestry work. For example, the archives include the Arizona Lumber & Timber Company Collection (manuscripts), the Coconino National Forest Collection (photographs) and the African American Pioneers Collection (oral histories). Cline Library’s online “Fire on the Plateau” exhibit has been integrated into a number of courses.

The Cline Library is a selective federal depository library with a selection rate of approximately 60% dating back to 1937, providing unique and primary source materials for research in topics pertinent to Forestry research. The U.S. Documents collection has extensive holdings in materials from the Bureau of Land Management, the United States Department of Agriculture, the Rocky Mountain Forest and Range Experiment Station and other pertinent federal and state agencies. The Cline Library also collects Arizona State publications.
The library continues to catalog federal documents that relate to forestry, and recently partnered with the School of Forestry to fully catalog and house many federal government documents that were formerly located in the school. The library continues to expand access to these and other federal documents that relate to the Forestry curriculum through a retrospective cataloging project.

Faculty and others across the University community collaborate with the library to critically evaluate resources of all types, ensuring that funds are focused on resources that closely align with curricular and scholarly needs and honor University priorities. Many of our resource selection decisions are additionally informed by usage metrics, such as cost per use for e-journals and circulation records for print items. The library welcomes opportunities to hear more from faculty and students about how we can best meet their needs.

In addition, the Cline Library is in the process of creating a model 50-60 seat active-learning classroom that we anticipate will be available in 2013. We hope the new space will promote faculty collaboration with our archivists and librarians, and that it will give faculty increased options for designing, using and evaluating a learning environment. We anticipate that students will appreciate a technology-enriched, highly flexible space that will be open to them outside of scheduled class times. We look forward to sharing this space with Forestry students and faculty.

For more information about the Cline Library’s facilities, resources, and services, please see the library’s website at nau.edu/library.