Department of Ecosystem Science and Management  
Academic Program Review  
January, 2015  

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Texas A&M University
Academic Program Review (APR)

Charge to the Peer Review Team
Ecosystem Science and Management

The Academic Program Review (APR) process at Texas A&M University provides the occasion for academic units to plan strategically, assess the quality and efficacy of their programs, and determine the best courses of action for ongoing improvement. APR is at the heart of our institutional commitment to excellence, and we sincerely thank you for assisting us. This letter provides you with the charge to the committee and a brief overview of the department.

Peer Review Team Charge
Please examine the department and its programs and make recommendations that will help in planning improvements. Your resources are a self-study report prepared by the department, copies of materials from the program’s last review, information you gain through personal interactions while visiting Texas A&M University, copies of strategic plans and goal-setting documents at the department, college, and/or university level, and any additional information requested by you or by the department. Within the broad charge of recommending ways the department can continue to improve are some specific questions that we would like you to address:

- Based on the data/information provided in the self-study report or gathered by the review team, what are the department’s overall strengths and weaknesses?
- How well do the department’s strategic goals align with those of its college and with those of Texas A&M University?
- How would you compare this department with its peers?
- What improvements (including student learning and faculty development) has the department made since the previous program review?
- With only current resources or a modest infusion of new ones, what specific recommendations could improve the department’s performance, marginally or significantly?

Overview of the Program
The Department of Ecosystem Science and Management (ESSM) was formed in March 2007 by combining the Departments of Rangeland Ecology and Management and Forest Science. This new academic Department reflects an expanded emphasis on ecosystem science and natural resource management in its education, research, and extension programs. The Department is comprised of 45 faculty, 26 staff, and 100 graduate and 210 undergraduate students.

The merger has increased the profile, quality, and efficiency of our academic programs by reorganizing our scientists and educators to create additional synergies. Expanded collaboration among research, teaching, and extension programs enhances our collective ability to conduct discovery research and to translate that information into solutions for contemporary natural resource management problems. ESSM is currently one of the 14 departments in the College of Agriculture and Life Sciences (COALS), and a key player in the Institute of Renewable Natural Resources (IRNR) and the Texas Water Resources Institute.
This reorganization also enriches our research programs by expanding our spatial and disciplinary scope and engaging a more diverse group of faculty. Research strength in ESSM includes ecosystem issues spanning all rural-urban gradients, genetics, and genomics research within an ecosystem framework, ecological restoration within a broader range of ecosystems, human dimensions within an ecosystem management perspective, and a more comprehensive spatial sciences program focused on ecological and natural resource issues.

The Department of Ecosystem Science and Management’s Vision and Mission Statements:
The Department aspires to be a premier ecosystem science and management program that significantly impacts the science, education, and management affecting ecosystems. The mission of the Department is to:

- Advance knowledge of ecosystem structure, function, services, and stewardship through a combination of discovery and translational research that develops and adapts cutting-edge science to anticipate and address real-world problems.
- Create stimulating and adaptive learning environments, accessible to diverse populations, which prepare students for leadership in the science and stewardship of rangeland, forest, and wetland ecosystems across the rural-urban gradient.
- Deliver outreach and continuing education programs that provide pragmatic solutions for diverse stakeholders while increasing economic vitality and societal appreciation for the value of healthy, functional ecosystems.

Fundamental scientific knowledge of natural and human-dominated ecosystems is essential to enable mankind to understand and respond to current and future environmental challenges. Our faculty and students are investigating key scientific questions related to the structure and function of ecosystems, and developing new knowledge that will help us sustain ecosystem services and protect biodiversity. In addition, our faculty and students are developing science-based approaches for ecosystem management that integrate social systems and the environment.

The Department of Ecosystem Science and Management is currently reviewing the strategic direction, learning objectives and effectiveness of every degree, curricula, course, and teaching assignment within the department with the goal of pursuing those opportunities.

Current graduate-level degree offerings include:

1. Ph.D. in Ecosystem Science and Management
2. M.S. (thesis or non-thesis options) in Ecosystem Science and Management
3. M.Agr. in Ecosystem Science and Management
4. M.N.R.D. Masters in Natural Resource Development

Current Bachelor of Science degrees/options within the department include:

1. Rangeland Ecology and Management – a) Rangeland Resources, or b) Ranch Management
2. Forestry – a) Forest Resource Management, or b) Urban Forestry
3. Renewable Natural Resources
4. Ecological Restoration
5. Spatial Sciences
<table>
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We look forward to meeting with you during your time on campus. If you have any questions or require additional information prior to your visit, please contact Dr. Pamela R. Matthews, Vice Provost, at pam-matthews@tamu.edu or Ms. Bettyann Zito, APR Program Coordinator, at apr@tamu.edu.

Thank you.
1.0 Department of Ecosystem Science and Management

1.1 Introduction and Welcome

The Department of Ecosystem Science and Management (ESSM) welcomes you to Texas A&M University (TAMU) and thanks you for your service as external reviewers of our program. We are pleased to have our program assessed and to be presented with opportunities for continual improvement. We realize that building and enhancing our reputation requires strong academic programs. Thus, we are grateful for your assistance in this process.

Our self-study was prepared for this review and reflects a current statement of our undergraduate and graduate programs. It includes a brief history and background of the Department, including information on our faculty, students, facilities, and much more. It provides information on the curricula and information about each academic program. The suggestions from the 2008 external review committee are provided in Appendix A.

Texas rangeland, woodland, wetland, and forest ecosystems provide the citizens of Texas with a multitude of benefits. These benefits include income, water, recreation, wildlife habitat, and scenic beauty. However, rapid population growth and environmental change threaten resilience and thus sustainability of these vital ecosystems. Educating ecosystem managers skilled in making decisions that promote sustainability and resilience is a primary goal of the faculty and staff of ESSM. We can accomplish this because we integrate knowledge derived from several science disciplines. The synergy that arises from the integration of biological, physical, and social sciences in ESSM gives rise to novel real-world solutions suitable for uncertainty and unprecedented change. We are not entrenched in any one discipline or any single ecosystem; we are as broad and diverse as the ecosystems that we live in and the issues we face.

This is an opportune time for our academic program review. The merger of the Departments of Forest Science and Rangeland Ecology and Management in 2007 created opportunities for improving the quality of our academic programs and the efficiency with which they are delivered. We continue to pursue those opportunities. We have completely revised our undergraduate curriculum as is described in Section 6.2. In 2013, the individual programmatic masters and Ph.D. degrees (e.g., Forest Science, Rangeland Ecology and Management) were merged into a single M.S. and Ph.D. in ESSM. Finally, ESSM has recently hired a new Department Head thus there is a strong likelihood that your suggestions will find fertile new ground.

The Department of Ecosystem Science and Management is continually assessing our strategic direction, learning objectives, and effectiveness of every degree, curricula, course, and teaching assignment. We look forward to your feedback and await your recommendations about how we might improve our programs as we strive for excellence. We realize this is a time-consuming task and thank you again for your service. We will answer any questions you might have and will provide additional information as requested.

1.2 Brief History of Department and Academic Programs

The Department of Ecosystem Science and Management was formed in 2007 through a merger of the Departments of Forest Science and Rangeland Ecology and Management. The programs of the current ESSM Department began at Texas A&M University in 1946, initially as the Department of Range Management. The name was changed in November 1946 to the Department of Range and Forestry to reflect forestry courses in the curriculum. In 1961, the name was changed to the Department of Range Science. The Department of Forest Science was created in 1969 from faculty within the Department of Range Science. In 1991, the Department of Range Science was renamed...
the Department of Rangeland Ecology and Management. On March 6, 2007, the two Departments officially merged to become the ESSM Department.

The first B.S. and M.S. degrees in the Department of Range and Forestry were granted in 1948 – the first doctoral degree was granted in 1950. The Master of Agriculture program was initiated in 1970, and our participation in the Master of Natural Resource Development degree began in 2007.

At the graduate level, 79 M.S. degrees and 22 Ph.D. degrees were awarded between 2009 and 2013. At the undergraduate level, 330 B.S. degrees were awarded during that same time interval.

Dr. Steve Whisenant was appointed Head of the Department of Rangeland Ecology and Management in August 2004, Interim Head of the Department of Forest Science in January 2006 and Head of the ESSM Department on March 6, 2007.

On March 19, 2012, Dr. Whisenant stepped down as department head. Dr. David Baltensperger (Head of the Department of Soil and Crop Sciences) then began serving as Interim Department Head and held this position until July 2014. Following a national search, Dr. Kathleen Kavanagh from the University of Idaho was selected as Department Head and began her appointment in July 2014.

1.3 Relationships within the Texas A&M University System

The ESSM Department is a programmatic unit of Texas A&M University (within the College of Agriculture and Life Sciences), Texas AgriLife Research, and Texas AgriLife Extension. Additional salary support for the Department comes from the Texas Forest Service. Most tenured and tenure-track faculty members hold joint appointments between Texas A&M University and Texas AgriLife Research, although faculty expectations are not directly linked to the budgetary appointment percentages.

The Department is a basic academic unit. Most decisions on hiring of faculty are made by the department head pending approval by the Dean and Provost (through the Dean of Faculties). However, when vacancies occur due to resignation or retirement, the Department must make a case to the college administration to retain the position. This decentralization allows most decisions on priorities and allocations of resources to be made at the college and department level. The Department Head may request additional support from the Dean or Agency Directors when opportunities or problems arise.

Texas A&M University is a major component of The Texas A&M University System (TAMUS), which consists of nine universities, Texas AgriLife Research, Texas AgriLife Extension, the Texas Forest Service, and several other organizations (Figure 1). The ESSM Department reports to the University through the Dean of the College of Agriculture and Life Sciences and to TAMUS through the Agency Directors and the Vice Chancellor for Agriculture.

Dr. William Dugas is Interim Vice Chancellor for Agriculture and Interim Dean of the College of Agriculture and Life Science. Dr. Craig Nessler is the Director of Texas AgriLife Research. Dr. Douglas Steele serves as Director of Texas AgriLife Extension.

Dr. Mark Hussey is the Interim President of Texas A&M University. Dr. Karan L. Watson is the Provost and Executive Vice President.
1.4 Administrative Structure of the Department

The Department Head directs the program with the assistance of three Associate Department Heads: Dr. Mort Kothmann (Undergraduate), Dr. Tom Boutton (Graduate), and Dr. Robert Lyons (Extension), as well as, an Academic Business Administrator (Jeanne Andreski), an Assistant to the Department Head (Chris Wilson), a Senior Academic Advisor (Heather Janke), and an Administrative Assistant for Graduate Programs (Sara Eliason) (Figure 2). The Associate Department Heads have responsibility to manage their programs. The Senior Academic Advisor works with the Associate Department Head for Undergraduate Programs to advise and recruit undergraduate students and respond to questions. The Administrative Assistant for Graduate Programs works with the Associate Department Head for Graduate Programs to administer graduate programs and students. Administrative support personnel in the Department are supervised by an Assistant to the Department Head. Fiscal, personnel, and travel-related functions are supervised by an Academic Business Administrator. Both report directly to the Department Head.
Organizational Chart
Ecosystem Science and Management

Figure 2. Organizational chart for the Department of Ecosystem Science and Management.

Technical support personnel play an important role in the academic and research activities at the departmental level. The department has approximately 21.4 FTEs of tenure or tenure-track faculty and 22 FTEs of technicians, research associates, research scientists, programmers, modelers, system's analysts and other business support personnel.

The Department Head makes decisions concerning fiscal and policy affairs affecting the Department. Associate Department Heads, faculty members, and key committees provide input. The Associate Department Head for Undergraduate Programs serves as Chair of the Undergraduate Programs Committee. The Associate Department Head for Undergraduate Programs in consultation with the Senior Academic Advisor is responsible for admissions, dismissals, and probation decisions for undergraduate students. The Associate Department Head for Graduate Programs serves as Chair of the Graduate Programs Committee, which manages admissions, dismissals, and probation for graduate students.

Departmental committees are designed to manage the affairs of the Department with the final synthesis and decision being the responsibility of the Department Head. The Department Head appoints committees and charges them with the responsibility for major departmental functions. All committee chairs report directly to the Department Head. Committee assignments are made on a biennial basis with rotation of responsibilities as needed.

Committees

- **Graduate Programs and Curricula** – The Associate Department Head for Graduate Programs serves as Chair of this committee. Other members are appointed by the Department Head. They review the Department's graduate policies and identifies
opportunities for improving the effectiveness and scope of our graduate programs. The committee reviews graduate student applications for admission into ESSM. Enhanced graduate education via research opportunities with off-campus faculty or distance education is encouraged and facilitated. Developing strategies for increasing the diversity of our graduate student population is an important objective.

- **Undergraduate Programs and Curricula** – This committee consists of the Associate Department Head for Undergraduate Programs, Chair, the Senior Academic Advisor, and a Program Leader for each of the five undergraduate degree programs. The committee reviews ESSM undergraduate programs, courses, and curricula to ensure our graduates are job ready. Program leaders conduct program assessment for their respective degree programs. Additional responsibilities include: identifying new strategies for enhancing student participation in high impact educational practices, student recruitment, increasing the diversity of our undergraduate population, student professional organizations and involvement, selection of scholarship recipients, and other student service activities.

- **Recognition and Awards** – This committee identifies faculty, staff, and students for special recognition or awards and prepares materials to support the nominations of those individuals for the awards. These include Departmental, College, University, Association of Former Students, and relevant Professional Society awards.

- **Tenure and Promotion** – The tenure and promotion process at Texas A&M University is rigorous. The ESSM Department maintains high standards, since it ultimately affects the quality of the departmental program and the welfare of the faculty. Tenure and promotion guidelines and policies for Texas A&M University are published and available to the Tenure and Promotion committee members. A faculty and staff handbook published by the University gives specific guidelines. A position description developed by each faculty member and the Department Head lists the requirements for teaching and research. Faculty on- and off-campus elect the Tenure and Promotion Committee. Faculty with administrative appointments are not eligible for election. Members serve a three-year term and are eligible for re-election. The Tenure and Promotion Committee meets annually to review the status of all faculty members below the rank of professor who submit their packet for evaluation. For each evaluated faculty member, the Tenure and Promotion Committee develops a written statement that reflects their collective opinion of current status and provides advice regarding the individuals’ progress toward tenure. This is utilized by the Department Head in consulting with the faculty member during annual review. The Department Head forwards her independent recommendation along with the committee report to the Dean for those faculty members who are applying for tenure and/or promotion. If tenure is denied, the candidate has one final year before termination.

### 1.4.1 Relationship of the Department to Institutes and Centers

The purpose of Institutes, Centers, and Laboratories at Texas A&M University is to more fully develop interdisciplinary opportunities for research, academic, extension, and service programs and to provide for more effective recruiting and competition for extramural funding than could be achieved solely through traditional departments. The creation of “official” Institutes and Centers requires development and approval of a governing document by the College of Agriculture and Life Sciences and the Texas A&M University System Board of Regents. Establishing a “Laboratory” requires no formal approval. Centers and Laboratories are assigned to and managed within a department. Institutes are administratively and financially independent of departments. The ESSM Department participates in two Centers, three Institutes, and one major Laboratory, which is administered within ESSM.
Center for Grazinglands and Ranch Management (CGRM) (http://cnrit.tamu.edu/cgrm/) was established in 1997 in the Department of Rangeland Ecology and Management. It focuses on the critical decision processes that natural resource managers face when integrating resources, including production, economic, social policy, and environmental practices into sustainable ranch management.

Center for Natural Resource Information Technology (CNRIT) (http://cnrit.tamu.edu/index.php) was established in the Department of Rangeland Ecology in 1991 and was recently transferred to Texas AgriLife Research Blackland Research and Extension Center in Temple; however, Dr. Conner and Mr. Hamilton are active participants in Center research. It serves as a focal point for research and development that takes a holistic and interdisciplinary approach to information management and decision systems for planning, monitoring and assessing management systems, new technologies and policy relative to the economic well-being of land owners, society, and the natural resources supporting future generations. Dr. Jay Angerer is the Director.

Spatial Sciences Laboratory (SSL) (http://ssl.tamu.edu/) strives to develop and support excellence in research and teaching advanced spatial analysis, spatial data handling, Geographic Information Systems, Global Positioning Systems, and Remote Sensing. The Laboratory applies spatial models, procedures, and processes to address natural resource issues. Dr. Raghavan Srinivasan is the Director of the Spatial Sciences Laboratory.

Three on-campus Institutes have strong connections to ESSM:

Institute for Plant Genomics and Biotechnology (IPGB) (http://ipgb.tamu.edu) hosts faculty from seven different departments, including one from Ecosystem Science and Management (Dr. Carol Loopstra). In addition, the IPGB provides service to TAMU researchers through the Laboratory for Crop Transformation, the Laboratory for Molecular Cytogenetics, and the Laboratory for Crop Genome Analysis. The IPGB Director is Dr. Martin Dickman.

Texas Water Resources Institute (TWRI) (http://twri.tamu.edu/) was first established in 1952. TWRI was designated as the water resources institute for the state of Texas in 1964 by the Texas Legislature and Texas Governor after Congress passed the Water Resources Research Act (WRRA) of 1964. The WRRA established water resources institutes in each state and provided funds for research on solving water issues. Today, TWRI is one of 54 institutes in the National Institute for Water Resources, which serves as the contact between individual institutes and the federal funding sponsor, U.S. Geological Survey. The TWRI provides leadership to stimulate priority research and extension programs in water resources. TWRI thrives on collaborations and partnerships — currently managing more than 70 projects, involving some 150 faculty from across the state with more than $13.5 million in funding. TWRI links academic expertise with agencies and stakeholders to provide research-derived, science-based information to help answer diverse water questions and to produce communications materials to convey critical information and to gain visibility for its programs. TWRI awards scholarships to graduate students at Texas universities through the U.S. Geological Survey Program water resources research grants and the W. G. Mills Scholarship Program to conduct research on priority water issues. Dr. Roel Lopez is the Interim Director.

Institute of Renewable Natural Resources (IRNR) (http://irnr.tamu.edu/). The Institute’s purpose is to foster research and extension programs focused on natural resource science and management. The goal of the IRNR is to promote, coordinate, and implement interdisciplinary projects, developing proposals, providing technical support, and providing increased access to new sources of extramural funding. The IRNR serves as the host for the Gulf Coast Cooperative
Ecosystems Studies Unit, a partnership among seven Federal Agencies and 23 Universities through a cooperative agreement established in 2003. The Director is Dr. Roel Lopez.

2.0 Vision and Mission of the Department

2.1. Vision: The Department aspires to be an academic leader in the development of integrated ecosystem science and management knowledge founded upon innovative research, education, and outreach to inform ecosystem stewardship.

2.2. Mission: Advance knowledge of ecosystem science and management through a combination of discovery and translational research that develops and adapts cutting-edge science to anticipate and address real-world problems.

Create stimulating learning environments that are accessible to diverse populations and that prepare students for leadership in science and stewardship of rangeland, forest, and wetland ecosystems distributed across rural-urban gradients.

Deliver outreach scholarship and continuing education that provides practical solutions for diverse stakeholders while increasing economic vitality and societal awareness for the benefits of ecosystem conservation and sustainability.

2.2.1. Mission Actions:
- Excellence in faculty and student research aimed at understanding the structure, function, and human dimensions of ecosystems throughout Texas, the Nation and globe;
- Integration of state-of-the-art ecological and social research into management and policy decisions to ensure sustained delivery of ecosystem services to support human well-being;
- Enrichment of undergraduate and graduate student education by providing relevant science and management knowledge, experience in real-world settings, and learning skills that foster life-long innovation and creativity; and
- Strengthen our ability to engage in timely and relevant public outreach and knowledge sharing with diverse stakeholders to increase the capacity of Texas citizens to develop informed environmental decisions.

The ranked items below were identified as being key to achieving the Departmental vision and mission by the faculty as part of a two-day retreat in Spring 2014.
1. A department with multi-disciplinary perspectives where knowledge and information readily flows across all levels by developing a culture that fosters and rewards interaction and collaborations.
2. A new building that is designed to encourage integration of the biological, physical and social science faculty in the Department.
3. Prepare students who are competitive for leadership roles in an evolving future in environmental decision-making.
4. We are a force for a cultural shift toward the realization of the values of a systems/ecosystems understanding and process-based practices through students, research, extension, engagement with stakeholders, service, etc.
5. The Department has many successful partnerships & meaningful collaborations with a wide variety of external entities.
6. The Department is recognized for quality graduate students who are trained to be better educators and researchers.
7. Faculty in the department are competitive for leadership of big grants in the $20 million plus category and capable of attracting endowed gifts of over $100 million in the next 10 years.
8. We must strive for excellence in teaching (both grad & undergrad), research (both basic & applied), and extension of knowledge to landowners & managers and to the development of policies at state, national and international level.
9. We improve the translation of science info decision-making through education, outreach and extension by conducting research that improves delivery of our own programs.
10. The Department maintains a proper balance between science & management.

2.3. **Relationship to Vision, Goals, Mission, and Objectives of Texas A&M**

The ESSM Department has been and will continue to reorganize and redirect faculty, staff, programs, and resources to pursue our vision and missions. Our current academic strategies focus on the first three Imperatives of the Texas A&M University Vision 2020: Creating a Culture of Excellence. Those are to: (1) elevate our faculty and their teaching, research, and scholarship; (2) strengthen our graduate programs; and (3) enhance the undergraduate academic experience. Texas A&M University’s Quality Enhancement Plan 2002 (QEP) guides our assessment programs for both graduate and undergraduate education.

2.4 **Departmental Programmatic Areas**

The programmatic areas within ESSM can be categorized into four general areas: ecosystem science, ecosystem management, spatial sciences, and genetics and systematics.

2.4.1 **Ecosystem Science and Management**

Sound science is an important component to making sound societal decisions concerning current and future environmental challenges. Greater understanding of ecosystem patterns and processes are essential to inform and guide sustainable natural resource use in the state and nation. Research conducted by our faculty and students provide ecological insight into potential outcomes, risks, and trade-offs associated with both natural and human-induced environmental impacts. Research activities emphasize biogeochemistry, eco-hydrology, global change biology, human dimensions, ecological economics, and integrative sciences.

The ESSM Department research, education, and extension programs translate scientific and experiential knowledge into practical strategies for resolving important natural resource issues for multiple stakeholder groups. Ecosystem management brings an integrative sciences approach to resource management as a way to address the many opportunities and challenges of the 21st century. Solutions to major environmental challenges require multiple scientific disciplines, including the social sciences, and the involvement of diverse stakeholder groups so new solutions can be developed for emerging challenges.
2.4.2 Spatial Sciences

Spatial sciences allow students, scientists, and practitioners to observe, explore, and analyze the Earth and its ecosystems from both outside and inside the classroom. The Department of Ecosystem Science and Management requires understanding spatial processes that define ecosystem dynamics. The spatial sciences in ESSM provide students with a set of contemporary and cutting-edge technologies for inventory, characterization and mapping, and assessment of natural and human-made environments. These technologies include Remote Sensing, Geographic Information Systems (GIS), spatial statistics, and the Global Positioning System (GPS).

2.4.3 Genetics and Systematics

Within the ESSM Department, there are strengths in a wide variety of areas including plant population genetics, genomics, molecular genetics, cytogenetics and tree breeding. The ESSM Department Genetics faculty have a variety of associations with the Texas A&M Forest Service, the USDA Forest Service and a variety TAMU interdisciplinary programs including Genetics, Molecular and Environmental Plants Sciences, Ecology and Evolutionary Biology, and Biotechnology. These contribute to the diversity we have in research and teaching. The ESSM Department Genetics faculty have developed strong collaborations among themselves as well as with the ecophysiologists within the department. Participation in the Western Gulf Tree Improvement ties the basic research with preservation and improvement of southern pine and hardwood species.

Several systematics courses contribute to the taxonomy aspects of undergraduate and graduate education. The S.M. Tracy Herbarium contains plant specimens from around the world, including an outstanding collection of new-world grasses and wetland species. Smaller collections are maintained on campus for teaching purposes.

3.0 The Faculty

There are currently 23 full-time tenured and tenure-track administratively located faculty in ESSM (Table 1). Two have joint appointments, with the majority appointment in other departments (Agricultural Economics and Biological and Agricultural Engineering). The ESSM Department has five non-tenure-track faculty engaged in teaching and research activities, only one of these faculty has a nine month appointment, the remainder have a 30% or less appointment. There are seven extension specialists, who are in non-tenure-track

![Figure 3. The number of faculty by rank in the Department of Ecosystem Science and Management as of 2014.](image-url)
positions. With the exception of administrators and Extension faculty, the large majority of our faculty are on 10 month appointments with a few on nine month. The faculty appointments were reduced from 12 to 10 months in 2011 due to budget reductions. The faculty student ratio is 1:5 and 1:10 for graduate and undergraduate students respectively. Faculty demographics are presented in Figure 3 and metrics for publications, external grants and teaching loads are presented in Figure 5. Curriculum vitae are included in Appendix B.

**Table 1.** List of the Department of Ecosystem Science and Management Faculty in alphabetical order. All faculty have 100% appointment in the Department except those with values listed in the % column.

<table>
<thead>
<tr>
<th>Name</th>
<th>Rank</th>
<th>Tenure/Tenure Track</th>
<th>Faculty Assignment</th>
<th>Location</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angerer, Jay</td>
<td>Assistant Professor</td>
<td>No</td>
<td>AgriLife Research</td>
<td>Temple, TX</td>
<td></td>
</tr>
<tr>
<td>Ansley, James</td>
<td>Professor</td>
<td>No</td>
<td>AgriLife Research</td>
<td>Vernon, TX</td>
<td></td>
</tr>
<tr>
<td>Boutton, Tom</td>
<td>Professor</td>
<td>Yes</td>
<td>Teaching/Research/RDH</td>
<td>College Station, TX</td>
<td></td>
</tr>
<tr>
<td>Briske, David</td>
<td>Professor</td>
<td>Yes</td>
<td>Teaching/Research</td>
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<td></td>
</tr>
<tr>
<td>Byram, Tom</td>
<td>Assistant Professor</td>
<td>No</td>
<td>Texas A&amp;M Forest Service</td>
<td>College Station, TX</td>
<td></td>
</tr>
<tr>
<td>Casola, Claudio</td>
<td>Assistant Professor</td>
<td>Yes</td>
<td>Teaching/Research</td>
<td>College Station, TX</td>
<td></td>
</tr>
<tr>
<td>Clayton, Megan</td>
<td>Assistant Professor</td>
<td>No</td>
<td>AgriLife Extension</td>
<td>Corpus Christi, TX</td>
<td></td>
</tr>
<tr>
<td>Conner, Richard</td>
<td>Professor</td>
<td>Yes</td>
<td>Teaching/Research</td>
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<tr>
<td>Doan-Crider, Diana</td>
<td>Lecturer</td>
<td>No</td>
<td>Teaching</td>
<td>Boerne, TX</td>
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<tr>
<td>Eriksson, Marian</td>
<td>Associate Professor</td>
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<tr>
<td>Feagin, Rusty</td>
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<td>College Station, TX</td>
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<tr>
<td>Fleischman, Forrest</td>
<td>Assistant Professor</td>
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<tr>
<td>Fox, Bill</td>
<td>Assistant Professor</td>
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<tr>
<td>Gan, Jianbang</td>
<td>Professor</td>
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<tr>
<td>Hamilton, Wayne</td>
<td>Senior Lecturer</td>
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<td>Teaching/Research</td>
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<tr>
<td>Hatch, Steve</td>
<td>Professor</td>
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<td>Teaching/Research</td>
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</tr>
<tr>
<td>Name</td>
<td>Rank</td>
<td>Tenure/ Tenure Track</td>
<td>Faculty Assignment</td>
<td>Location</td>
<td>%</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------</td>
<td>----------------------</td>
<td>----------------------------</td>
<td>-------------------</td>
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</tr>
<tr>
<td>Jackson, James</td>
<td>Program Specialist</td>
<td>No</td>
<td>AgriLife Extension</td>
<td>Stephenville, TX</td>
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<tr>
<td>Kavanagh, Kathleen</td>
<td>Professor</td>
<td>Yes</td>
<td>Department Head, Admin</td>
<td>College Station, TX</td>
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<td>Knight, Bob</td>
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<tr>
<td>Kothmann, Mort</td>
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<td>Teaching/Research/A DH</td>
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<td>Teaching/Research</td>
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<td>Lawing, Michelle</td>
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<td>Loopstra, Carol</td>
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<td>Yes</td>
<td>Teaching/Research</td>
<td>College Station, TX</td>
<td></td>
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<tr>
<td>Lyons, Bob</td>
<td>Professor</td>
<td>No</td>
<td>AgriLife Extension</td>
<td>Uvalde, TX</td>
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<tr>
<td>McDonald, Alyson</td>
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<td>AgriLife Extension</td>
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<tr>
<td>Mohanty, Binayak</td>
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<td>Moore, Georgianne</td>
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<td>Popescu, Sorin</td>
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<tr>
<td>Rector, Barron</td>
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<td>AgriLife Extension</td>
<td>College Station, TX</td>
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<tr>
<td>Rogers, Bill</td>
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<td>Teaching/Research</td>
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<tr>
<td>Russell, Morgan</td>
<td>Assistant Professor</td>
<td>No</td>
<td>AgriLife Extension</td>
<td>San Angelo, TX</td>
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<tr>
<td>Shaw, Bob</td>
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<td>College Station, TX</td>
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<tr>
<td>Smeins, Fred</td>
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<tr>
<td>Teague, Richard</td>
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<tr>
<td>Vogel, Jason</td>
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<tr>
<td>Name</td>
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<td>Tenure/ Tenure Track</td>
<td>Faculty Assignment</td>
<td>Location</td>
<td>%</td>
</tr>
<tr>
<td>--------------</td>
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<td>---------------------</td>
<td>----</td>
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<td>Walker, John</td>
<td>Professor &amp; Res Dir</td>
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<tr>
<td>West, Jason</td>
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<td>Whisenant, Steve</td>
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<tr>
<td>Wilcox, Brad</td>
<td>Professor</td>
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<td>Teaching/Research</td>
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<tr>
<td>Wu, Ben</td>
<td>Professor</td>
<td>Yes</td>
<td>Teaching/Research</td>
<td>College Station, TX</td>
<td></td>
</tr>
</tbody>
</table>

**Faculty Diversity**

In 2013, the faculty were 79% male and 21% female if all on-campus faculty are considered including part-time lectures. However, the percentage of females falls to 14% when only tenure and tenure-track faculty are considered. It is expected that the percentage of women will increase in the future with the addition of two new tenure-track female faculty since 2014. Ethnicity of all faculty is 76%, 3%, 14% and 7% for white, Hispanic, Asian and International faculty respectively. However if just tenure and tenure-track faculty are considered, the number of Hispanic and international faculty falls to zero leaving 81% white and 19% Asian. Clearly, there is room for improvement in faculty diversity in gender and ethnicity.

**Faculty Qualifications**

The expected qualifications for faculty are best described by three recent faculty hires (Appendix C). Here is the list of requirements for one of these positions “A doctoral degree in human dimensions of natural resources, rural sociology, political science, human geography, or a related discipline and demonstrated expertise and accomplishment in one or more of the above emphasis areas is required. The ability to develop an internationally recognized research program; conduct collaborative, multidisciplinary research; solicit extramural contracts and grants, and effectively contribute to graduate and undergraduate teaching programs is essential. The incumbent will be responsible for teaching a senior undergraduate course in Natural Resource and Environmental Policy, and contribute to a second undergraduate course in Coupled Social-Ecological Systems or Environmental Impact Assessment or Ecosystem Management, and development of a graduate course in their area of expertise.”

**Faculty Performance**

Faculty are assessed annually and tenure-track faculty undergo an extensive review by the tenure committee 3 years after being hired. We have only included annual evaluation data for 2010 to 2013 since there was a change in evaluation rankings in 2010 making it difficult to include the 2009 data. The data for faculty annual evaluations is presented in Figure 4. Dr. Whisenant was the
Department Head from 2007 through 2011. In March 2012, Dr. Baltensperger became interim Department Head. This shift in Department Head evaluations is reflected in the sharp decline in the effective category and an increase in highly effective and outstanding category. Since we do not see a similar increase in the number of publications or grants associated with the improved evaluations, we assume that this shift is due to the philosophy of the Department Head and not a pronounced shift in productivity.

The core faculty maintain a high productivity with an average of five publications and just under two grants per year. On average, 35% of the core faculty publications are papers published with their Ph.D. students. This high productivity occurs in spite an average teaching load of six credits per year (Figure 5). Not surprisingly, the non-core or “other” faculty have lower productivity in terms of grants and publications although they teach an average of 10 credit hours per year.

Figure 4. Annual evaluation data for the Department of Ecosystem Science and Management Faculty. There was a change in person doing the evaluations in 2013.

Figure 5. The average number of publications, grants, and teaching load for core and other faculty in the Department of Ecosystem Science and Management.
The quality of ESSM faculty has been recognized at the department, college, university, national and international level. Listed in Table 2 are examples of awards and recognition for teaching, research, publications and Extension presented to ESSM faculty members during 2009-2013.

**Table 2. Summary of Recognition, Awards, and Indicators of Successful Teaching by the Department of Ecosystem Science and Management Faculty, 2009 to 2013.**

<table>
<thead>
<tr>
<th>Name (Rank)</th>
<th>Year Presented</th>
<th>Award Presented (Presented from)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom Boutton (Regent's Professor)</td>
<td>2010</td>
<td>Texas A&amp;M AgriLife Senior Faculty Fellow. <em>This award recognizes outstanding and productive faculty who have contributed to the scholarly creation and dissemination of new knowledge through exceptional research leadership and grantsmanship within their respective discipline.</em></td>
</tr>
<tr>
<td></td>
<td>2013-2014</td>
<td>Outstanding Graduate Teacher (ESSM)</td>
</tr>
<tr>
<td>David Briske (Professor)</td>
<td>2008 – present</td>
<td>Editor-in-Chief, Rangeland Ecology &amp; Management</td>
</tr>
<tr>
<td></td>
<td>January 2008</td>
<td>Chapline Research Award (Society for Range Management)</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>Graduate Instructor of the Year (Ecosystem Science &amp; Management, TAMU)</td>
</tr>
<tr>
<td></td>
<td>February 2010</td>
<td>Sustained Lifetime Achievement Award (Society for Range Management)</td>
</tr>
<tr>
<td></td>
<td>February 2011</td>
<td>Teaching Excellence Award (SLATE) (Texas A&amp;M University System)</td>
</tr>
<tr>
<td></td>
<td>September 2012</td>
<td>Dean’s Outstanding Achievement Award - Research (COALS, Texas A&amp;M University)</td>
</tr>
<tr>
<td></td>
<td>January 2012</td>
<td>Texas A&amp;M Agrlife Research Faculty Fellow (TAMU)</td>
</tr>
<tr>
<td></td>
<td>September 2013</td>
<td>Research Service Award (Mexican Society for Range Management)</td>
</tr>
<tr>
<td></td>
<td>December 2013</td>
<td>USDA Secretary of Agriculture’s Honor Award, Ecological Site Description Team (Washington DC.)</td>
</tr>
<tr>
<td>Megan Clayton (Assistant Professor)</td>
<td></td>
<td>Young Professionals Award from the Texas Section Society for Range Management</td>
</tr>
<tr>
<td>Robert Knight (Associate Professor)</td>
<td></td>
<td>Gamma Sigma Delta Award of Merit for Excellence in Teaching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outstanding Achievement Award from the Texas Section Society for Range Management</td>
</tr>
<tr>
<td>Urs Kreuter (Professor)</td>
<td>2013</td>
<td>Texas Section of Society for Range Management Technical Publication Award</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>COALS Dean’s Award for Outstanding Achievement – Interdisciplinary Research Team</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Assoc. Former Students’ Distinguished Achievement Award – College Level Teaching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PhD advisor: David Toledo who was awarded Texas A&amp;M University Distinguished Graduate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Award for Excellence in Research; and Dianne A. Stroman who was awarded Texas A&amp;M University</td>
</tr>
<tr>
<td>Name (Rank)</td>
<td>Year Presented</td>
<td>Award Presented (Presented from)</td>
</tr>
<tr>
<td>------------</td>
<td>----------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Distinguished Graduate Award for Excellence in Teaching</td>
</tr>
<tr>
<td></td>
<td>2011</td>
<td>Senior Scientist, Norman Borlaug Institute for International Ag., Texas A&amp;M University</td>
</tr>
<tr>
<td></td>
<td>2011</td>
<td>Distinguished Visiting Scientist, CSIRO, Townsville, QLD, Australia (Apr-Aug)</td>
</tr>
<tr>
<td></td>
<td>2010</td>
<td>Dept. Ecosystem Sci. &amp; Management Graduate Professor of the Year</td>
</tr>
<tr>
<td>Robert Shaw (Professor)</td>
<td>2013</td>
<td>Texas Section of Society for Range Management Special Publication Award for Guide to Texas Grasses</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Donovan Stewart Correll Memorial Award for scientific writing (Guide to Texas Grasses) in the field of the native flora of Texas presented by the Native Plant Society of Texas</td>
</tr>
<tr>
<td>Fred Smeins (Professor)</td>
<td>2009, 2011</td>
<td>Undergraduate Teacher of the Year, Department of Ecosystem Science and Management</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>Graduate Teacher of the Year, Department of Ecosystem Science and Management</td>
</tr>
<tr>
<td></td>
<td>2010</td>
<td>Texas Plant Conservation Award, Texas Plant Conservation Conference Annual Meeting, LBJ Wildflower Center/University of Texas</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>19th Honorary San Antonio Livestock Exposition Lecture in Agriculture Series, Sul Ross State University</td>
</tr>
<tr>
<td>Raghavan Srinivasan (Professor)</td>
<td>2013</td>
<td>Awarded Docteur Honoria Causa (Honorary Doctorate Award) by Paul Sabatier University – Toulouse III in recognition of outstanding scientific accomplishments</td>
</tr>
<tr>
<td></td>
<td>2012</td>
<td>Norman Hudson Memorial Award from the World Association of Soil and Water Conservation for outstanding contribution to soil and water conservation and the successful develop and worldwide application of the Soil and Water Assessment Tool (SWAT) model</td>
</tr>
<tr>
<td></td>
<td>2011</td>
<td>Honorary appointment as Senior Scientist of Borlaug Institute</td>
</tr>
<tr>
<td></td>
<td>2010</td>
<td>Awarded Scientist of the year by the Biological and Agricultural Engineering Department, Texas A&amp;M University</td>
</tr>
<tr>
<td>X. Ben Wu (Professor)</td>
<td>2012</td>
<td>John Kincaid University Professorship for Undergraduate Teaching Excellence</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>Presidential Professor for Teaching Excellence Award, Texas A&amp;M University</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>Award for Innovative Excellence in Teaching, Learning, and Technology, the International Conference on College Teaching and Learning</td>
</tr>
</tbody>
</table>
4.0 Facilities and Space

The amount and quality of office and laboratory space available to the department is reasonable (Table 3). Although we must set priorities and reallocate space assignments, the amount of space available does not limit our effectiveness with the exception of teaching space. The quality of our building facilities is variable and there are several areas that need upgrading although we have benefited from over a million dollar upgrade in our laboratory facilities in 2014. Unfortunately, our available space has faculty housed in six buildings (eight, if joint faculty are included) on the Texas A&M University Campus. The largest faculty group was located in the Animal Industries Building on the main campus, but we have vacated that building and split the faculty/staff up between three other buildings (HFSB, Kleberg, and Centeq). Much of this separation is an artifact of the merger of two departments and is not easily remedied without a new building. The great physical separation of faculty, staff, and students is a major impediment to operational efficiency, creation of a common culture, and the development of transdisciplinary synergies among the faculty. Lack of classroom space is also an emerging problem. We have field lab facilities available a short distance from campus that are heavily used. We have two dedicated teaching laboratories for plant identification courses. We also have two computer laboratories. Teaching labs that can accommodate courses with multiple lab sections are a major priority for ESSM. As is evident in Figure 6, 60% of our courses are taught in small class or lab sections.

<table>
<thead>
<tr>
<th>Building*</th>
<th>Assignable</th>
<th>Laboratory</th>
<th>Office</th>
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<tr>
<td>Kleberg Center</td>
<td>20,082</td>
<td>7,689</td>
<td>8,556</td>
</tr>
<tr>
<td>Horticulture &amp; Forestry Science Building (HFSB)</td>
<td>16,966</td>
<td>6,697</td>
<td>4,782</td>
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<tr>
<td>Range Field Laboratory</td>
<td>5,703</td>
<td>1,730</td>
<td>1,121</td>
</tr>
<tr>
<td>S.M. Tracy Herbarium (University Services Building)</td>
<td>7,050</td>
<td>341</td>
<td>527</td>
</tr>
<tr>
<td>Forest Science Field Laboratory</td>
<td>5,703</td>
<td>1,703</td>
<td>1,121</td>
</tr>
<tr>
<td>Centeq Building</td>
<td>12,424</td>
<td>600</td>
<td>2,337</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>67,928</strong></td>
<td><strong>18,760</strong></td>
<td><strong>18,444</strong></td>
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</tbody>
</table>

* Additional space in Centeq and Kleberg was estimated because the official space inventory has not been updated to reflect changes from the recent move. The space lost by ESSM in Animal Industries is comparable to that provided in Centeq, HFSB, and Kleberg.
5.0 Departmental Budget Information

Table 4. Department of Ecosystem Science and Management annual budget in FY 2013, 2014, and 2015. This includes budgets for teaching, research and Extension.

<table>
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<th>Item</th>
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<tbody>
<tr>
<td>Faculty Salaries</td>
<td>$2,325,139.00</td>
<td>$2,362,130.00</td>
<td>$2,853,252.00</td>
</tr>
<tr>
<td>Non-faculty Salaries</td>
<td>$522,441.00</td>
<td>$460,170.00</td>
<td>$486,700.00</td>
</tr>
<tr>
<td>GARs/GANTs</td>
<td>$110,938.00</td>
<td>$110,938.00</td>
<td>$110,938.00</td>
</tr>
<tr>
<td>Unallocated Salaries</td>
<td>$70,041.00</td>
<td>$160,877.00</td>
<td>$160,877.00</td>
</tr>
<tr>
<td>Summer Teaching</td>
<td></td>
<td>$119,000.00</td>
<td>$68,214.00</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>$288,725.00</td>
<td>$361,573.00</td>
<td>$399,399.00</td>
</tr>
<tr>
<td>Advising</td>
<td>$42,654.00</td>
<td>$44,360.00</td>
<td>$45,685.00</td>
</tr>
<tr>
<td>Total</td>
<td>$3,359,938.00</td>
<td>$3,619,048.00</td>
<td>$3,853,250.00</td>
</tr>
</tbody>
</table>

Figure 6. The percentage of class or lab section in the Department of Ecosystem Science and Management by the number of students. This is a compilation of all courses taught in all majors.
5.1 Faculty Salaries

Faculty salaries at Texas A&M University are lagging behind those of competitor institutions across the United States (Table 5). Annual faculty salaries are usually based solely on merit; with the annual pool for merit increases varying from zero to three percent.

Table 5. Mean salary for tenure and tenure-track faculty in the Department of Ecosystem Science and Management (ESSM), the College of Agriculture and Life Sciences (COALS), and peer institutions. Data is for 2013 only.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Mean Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ESSM</td>
</tr>
<tr>
<td>Professor</td>
<td>$101,674</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>$73,192</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>$71,559</td>
</tr>
</tbody>
</table>

5.2 Contracts and Grants

Annual expenditures from contract and grants (Research and Extension) have fluctuated with a high of $3.6 million and a low of $1.8 million (Figure 7). These soft dollar funds pay faculty, students, and technical support staff (technicians, research associates, research scientists, programmers, modelers, and system analysts). Using ESSM’s hard dollar support as leverage to generate additional contract and grant funding is an important goal of ESSM.

Figure 7. Annual contract and grant awards of the Department of Ecosystem Science and Management, FY 2009 to 2014. These numbers include contracts and grants in research, teaching and Extension.
6.0 Educational Programs

6.1 Current Practices and Policies that Contribute Toward Improved Teaching

Quality teaching, advising, and student learning are important missions of ESSM. Quality of teaching is partially gauged by the mandatory use of student evaluations in all courses. All ESSM faculty are evaluated with the same questions, which were written with input from the entire faculty and guidance from Data and Research Services (DARS). Students in traditional classroom courses complete scantron forms and write comments on the back of the form. These are collected by a student and turned in to the staff support person who types up the comments for each course and sends the forms to DARS for numerical summarization. The results of the evaluation and the typed summary of comments are then distributed to the faculty. Faculty members do not see the original written forms in an effort to ensure complete anonymity for the students. Comments from students are used by the faculty for continual course improvement. Courses taught on-line use on-line course evaluation forms administered by DARS at the end of each semester. We use the paper scantron forms because, unfortunately, participation in the on-line evaluation is lower than we would like (about 52% University-wide) and in small sections it does not give an adequate sample. Evaluation results are provided to the Department Head and form part of the basis for annual faculty reviews.

When regular evaluation reveals that faculty may require extra guidance in teaching, formulation of syllabi, writing of course learning objectives, incorporation of technology into the classroom, and so forth, Texas A&M is fortunate to have a superior Center for Teaching Excellence (CTE) (http://cte.tamu.edu/). The CTE provides numerous resources to all faculty interested in improving their teaching, such as short courses, workshops, and even individual consultation, which can include classroom observation and/or videotaping of teaching. Consultation regarding teaching-related issues is also available to departments. The CTE also has an Early Feedback Program designed to provide feedback to faculty that they can use in the same semester to improve student learning. A CTE Instructional Consultant observes the lecture and collects data similar to the end-of-semester student evaluations. Insights about the classroom learning environment are then discussed with the faculty member in a subsequent meeting to allow mid-semester changes as necessary.

Effective advising is an important component of undergraduate student learning. Heather Janke, Senior Academic Advisor for all undergraduate programs, assists our 246 undergraduate students to develop degree plans and schedule semester courses. She also manages classroom assignments and semester course schedules to avoid conflicts in scheduling of class times.

The ESSM Department faculty believe that effective student learning is strongly influenced by the creation of an appropriate student-centered environment. Toward that end, we promote student participation in a variety of professional student clubs that reflect the diversity of our majors. These include the American Society of Photogrammetry and Remote Sensing, Range Club, Society of American Foresters, Soil and Water Conservation Society, and the Student Society for Ecological Restoration. These organizations allow the students to demonstrate leadership, hear from practitioners in the field, and attend state, regional, national, and international meetings of professional societies.

The ESSM Department’s goal is to have all students participate in one or more High Impact Learning Experience (HIP). To achieve this, the Department has implemented a variety of HIP experiences for our students. These include a required ‘new student’ seminar (ESSM 201), a required senior seminar, and an honors seminar to provide honors students an additional high impact learning opportunity. All undergraduate students are required to take two “writing
intensive” courses within the major where they are evaluated on writing as well as course content. We have an extended 2-week field trip course (ESSM 300 Forestry summer camp) for Forestry majors and shorter field trips in many other courses. The ESSM Department offers one study abroad course in which students are encouraged to participate. Many other study abroad courses are available within the college and university. Students are also encouraged to apply for the Agriculture and Natural Resources Policy Internships in Washington D.C. and Austin. Students participate in undergraduate research with faculty and some are Undergraduate Research Fellows. We utilize outstanding upper division undergraduate students as Undergraduate Teaching Interns in courses where they have excelled. All students in the Renewable Natural Resources degree program are required to participate in a work internship for credit. This experience requires a report that is graded. Students from other majors are encouraged to participate in work internships.

In addition to classical classroom instruction, ESSM faculty have participated for years in off-campus teaching activities that likely help us recruit potential undergraduates. One of the best examples of this type of teaching is the Youth Range Workshop, held annually for 60 years. The purpose of the Workshop is to recognize outstanding youth, develop leadership skills, and provide advanced training to 4-H and FFA youth interested in practical range ecology, ranch and natural resource management. A goal of the Workshop is to enable participants to return to their local communities and serve as leaders to educate youth and other audiences. Hands-on activities provide curriculum reinforcement, visual examples, and opportunities to learn skills in plant identification, plant collecting, plant species composition, total resource planning, stocking rate determinations, estimating forage standing crops, and estimating brush densities and ecological trend. Special sessions on water and range health provide the participants with skills for teaching youth and adults in their home communities. A media program is conducted which encourages youth participants to use and train others on what they have learned. Extending the knowledge learned or gained to others is one of the highest goals of this program.

Course syllabi are included in Appendix D.

### 6.1.1 Distance Education Initiatives

We have made a concerted effort to develop distance-based graduate courses and programs. Less emphasis has been placed on developing distance based undergraduate courses. A primary incentive for develop distance based undergraduate courses would be to ‘share’ courses with other university where faculty with specialized training are not available. The graduate distance program is based on the recognition of critical needs to provide advanced training for natural resource professionals, which can significantly enhance the professional development of a new generation of natural resource professionals, and directly impact the conservation and management of our natural resources. Given the changing learning habits of today’s students, the distance-based courses will also benefit many on-campus students, students who are away from campus conducting fieldwork, and students from other institutions that lack the expertise and courses offerings in specific areas.

A set of ten graduate courses and three upper-level undergraduate distance-based courses have been developed (Table 6). Some of these courses are offered in distance-based format only while others are in both distance-based and in-class formats. These courses along with distance-based courses from related departments provide a sufficient course base for our Master of Nature Resource Development (MNRD) degree program in ESSM (description in Section 6.7.1). We plan to continue our efforts of developing more
distance-based courses to provide a richer and more balanced distance-based graduate and undergraduate curriculum.

Table 6. Distance-based courses developed in the ESSM Department for a total 39 student credit hours (SCH).

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course Title</th>
<th>SCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNDERGRADUATE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RENR 405</td>
<td>GIS for Environmental Problem Solving</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 314</td>
<td>Principles of Range Management of the World</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 406</td>
<td>Natural Resources Policy</td>
<td>3</td>
</tr>
<tr>
<td>GRADUATE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESSM 610</td>
<td>Rangeland Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 611</td>
<td>Grazing Management and Range Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 612</td>
<td>Rangeland Vegetation Management</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 630</td>
<td>Restoration Ecology</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 635</td>
<td>Ecohydrology</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 636</td>
<td>Range and Forest Watershed Management</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 651</td>
<td>Geographic Information System for Resource Management.</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 660</td>
<td>Landscape Analysis and Modeling</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 675</td>
<td>International Sustainable Community Development</td>
<td>3</td>
</tr>
<tr>
<td>ESSM 676</td>
<td>Leadership, Development and Management of Environmental NGOs</td>
<td>3</td>
</tr>
</tbody>
</table>

6.2 Documentation of Student Learning

Texas A&M University through the Office of Institutional Assessment (http://assessment.tamu.edu) assesses the effectiveness of all degree programs. In the ESSM Department, undergraduate and graduate program assessment is coordinated by the Associate Department Head for Undergraduate Programs and the Associate Department Head for graduate degree programs, respectively. For undergraduate, each degree program leader is responsible for conducting the assessment for the program(s) they represent. TAMU utilizes WEAVEOnline as the platform for capturing the assessment data. Assessment plans were developed for each undergraduate degree program in WEAVEOnline during 2008-10. Assessment data have been collected annually and entered into WEAVEOnline. The ESSM Department assessment plans link to the TAMU master (Appendix E-1) set of learning outcomes that apply to all university graduates. Assessment plans consist of program missions, learning outcomes, measures, achievements, action plans, and analysis. The plans and the data entered are reviewed by administrators from the dean to the provost. Emphasis is placed on using the results of assessment for making program improvements.
Undergraduate Program Assessment

During an extensive review and revision of the ESSM Department undergraduate degree programs during 2009-10, we developed 15 Program Learning Outcomes (PLO) to guide all five programs. In the fall of 2012, we began operating under the revised curriculum and courses. Although we completed the revision of all five curricula and all ESSM undergraduate courses, we did not revise our assessment plans at that time. After two years’ experience using the ‘old’ assessment plans with the new curricula and PLO, we initiated a review of the curricula and assessment plans during the fall 2014 and expect to complete it during the spring 2015. During this review, the initial 15 PLO have been reduced to 12 (Appendix E-2) and rubrics (Appendix E-3) were developed for assessment of each PLO. We have developed a matrix of PLO and courses for each curriculum (Appendix E-4) to determine in which courses each of the 12 PLO is introduced, reinforced, and/or demonstrated in the curricula. Sources of direct evidence identified in courses where PLO are demonstrated will be evaluated using the rubrics to determine the performance levels of our graduates. A comprehensive assessment plan is being developed to guide this assessment process over time (Appendix E-5).

In addition to direct evidence from courses, we administer a senior survey to all graduating seniors to obtain indirect evidence of the students’ perceptions of their level of preparation. Periodically we have conducted surveys of former students and employers to evaluate the relevance and effectiveness of our degree programs.

Graduate Program Assessment

The Department assesses learning outcomes for graduate students on an annual basis providing feedback for the Department’s graduate program planning. In 2013, the Department revised this assessment to align with the university student learning outcomes and the College of Agriculture and Life Sciences’ graduate student evaluations. As such, the Department’s graduate student assessment aims to gauge the degree to which graduating master’s and doctoral students demonstrate:

1. Mastery of disciplinary knowledge and skills;
2. Ability to critically analyze disciplinary knowledge;
3. Competence in independent scientific research;
4. Proficiency in communication;
5. Competence in scientific teaching in respective fields; and
6. Engagement in professional activities.

The assessment of each of these student learning outcomes is based on responses from the COALS faculty evaluation and student self-evaluation, given at the conclusion of the final exam (Appendix E-6, Grad Student Evaluation Forms). This assessment lends itself to extension over time, allowing the Department to incorporate direct measures of student learning throughout students’ graduate careers in ESSM, as deemed necessary and appropriate.

This graduate student learning outcomes assessment plan is detailed in Appendix E-7.
6.3 Undergraduate Degrees and Programs

The Department offers five undergraduate degrees, one of which has two options. We therefore conclude that ESSM has a degree/option for any student whose career goal is to comprehensively manage ecosystems (Appendix F). The ESSM Department has two professionally accredited degree programs, Forestry and Rangeland Ecology and Management. These programs are reviewed every 10 years by an outside assessment team from the accrediting organization, Society of American Foresters (accredited in 2013) and Society for Range Management (accredited in 2007).

Our degrees and options are:

6.3.1 B.S. Rangeland Ecology and Management

Rangeland Ecology and Management (RELM), Ranch Management Option (RMO) –
Students majoring in Rangeland Ecology and Management are taught to integrate knowledge and technology in a systems approach to manage land for sustainable utilization of natural resources. Emphasis is placed on conservation and maintenance of biological diversity in wet to arid environments. This option is designed for students preparing for careers in ranch management, land management and agribusiness. It emphasizes management and utilization of rangeland for livestock and wildlife production. It provides excellent preparation for students desiring to obtain a Master of Agriculture degree in ranch management. Employment opportunities are available on private ranches, businesses, and industries supporting ranches, with state and federal agencies and related fields.

Rangeland Ecology and Management (RELM), Rangeland Resources Option (RRO) –
This option is designed for students preparing for careers in the private, state and federal sectors in the area of natural resources conservation and management. It also provides good preparation for graduate study leading to positions in extension, teaching, research, and consulting. It allows maximum flexibility to orient a degree program toward specific career interests. Students are encouraged to develop an emphasis area by selecting 15 hours of directed elective courses in related disciplines. Several emphasis areas exist for specialization. Students are successful in obtaining employment with local, state and federal agencies, energy companies, environmental consulting companies, teaching and related fields.

6.3.2 B.S. Forestry

Forestry (FORS) – The Forestry program prepares students for a wide range of careers or graduate study in the science and management of forest or urban forest ecosystems. The program leads to a B.S. degree in Forestry that is accredited by the Society of American Foresters (SAF). The most recent accreditation was awarded in 2013. The Council for Higher Education Accreditation recognizes SAF as the specialized accrediting body for forestry education in the United States. In addition to the university and ESSM core courses, FORS students take an additional six courses focusing on forest science and management, 9 credits of directed electives and 9 credits of free electives. These hours allow students to place an emphasis in an area of particular interest. Roughly 25% of students currently pursuing an undergraduate degree in Forestry are obtaining a double major, usually within the department (primarily RENR, ECOR or SPSA) but occasionally from another department. The shared departmental core makes this possible. Students are strongly encouraged to complete an internship before graduation. Graduates receive employment with public agencies such as the Texas A&M Forest Service or the U.S. Forest
Service, private forestry companies such as Weyerhaeuser and Plum Creek, conservation groups, municipalities, wood products companies, and many others. TAMU FORS graduates are currently in demand with more companies seeking them out each year.

6.3.3 B.S. Renewable Natural Resources

Renewable Natural Resources (RENR) – This program may be selected by students in any department in the Institute of Renewable Natural Resources (Ecosystem Science and Management; Recreation, Park and Tourism Sciences; and Wildlife and Fisheries Sciences). The curriculum was developed by a joint committee from the IRNR departments. The Renewable and Natural Resources degree is for students with a broad interest in natural resources and ecology, including forestry and associated values such as range and wildland, wildlife, recreation, water, and other environmental sciences. Students may design degree plans emphasizing natural resource management, social and public policy, or biophysical sciences. The RENR program of study is comprised of a core of courses and 24-27 hours of directed electives. The goal of this core/emphasis structure is to provide students with an identity as a renewable natural resources specialist, while concurrently affording the flexibility for preparation for a variety for career tracks. The underlying goal of the RENR degree is to integrate the scientific issues of renewable natural resources. Graduates of this program will be able to articulate these issues verbally and in writing in their chosen career. Therefore, the RENR degree emphasizes verbal presentations and major papers as well as field-oriented activities. The RENR programs are designed to help students prepare for careers in public and private organizations associated with the planning and use of natural resources and the environment. Possible employment includes areas such as multi-use land management, environmental consulting, resource inventory, natural resource planning, law, policy, and land remediation.

6.3.4 B.S. Ecological Restoration

Ecological Restoration (ECOR) – This degree was initiated in 2006. The Ecological Restoration degree prepares students for a career that requires an understanding of the causes of land degradation and strategies for recovery of ecosystems damaged, degraded, or destroyed by natural or human causes. The curriculum focuses on restoration of damaged ecosystems and landscapes, particularly terrestrial, wetland, and riparian systems in diverse settings that span the rural-urban spectrum. This degree combines basic sciences, modern technologies, and contemporary ecological knowledge. Students will develop practical capabilities and gain critical understanding of the interaction of biophysical, socio-economic and political drivers that affect land degradation and restoration through a program that incorporates integrated coursework and an internship with ecological restoration practitioners. Completion of this degree will prepare students to assess the causes of ecosystem degradation and to develop strategies for ecological restoration at multiple spatial scales. Graduates will be equipped for professional careers with environmental consulting companies, governmental and non-governmental land management organizations, and regulatory agencies. This degree program also provides a foundation for students planning to pursue advanced degrees in restoration ecology, disturbed land reclamation, natural resources conservation and management, or related fields.

6.3.5 B.S. Spatial Science

Spatial Science (SPSA) – Initiated in 2004, this degree gives students the knowledge and skills to use computer-based technologies such as Geographic Information Systems (GIS),
Global Positioning Systems (GPS), and Remote Sensing (RS). These technologies help natural and environmental resource managers in mapping geographical features, patterns, changes, and conditions for environmental decision-making, planning, and problem solving purposes. The degree combines a solid background in spatial science and environmental studies to provide students with an advanced knowledge of the spatial sciences, experience in interpretation of aerial photographs and satellite images, as well as a broad understanding of computer applications and database management. Through core coursework in spatial sciences and supporting courses students will learn to utilize the full potential of the spatial sciences in real-world problem solving. From real-time wildfire risk assessment to crime analysis, the spatial sciences are fast becoming an integral part of modern resource management.

6.4 Undergraduate Student Data

The overall student enrollment continues to climb (Figure 8) with the RENR degree growing the fastest. However, there are increases in almost all majors. There is a small dip in RLEM majors due to deliberate purge of underperforming students in 2009-2010. Currently many of our students are taking the opportunity to get second majors and minors as are indicated in Table 7. The number of graduating students reflects enrollment 4 years earlier (Table 8) so we can expect graduation rates to increase starting in about 2016. We strive to recruit high quality students with gender, cultural and ethnic diversity. A large number of our undergraduate students are white males. However, the percentage of woman remains steady at about 20% (Figure 9) with a small but growing percentage of underrepresented minorities (Figure 10). We are pleased that almost 40% of our undergraduate students are the first in their family to attend college (Figure 11).

<table>
<thead>
<tr>
<th>Degree/Option</th>
<th>Major Number</th>
<th>Second Major</th>
<th>Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecological Restoration</td>
<td>32</td>
<td>2</td>
<td>NA</td>
</tr>
<tr>
<td>Forestry</td>
<td>37</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Renewable Natural Resources</td>
<td>84</td>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>Rangeland Ecology and Management, Ranch Management Option</td>
<td>41</td>
<td>1</td>
<td>33</td>
</tr>
<tr>
<td>Rangeland Ecology and Management, Rangeland Resources Option</td>
<td>22</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Spatial Science</td>
<td>34</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>246</strong></td>
<td><strong>21</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>
Figure 8. Enrollment trends in the five majors offered by the Department of Ecosystem Science and Management from 2009 to 2014.

Table 8. The number of students graduating from each undergraduate degree program in the Department of Ecosystem Science and Management, 2009 to 2014.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ECOR</td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>FORS</td>
<td>9</td>
<td>5</td>
<td>10</td>
<td>7</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>RENR</td>
<td>14</td>
<td>17</td>
<td>14</td>
<td>20</td>
<td>21</td>
<td>23</td>
</tr>
<tr>
<td>RLEM</td>
<td>25</td>
<td>25</td>
<td>16</td>
<td>11</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td>SPSA</td>
<td>9</td>
<td>18</td>
<td>15</td>
<td>10</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>57</strong></td>
<td><strong>68</strong></td>
<td><strong>61</strong></td>
<td><strong>51</strong></td>
<td><strong>54</strong></td>
<td><strong>54</strong></td>
</tr>
</tbody>
</table>
Figure 9. Percentage of undergraduate students in the Department of Ecosystem Science and Management by gender.

Figure 10. Percentage of undergraduate students in the Department of Ecosystem Science and Management by ethnicity.
Figure 11. Percentage of undergraduate students in the Department of Ecosystem Science and Management that are not first generation students (Not first), first generation (First) and unknown.

6.5 Financial Support for Undergraduate Students

The ESSM Department has many scholarships available for our undergraduates. We typically present over $166,000 in scholarships to our most outstanding undergraduate students at the Spring awards banquet. These scholarships are available to students in all of our majors, but at varying levels due to donors’ directions when the scholarships were established. Most of these scholarships are awarded based upon academic performance, but some have additional requirements for demonstration of leadership, financial need, and selected area of study. Every ESSM undergraduate is annually invited to apply for scholarships through a common application form. The Senior Academic Advisor sends the request for applications and compiles them and the Undergraduate Programs Committee makes the awards. Development efforts are continuing to build endowment funding to support student excellence. Below is a list of undergraduate scholarships with a brief description of the criteria. After the scholarship name in parentheses is the majors who are eligible to apply for that scholarship and in the second parentheses is the typical amount of each award.

Undergraduate Scholarships

A. D. Folweiler Scholarship (FORS) ($1,200)
Recipients must be a sophomore or higher (in hours) student in good academic standing with at least 24 hours of course work completed at TAMU. The ideal candidate would show character and dedication to the forestry profession, high academic achievement, and financial need. (requires two letters of recommendation and a short statement of financial need)
Bartlett Tree Foundation, Inc. Grant-In-Kind (FORS) ($1,000)
Recipient must be interested in arboriculture. Open to all classifications enrolled full time and in good standing with the university.

Bruce R. Miles Endowed Scholarship (FORS) ($1,500)
Recipient must be a full-time student in good academic standing.

Charles B. & Jean G. Smith, Jr. Endowed Scholarship in Rangeland Ecology & Management (RLEM, RENR, ECOR) ($5,000)
Recipient must enrolled full time and in good standing; include a statement of financial need.

Floyd Collins Memorial Scholarship (RLEM) ($1,000)

Garlyn O. Hoffman Memorial Scholarship in Range Management (ECOR, RENR, RLEM)
Recipient must be a Junior or Senior (in hours) and have a 2.75 or above GPR at TAMU. Criteria will be based on financial need, scholarship and leadership achievements. Must be a U.S. citizen.

Goodrich Jones Memorial Scholarship (FORS) ($1,000)
Recipient will be selected based on outstanding academic ability, integrity and character, professional promise, financial need and scholarship. Recipient must be a junior or senior (in hours), legal resident of Texas and be enrolled full time and in good standing with the university.

International Society of Arboriculture Scholarship (FORS) (1,000)
Recipient must be a full-time Urban Forestry student in good academic standing.

Joseph L. Schuster Leadership in Range Management Scholarship (ECOR, RENR, RLEM) ($1,200)
Recipient must be enrolled full-time student who demonstrates leadership in student clubs, team competition, or other student leadership activities, and maintains a minimum 3.0 GPR at TAMU.

Laverne Addison Endowed Scholarship Fund (FORS, RENR, SPSA) ($2,500)
Recipient must be a full-time student in good academic standing.

Mabern David Humphrey, Jr. ‘50 Endowed Memorial Scholarship (FORS, RENR, SPSA) ($1,000)
Recipient must be a full-time Junior or Senior (in hours) who has completed at least one semester at TAMU. Must be in good academic standing. You must also fill out a continuing student scholarship application found at http://scholarships.tamu.edu/.

Mary & G.G. “Hoot” Gibson’29 Forestry Scholarship (FORS, RENR, SPSA) ($6,000)
Recipient must be a worthy and deserving student enrolled full time and in good academic standing.

Nell S. & A.H. “Fred” Walker’36 Range Science (RLEM) ($2,000)
Recipient must be enrolled full time and have a minimum 2.5 GPR and show financial need.

Range Science Memorial Scholarship (ECOR, RENR, RLEM) ($2,500)
Recipient has to be enrolled full time. Freshman recipients need to be in the upper 25% of their High School Class. Transfer or upperclassmen students must have maintained at least a 2.75 GPR.
Robert R. Rhodes Forestry Alumni Scholarship (FORS) ($1,000)
Recipient must have completed 60 hours by the end of Spring 2008, 10 hours in FORS (included in 60 total), with 24 TAMU hours with a minimum 2.5 GPR on those hours. Must also be a full-time student in good academic standing.

Toby & Barbara C. Hinesley ’81 Endowed Scholarship Fund (ECOR, RLEM, SPSA) ($1,000)
Recipient must be enrolled full-time and in good academic standing. Preference will be given to students with participation in youth/collegiate shooting programs.

Tommy B. & Lucile Jackson Slaughter Foundation No.2 Scholarship (FORS) ($130,000 at $5,000 to $9,000 per student)
Recipients must have completed 28 hours of course work taken at or transferred to TAMU with a minimum 3.0 GPR. Must be enrolled in at least 14 hours in both Fall 2009 Spring 2010 semesters with a 3.0 GPR or better.

Texas Forestry Association, W. Goodrich Jones Scholarship (FORS) ($1,000)
Recipient must be a junior or senior (in hours), and a legal resident of Texas; may receive this scholarship only once. Must be enrolled full time and in good standing with the university. (requires two letters of recommendation and a short statement of financial need)

W. GOODRICH JONES MEMORIAL FORESTRY AWARD (FORS) ($1,200)
Recipient must be an outstanding senior (in hours) enrolled full time and in good standing with the university.

Forrest S. Warren Scholarship (RLEM RMO) ($2,000)
Interest in ranching, and sheep and goat production; the student needs to be a junior or senior

SOUTHLAND PAPER MILLS FORESTRY (FORS) ($4,000)
Recipients must be an outstanding student in Forestry.

6.6 Potential and Planned Changes in the Management, Scope or Direction of the Undergraduate Programs

In 2007, just prior to the 2008 Academic Program Review, the former Departments of Forest Science and Rangeland Ecology and Management merged to form the ESSM Department. The new department had six graduate M.S. and Ph.D. degrees in Forestry and Rangeland Ecology and Management including professional masters in Natural Resource Development and Master of Agriculture. It also had five B.S. degrees. The Forestry Department had Forestry (Management and Urban Forestry options), Spatial Sciences and Renewable Natural Resources. The Rangeland Ecology and Management Department had Rangeland Ecology and Management (Rangeland Resources and Ranch Management options), Ecological Restoration, and Renewable Natural Resources, which is an interdisciplinary degree that was shared by four natural resource departments. We began the process of evaluating how to integrate these varied programs and also to increase our academic efficiency and effectiveness. Details of the processes and changes we have made are documented elsewhere is this self-study.

In March 2012, Dr. Steve Whisenant stepped down as department head and Dr. David Baltensperger (Soil & Crop Sciences Department Head) assumed the role of Interim Department Head until June 2014. Also in 2012, the ESSM Business Assistant took a position in another department, resulting in significant administrative changes for departmental programs. During the past 7 years, a large number of faculty have retired or moved to other positions with very minimal
replacement. During the past two years, we have recruited and hired seven new faculty into the statewide ESSM program and hired a new Department Head, Dr. Katy Kavanagh.

![Figure 12](image)

**Figure 12.** The distribution of faculty ranks in each of the Department of Ecosystem Science and Management undergraduate degree programs.

Another potential change for ESSM relates to faculty demographics. Eight ESSM teaching faculty are eligible or nearly eligible for retirement (Figure 12). They all teach courses supporting the Rangeland Ecology and Management degree program. Together they teach a total of 24 undergraduate courses and 13 graduate courses, not counting 684, 685, & 691 and other variable credit courses. This represents the entire suite of core courses required in the RLEM B.S. degree program and restricted electives for several other departmental degree programs. This is already having impacts on the level of grants and contracts funding in ESSM and the number of new graduate students recruited. As these individuals retire, it will have a tremendous impact on the teaching program, especially the Rangeland Ecology and Management B.S. degree, where this Department has been a world leader for the past 68 years.

In addition, the Sid Kyle endowment fund, which provides critical funding for ESSM programs, has grown dramatically in the past two years. All of this creates significant opportunities for ESSM to plan and implement new initiatives to enhance program excellence. Since our new department head has only been here for 6 months, we are in the initial planning stages for future program directions.

Another potential change in the future would be the construction or availability of space to house the departmental faculty and laboratories in a common area. This department has never been housed together. Currently we are in three major locations and several other minor locations.

### 6.7 Graduate Degrees and Programs

Prior to August 1, 2013, graduate students were able to choose if they wanted to pursue a degree in either Forest Science or Rangeland Ecology and Management (descriptions in Section 6.7.1). After that date, all of our graduate degrees were renamed to Ecosystem Science and Management
to better reflect the identity of our department. Graduate students under the direction of ESSM faculty can also major in one of the interdisciplinary degree programs, including the Peace Corps Masters International Program (MI), Genetics (GENE, M.S. and Ph.D.), Molecular and Environmental Plant Sciences (MEPS, M.S. and Ph.D.), and Water Management and Hydrological Science (WMHS, M.S. and Ph.D.). The ESSM Department also administers or jointly administers four Graduate Certificate Programs in Geographic Information Systems, Remote Sensing, International Agriculture and Resource Management, and Military Land Sustainability (descriptions in Section 6.7.2 and Appendix G).

Table 5 shows the number of graduate students enrolled in each of the ESSM degree programs and the interdisciplinary degree programs from 2009-2013. The mean number of students enrolled during that 5-year period was 88.

<table>
<thead>
<tr>
<th>Degree</th>
<th>Major</th>
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<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
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</thead>
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</tr>
<tr>
<td></td>
<td>RLEM/ESSM</td>
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<tr>
<td><strong>Total enrollment</strong></td>
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<td>87</td>
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<table>
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<tr>
<th>Degree</th>
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<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
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</tr>
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<tr>
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</tr>
<tr>
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<tr>
<td></td>
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<td>1</td>
<td>1</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>WMHS</td>
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<td><strong>16</strong></td>
<td><strong>21</strong></td>
<td><strong>22</strong></td>
<td><strong>27</strong></td>
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6.7.1 Graduate Degrees Offered

In 2007, the Departments of Forest Science and Rangeland Ecology and Management merged to form the ESSM Department. From 2007-2014, the department maintained two sets of graduate degrees: the Master of Science and Doctor of Philosophy in Forestry, and Master of Science and Doctor of Philosophy in Rangeland Ecology and Management, along with the Master of Agriculture in Rangeland Ecology and Management. To better reflect the department’s new identity and the scope of our research and teaching activities, our faculty and graduate students voted to change the names of all graduate degrees to Ecosystem Science and Management. This was done to: (1) bring degree names into alignment with the departmental name in place since the 2007 departmental merger; (2) better reflect to students and prospective employers the department’s current approach of preparing scientists and professionals with the broad, integrative training needed for research and application of knowledge in rangeland, forest, wetland, and urban ecosystems; and (3) enhance grad student recruiting by more effectively portraying how the department affords students with opportunities for attaining strong skills in the science and stewardship of natural and managed ecosystems.

![Percent of students graduated compared to years in the Department of Ecosystem Science and Management. Bars represent ±1 standard deviation.](image)

**Figure 13.** Percent of students graduated compared to years in the Department of Ecosystem Science and Management. Bars represent ±1 standard deviation.

The Texas Higher Education Coordinating Board approved this change in graduate degree names effective August 1, 2013. Here we describe our degree offerings both before and after the degree name changes became effective.

(a) Degrees Offered Between 2009-2013:

**Ph.D. in Rangeland Ecology and Management** – This Ph.D. degree (64 credit hours minimum) is designed primarily for students who are pursuing an academic or research career in natural resources and related fields, with an emphasis on rangeland resources.
Ph.D. in Forestry – This Ph.D. degree (64 credit hours minimum) is designed primarily for students who are pursuing an academic or research career in natural resources and related fields, with an emphasis on forest resources.

M.S. in Rangeland Ecology and Management – This M.S. degree is intended to educate scientists and professionals in research and management in natural resources and related fields, with an emphasis on rangeland resources. It offers a thesis option (32 credit hours minimum) for those who desire a serious research experience and a non-thesis option (36 credit hours minimum) for those who seek a professional career outside of research.

M.S. in Forestry – This M.S. degree is intended to educate scientists and professionals in research and management in natural resources and related fields, with an emphasis on forest resources. It offers a thesis option (32 credit hours minimum) for those who desire a serious research experience and a non-thesis option (36 credit hours minimum) for those who seek a professional career outside of research.

Master of Agriculture (M.Agr.) in Rangeland Ecology and Management – This M.Agr degree (non-thesis, 36 credit hours minimum) is designed for students who want professional graduate training with a management orientation. It provides advanced training in the science and management of rangeland resources, emphasizes the development of problem-solving capabilities, and requires an intensive (minimum six months) professional internship that is designed to provide meaningful, applied, practical experiences.

Master of Natural Resource Development (MNRD) – The MNRD degree (non-thesis, 36 credit hours minimum) is designed for students who want professional graduate training with a management orientation in natural resources. It is intended to emphasize the problem-solving skills involved in the use of science and technology to benefit humanity, not as a research degree. A professional internship is required.

Distance-based Master of Natural Resource Development (MNRD) – The distance-based MNRD degree (non-thesis, 36 credit hours minimum) is designed for working natural resource professionals seeking advanced graduate training. It aims to develop an understanding of the interrelationships among ecology, economics, policy, and culture, as factors that influence natural resource conservation and management. Development of a professional paper in a relevant area of natural resources management is required.

(b) Degrees Offered Effective August 1, 2013:

Ph.D. in Ecosystem Science and Management – The Ph.D. degree in Ecosystem Science and Management(64 credit hours minimum) is designed primarily for students who are pursuing an academic or research career in ecology and/or natural resource management, with an emphasis on forest, rangeland, wetland, or urban ecosystems. Specialization is available within four broad research areas: (i) ecosystem science; (ii) ecosystem management; (iii) genetics, systematics, evolution; and (iv) spatial sciences.

M.S. in Ecosystem Science and Management – The M.S. degree is intended to educate students in the ecology and management of forest, rangeland, wetland, or urban ecosystems. It offers a thesis option (32 credit hours minimum) for those who desire a serious research experience, and a non-thesis option (36 credit hours minimum) for those who seek a professional career outside of research. Specialization is available within four
broad research areas: (i) ecosystem science; (ii) ecosystem management; (iii) genetics, systematics, evolution; and (iv) spatial sciences.

**Master of Agriculture (M.Agr.) in Ecosystem Science and Management** – The M.Agr. degree (non-thesis, 36 credit hours minimum) is designed for students who want professional graduate training with an ecosystem management orientation. It provides advanced training in the science and management of ecosystem resources, emphasizes the development of problem solving capabilities, and requires an intensive (minimum six months) professional internship that is designed to provide meaningful, applied, practical experiences.

**Master of Natural Resource Development (MNRD)** – The MNRD degree (non-thesis, 36 credit hours minimum) is designed for students who want professional graduate training with a management orientation in natural resources. It is intended to emphasize the problem-solving skills involved in the use of science and technology to benefit humanity, not as a research degree. A professional paper in a relevant area of natural resource management is required.

**Distance-based Master of Natural Resource Development (MNRD)** – The distance-based MNRD degree (non-thesis, 36 credit hours minimum) is designed for working natural resource professionals seeking advanced graduate training. It aims to develop an understanding of the interrelationships among ecology, economics, policy, and culture, as factors that influence natural resource conservation and management. A professional paper in a relevant area of natural resource management is required.

**Peace Corps Masters International Program (MI)** – This program is designed to allow a student to complement the coursework for a master’s degree with related overseas service in one of the more than 60 countries where the Peace Corps serves. With departmental approval, a student studying for a degree in any of the College of Agriculture and Life Sciences master’s programs can earn 4-6 credit hours for his/her Peace Corps service toward the 32-36 credit hours required for a master’s degree.

(c) **Intercollegiate Graduate Degree Programs:**

Texas A&M University has established the concept of an intercollegiate faculty with expressed goals of (a) fostering development and communication in disciplinary fields represented by faculty members in different departments and colleges, (b) utilizing faculty expertise in specific areas to strengthen emerging disciplinary programs and (c) overseeing the academic administration of graduate degree programs in a particular discipline.

To have access to an intercollegiate faculty’s degree programs, a graduate student must be admitted to that program and a member of that faculty must serve as chair or co-chair of the student’s advisory committee.

Intercollegiate faculties that currently include faculty members and graduate students from ESSM include: Genetics; Molecular and Environmental Plant Sciences; and Water Management and Hydrological Science.
Genetics (GENE) – The graduate program in genetics is supervised by the Faculty of Genetics, which is composed of faculty from several departments and colleges whose training, teaching and research is in genetics. Research areas represented by this program include biochemical genetics, cytogenetics, developmental genetics, immunogenetics, molecular genetics, population genetics, quantitative genetics, somatic cell genetics, forest genetics, animal breeding and plant breeding. Commonly used experimental organisms include bacteria, viruses and fungi, and many species of higher plants and animals. Degree programs are available leading to M.S. and Ph.D. degrees. Program requirements are determined and supervised by GENE faculty. Degree programs are prepared on an individual basis by the graduate students in consultation with their advisory committee. Students hold appointments, for administrative purposes, in the department of their major professors.

Molecular and Environmental Plant Sciences (MEPS) – The Faculty of Molecular and Environmental Plant Sciences includes faculty members from the Colleges of Agriculture and Life Sciences, Geosciences, and Science and is administered through the Department of Soil and Crop Sciences. Degree programs are available leading to M.S. and Ph.D. degree in molecular and environmental plant sciences. Program requirements are determined and supervised by MEPS faculty. Degree programs are prepared on an individual basis by the graduate students in consultation with their advisory committee. Students hold appointments, for administrative purposes, in the department of their major professors.

Water Management and Hydrological Science (WMHS) - The interdisciplinary graduate water degree program offers a Master of Water Management, a M.S. degree and a Ph.D. degree in Water Management and Hydrological Science. The degrees are designed to prepare students for academic, research and professional careers in water management and science by expanding and deepening knowledge in a primary water discipline while providing an integrated and multidisciplinary perspective on water. Degree programs are prepared by the student in consultation with his or her graduate committee. Courses for the degree program are selected from various departments and colleges as designated by the interdisciplinary water faculty. The graduate program and degrees are administered by an interdisciplinary water faculty whose membership includes faculty from the Colleges of Agriculture, Architecture, Engineering and Geosciences. Program supervision includes a Council of Participating Deans, Program Chair and the interdisciplinary water faculty.

6.7.2 Graduate Certificate Programs

A graduate certification program represents an emphasis area within a particular field, or it could be interdisciplinary and involve several fields. The following graduate certificate programs are administered entirely or in part by the ESSM Department:

Graduate Certificate in Geographic Information Systems (GIS) – This is a joint program administered by the Departments of Ecosystem Science and Management and Geography. GIS technologies are applied to wide-ranging fields with interests in spatially distributed information such as transportation, environmental/resource management, marketing, facility management, healthcare delivery, homeland security, agriculture, and urban planning, among others. This certificate program has been designed to meet the growing demand for qualified individuals in the field. The certificate requires four courses (12 hours), including an introductory, two advanced, and one elective course.
Graduate Certificate in Remote Sensing (RS) – This is a joint program administered by the Departments of Ecosystem Science and Management and Geography. Remote Sensing (RS) technologies are applied to wide-ranging fields such as environmental/resource management, marketing, facility management, agriculture, urban planning, homeland security and intelligence, among others. In addition, the synergistic linkages between RS technologies and Geographic Information Systems (GIS) are rapidly increasing. This certificate program has been designed to meet the growing demand for qualified individuals in this field. The certificate requires four courses (12 hours), including an introductory, two advanced, and one elective course.

Graduate Certificate in International Agriculture and Resource Management (IARM) – This program is available to persons majoring in one of the 17 graduate programs in the College of Agriculture and Life Sciences. It prepares students for an international career in agriculture, life sciences and natural resources, provides opportunities to interact with internationally-focused faculty and students, increases cross-cultural awareness and understanding, and offers a broader understanding of world food and fiber systems and sustainable development. Students select core courses in consultation with their emphasis area which should be primarily international in application and should help them to understand better the processes and context in which agricultural and natural resources systems function. Students are encouraged to direct their subsequent thesis and dissertation research toward issues of international agriculture and resource management.

Certificate in Military Land Sustainability – This is a web-based program that provides students with an understanding of factors that influence natural resource conservation and management of military lands. The program is comprised of coursework in three integrated, multidisciplinary thematic areas of emphasis: land management, policy analysis and development, and cultural competencies and conflict management. The Certificate in Military Land Sustainability can complement existing professional graduate degrees offered in the Departments of Ecosystem Sciences and Management and Wildlife and Fisheries Sciences.

6.8 Improvements in the Graduate Degree Programs

Changed graduate degree names – Following the merger of the Departments of Rangeland Ecology and Management and Forest Science to form ESSM, we had two different graduate degree options: (a) Rangeland Ecology and Management, and (b) Forest Science. To better reflect the name of our new department, faculty and graduate students voted to change the names of our M.S. and PhD. degrees to Ecosystem Science and Management. This request was approved by the Texas Higher Education Coordinating Board effective August 1, 2013.

Created an administrative assistant position for graduate program – In 2011, a new administrative assistant position was created to enhance departmental support for graduate students and faculty. This has improved the management of student advising, academic assessment processes, maintenance of the grad program web site, interaction with and recruitment of potential students, and the flow of information from higher administration to students and faculty.

Developed a new grad student orientation session – In fall 2012, a new graduate student orientation session was developed and is now offered at the beginning of every fall semester. This session familiarizes our student with the organization of our department, highlights important
procedures and milestones within their graduate programs, describes the TAMU Library and its amenities specific to graduate students, and introduces them to the TAMU Career Center to initiate planning for their post-graduate lives.

**Changed admissions processes** – In 2013, we made the deadline dates earlier for student applications to our graduate program. These changes were made to enable us to compete more effectively for the best students against other similar graduate programs in ecology and natural resource management with earlier dates.

**Redesigned and updated graduate program web site** – During 2012-2013, our graduate program web site was thoroughly revised and redesigned in a user-friendly manner to provide essential information for current and prospective students and faculty members.

**Maintained flexibility of grad degree program design** – Although there has been some interest in developing a list of a few prescribed, required courses that all students would be required to take during their degree programs, the consensus of our graduate program committee is that our department needs to remain flexible due to the breadth of research pursuits represented by our graduate student body, which range from the molecular scale to landscape and regional scales, and from sociology to biogeochemistry. Decisions about coursework required by each student will continue to be made by the individual student in consultation with his/her major professor and graduate advisory committee.

**Need to increase attendance at departmental seminar** – Despite efforts to schedule an array of high quality speakers addressing topics of timely interest every semester, graduate student attendance at our weekly seminars has been historically very low. We will be making an effort to try to change that culture and make our seminar series a focal point for weekly departmental interactions.

**Need to promote applications for external fellowships and research funding** – Few of our graduate students make the effort to apply for external graduate fellowships such as those offered by the NSF Graduate Research Fellowship Program and other similar fellowships offered by USDA, DOE, and NASA. In addition, few of our students apply for funding from programs such as the NSF Doctoral Dissertation Improvement Grant program that can help expand the scope and cover some of the costs of their research activities. During the next five years, we will make a deliberate effort to encourage our students to be more proactive in pursuing these funding opportunities. Regardless of their future goals, we view the preparation of proposals as an important process in career development.

6.9 **Methods of Financial Support – Graduate Students**

Nearly all M.S. thesis and Ph.D. students in ESSM are supported by departmental Teaching Assistantships, grant-based Research Assistantships, and/or internal or external graduate fellowships (Table 11). Students enrolled in M.S. non-thesis, M.Agr., and MNRD programs are self-funded and do not receive support from the department.
Table 11. Sources of funding for the Department of Ecosystem Science and Management graduate students, 2011-2013.

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</table>

*Graduate Merit, Graduate Diversity, COALS Excellence, Tom Slick, etc.
**NSF, Schlumberger, SLOAN, National Needs, Sponsored, ABS, etc.
***Personal resources, employer support, G.I. Bill support, outside employment, etc.

The variety of funding sources that support our grad students include:

- **Graduate Fellowships** from department, university, and external funding agencies and foundations have become increasingly significant in graduate student support. The ESSM Department provides matching for selected university-level graduate fellowships (Graduate Diversity Fellowships, Hispanic Leadership Fellowships, and College of Agriculture and Life Sciences Excellence Fellowships) that require matching by department or faculty. Some examples include:
  - **Departmental Fellowships:**
    - **Sid Kyle Graduate Fellowship** – supports students with interests in rangeland ecology and management.
    - **McMillan-Ward Fellowship** – supports students with interests in forest ecology and management.
    - **Dishman-Lucas Fellowship** – supports students with interests in forest ecology and management.
    - **Carder Fellowship** – supports students with interests in ecology and natural resource management in urban ecosystems.
    - **Wascko Fellowship** – supports students with interests in rangeland ecology and management.
o **College of Agriculture and Life Sciences Fellowships:**
  - *Tom Slick Fellowship* – supports Ph.D. students who conducted their research in the state of Texas and who are in their final year of study.
  - *Excellence Fellowship* – intended to foster the recruitment of new M.S. and Ph.D. students.
  - *Louis Stokes Minority NSF Fellowships* – intended to aid in the recruitment of new minority M.S. and Ph.D. students.
  - *Willie Mae Harris Fellowship* – supports Ph.D. students during their final year of study.

o **University Fellowships:**
  - *Graduate Merit Fellowships* – intended to facilitate the recruitment of the highest quality new M.S. and Ph.D. students.
  - *Graduate Diversity Fellowships* – designed to promote the recruitment and retention of new minority M.S. and Ph.D. students.

o **External Fellowships:**
  - *Schlumberger Faculty for the Future Fellowships* - supports women from developing and emerging economies to pursue Ph.D. degrees in STEM disciplines at leading universities worldwide.

- **Grant-based Research Assistantships** are always an essential component of graduate student support. The availability varies with grant acquisitions. With the rapid increase of the cost of supporting graduate students, some faculty have opted to support more postdoctoral fellows and technicians instead of graduate students, for higher efficiency. Sources of funding for these assistantships include NSF, USDA, DOE, NASA, and other federal and state agencies.

- **Teaching Assistantships** – Approximately 10 teaching assistantships derived from departmental graduate program funds are available each long semester. Nearly all of these are used for startup support for new faculty and for matching for selected graduate fellowships that requires departmental matching (e.g., Graduate Diversity Fellowship, Hispanic Leadership Graduate Fellowship, USDA National Needs Fellowships). In addition to receiving financial support, our teaching assistants receive formal training in the art of teaching from the TAMU Office of Graduate and Professional Studies, and from the professor responsible for their assigned courses.
6.10 Increasing the Diversity of the Graduate Student Population

ESSM has a strong desire to improve the diversity of our graduate students and has been making significant efforts toward this end in the last few years. A multi-faceted strategy has been employed to strengthen the recruitment and retention of minority graduate students. In addition, our international student population is a significant portion of our student body and also provides an element of diversity to our department.

Figure 14. Department of Ecosystem Science and Management graduate student enrollment by gender, 2009-2013.

Figure 15. Department of Ecosystem Science and Management graduate student enrollment by ethnic background, 2009-2013.
Table 12. Minority graduate students in Department of Ecosystem Science and Management, 2009-2013.

<table>
<thead>
<tr>
<th>Degree</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ph.D.</td>
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<td></td>
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</tr>
<tr>
<td>Black</td>
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<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
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<td>10</td>
<td>9</td>
<td>9</td>
<td>7</td>
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<tr>
<td>Total Ph.D.</td>
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<td>13</td>
<td>11</td>
<td>11</td>
<td>9</td>
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<tr>
<td>M.S.</td>
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</tr>
<tr>
<td>Black</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Hispanic</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Total M.S.</td>
<td>5</td>
<td>2</td>
<td>6</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Total minority graduate student enrollment</td>
<td>16</td>
<td>15</td>
<td>17</td>
<td>22</td>
<td>17</td>
</tr>
</tbody>
</table>

Table 13. International graduate students in Department of Ecosystem Science and Management, 2009-2013.

<table>
<thead>
<tr>
<th>Degree</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
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<tbody>
<tr>
<td>Ph.D.</td>
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<tr>
<td></td>
<td>7</td>
<td>6</td>
<td>10</td>
<td>12</td>
<td>14</td>
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<tr>
<td>M.S.</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Total international graduate student enrollment</td>
<td>10</td>
<td>12</td>
<td>16</td>
<td>16</td>
<td>15</td>
</tr>
</tbody>
</table>

Recruiting Minority and Women Faculty – During the past 7 years our department has been able to recruit 3 new women faculty members. We view this as an important development since >50% of our graduate student population is women.

Sloan Minority Ph.D. Program – Our department is committed to improving the recruitment, retention, mentoring, and graduation of underrepresented minority doctoral students. To that end, ESSM became a member of the Sloan program in 2007. Since that time, we have recruited 13 Sloan Ph.D. Fellows, and 4 students have graduated.

Departmental Support for Minority Graduate Students – The ESSM Department has provided support for faculty to recruit high-quality minority graduate students. Furthermore, we have provided significant departmental matching (>-$7,000 per fellow per year, two years for Masters and three years for PhD) for university-level Graduate Diversity Fellowships. We have recruited 11 minority graduate students with Graduate Diversity Fellowships and departmental matching between 2009 and 2013.

International Graduate Students – Our international student population has ranged from 10-16 during the period from 2009 to 2013. This represents approximately 15-20% of our overall graduate student body during that interval. Our international students have come from China, India, Sri Lanka, Brazil, Malawi, Kuwait, and Mexico and bring unique experiences and perspectives to our faculty and students.
Collectively, these efforts have resulted in significant improvement in the diversity of our graduate student body, and the total number of minority graduate students has ranged from 15 to 22 during 2009-2013. By comparison, minority enrollment ranged from 3 to 9 students between 2005-2008. We intend to continue this effort to promote diversity in our graduate student body.

6.11 Graduate Students’ Honors

Our graduate students receive a variety of prestigious awards each year, and a few highlights are provided below:

2010-2011
- Dirac Twidwell and Min-cheng Tu received Mills Scholarships for water resource research.
- Christopher Cheleuiite-Nieves, Ilsa Kantola, and Dirac Twidwell received the 2011 Tom Slick Fellowships.
- ESSM graduate students received 8 travel grants for presenting their research at professional meetings in AY10.

2011-2012
- Ph.D. student Marian Higgins received a $75,000 research grant from Houston Advanced Research Center, The Woodlands, TX, Coastal Impacts Technology Program.
- Ph.D. student Jose Franco received at $10,000 grant from the USDA Southern Sustainable Agriculture Research and Education (SARE) program.
- Ph.D. candidate Dirac Twidwell was recognized by his peers in the Ecological Society of America Rangeland Ecology Section with the Excellence in Rangeland Research Award.
- Graduate students gave >40 oral and poster presentations at international professional meetings such as the American Geophysical Union, Ecological Society of America, Society of Range Management and the International Rangeland Congress.
- Graduate students were authors or co-authors of eight refereed articles in journals including the Canadian Journal of Fisheries and Aquatic Sciences, Soil Biology and Biochemistry, and Restoration Ecology and nine non-refereed publications.

2012-2013
- Ph.D. student Jose Franco received $72,000 from the USDA Specialty Crop Block Grant program run through the Texas Department of Agriculture.
- Ph.D. candidate David Toledo won the Judge’s Choice award in the National Science Foundation-IGERT poster and video competition. He also was recognized by his peers with the Best Research Presentation Award at the annual meeting of the Texas section of the Society for Ecological Restoration.
- Ph.D. candidate Matt Berg received the Ecological Society of America Graduate Student Policy Award and Office of International Student Services International Education Scholarship.
- Graduate students gave >20 oral and poster presentations at international professional meetings, such as the American Geophysical Union, Ecological Society of America and Society of Range Management.
- Graduate students were authors or co-authors of ten refereed articles in journals, such as the Canadian Journal of Fisheries and Aquatic Sciences and Journal of Coastal Research.

2013-2014
• Ph.D. candidate Dianne Stroman received the 2013 Association of Former Students’ Distinguished Graduate Student Award for Excellence in Teaching. Dianne also was awarded the College of Agriculture and Life Sciences Dean’s Outstanding Achievement Award for Graduate Teaching.
• Ph.D. student Wenjuan Chen was a member of team that won the Berkeley Big Ideas Competition at the University of California at Berkeley for a project addressing global poverty alleviation.
• Recent Ph.D. graduate David Toledo received the 2013 Association of Former Students’ Distinguished Graduate Student Award for Excellence in Research.
• Ph.D. student Ryan Sheridan won the Paul R. Wolf Memorial Scholarship from the American Society of Photogrammetry and Remote Sensing.
• Ph.D. candidate Matt Berg was runner-up in the Office of Graduate and Professional Studies’ inaugural 3 Minute Thesis competition. Matt also received the Ecological Society of America 2013 Graduate Student Policy Award.
• Ph.D. student Elvis Takow won the City of Houston Open Invitational Hackathon competition with a project on urban land management.
• M.S. student Michele Clark received a Welder Wildlife Foundation research grant for a fire and grazing experiment on the Welder Wildlife Refuge.
• Graduate students gave >20 oral and poster presentations at international professional meetings, such as the American Geophysical Union, Ecological Society of America and Society of Range Management.

6.12 Graduate Student Employment

Based on a sample of our graduate students we have been successful in producing Ph.D. students that are competitive for academic positions (Figure 16). While, the M.S. degree is producing students well suited for state and federal agencies and the private sector as well as Ph.D. students.

![Employment data from a sample of 51 graduate students graduating from the Department of Ecosystem Science and Management, 2009 to 2013. MNRD is the professional Masters of Natural Resources Development degree. The Academic category includes Post-doc and Assistant professor positions; additionally, Agency includes non-profits.](image-url)
7.0 Concluding Observations

In closing we would like to make one more request of this committee. The Department has the resources to make transformational changes and we would appreciate a candid assessment of where these resources would be most effective. Below is a draft plan for these funds that represents a strong linkage to the strategic action items in Section 2.0.

Meeting our Vision and Mission through strategic investments
Currently the Department manages over 15 million dollars in endowments for undergraduate scholarships, graduate assistantships, two professorships, student leadership and research.

This total includes the recent additions to the Sid Kyle Memorial Endowment in Arid and Semi-Arid Land Studies. This endowment is currently at 12.7 million dollars and the annual amount to be invested in arid and semi-arid land studies is approximately $550,000.00. This amount fluctuates slightly based on withdrawal to pay the endowment fee and interest rates. The recent surge in the endowment corpus funds is due to oil and gas lease payments and royalties. Depending on oil and gas prices, the amount of funds flowing into the endowment should continue to rise albeit at a slower rate relative to the past three years.

Guiding principles for strategic investments
- Honor the guidelines set forward by the donors
- Where possible focus resources-don't dilute across too many tasks
- Leverage but do not replace existing resources
- Be transformative and novel
- Maintain some degree of flexibility to deal with unforeseen issues

Strategic investments in faculty support
1) To make faculty more productive and more competitive for systems/ecosystems understanding and process-based science major grant opportunities.
   a. To accomplish this we will attract highly qualified graduate students and post-doc scientists by offering competitive stipends and salaries while assuring funding for the appropriate number of years.
   b. We will invest in field research facilities that span major environmental gradients and provide field/lab equipment to focus on major long-term ecosystem science research questions relative to Texas and beyond.
      i. LaCopita, Vernon, Sonora, Brady, San Angelo, Sid Kyle lands in Loving County are possible sites.
   c. We will provide faculty travel and summer salary competitive support to conduct research focused on our long-term research sites.
   d. Develop a major department-wide research focus that will provide a framework for these efforts.
   e. Provide infrastructure for faculty to participate in major national research campaigns.
2) To develop a better integrated faculty and staff where knowledge and information readily flows across all levels by developing a culture that fosters and rewards interaction and collaborations.
   a. Create graduate assistantships were joint off and on campus faculty participation as co-chairs or committee membership is required.
   b. Create a competitive grant program for Extension faculty to improve the translation of process-based science findings into decision-making frameworks.
   c. Provide reliable funding for off-campus faculty to travel to national meetings.

**Strategic investments in our academic programs**

1) To lead natural resource programs in realizing the values of a systems/ecosystems understanding and process-based practices in natural resources education and management.
   a. Hire faculty capable of leading in the development of process-based practices in their research and in the course materials that they will present. There is a need for a better balance of faculty demographics in the Range program. Since the focus of Sid Kyle funds is on arid and semi-arid land studies we will use these funds to attract top faculty focusing on semi-arid and arid ecosystems at the assistant and associate level that can contribute to teaching in the RLEM UG program. These new faculty will be supported on Sid Kyle funds temporarily thus allowing overlap with existing senior faculty before their retirement.

2) To prepare undergraduate and graduate students who are competitive for leadership roles in an evolving future in natural resources decision-making.
   a. Establish a fund to support travel to professional meetings, allowing more students to present and attend.

3) Be recognized for quality graduate students who are trained to be better educators and researchers.
   a. Establish a consistent fund to support travel to professional meetings, allowing more students to present and attend.

4) Maintain the proper balance between science & management.
   a. Fund instructors with some management experience to teach UG courses that focus on management.
   b. Fund an extended field course that highlights the interactions between process-based science and management.
   c. Develop field-based teaching and research facilities that provide high impact experiences for students and faculty and will provide a key link with the on-campus facilities. Field sites will provide a more seamless transition between teaching and research and give students long-term access to more real-world experiences and demonstrations.
Texas A&M University

Department of Ecosystem Science and Management

Academic Program Review
Self-Study Document
January, 2015

List of Appendices

Appendix A – Departmental Response to the 2008 External Review
Appendix B – Curriculum Vitae
Appendix C – Faculty Qualifications
Appendix D – Syllabi
Appendix E – Assessments
Appendix F – Undergraduate Handbook
Appendix G – Graduate Handbook
17 July 2008

TO: Dr. Robert C. Webb, Interim Dean of Graduate Studies

THROUGH: Dr. Ann Kenimer, Interim Executive Associate Dean, College of Agriculture and Life Sciences

FROM: Dr. Steve Whisenant, Department Head

REGARDING: Department’s Response to Total Academic Program Review’s Recommendations

The external review team, appointed by the Office of Graduate Studies, conducted the Total Academic Program Review of the Department of Ecosystem Science and Management during an April 28 – 30, 2008 visit to Texas A&M University. The review team was comprised of members from Iowa State University, University of Arizona, University of Minnesota, and The Ohio State University. Review team members were Deans, Directors, and Department Heads from top-ranked natural resource departments, schools, and colleges. They had administrative experience with diverse academic programs, similar to the Department of Ecosystem Science and Management (ESSM). Two of the four members had lead recently merged departments. We believe their unique combination of experience and academic excellence lead to recommendations that will help guide ESSM toward a productive future.

The recommendations and our response are listed on the following pages.
Reviewer's recommendation

ESSM response

1. **Faculty in ESSM should be brought together in close proximity.**
   
   We agree. The physical separation of faculty, staff, and students into seven widely dispersed buildings is a major impediment to improving the efficiency and intellectual synergy made possible by the merger of the departments of Forest Science and Rangeland Ecology & Management. This physical separation reduces operational efficiency and hinders the creation of a common corporate culture within the department.

2. **Plan for continued growth in the Spatial Sciences (SPSA) major and course demand.**
   
   We recognize the importance of spatial sciences and believe this program has the opportunity for continued growth. This collaborative program with the Department of Geography continues to be a priority. Our SPSA graduates have multiple employment opportunities with professional growth potential.

   Our most recent faculty hire is contributing to our spatial science teaching and research programs. Continued growth in the spatial sciences is a departmental priority.

   Currently, our ability to develop the spatial science academic program is limited by classroom space and software licensing for our Geographic Information System and Remote Sensing classes. Texas A&M University could improve this situation for the entire university by offering university-wide software licensing for important GIS and remote sensing applications. This allows classes to be held in more classrooms and reduces the need for individual departments to provide a specific facility with appropriate software licensing for students to work on class projects requiring specialized software. Many other universities take this approach to software licensing, often through their university libraries.

3. **The department should rethink how it presents its strengths and programmatic areas.**
   
   ESSM will change its marketing strategy and presentation of academic and research programs to the public, particularly to prospective undergraduate and graduate students. We will emphasize our priorities as ecosystem science and ecosystem management. All our programs will be described as contributing toward those two strategic objectives. For example, the spatial sciences represent a significant strength and focus with elements of both discovery (ecosystem science) and translational research and education (ecosystem management).

4. **For at least the next four years, continue portfolio of five B.S. degrees. Monitor enrollment and employment of those students. Align resources and strengths to meet societal and student needs.**
   
   We agree. ESSM will continue to support and promote each of the existing B.S. degrees. During the next five years we will assess the viability and strategic role of each degree program. Ultimately, the necessary changes, reductions, or combinations deserve careful examination and strategic planning.

   Two of our five B.S. degrees are shared with other departments. The Renewable Natural Resources B.S. degree is shared with the Department of Wildlife and Fisheries Sciences and the Department of Recreation, Parks, and Tourism Science. The Spatial Sciences B.S. degree is shared with the Department of Geography.
5. Combine the existing graduate degrees in Forestry and Rangeland Ecology & Management into a single in Ecosystem Science and Management graduate degree.

A graduate degree name reflecting the central focus of a department contributes to the identity, recognition, and success of an academic department. Most of the ESSM faculty and graduate students agree with the Academic Program Review team’s recommendation of seeking graduate degrees in Ecosystem Science and Management. We will begin coordinating with related departments across campus as we develop our proposal to pursue these degrees.

6. Build additional collaborative relationships across campus to enhance capacity for research and instruction in human dimensions of ecosystem science and management.

We recognize there are significant opportunities across Texas A&M University to enhance our capacity and collaboration in collaborative decision-making, regional planning, economics, sociology, business, and other critical areas of ecosystem management. We are developing departmental strategies to strengthen existing collaborations and identify promising new collaborations. ESSM will organize a human-dimensions seminar series during Spring 2009 to build and develop new relationships with appropriate faculty in other departments. We may ultimately consider team-teaching relevant courses, joint appointments, and other, less formal linkages across colleges and departments involved in human dimensions research and education relevant to ecosystem science and management.

7. The university should better integrate its environmental science programs.

We agree that environmental science programs at Texas A&M are fragmented, uncoordinated, and under-achieving. Environmental science programs at many peer institutions are strong and actively growing because they are more coordinated, focused and actively promoted. Texas A&M University has great individual and departmental strengths in the environmental sciences, located across several colleges. Collectively, the environmental science academic program has achieved little of its potential.

8. Assign administration of the environmental sciences B.S. to ESSM.

ESSM did not suggest this to the review team. Although we plan to participate in the environmental sciences program, simply assigning it to a single department is unlikely to accomplish much. This problem deserves a less fragmented, more coordinated university-wide approach that is beyond the ability of a single department.

9. ESSM should continue to increase gender/ethnic diversity of faculty.

This is an ongoing priority for ESSM and improving our gender/ethnic diversity will continue to be a priority in future faculty hires. However, change through attrition is slow. University initiatives, such as the faculty reinvestment program, that fund new positions for productive and diverse faculty provide the opportunity for rapid change. The continued availability of these opportunities is beneficial.

10. The University should further invest in newly recruited faculty.

We agree and believe retention of the best faculty, of all academic ranks, is vitally important to the University.

11. ESSM should develop strategies to showcase the work of women and minority faculty from other institutions through mechanisms that include mechanisms to facilitate mentoring and network-building opportunities, such as an annual colloquium.

ESSM will use our departmental seminar series as an ongoing forum to showcase women and minority faculty. We will increase opportunities for faculty and students to interact with invited seminar speakers, providing a mechanism for developing external mentoring and
networking opportunities. ESSM will continue to provide support for our faculty and students participating in the Women in Science and Engineering (WISE) activities.

We believe an annual colloquium, such as that suggested by the review team, has merit but is beyond the capacity of an individual department. Texas A&M might consider sponsoring this activity for the university community. ESSM would be an active supporter and participant.

12. Outcome assessment should be monitored and used to improve courses, curricula and other learning experiences.

ESSM has developed learning outcomes for each degree program. We are also developing outcome objectives and assessment protocols for each course. By December 2008 we will be collecting data on our programs with the objective of guiding future changes in curricula, courses, and instructional methods.

13. University administrators should recognize the real, short-term costs associated with departmental mergers, and provide additional support for staff and faculty working on joint activities.

Building

Patience

New graduate degree

Seed funds for increasing collaborative research between the two former departments.

14. Begin work immediately with the Texas A&M Foundation to initiate a strategic development effort to increase gifts and unrestricted funds for the new department focusing on work not traditionally associated with the two previous departments.

We are working with the Texas A&M Foundation to develop new initiatives as well as continuing our ongoing activities. We are building and expanding our interactions with potential donors not previously familiar with our department. The Texas A&M Foundation can assist us make those new connections, but this effort will require additional departmental emphasis on establishing and maintaining those relationships.

15. ESSM should investigate establishing a field research and teaching park adjacent to campus as a living laboratory for ESSM and allied departments.

We agree that ESSM has a unique opportunity by using the “Ecology and Natural Resources Teaching Area” as the basis for developing a living laboratory focused on research and education. Two members of ESSM (1 faculty and 1 staff) recently visited The Ohio State University and the Olentangy River Wetland Research Park, which has successfully attracted both competitive research funding and endowment donations. This visit initiates our planning for a major research, education, and endowment campaign directed at creating a research park – tentatively called the “White Creek Ecosystem Research Park.”

16. Recruitment and retention of PhD students in the new department should accelerate in 5 years to a steady state rate of 10 to 15 PhD’s awarded annually.

ESSM is currently awarding 3 to 5 PhD degrees each year (7 so far in 2008). Increasing PhD’s awarded by 3X will be very difficult, but we agree it is a worthy goal for the next 6 to
Achieving this goal requires three changes: (1) departmental policies and expenditures must increase incentives for faculty to recruit and select PhD students over masters students, technicians, or post doctoral assistants; (2) ESSM faculty must acquire more contract and grant support for PhD students; and (3) TAMU and college support for ESSM graduate programs must be increased.

Most PhD students take 4 years to finish. Awarding 15 PhD’s per yr would require at least 60 PhD students (currently 26 in ESSM). This 2X increase in PhD students cannot be funded with current resources. We receive $110,900 / year from TAMU for graduate assistantships and $52,000 / yr for Graduate Program Enhancement Funds (GPEF). These fringe-bearing accounts can pay fewer than 8 PhD students minus the GPEF used to actually enhance the graduate program.

Although ESSM will increase the incentives for educating the number of PhD students, departmental policies that dramatically reduce faculty decision-making options would be counter-productive. Masters level graduates play an important role in government, non-governmental, and industry professions. Technicians, Research Associates, and Post-doctoral Assistants are often more economical and productive than graduate students. Thus, we must seek a balance between increasing the number of PhD students, producing MS graduates, and damaging faculty research productivity.

ESSM faculty support PhD students in Genetics, Molecular and Environmental Plant Sciences and the Water and Hydrologic Sciences programs. These degrees have not counted toward our PhD degrees awarded total, but benefit Texas A&M University and ESSM. We do not want to create departmental policies that limit those options for faculty and students.

17. Before embarking on a professional masters degree, develop a business plan that ensures necessary cash flow without redirecting scarce resources from primary scholarly programs.

The review team indicated that our pursuit of too many major initiatives would limit our effectiveness in all of those objectives. In order to focus on fewer priorities, we are reconsidering and delaying our pursuit of a separate professional masters degree (such as Masters of Ecosystem Management). We believe this professional masters degree presents significant opportunities for ESSM. However, our focus for the next few years will be on increasing the quality and size of our doctoral program and continuing our ongoing distance education efforts.

Over the last 15 months, ESSM has developed online versions of ten graduate classes for the Master of Natural Resources Development degree. The distance MNRD is also offered by the Department of Wildlife and Fisheries Sciences. Our combined online course portfolio offers greater opportunities for MNRD students to create degree plans for their unique career goals. The initial response to our online MNRD has been impressive, with 8 new graduate students registering for this degree in ESSM in the last 5 weeks.
Appendix B – Curriculum Vitae
Jay Angerer

Academic Rank: Assistant Professor
Specialization: Agroecological Modeling and Rangeland Ecology
Appointment Basis: 12-month

Academic Education Background
Ph.D. (Rangeland Ecology and Management), Texas A&M University, College Station, TX, May 2008
M.S. (Range Science), Texas A&M University, College Station, TX, 1991
B.S. (Range Management), Texas Tech University, Lubbock, TX 1986

Professional and Research Experience
Aug. 2008 to present Assistant Professor, Texas A&M AgriLife Research, Blackland Research and Extension Center, Temple, TX
Mar. 2006 to Jul. 2008 Research Scientist, Dept. of Ecosystem Science and Management, Texas A&M University, College Station, TX
May 1998 to Feb. 2006 Assistant Research Scientist, Dept. Rangeland Ecology and Management, Texas A&M University, College Station, TX
Jan. 1992 to May 1992 Adjunct Faculty Member, North Harris Montgomery Community College District, Houston, TX
Sep. 1998 to Jun. 1992 Research Associate, Dept. Rangeland Ecology and Management, Texas A&M University, College Station, TX

Teaching Experience
Jan. 1992 to May 1992 Adjunct Faculty Member, North Harris Montgomery Community College District, Houston, TX

Dates of Appointment and Promotions at Present Institution
Aug. 1, 2008 Assistant Professor, Texas A&M AgriLife Research, Blackland Research and Extension Center, Temple, TX

Publications (last five years)


Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)
Grazing Management Systems, Inc. – Consulting related to development of insurance products on rangelands for USDA’s Risk Management Agency
United Nations Food and Agriculture Organization – Development of guidelines document for national forage and feed inventories on rangelands
Society for Range Management, Texas Section. Technical Publication Award. October 2012
Review Panelist for US Department of Agriculture (USDA) grants program

Membership and Offices Held in Professional Organizations
Member, Society for Range Management and Ecological Society of America

External Grants and Other Research Funding (last five years)
Technical Assistance on the Conservation Effects Assessment Project (CEAP). Year Ten Continuation of 68-7482-8-383. United States Department of Agriculture, Natural Resources Conservation Service. $590,725. (Co-PI with Tom Gerik)
Impacts of Crop Rotation on Nutrient Management and Sustainability Performance. United Soybean Board. $228,070. Mar. 2011 to June 2014 (Co-Pi with T. Gerik)
R. James (Jim) Ansley

Academic Rank: Professor
Specialization: Rangeland Ecology, Woody Plant Management
Appointment Basis: 12-month

Academic Education Background
Ph.D., Agronomy, University of Wyoming (1983)
M.S., Range Science, Utah State University (1979)
B.A., Biology, Hastings College (Nebraska) (1975)

Professional and Research Experience
2004-present  Professor, Texas AgriLife Research, Vernon, TX
1998-2004  Associate Professor, Texas Agriculture Experiment Station, TX
1994-1998  Assistant Professor, Texas Agriculture Experiment Station, Vernon, TX
1983-1993  Postdoctoral Research Associate, Texas Agriculture Experiment Station, Vernon, TX

Teaching Experience
2004-present  Professor, Texas AgriLife Research, Vernon, TX
1998-2004  Associate Professor, Texas Agriculture Experiment Station, TX
1994-1998  Assistant Professor, Texas Agriculture Experiment Station, Vernon, TX

Publications (2010-2014)


**Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (2010-2014)**

Regents Fellow Service Award, Texas A&M AgriLife Research, College Station, TX, 2014

Associate Editor, Rangeland Ecology and Management Journal (term 2014-2016)

Director, Texas Section Society for Range Management (term 2013-2015)

Best Popular Article, Texas Section Society for Range Management, 2012

Best Technical Journal Article, Texas Section Society for Range Management, 2011
David N. Appel

Academic Rank: Department Head and Professor
Specialization: Tree and small fruit disease biology, epidemiology and control
Appointment Basis: 12-month

Academic Education Background
Ph.D., Plant Pathology, Virginia Tech University, 1981
M.S., Plant Pathology, West Virginia University, 1976
B.A., Plant Pathology, West Virginia University, 1973

Research and Extension Appointments
2009-present  Associate Department Head, Extension, Texas A&M University (TAMU)
2001-2002  Interim Department Head, Texas A&M University (TAMU)
1990-2006  Associate Department Head, Academics, Texas A&M University (TAMU)
1989-1990  Interim Department Head, Texas A&M University (TAMU)
1995-present  Professor and Extension Specialist, Texas A&M University (TAMU)
1987-1995  Associate Professor, Texas A&M University (TAMU)
1981-1987  Assistant Professor, Texas A&M University (TAMU)
1976-1980  Research Assistant, Plant Pathology, Virginia Tech
1975-1976  Research Assistant, Plant Pathology, West Virginia University

Teaching Appointments
1995-present  Professor, Texas A&M University (TAMU)
1987-1995  Associate Professor, Texas A&M University (TAMU)
1981-1987  Assistant Professor, Texas A&M University (TAMU)

Dates of Appointment and Promotions at Present Institution
Aug. 1, 2001  Associate Professor (initial appointment), Department of Forest Sciences, TAMU
Sept. 1, 2006  Tenured, Department of Ecosystem Science and Management, TAMU
Sept. 1, 2008  Promoted to Full Professor, Department of Ecosystem Science and Management, TAMU

Publications (last five years)

External Grants and Other Research Funding (last five years)
Streamside Survey for Phytophthora ramorum in Texas (Sudden Oak Death), US Forest Service, Forest Health Monitoring
Epidemiology and Control of Pierce’s Disease of Grapes, USDA APHIS/PPQ
Upper Gulf Coast Survey for the Asian Citrus Psyllid, USDA APHIS/PPQ
Solutions for Control of Cotton Root Rot in Commercial Vineyards in Texas, Texas Department of Agriculture
Classes Taught (last five years)
PLPA 301 Plant Pathology
ESSM 307 (FRSC 307) Forest Protection
BESC 481 Seminar
Anna R. Armitage  
Departments of Marine Biology and Ecosystem Science and Management  
Texas A&M University • 200 Seawolf Parkway • Galveston, TX 77553  
Tel (409) 740-4842 • Fax (409) 740-5001 • armitaga@tamug.edu  
http://www.tamug.edu/armitage • http://marshdispatch.blogspot.com/  

Academic Rank:  Associate Professor  
Specialization:  Coastal and wetlands ecology  
Appointment Basis:  9 month  

Academic Education Background  
Ph.D., Biology, University of California, 2003  
B.S., Marine Biology, University of California, 1995  

Professional and Research Experience  
2012-Present  Associate Professor, Department of Marine Biology, TAMUG  
2006-2012  Assistant Professor, Department of Marine Biology, TAMUG  
2007-Present  Adjunct Faculty, Dept. of Biol. and Biochem., University of Houston  
2007-Present  Graduate Faculty  
• Marine Biology Interdisciplinary Program, TAMU-TAMUG-TAMUCC  
• Dept. Marine Sciences, Marine Resources Management Program, TAMUG  
• Department of Ecosystem Science & Management, TAMU  
2003-2006  Postdoctoral Research Associate, Southeast Environmental Research Center and Department of Biological Sciences, Florida International University  

Teaching Experience  
Undergraduate courses taught  
Coastal Plant Ecology (MARB 430)  
Seminar in Marine Biology: Communication in the Scientific Community (MARB 482)  
Directed Independent Study (MARB 491)  

Graduate courses taught  
Professional Development (MARB 610)  
Coastal Plant Ecology (MARB 654)  
Ecosystem Processes in Marine Environments (MARB 640)  
Southeastern Wetland Ecosystems Field Trip (MARB/RLEM 689)  
Seminar: Readings in Ecology (MARB/ESSM 689)  
Directed Independent Study (MARB/ESSM 691)  

Current graduate students:  
Chair:  3 PhD, 1 MS  
Committee member:  10 PhD, 4 MS  

Graduate degrees awarded:  
Chair:  4 MS  
Committee member:  2 PhD, 2 MS  

Undergraduate scholars (students in REU, Honors, or other scholarship programs who produced a senior thesis, presented a poster at a scientific conference, or co-authored a journal article): 8  
Postdoctoral fellows advised: 3
Publications (2010-2014)


Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)

Executive board:
- Galveston Bay Foundation: Board of Directors

Review panels:
- Maryland Sea Grant Omnibus 2009-2011
- Virginia Sea Grant 2012-2014 Coastal and Marine Science RFP
- Maryland Sea Grant 2014-2016 Technical Review Panel

Editorial service:
- Academic Editor for PLOS ONE; 10 manuscripts handled in 2014
- Review Editor for Frontiers in Marine Ecosystem Ecology; 1 manuscript handled in 2014

Journal reviews (57 in the last 48 months):
American Midland Naturalist; Aquatic Biology; Bulletin of Marine Science; Ecological Engineering; Ecology; Ecosystems; Estuaries and Coasts; Functional Ecology; Global Change Biology; Gulf and Caribbean Research; Hydrobiologia; Hydrological Sciences Journal; Journal of Experimental Marine Biology and Ecology; Marine Ecology Progress Series; Marine Pollution Bulletin; Oikos; PLOS ONE; Restoration Ecology; Wilson Journal of Ornithology

Proposal reviews (11 in the last 48 months):
New York Sea Grant 2013; National Science Foundation Biological Oceanography program; National Oceanic and Atmospheric Administration, National Marine Fisheries Service, and National Science Foundation – Comparative Analysis of Marine Ecosystem Organization (CAMEO) Program; National Oceanic and Atmospheric Administration Center for Sponsored Coastal Ocean Research – Coastal Hypoxia Research Program; Maryland Sea Grant Omnibus 2011-2012 pre-proposals; Maryland Sea Grant Omnibus 2011-2012 full proposal; Virginia Sea Grant; National Science Foundation CAREER program

Membership and Offices Held in Professional Organizations

Professional society memberships
- Association for the Sciences of Limnology and Oceanography
- Coastal and Estuarine Research Federation
- Ecological Society of America
- Gulf Estuarine Research Society

Other professional organizations
- Research Affiliate, Institute for Sustainable Coastal Communities, TAMUG
- Research Fellow, Center for Texas Beaches and Shores, TAMUG
- Core faculty member, Ecology and Evolutionary Biology faculty at TAMU-College Station
- Collaborator, Florida Coastal Everglades Long Term Ecological Research Program
- Member, Marine Biology Interdisciplinary Program graduate faculty
<table>
<thead>
<tr>
<th>Year</th>
<th>Agency</th>
<th>Title and Role</th>
<th>Total Award</th>
<th>Allocation</th>
<th>Award Period</th>
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<tbody>
<tr>
<td>2014</td>
<td>TCEQ</td>
<td>Mangrove restoration in Galveston Bay: ecological benefits and effective restoration techniques. (as PI)</td>
<td>$138,518</td>
<td>$138,518</td>
<td>10/14-5/16</td>
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<tr>
<td>2014</td>
<td>TX Sea Grant</td>
<td>Mangroves are invading Texas salt marshes: what are the consequences? (as Co-PI)</td>
<td>$259,321</td>
<td>$87,321</td>
<td>2/14-1/16</td>
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<tr>
<td>2013</td>
<td>TX GLO (Oil Spill R&amp;D)</td>
<td>Identifying compensatory restoration techniques that maximize wildlife recovery in coastal wetlands. (as PI)</td>
<td>$405,779</td>
<td>$304,334</td>
<td>9/13-8/15</td>
</tr>
<tr>
<td>2013</td>
<td>TX GLO (CMP)</td>
<td>Maximizing the ecological value of coastal wetland restoration: comparisons among restoration techniques. (as PI)</td>
<td>$100,000</td>
<td>$100,000</td>
<td>10/13-3/15</td>
</tr>
<tr>
<td>2012</td>
<td>TX Sea Grant</td>
<td>Mangroves invading Texas salt marshes: Does it matter? (as Co-PI)</td>
<td>$296,600</td>
<td>$118,502</td>
<td>2/12-1/14</td>
</tr>
<tr>
<td>2011</td>
<td>NASA</td>
<td>Examining the relationships between land use change, wetland alteration, and carbon sequestration in the Gulf of Mexico. (as Co-PI)</td>
<td>$399,857</td>
<td>$99,964</td>
<td>7/11-6/14</td>
</tr>
<tr>
<td>2010</td>
<td>TX GLO (CMP)</td>
<td>Identifying ecologically effective wetland restoration techniques in coastal wetlands. (as PI)</td>
<td>$120,465</td>
<td>$90,348</td>
<td>10/10-4/12</td>
</tr>
</tbody>
</table>
Thomas W. Boutton

**Academic Rank:** Professor  
**Specialization:** Biogeochemistry, soil ecology  
**Appointment Basis:** 10-month appointment

**Academic Education Background**  
B.A., Biology, St. Louis University, 1973  
M.S., Biology, University of Houston, 1976  
Ph.D., Botany, Brigham Young University, 1979

**Professional and Research Experience**  
2011-present  
Associate Department Head for Graduate Programs, Department of Ecosystem Science and Management, Texas A&M University, College Station, TX

1994-present  
Regents Professor and Texas AgriLife Senior Faculty Fellow, Department of Ecosystem Science and Management, Interdisciplinary Program in Ecology and Evolutionary Biology, and Faculty of Molecular and Environmental Plant Sciences, Texas A&M University, College Station, TX

1987-1994  
Associate Professor, Department of Ecosystem Science and Management, and Faculty of Molecular and Environmental Plant Sciences, Texas A&M University, College Station, TX

1985-1987  
Research Assistant Professor, Stable Isotope Laboratory, USDA/ARS Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine and Texas Childrens Hospital, Houston, TX

1983-1985  
Research Instructor, Stable Isotope Laboratory, USDA/ARS Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine and Texas Childrens Hospital, Houston, TX

1982-1983  
Postdoctoral Fellow, Stable Isotope Laboratory, USDA/ARS Children's Nutrition Research Center, Department of Pediatrics, Baylor College of Medicine and Texas Childrens Hospital, Houston, TX

1981-1982  
Visiting Assistant Professor, Department of Biology, Augustana College, Sioux Falls, SD

1980-1981  
Postdoctoral Fellow, Department of Biology, Augustana College, Sioux Falls, SD, and Department of Botany, University of Nairobi, Nairobi, Kenya

**Teaching Experience**  
1988-present  
ESSM 600 – Principles of Ecosystem Science and Management

1988-present  
ESSM 622 – Biogeochemistry of Terrestrial Ecosystems

1996-1998  
ESSM 681 – Graduate Seminar in Ecosystem Science

2013-present  
ESSM 689 – Isotope Applications in Biosphere Science

1990-1993  
RENR 205 – Fundamentals of Ecology

**Dates of Appointment and Promotions at Present Institution**  
2011  
Associate Department Head for Graduate Programs, Department of Ecosystem Science and Management, Texas A&M University, College Station, TX

1994  
Regents Professor and Texas AgriLife Senior Faculty Fellow, Department of Ecosystem Science and Management, Interdisciplinary Program in Ecology and Evolutionary Biology, and Faculty of Molecular and Environmental Plant Sciences, Texas A&M University, College Station, TX
Publications (2010-2014)


**Off-campus Consulting, Other Professional Activities, Special Honors and Recognition (2010-2014)**

Outstanding Graduate Teacher: Department of Ecosystem Science and Management, Texas A&M University, 2014

Graduate Faculty Member: Texas A&M University at Kingsville, 2013-present

Session Co-Organizer and Co-Chair: “Global Change and the Biogeochemistry of Dryland Ecosystems,” annual meeting of the American Geophysical Union, 2012


Committee Member: NEON Domain Science and Education Coordination Committee, Southeastern Region, 2009-present

Graduate Faculty Member: Purdue University, Department of Earth, Atmospheric, and Planetary Sciences, 2009-2014

Faculty Mentor: Sloan Foundation Minority Ph.D. Program, 2007-present

Faculty Mentor: Hispanic Leadership Program in Agriculture and Natural Resources, 2007-2013

Advisory Panel Member: National Science Foundation, Washington, DC, 2008-2011

Executive Committee Member: Program in Ecology and Evolutionary Biology, Texas A&M University, 2006-2011

Senior Faculty Fellow, Texas A&M AgriLife Research, 2010

**Major Professional Self-improvement Activities (past 10 years)**

Visiting Scholar: Department of Earth and Atmospheric Sciences, Purdue University, West Lafayette, Indiana, 2006.

**External Grants and Other Research Funding (2010-2014)**


Boutton TW, Scott A. 2010-2013. Soil carbon storage and dynamics in the western Gulf Coastal Plain as impacted by forest management. *U.S. Forest Service Cooperative Agreement* (I0-CA-11330124-093) ($25,000).


David D. Briske

Academic Rank: Professor
Specialization: Rangeland Ecology
Appointment Basis: 10-month

Academic Education Background
Ph.D., Rangeland Ecology, Colorado State University, 1978
B.A., Botany, North Dakota State University, 1973

Professional and Research Experience
2004-present  Member, Ecology and Evolutionary Biology Program, Texas A&M University (TAMU)
1991-present  Professor, Department of Ecosystem Science and Management, Texas A&M University (TAMU)
1983-1991  Associate Professor, Department of Range Science, Texas A&M University (TAMU)
1983-present  Member, Interdisciplinary Faculty of Molecular and Environmental Plant Sciences, Texas A&M University (TAMU)
1978-1983  Assistant Professor, Department of Range Science, Texas A&M University (TAMU)
1974-1977  Graduate Research Assistant, Colorado State University

Teaching Experience
1991-present  Professor, Department of Ecosystem Science and Management, Texas A&M University (TAMU)
1983-1991  Associate Professor, Department of Range Science, Texas A&M University (TAMU)
1978-1983  Assistant Professor, Department of Range Science, Texas A&M University (TAMU)

Publications (last five years)


Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)

Dean's Outstanding Achievement Award for Teaching, September 2014, College of Agriculture and Life Sciences, Texas A&M University.

Texas A&M Agrilife Research Faculty Fellow, January 2013, Texas A&M University System.

USDA Secretary of Agriculture’s Honor Award - Ecological Site Description Team, December 2013, Washington DC.

Texas A&M Agrilife Research Faculty Fellow, January 2013, Texas A&M University System.

Dean's Outstanding Achievement Award for Research, September 2012, College of Agriculture and Life Sciences, Texas A&M University.

Student Lead Assessment of Teaching Excellence Award (SLATE), February 2011, Office of the Provost, Texas A&M University System.

Sustained Lifetime Achievement Award, February 2010, International Society for Range Management.

Graduate Instructor of Year, 2009, Department of Ecosystem Science & Management, TAMU.
Participation in NSF NEON Initiative, 2006-2010: Advisory committee member for the Southern Plains Domain (domain 11 of the 20 domain network) for the National Ecological Observatory Network (NEON) sponsored by NSF. Core site for the domain is located on the LBJ National Grasslands near Decatur, TX.

Academic Coordinator for USDA Rangeland CEAP, 2007-2011: Selected to serve as academic coordinator to the Conservation Effects Assessment Program (CEAP) of the USDA-NRCS Resource Inventory and Assessment Division. Organized and edited the 12 chapter book that reported the assessment team’s findings regarding the effectiveness of current conservation programs and recommendations to develop more cost-effective and ecologically efficient programs.

Editor-in-Chief Rangeland Ecology and Management, 2008 – present. Responsible for all academic aspects of publishing the premier international journal addressing global rangeland issues. The Journal receives approximately 250 submissions from authors world-wide and publishes six issues (720 pages) per year.

Membership and Offices Held in Professional Organizations
International Society for Range Management, 1973-present
Ecological Society of America, 1980-present
American Institute for Biological Sciences, 1991-present

Major Professional Self-improvement Activities (past 10 years, including sabbatical)
Academic coordinator, U.S. Department of Agriculture, Rangeland Conservation Assessment Team, 2007-present
Academic journal editor, Rangeland Ecology and Management, 2007-present
International workshops and conferences, China 2008 and 2010, Chile 2012

External Grants and Other Research Funding (last five years)
Thomas D. Byram

Academic Rank: Western Gulf Forest Tree Improvement Program Geneticist, Assistant Professor
Specialization: Genetics
Appointment Basis: 12-month

Academic Education Background
B.A., Biology, Hendrix College, 1975
M.S., Forestry, Texas A&M University, 1978
Ph.D., Molecular and Environmental Plant Sciences, Texas A&M University, 2000

Professional and Research Experience
2001-Present Assistant Professor, Department of Ecosystem Science and Management – Research problems addressing operational tree improvement problems for both pine and hardwood species
2001-Present Geneticist, Texas A&M Forest Service – Responsible for the direction of the TFS Pine and Hardwood Tree Improvement Programs, Western Gulf Forest Tree Improvement Program – Pine, Western Gulf Forest Tree Improvement Program – Hardwood, and Urban Tree Improvement Program
1978-2001 Assistant Geneticist, Texas Forest Service
1976-1978 Research Assistant, Department of Forest Science, Texas A&M University

Teaching Experience
2001 – Present, No formal teaching appointment. Service on nine graduate student committees (four current including two as co-chair), Guest lectures.

Dates of Appointment and Promotions at Present Institution
2001-Present Assistant Professor, Department of Ecosystem Science and Management.
2001-Present Geneticist, Texas A&M Forest Service.
1978-2001 Assistant Geneticist, Texas Forest Service

Publications
Off-campus Consulting, or Other Professional Activities, Special Honors, Recognition (past five years)

Directs the activities of the Western Gulf Forest Tree Improvement Program - Pine.
Responsible for the direction of the Western Gulf Forest Tree Improvement Program - Hardwood.
Responsible for the operation of the Texas A&M Forest Service Pine Tree Improvement Program.
Leads the Texas A&M Forest Service Urban Tree Improvement Program.
Responsible for the Texas A&M Forest Service Hardwood Tree Improvement Program.
USDA 2011 Honor Award for Excellence - Conifer Translational Genomics Team
Committee member – Science Advisory Committee for the PINEREFSEQ Loblolly Pine Genome Project
USDA/NIFA
Committee member - Science and Outreach Advisory Committee for the USDA/IFAS Grant: Allele Discovery for Economic Pine Traits I and II (ADEPT)
Invited Opponent – 2007 Ph.D. Disputation, SLU Umeå, Sweden
Member, Farm Services Advisory Committee.
Member, USDA-Forest Service Resistance Screening Center Steering Committee.
Served as reviewer for Forest Science, Canadian Journal of Forestry Research, Southern Journal of Applied Forestry, Tree Genetics and Genomes.
Tony Squillace Award (Southern Forest Tree Improvement Conference): 1995 and 1999

Membership and offices held in professional organizations
Society of American Foresters
SAF Genetics and Tree Improvement Working Group
Seed Orchard Pest Management Subcommittee of the Southern Forest Tree Improvement Committee
(Current Chair)

External Grants and Other Research Funding (past five years)
Claudio Casola

Academic Rank: Assistant Professor
Specialization: Forest Tree Genomics
Appointment Basis: 9-month

Academic Education Background
Ph.D., Biology (Molecular Biology Emphasis), University of Pisa, Italy, 2006
M.S., Biology, University of Pisa, Italy, 2001

Professional and Research Experience
January 2014-present  Assistant Professor, Department of Ecosystem Science and Management, Texas A&M University
August 2012-December 2013  Assistant Professor, Department of Biology, Saint Louis University
August 2007-July 2012  Postdoctoral Fellow, Department of Biology, Indiana University, Bloomington, Indiana
January 2006-July 2007  Postdoctoral Fellow, Department of Biology, University of Texas Arlington, Arlington, TX

Teaching Experience
January 2015-present  Assistant Professor, Department of Ecosystem Science and Management, Texas A&M University
August 2012-December 2013  Assistant Professor, Department of Biology, Saint Louis University
Fall 2012  Postdoctoral Fellow, Department of Biology, Indiana University, Bloomington, Indiana

Dates of Appointment and Promotions at Present Institution
January 2014  Assistant Professor, Department of Ecosystem Science and Management, Texas A&M University

Publications (last five years)

Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)
Reviewer for book publishers and over 25 articles in 11 journals since 2007
Interdisciplinary Research Program in Ecology and Evolutionary Biology – Executive Committee Member,
Seminar Committee Chair
More than twenty Professional Science Presentation

Membership and Offices Held in Professional Organizations
Member of The Genetics Society of America
Member of The Society for the Study of Evolution
Member of Society for Molecular Biology and Evolution

External Grants and Other Research Funding (last five years)
Presidential’s Research Fund, Saint Louis University. “Dissecting the molecular basis of symbiosis and coloniality in stony corals using a comparative transcriptomic strategy”. September 2013. $25,000.
Megan K. Clayton

**Academic Rank:** Assistant Professor  
**Specialization:** Habitat Management  
**Appointment Basis:** 12-month Extension

**Academic Education Background**  
Ph.D., Wildlife Science, Texas A&M University – Kingsville, Kingsville, TX, 2009  
M.S., Range & Wildlife Management, Texas A&M University – Kingsville, Kingsville, TX, 2006  
B.S., Wildlife & Fisheries Sciences, Texas A&M University, College Station, TX, 2003

**Professional and Research Experience**  
September 2010-present  
Assistant Professor & Extension Range Specialist, Texas A&M AgriLife Extension Service, Department of Ecosystem Science and Management, Texas A&M University

**Publications (last five years)**  


**Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)**
- Texas Chapter of The Wildlife Society 3rd Place Educational Video
- Texas Chapter of The Wildlife Society Outstanding Technical Publication
- Co-author of 2nd Place Young Professionals’ Presentation Award – Texas Section Society for Range Management
- Texas Section Society for Range Management – Outstanding Young Range Professional Award
- The Wildlife Society’s National Leadership Institute
- Texas A&M – Kingsville Alumni Focus, Inaugural Javalina Today Magazine
- Initiated, Developed, and Chairing the National Rangeland Wildlife Working Group through The Wildlife Society
- The Wildlife Society’s National Leadership Institute Program
- Director of the Texas Chapter of The Wildlife Society’s Wildlife Conservation Camp

**Membership and Offices Held in Professional Organizations**
- Member of Society for Range Management
  - Nominations Committee (2 yrs), 2016 Program Committee, Academic Interview Workshop Chair, Wildlife Habitat Committee Member (3 yrs), Graduate School Workshop Committee Co-chair
- Member of Texas Section Society for Range Management
  - Publications Award Committee Member (3 yrs), Youth Range Workshop Director (2 yrs), Grass Roots Award Committee Member, Land Management Awards Committee Member (2 yrs), Exhibitor/Sponsorship Sub-committee Chair
- Member of Texas Wildlife Association
- Member of The Wildlife Society
  - Chair of Rangeland Wildlife Working Group (3 yrs), Leadership Institute Committee Member (3 yrs), Chair of Excellence in Wildlife Education Committee, Member of Education & Outreach Working Group, Symposium Proposal Committee, Leadership Institute Member, Founder of Rangeland Wildlife Working Group
- Member of Southwest Section of The Wildlife Society
- Member of Texas Chapter of The Wildlife Society
  - Conservation Camp Committee Member (10 yrs), Conservation Camp Director (2 yrs), Scholarship Committee Member
<table>
<thead>
<tr>
<th>Project Year(s)</th>
<th>Grant</th>
<th>Title</th>
<th>Awarded ($)</th>
<th>My Portion</th>
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<td>PENDING</td>
<td>RREA Extension Grant</td>
<td>Generation Next Webinars</td>
<td>12,280</td>
<td>12,280</td>
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<td>2014-2016</td>
<td>DuPont Research</td>
<td>Retama Control with aminocyclopyrachlor blends</td>
<td>4,000</td>
<td>4,000</td>
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<td>2014-2015</td>
<td>DuPont Research</td>
<td>Evaluation of Huisache broadcast control</td>
<td>2,000</td>
<td>2,000</td>
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<td>2014-2016</td>
<td>Dow AgroSciences</td>
<td>Aerial Wildlife Brush Mgmt</td>
<td>5,000</td>
<td>5,000</td>
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<tr>
<td>2014-2016</td>
<td>Dow AgroSciences</td>
<td>Aerial Huisache Appl.</td>
<td>5,000</td>
<td>5,000</td>
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<td>2014-2016</td>
<td>Dow AgroSciences</td>
<td>Ground Broadcast Huisache Appl.</td>
<td>4,000</td>
<td>4,000</td>
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<td>2014-2016</td>
<td>Dow AgroSciences</td>
<td>IPT Huisache Appl.</td>
<td>2,000</td>
<td>2,000</td>
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<td>2014-2015</td>
<td>Behmann Brothers Found.</td>
<td>South Region Range 4-H Day</td>
<td>2,000</td>
<td>2,000</td>
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<tr>
<td>2014-2015</td>
<td>Behmann Brothers Found.</td>
<td>South Texas Result Demonstrations</td>
<td>1,500</td>
<td>1,500</td>
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<tr>
<td>2014-2015</td>
<td>WFSC Quail Initiative Funds</td>
<td>Bluestem Book</td>
<td>9,000</td>
<td>4,500</td>
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<td>2014</td>
<td>Renewable Resources Extension Act (RREA)</td>
<td>Generation Next: Our Turn to Ranch</td>
<td>21,890</td>
<td>14,690</td>
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<td>2014</td>
<td>RREA</td>
<td>Living with Fire in Texas</td>
<td>17,500</td>
<td>5,000</td>
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<td>2014</td>
<td>SARE Prof Develop</td>
<td>Farming for the Future</td>
<td>55,004</td>
<td>55,004</td>
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<td>2014</td>
<td>La India Ranch</td>
<td>Tanglehead Burning &amp; Grazing Project</td>
<td>5,000</td>
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<td>2013-2014</td>
<td>Behmann Brothers Found.</td>
<td>South Region Range 4-H Day</td>
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<tr>
<td>2013-2014</td>
<td>Behmann Brothers Found.</td>
<td>South Texas Result Demonstrations</td>
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<td>1,500</td>
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<tr>
<td>2013-2015</td>
<td>DuPont Research</td>
<td>Mixed Brush in Fencelines</td>
<td>3,000</td>
<td>3,000</td>
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<td>2013-2015</td>
<td>DuPont Research</td>
<td>Aerial Mesquite App.</td>
<td>15,000</td>
<td>15,000</td>
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<tr>
<td>2013-2015</td>
<td>DuPont Research</td>
<td>Huisache Basal Bark App.</td>
<td>4,000</td>
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<td>2013-2015</td>
<td>DuPont Research</td>
<td>IPT Mesquite &amp; Huisache App.</td>
<td>4,000</td>
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<td>2013-2015</td>
<td>DuPont Research</td>
<td>Efficacy of broadcast huisache</td>
<td>4,000</td>
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<tr>
<td>2013-2015</td>
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<td>Aerial Wildlife Brush Mgmt.</td>
<td>10,000</td>
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<td>2013-2015</td>
<td>Dow AgroSciences</td>
<td>Sendero Mesquite IPT</td>
<td>2,000</td>
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<td>2013-2015</td>
<td>Dow AgroSciences</td>
<td>False Broomweed App.</td>
<td>3,000</td>
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<td>2013-2015</td>
<td>Dow AgroSciences</td>
<td>Euthemia Appl.</td>
<td>3,000</td>
<td>3,000</td>
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<td>2013-2015</td>
<td>Dow AgroSciences</td>
<td>Sendero Huisache IPT</td>
<td>2,000</td>
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<td>2013-2015</td>
<td>Dow AgroSciences</td>
<td>Sendero Huisache Aerial</td>
<td>15,000</td>
<td>15,000</td>
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<td>2013-2015</td>
<td>Dow AgroSciences</td>
<td>Sendero Huisache Ground App</td>
<td>4,000</td>
<td>4,000</td>
</tr>
<tr>
<td>2012-2013</td>
<td>Behmann Brothers Found.</td>
<td>South Region Range 4-H Day</td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>2012-2013</td>
<td>Behmann Brothers Found.</td>
<td>South Texas Result Demonstrations</td>
<td>1,500</td>
<td>1,500</td>
</tr>
<tr>
<td>2012</td>
<td>Texas Parks &amp; Wildlife Department Wildlife Research</td>
<td>Eradication of Invasive Bluestems to Restore Native Grasslands</td>
<td>185,308</td>
<td>36,000</td>
</tr>
<tr>
<td>Year</td>
<td>Organization</td>
<td>Project Description</td>
<td>2012</td>
<td>2013</td>
</tr>
<tr>
<td>------</td>
<td>-------------------------------------</td>
<td>----------------------------------------------------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>2012</td>
<td>RREA Extension Grant</td>
<td>Native Reseeding publication and video series</td>
<td>8,840</td>
<td>8,840</td>
</tr>
<tr>
<td>2012</td>
<td>RREA Extension Grant</td>
<td>Prescribed Burn Ban Education for County Commissioners</td>
<td>10,073</td>
<td>5,037</td>
</tr>
<tr>
<td>2012</td>
<td>Ag Comm Ed Resource Assistance</td>
<td>South Texas Landowner Field Journal</td>
<td>3,000</td>
<td>1,500</td>
</tr>
<tr>
<td>2012-2013</td>
<td>NuFarm</td>
<td>Prickly Pear Broadcast, Trooper</td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>2012-2013</td>
<td>DuPont Research</td>
<td>Saw Palmetto Broadcast, MAT</td>
<td>4,000</td>
<td>4,000</td>
</tr>
<tr>
<td>2012-2014</td>
<td>DuPont Research</td>
<td>Huisache Ground Broadcast</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>2012-2014</td>
<td>DuPont Research</td>
<td>Mesquite Ground Broadcast</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>2012-2014</td>
<td>DuPont Research</td>
<td>Huisache Aerial</td>
<td>2,500</td>
<td>2,500</td>
</tr>
<tr>
<td>2012-2014</td>
<td>DuPont Research</td>
<td>Fenceline IPT, foliar</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>2012-2014</td>
<td>DuPont Research</td>
<td>Mesquite IPT, foliar</td>
<td>2,500</td>
<td>2,500</td>
</tr>
<tr>
<td>2012-2014</td>
<td>DuPont Research</td>
<td>Mesquite IPT, basal</td>
<td>2,500</td>
<td>2,500</td>
</tr>
<tr>
<td>2012-2014</td>
<td>Dow AgroSciences</td>
<td>Huisache Aerial</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>2012-2014</td>
<td>Dow AgroSciences</td>
<td>Mesquite Broadcast, Sendero</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>2012-2014</td>
<td>Dow AgroSciences</td>
<td>Huisache Broadcast, Sendero</td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>2012-2014</td>
<td>Dow AgroSciences</td>
<td>Mesquite IPT, Sendero</td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>2012-2014</td>
<td>Dow AgroSciences</td>
<td>Huisache IPT, Sendero</td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>2012</td>
<td>Dow AgroSciences</td>
<td>Forb &amp; Shrub Response, Aerial</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>2011-2013</td>
<td>DuPont Research</td>
<td>Huisache IPT with MAT28</td>
<td>2,500</td>
<td>2,500</td>
</tr>
<tr>
<td>2011-2013</td>
<td>DuPont Research</td>
<td>Mesquite IPT with MAT28</td>
<td>2,500</td>
<td>2,500</td>
</tr>
<tr>
<td>2011-2013</td>
<td>Dow AgroSciences</td>
<td>Aerial Control of Mesquite</td>
<td>4,000</td>
<td>4,000</td>
</tr>
<tr>
<td>2011-2013</td>
<td>Dow AgroSciences</td>
<td>Weed Control in Cotton Co.</td>
<td>1,500</td>
<td>1,500</td>
</tr>
<tr>
<td>2011-2014</td>
<td>Dow AgroSciences</td>
<td>Macartney Rose Tests</td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>2011-2012</td>
<td>Behmann Brothers Found.</td>
<td>Support of Programs &amp; Demos in Range Mgmt</td>
<td>1,500</td>
<td>1,500</td>
</tr>
<tr>
<td>2011-2012</td>
<td>Behmann Brothers Found.</td>
<td>South TX Landowner Survey</td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>2011-2012</td>
<td>Behmann Brothers Found.</td>
<td>South TX Landowner Field Journal</td>
<td>1,500</td>
<td>1,500</td>
</tr>
<tr>
<td>2010-2011</td>
<td>The Hal &amp; Charlie Peterson Found.</td>
<td>Educational Habitat Demo Sites</td>
<td>9,895</td>
<td>9,895</td>
</tr>
<tr>
<td>2010-2011</td>
<td>Partners for Fish &amp; Wildlife</td>
<td>Educational Habitat Demo Sites</td>
<td>13,500</td>
<td>13,500</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>$491,910</strong></td>
<td><strong>$309,366</strong></td>
</tr>
</tbody>
</table>
James Richard Conner

Academic Rank: Professor
Specialization: Management, range resource and ecological economics
Appointment Basis: 10-month

Academic Education Background
Ph.D., Agricultural Economics, Texas A&M University, 1970
M.S., Statistics, Texas A&M University, 1967
B.S., Agronomy, Texas A&M University, 1965

Professional and Research Experience
1981-present Professor, Agricultural Economics, Ecosystem Science and Management, Texas A&M University (TAMU)
1975-1981 Associate Professor, Agricultural Economics, Mississippi State University
1973-1975 Coordinator/Director, Planning and Analysis, State University System of Florida
1969-1973 Assistant Professor, Food and Resource Economics, University of Florida

Teaching Experience
1981-present Professor, Agricultural Economics, Ecosystem Science and Management, Texas A&M University (TAMU)
1975-1981 Associate Professor, Agricultural Economics, Mississippi State University
1969-1973 Assistant Professor, Food and Resource Economics, University of Florida

Publications (last five years)


Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)
Who's Who Among College and University Students in America, (1964-65)
American Agricultural Economics Assn., Member
Southern Agri. Econ. Assn., 2nd V.P., (1982); 1st V.P., (1983); President-elect, (1984); President, (1985)
National Agri-Marketing Assn., National Careers Committee (1979-80)
Western Agricultural Economics Assn., Member
Society for Range Management, Member
Western Research Coordinating Committee for Range Economics, Chairman (1986-88)
Distinguished Performance Award for Team Research, Texas Agricultural Experiment Station (1984)
Named Thomas M. O'Connor Professor of Rangeland Ecology and Management (1989)
USDA-Soil Conservation Service Superior Service Award (1991)
TeXas Economists, Board of Directors (2001)
Society for Range Management Outstanding Achievement Award (2008) and Zimbabwe.

Major Professional Self-improvement Activities (past 10 years, including sabbatical)
International research assignments and invitations to present seminars and workshops in several countries including Australia, Argentina, Brazil, China, Kenya, Mexico, Mongolia, and Zimbabwe.

External Grants and Other Research Funding (last five years)


2011-14. TFS-USFS “County-wide Herbaceous Fuel Monitoring” - $120,000
Robert N. Coulson

Academic Rank: Professor
Specialization: Landscape ecology
Appointment Basis: 12-month

Academic Education Background
Ph.D., Entomology, University of Georgia, 1969
M.S., Entomology, University of Georgia, 1967
B.S., Biology, Furman University, 1965

Professional and Research Experience
1980-present  Professor, Entomology, Texas A&M University (TAMU)
1976-1980  Associate Professor, Entomology, Texas A&M University (TAMU)
1970-1976  Assistant Professor, Entomology, Texas A&M University (TAMU)
1970-1973  Principal Entomologist, Texas Forest Service
1969-1970  Postdoctorate Research Associate, Institute of Ecology, University of Georgia

Teaching Experience
1980-present  Professor, Entomology, Texas A&M University (TAMU)
1976-1980  Associate Professor, Entomology, Texas A&M University (TAMU)
1970-1976  Assistant Professor, Entomology, Texas A&M University (TAMU)

Publications (last five years)


Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)

Fellow, Entomological Society of America. 2008

Henry C. Cowles Award, AAG, Outstanding Published Paper: Simulating the reciprocal interaction of forest landscape structure and southern pine beetle herbivory using LANDIS. Landscape Ecology, 2008.

Outstanding Achievement in International Programs-National Agricultural Research Program. USDA, Organization of International Cooperation and Development. 1993.

Faculty Achievement Award for Research, Texas A&M University Former Student Association. 1986.
J. E. Bussart Award, Entomological Society of America. 1985.
Award of Merit in Recognition of Outstanding Achievements in Forest Research, Texas Forestry Association. 1980.

**External Grants and Other Research Funding (last five years)**
Development of the Texas Crop Registry (formerly the Texas Sensitive Crops Website: Sponsor Texas Department of Agriculture, Specialty Crop Block Grant Program, Amount: $123,055, Duration: 2011-2013, PI: Robert Coulson.
WILDLIFE, RANGE AND LANDSCAPE ECOLOGIST

My research focuses on the impacts of stochastic events on wildlife populations and their landscape use, and on the development of useful tools and models that help managers and agricultural producers adapt to these responses. My professional goal is to cultivate a synergy between natural resource conservation and agricultural production. Due to a rapidly changing environment, the overlap between these two areas is becoming increasingly competitive, and I believe the need to address and develop ways to reduce pressure and adapt to these changes is critical. In addition, I believe we need to prepare our students for these challenges, which may require innovative teaching and problem solving approaches at both the national and international level. I have experience and a strong interest in working with indigenous and underrepresented students, and helping to build capacity for natural resource sustainability in their communities.

Areas of Expertise

♦ Wildlife management
♦ Range management
♦ Landscape ecology
♦ Fire ecology
♦ Conservation policy
♦ Animal handling and capture
♦ Retention, recruitment, and diversity
♦ International wildlife management
♦ Philanthropic development
♦ Public relations
♦ Native American natural resource issues
♦ Ranch management

Education

♦ Ph.D., Wildlife Science, Texas A&M University-Kingsville and Texas A&M University, May 2003.
♦ B.S., Wildlife Biology, University of Montana, December 1990.

Employment & Experience

Texas A&M University, Department of Ecosystem Science and Management

Faculty Member & Researcher: 2007–present

- Coordination of USDA Pathways Workshop Problem-Solving Workshop in conjunction with the Office of Personnel Management. Includes strategic planning for identification of challenges and solutions for increasing minority recruitment into federal agencies under the Pathways Program.
- Post-fire assessment and burn severity mapping, training, and coordination for the Davis Mountains, Texas, and the Serranias del Burro, Coahuila, México. Included development of long-term post-fire restoration and land management plan.

- Coordination for USDA-NIFA “Three E’s Model: Education, Experiential Learning, and Employment for Underrepresented Students in Natural Resources,” in collaboration with St. Edwards University. Includes planning of field courses and Master’s level graduate positions that are linked with federal natural resource management agencies.

- Coordination for USDA-NIFA “Bridge-the-Gap” program in collaboration with University of Texas at San Antonio.

United States Department of Agriculture (USDA)

Consultant: 2010-2011

- Assessment of education, experience, and employment model recruiting Native American students into federal agencies in collaboration with the American Indian Higher Education Consortium.

- Special scholarship program with the Texas Hispanic Serving Institution Consortium to host minorities and veterans from 5 Hispanic Serving Institutions on a three-week tour through western United States to introduce them to public lands and employment opportunities with federal agencies.

Texas A&M University-Kingsville

Faculty Member, College of Agriculture; Development and Public Relations Officer, King Ranch Institute for Ranch Management: 2005-2007

- Recruitment and retention of undergraduates, curriculum development, field exercises, grant-writing, advising. Field course design and implementation for wildlife/range management, and implementation of internship programs with US Forest Service.

- Coordination of donations, grants, and state line-item proposals.

- Planning and implementation of the Annual King Ranch Institute for Ranch Management Symposium.

- Coordination of special lectureships on ranching, oil and gas negotiation for private landowners, range and wildlife management, and systems thinking.

Research Associate, Caesar Kleberg Wildlife Research Institute: 2003-2005

- Co-publication of a native habitat ecological restoration manual, grant writing, and event planning for South Texas Natives.

- Coordinated field research and supervision of black bear research conducted in Serranias del Burro and Maderas del Carmen, Coahuila, and the Sierra del Nido, Chihuahua, México.

- Coordinated international conference and training workshops for civil authorities in bear handling and management.

Ph.D. Graduate Assistantship: 1998-2003

- Fund-raising, planning, and supervision of black bear research conducted in the Serranias del Burro and Maderas del Carmen, Coahuila, and the Sierra del Nido, Chihuahua, México.

- Coordination with 19 cattle ranches to develop GIS vegetation database, mitigate conflict between cattle and bears, and develop long-term land management plans.

- Development of harvest and management recommendations for a recovered black bear population in México.

M.S. Graduate Assistantship: 1991-1995

- Fund-raising, planning, and supervision of first black bear research project conducted in México.

- Recruitment of 19 cattle ranches into a black bear conservation program, developed baseline inventory for plants and wildlife.

- Collaboration with Mexican state and federal governments to develop an initial conservation strategy for the black bear.
Additional Experience

Land Management:
- Post-fire restoration and ecological recovery plans, fire planning, burn severity mapping, and development of GIS databases.
- Range management planning and implementation, plant identification and documentation.
- Cattle management for both yearling and cow-calf operations, and office, personnel and project management.

Wildlife Management
- Development of long-term conservation strategies, harvest recommendations, and policy for endangered species.
- Density estimation, and management of hunting programs (antelope, elk) on both private and public lands.
- Trapping, transport and monitoring of grizzly bears, black bears, deer, bighorn sheep, javelina, fox, rattlesnakes, and small mammals.
- Aversive conditioning trials of captive bears.
- Vegetation sampling and analysis.
- Filming and sound recording of wildlife for nature film production.

Courses Taught
- USDA-HSI summer field course to Montana and throughout western United States incorporating GIS technology and USDA Forest Service career development. St. Edwards University, Texas A&M University, Texas A&M University-Kingsville, and the Texas Hispanic Serving Institution Consortium.
- Wildlife Biology, Department of Biology, University of Texas at San Antonio, San Antonio, Texas. Senior level.

Publications


Presentations at Professional Meetings


Symposium on Conservation of Asiatic Black Bears. 2009. Taipei, Taiwan. Author and Keynote Speaker: Can food production be used to predict bear movements and trends in population dynamics?


2o Foro Regional de Vida Silvestre y Ecoturismo. 2003. Agujitas, Coahuila, México. El oso y el hombre: oportunidad o conflicto?


**Professional Growth and Community Outreach Activities**

**Conferences and Workshops**

- Committee Member, 20th International Conference on Bear Research & Management, Ottawa, Canada. 2011.
- Co-chair, 10th Western Black Bear Workshop, Reno, Nevada. 2008.
Co-chair, 18th International Conference on Bear Research & Management, Monterrey, México. 2007.

Professional Organizations
- International Union for the Conservation of Nature (IUCN) Bear Specialist Group
  • Team Leader, Mexican Black Bear Expert Team, 2000-present
  • Member, Expert Team on Human-Bear Conflicts, 2009-2014
  • Member, Coordinating Committee, 2013-present
- International Association for Bear Research and Management
  • Secretary, 2007-2013
  • Webmaster, 2007-present
  • Student Coordinator, 2002-2008
  • Southwest Correspondent, IBA Newsletter, 2000-2003
  • Ex-officio Council Member, 2002-2007
  • Chair, Conference Committee, 2013
- Comisión de Areas Naturales y Protegidas, México
  • Research Chair, Committee on the Program for Strategic Conservation of the Black Bear in México, 2007-2013
- Secretaría de Medio Ambiente, Recursos Naturales, y Pesca – México
  • Scientific Advisor, Technical Subcommittee on Bear Conservation and Management, 2000-2002
- Union Ganadera Regional de Coahuila (Regional Cattlemen’s Union for Coahuila)
  • Scientific Advisor, 1991-present
- CONECO Landowner Group, Serranias del Burro, México
  • Scientific Advisor, 1991-present
- The Wildlife Society
  • Member, 1980-present
  • President, University of Arizona Student Chapter, 1980-1982
- Society for Range Management
  • Member, 2010-present
  • Co-chair, Native American Range Advisory Council, Society for Range Management, 2010-present

Working Groups and Special Teams
- Team Member, Conservation Strategy Initiative for Andean Bears in the Machu Picchu-Choquequirao Sanctuary Complex, Peru. 2011.
- Team Member, Conservation Strategy Workshop for the Asiatic Black Bear in Taiwan. 2010.
- Team Member and Keynote Speaker, Conservation Strategy and Human-Bear Conflict Workshop for the Asiatic Black Bear in Kyoto, Japan. 2010.

Popular Articles


**External Funding**

The Nature Conservancy: Burn Severity Mapping in the Davis Mountains, Texas. Diana Doan-Crider, PI. 2013. $15,000.

USDA National Institute for Food and Agriculture: Education, Experience, and Employment for Underrepresented Students in Natural Resources. William Quinn, Mort Kothmann, and Diana Doan-Crider, Co-PI’s. Collaboration between St. Edwards University and Texas A&M University. 2010. $315,000.


**Special Skills**

- Fluent in Spanish (speaking and writing)
- Public speaking (100+ public & professional presentations)
- Advanced emergency and first aid, outdoor survival skills in extreme environments
- Field skills such as animal handling, radio-telemetry, orienteering, and data analysis
- Economic development / grant writing
- Proficient in Microsoft Office, Adobe Photoshop & InDesign
- ArcMap GIS modeling, vegetation mapping
- Website maintenance in PHP and Dreamweaver (limited)
- Operation of heavy equipment, ATV’s, and firearms
Marian Eriksson

**Academic Rank:** Associate Professor

**Specialization:** Statistics, Forest Biometrics, GeoInfo Sciences

**Appointment Basis:** 10-month

**Academic Education Background**

Ph.D., Forest Resource, University of Minnesota, 1989

M.S., Wildland Resource Science, University of California, 1981

A.B., Mathematics, University of California, 1977

**Professional and Research Experience**

1995-2014  Associate Professor, Department of Forest Science, Texas A&M University (TAMU)

1989-1995  Assistant Professor, Department of Forest Science, Texas A&M University (TAMU)

1984-1989  Graduate Research Assistant and Graduate Teaching Assistant, Department of Forestry, University of Minnesota

1983-1984  Research Associate, Department of Forestry, Auburn University

1978-1980  Graduate Research Assistant and Graduate Teaching Assistant, Department of Forestry and Resource Management and the Remote Sensing Research Program, University of California

**Teaching Experience**

1995-2014  Associate Professor, Department of Forest Science, Texas A&M University (TAMU)

1989-1995  Assistant Professor, Department of Forest Science, Texas A&M University (TAMU)

1984-1989  Graduate Research Assistant and Graduate Teaching Assistant, Department of Forestry, University of Minnesota

1978-1980  Graduate Research Assistant and Graduate Teaching Assistant, Department of Forestry and Resource Management and the Remote Sensing Research Program, University of California

**Publications (last five years)**


Rusty A. Feagin

Academic Rank: Associate Professor
Specialization: Coastal Ecology & Management, GIS
Appointment Basis: 10-month

Academic Education Background
Ph.D., Rangeland Ecology and Management, Texas A&M University, 2003
B.A., Environmental Studies, University of California, Santa Cruz, 1996

Professional and Research Experience
2009-present Associate Professor, Department of Ecosystem Science & Management, Ecology and Evolutionary Biology Program, Texas A&M University
2003-2009 Assistant Professor, Department of Ecosystem Science & Management, Texas A&M University (formerly Dept. Forest Science/Rangeland Ecology & Mgmt.)

Teaching Experience
2009-present Associate Professor, Department of Ecosystem Science & Management, Ecology and Evolutionary Biology Program, Texas A&M University
2003-2009 Assistant Professor, Department of Ecosystem Science & Management, Texas A&M University (formerly Dept. Forest Science/Rangeland Ecology & Mgmt.)
2011 Visiting Faculty, Gulf Coast Research Laboratory, University of Southern Mississippi

Dates of Appointment and Promotions at Present Institution
2009-present Associate Professor, Department of Ecosystem Science & Management, Ecology and Evolutionary Biology Program, Texas A&M University
2003-2009 Assistant Professor, Department of Ecosystem Science & Management, Texas A&M University (formerly Dept. Forest Science/Rangeland Ecology & Mgmt.)

Publications (last five years)


**Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014-2017</td>
<td>Associate Editor, <em>Estuarine, Coastal and Shelf Science</em></td>
</tr>
<tr>
<td>2014-2016</td>
<td>Graduate Faculty, University of Kentucky</td>
</tr>
<tr>
<td>2012-2016</td>
<td>Graduate Jury, Instituto de Ecología, A.C.</td>
</tr>
<tr>
<td>2010-2013</td>
<td>Fellow, Mexican American and US Latino Research Center, Texas A&amp;M University</td>
</tr>
<tr>
<td>2011</td>
<td>Visiting Faculty, Gulf Coast Research Laboratory, University of Southern Mississippi</td>
</tr>
<tr>
<td>2009-2010</td>
<td>Visiting Faculty, Restoration Institute, Continuing Studies, University of Victoria</td>
</tr>
<tr>
<td>2008</td>
<td>Visiting Fellow, Fitzwilliam College, Department of Geography, University of Cambridge</td>
</tr>
</tbody>
</table>

**Membership and Offices Held in Professional Organizations (last 5 years)**

- Member, American Shore & Beach Preservation Association, Coastal and Estuarine Research Federation
- American Society of Limnology and Oceanography, Society for Ecological Restoration
- Co-Director, Coastal Barrier Islands Network, NSF-funded Research Coordination Network in Biological Sciences (RCN), 2006-2014.

**Major Professional Self-improvement Activities (past 5 years, including sabbatical)**

- Teaching Workshops
- Recruitment Travel for Minority Student Participation

**External Grants and Other Research Funding (last five years)**

- Linked satellite and soil data to validate coastal wetland “blue carbon” inventories: Upscaled support for developing MRV REDD+ protocols, $5,820 out of $1,496,498, NASA, 2014-2017, co-PI.
- Can vegetation reduce sand dune erosion in the Gulf of Mexico? A bi-national research experiment and student exchange, $12,000 out of $24,000, CONACyT/TAMU, 2014-2015, PI.
- Coastal Geomorphology and Restoration: 44nd Annual Binghamton Geomorphology Symposium, $31,900, NSF, 2013, co-PI.
- Fish Pass Tidal Hydrology Restoration, $160,746, NOAA Restoration Center/Gulf of Mexico Sea Grant Tidal Hydrology Restoration program, 2014-2015, PI.
- Magnolia Inlet, $99,064, CEPRA/TxGLO, 2014-2015, PI.
- Restoration of multiple wetlands in the Magnolia Beach area, Calhoun County: Phase I Planning, $57,630, NOAA/TxGLO, 2013-2015, PI.
- Restoration and Management for Damaged Ecosystems in Kuwait, $35,000, Kuwait Foundation for the Advancement of Sciences, 2013-2015, PI.
- Graduate Certificate in Natural Sustainability for Military Readiness, $35,000, College of Agriculture & Life Sciences, TAMU, 2012, co-PI.
- Sea level rise impacts to a rare wetland forest and the Puerto Rican community, $6,000, Mexican American and US Latino Research Center (MALRC), 2010-2012, PI.
- CBIN/BIINET: Research Network for Sustaining Barrier Island Ecosystems in a Changing Global Environment, $476,170, NSF, Research Coordination Networks Program, 2008-2013, co-PI.
Vegetation Transition and Sedimentary Responses to Fault-induced Sea Level Rise, $60,000, Dept. of Energy (DOE)- NICCR Program, 2008-2010, PI.
Quantification of Hurricane Flooding Reduction by Vegetation along the Texas Coast, $90,208 out of $205,110 total, Texas Sea Grant, 2008-2010, co-PI.
Academic Rank: Assistant Professor
Specialization: Environmental Policy
Appointment Basis: 10-month

Academic Education Background
- Indiana University School of Public & Environmental Affairs & Department of Political Science: Joint PhD in Public Policy Awarded August 2012.

Professional and Research Experience
- Texas A&M University, Department of Ecosystem Science & Management & Texas Agrilife Research: Assistant Professor, August 2013 - Present
- Dartmouth College Environmental Studies Program: Postdoctoral Research Associate, September 2012-July 2013. Supervisor: Michael Cox

Teaching Experience
- Texas A&M University, Department of Ecosystem Science & Management, Assistant Professor, August 2013-present: ESSM 406 (Natural Resource Policy), ESSM 489/689 (Changing Natural Resource Policy)
- Indiana University, School of Public & Environmental Affairs, Associate Instructor, August 2009-June 2010: SPEA E-162: Environment & People.

Dates of Appointment and Promotions at Present Institution
- Assistant Professor, Texas A&M University, August 2013

Publications (last five years)


**Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)**

- Co-coordinator (with David Briske), ESSM departmental seminar series 2014-15
- Abstract review for the International Association for the Study of the Commons biannual meeting in Hyderabad, India, 2011; Mt. Fuji, Japan, 2013.

**Membership and Offices Held in Professional Organizations**

International Association for the Study of the Commons
Midwest Political Science Association

**External Grants and Other Research Funding (last five years)**

- 2014-17 CO-PI, “The Applied Biodiversity Science Program: Integrating Multidisciplinary Research and High Impact Learning into Undergraduate and Graduate Education.” Texas A&M Tier One Program, 3 years, $300,000

- 2007-2012 PI, National Science Foundation Graduate Research Fellowship Recipient (5 years, $150,000)
William Ernest Fox, III

**Academic Rank:** Assistant Professor  
**Specialization:** Rangeland & Water Resources Management  
**Appointment Basis:** 12-month (Texas A&M AgriLife Research)

**Academic Education Background**  
Ph.D., Rangeland Ecology & Management, Texas A&M University, College Station, 1999  
M.S., Animal & Range Sciences, New Mexico State University, Las Cruces, 1993  
B.S., Range Science, Texas A&M University, College Station, 1990

**Professional and Research Experience**  
May 2008-Present  
Assistant Professor, Texas A&M AgriLife Research – Blackland Research & Extension Center, Temple, TX

May 2003-Present  
Adjunct Professor, Dept. of Ecosystem Science & Management, Texas A&M University, College Station, TX

September 2005-May 2008  
Senior Research Scientist, Texas Water Resources Institute, Texas A&M University, College Station, TX – Manage & conduct Institute research programs

May 2003-September 2005  
Research Scientist, Texas Water Resources Institute, Texas A&M University, College Station, TX – Manage & conduct Institute research programs

May 2000-May 2003  
Extension Associate, Dept. of Rangeland Ecology & Management, Texas A&M University, College Station, TX – Develop & presented Total Resource Management

January 2000-May 2000  
Visiting Assistant Professor, Dept. of Rangeland Ecology & Management, Texas A&M University, College Station, TX – Taught Range & Forest Watershed Mgmt

December 1997-December 1999  
Senior Environmental Specialist, B&H Environmental Services, Houston, TX – Wetland Specialist

September 1993-October 1997  
Assistant Curator/Assistant Research Scientist, S.M. Tracy Herbarium, Texas A&M University, College Station, TX – Herbarium Management

**Dates of Appointment & Promotions at Present Institution**  
January 2000  
Appointed as Visiting Assistant Professor – Rangeland Ecology & Management

May 2000  
Appointed as Extension Associate – Rangeland Ecology & Management

May 2003  
Appointed as Research Scientist – Texas Water Resources Institute

September 2005  
Promoted to Senior Research Scientist – Texas Water Resources Institute

May 2008  
Accepted Academic Appointment as Assistant Professor – Ecosystem Science & Management Department & Texas A&M AgriLife Research

**Teaching Experience**  
2005  
Instructor: Rangeland Ecology & Management RENR 410 Ecosystem Management

2000  
Instructor: Rangeland Ecology & Management RLEM 310 Range & Forest Watershed Management
Publications (last five years)


Book Chapters


Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)
Vice-Chancellor’s Award for Excellence, Texas A&M AgriLife, 2009
Texas Environmental Excellence Awards – Governor’s Blue Ribbon Committee, 2007
Texas Environmental Excellence Award – Agriculture Division, 2006
  Presented for the Range Revegetation Pilot Project, Fort Hood, TX
Texas Commission on Environmental Quality
Outstanding Young Range Professional, Society for Range Management, 2001

Memberships and Offices Held in Professional Organizations
2001-Present Sustainable Rangelands Roundtable (USDA/USDI funded think-tank directed by University of Wyoming) – 2003-Present: Chair, Research Working Group; 2003-Present: Chair, Plant & Animal Criteria Group; 2005-Present: Steering Committee Member; 2003 & 2005: Member, Washington, D.C. Briefing Team
1989-Present Society for Range Management (SRM) – 2010-2012: Member SRM Awards Committee; 2010 – Chair of Awards Committee; 2006-2009: Member SRM Awards Committee; 2009 – Chair-elect of Awards Committee; 2000-2003: Member Accreditation Committee; 1999-2002: Member Student Activities Committee; 1992 Coach, Range Plant ID Team, NMSU; 1993: Coach, Undergraduate Range Management Exam Team, NMSU; 1989-Present: Texas Section Society for Range Management (TSSRM); 2011: Board of Directors (2011-2013); 2007: Chair, Publications Awards Committee; 2006-2007: Member, TSSRM Awards Committee; 2004-2005: Chair, TSSRM Awards Committee; 2003: Chair, TSSRM Membership Committee; 2003: Member, TSSRM Awards Committee; 2002: Chair, TSSRM College Activities Committee; 2001: Chair, TSSRM Youth Activities Committee; 1996-1999: Member, TSSRM County Awards Committee; 1996: Member, TSSRM Youth Activities Committee; 1996: Member, TSSRM Membership Committee
2010-Present Soil & Water Conservation Society

External Grants and Other Research Funding (last five years)
Jianbang Gan

**Academic Rank:** Professor  
**Specialization:** Forest Economics and Management  
**Appointment Basis:** 9-month

**Academic Education Background**
- Ph.D., Forestry (Economics), Iowa State University, Sept. 1988-Dec. 1990
- M.S., Forestry (Economics and Marketing), Iowa State University, Aug. 1986-Aug. 1988
- B.S., Forest Engineering, Fujian Agriculture and Forestry University (formerly Fujian Forestry College), China, Sept. 1978-July 1982

**Professional and Research Experience**
- **Sept. 2008-present**  
  Professor, Department of Ecosystem Science and Management, Texas A&M University (TAMU)
- **Aug. 2011-May 2012**  
  Visiting Fellow, School of Forestry & Environmental Studies, Yale University
- **Dec. 2008-Aug. 2011**  
  Associate Department Head for Graduate Programs (Aug. 2009-Aug. 2011) and for Undergraduate Programs (Dec. 2008-July 2009), Department of Ecosystem Science and Management, TAMU
- **Aug. 2001-Aug. 2008**  
  Associate Professor, Department of Ecosystem Science and Management, TAMU
- **Sept. 1999-July 2001**  
  Professor, Forest Resources and Agricultural Economics Programs, Tuskegee University
- **Sept. 1998-July 2001**  
  Coordinator for Forest Resources Program, Tuskegee University
- **Sept. 1997-Aug. 1999**  
  Associate Professor, Agricultural Economics Program, Tuskegee University
- **Sept. 1992-July 2001**  
  Coordinator for International Project Development, Tuskegee University
- **Sept. 1992-Aug. 1997**  
  Assistant Professor, Agricultural Economics Program, Tuskegee University
  Postdoctoral Research Associate, Iowa State University
- **Aug. 1986-Dec. 1990**  
  Graduate Research Assistant, Iowa State University
- **July 1982-Aug. 1986**  
  Assistant Lecturer, Fujian Agriculture and Forestry University, China

**Teaching Experience**
- **Sept. 2008-present**  
  Professor, Department of Ecosystem Science and Management, TAMU
- **Aug. 2001-Aug. 2008**  
  Associate Professor, Department of Ecosystem Science and Management, TAMU
- **Sept. 1999-July 2001**  
  Professor, Forest Resources and Agricultural Economics Programs, Tuskegee University
- **Sept. 1997-Aug. 1999**  
  Associate Professor, Agricultural Economics Program, Tuskegee University
- **Sept. 1992-Aug. 1997**  
  Assistant Professor, Agricultural Economics Program, Tuskegee University
- **July 1982-Aug. 1986**  
  Assistant Lecturer, Fujian Agriculture and Forestry University, China

**Dates of Appointment and Promotions at Present Institution**
- **Aug. 1, 2001**  
  Associate Professor (initial appointment), Department of Forest Sciences, TAMU
- **Sept. 1, 2006**  
  Tenured, Department of Ecosystem Science and Management, TAMU
- **Sept. 1, 2008**  
  Promoted to Full Professor, Department of Ecosystem Science and Management, TAMU
Publications (last five years)


**Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)**

Program for the Enhancement of Scholarly and Creative Activities, Texas A&M University, 2011

Research, Development and Innovation Award, Texas Forestry Association, 2010

Nominee for the *Eni* Award (for Non-conventional and Renewable Energy), 2009

Review Panelist for two National Science Foundation (NSF) grants programs, six US Department of Agriculture (USDA) grants programs, and a National Academy of Science and Ford Foundation program


Guest Editor, *Forests* special issue on Climate Change and Forest Fire (2014-2015)


**Membership and Offices Held in Professional Organizations**

Major Professional Self-improvement Activities (past 10 years, including sabbatical)
Aug. 2011-May 2012: Visiting Fellow, School of Forestry & Environmental Studies, Yale University
Jan. 2004: Completed an advanced course on General Algebraic Modeling System (GAMS), College Station, Texas
July 2002: Completed an advanced course on dynamic computable general equilibrium modeling, Global Economic Modeling Network, Brussels, Belgium

External Grants and Other Research Funding (last five years)
US-India consortium for development of sustainable advanced lignocellulosic biofuel systems, $6.25 million, 2012-17, US Department of Energy (DOE) (with P. Pullammanappallil et al.) (Co-PI)
Assessing socioeconomic impacts of forest biomass based biofuel development on rural communities in the southern United States, $350,000, 2012-15, USDA NIFA (with P. Lal) (Co-PI)
Integrating research, education and extension for enhancing southern pine climate change mitigation and adaptation, USDA NIFA, $20 million, 2011-16 (with T. Martin et al.) (Co-PI and Economics and Policy Aim Leader)
Designing institutional mechanisms for enhancing the efficacy of Reduced Emissions from Deforestation and Forest Degradation (REDD), Office of Vice President for Research, Texas A&M University, $10,000, 2011-12 (PI)
A graduate program in forest resources: Developing integrated expertise in forest resource management, conservation, and restoration, USDA Food and Agricultural Sciences National Needs Graduate and Postgraduate Fellowship Grants Program, $234,000, 2009-14 (with K. Krutovsky et al.) (Co-PI)
Location and biofeedstock production: An economic and environmental analysis, Texas AgriLife Research, $100,000, 2008-09 (with B.A. McCarl, T. Gerik, and J. Mullet) (Co-PI)
Potential of East Texas woody biomass residues as a feedstock for Carbonator™ technology, Texas AgriLife Research, $92,500, 2008-09 (with G. Smith, E. Taylor, D. Foster, and C. Long) (Co-PI)
Wayne Hamilton

Academic Rank: Senior Lecturer  
Specialization: Brush Control and Ranch Management  
Appointment Basis: 10-month

Academic Education Background  
MBA, Sul Ross State University  
MS, Range Animal Science, Sul Ross State University  
BS, Agriculture, Texas A&M University-Kingsville

Professional and Research Experience  
1985-present Senior Lecturer, Department of Ecosystem Science and Management, Texas A&M University (TAMU)  
1995-2006 Director, Center for Grazingland and Ranch Management, Texas A&M University  
1990-present Co-owner and Vice President, Grazingland Management System, Inc., TAMU

Teaching Experience  
1985-present Senior Lecturer, Department of Ecosystem Science and Management, Texas A&M University (TAMU). Current Teaching ESSM 317, ESSM 415, ESSM 610, ESSM 612

Publications (last five years)  


**Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)**

I have worked in Paraguay, S.A. as a consultant for the United Nations Development Program. I also worked in the Inner Mongolian Autonomous Region of China in 1989 and 1990 and in Liaoning Province of China in 1991 and in Xinjiang Province in 1993 as a consultant in a project funded by World Bank. I have worked as a consultant to the Secretary of Agriculture of the State of Nuevo Leon, Mexico and I have worked as a consultant in Argentina in Mendoza and Cordoba Provinces. I have worked as a consultant to EMBRAPA in the Pantanal region of Brazil and was an invited presenter at a workshop on technology transfer in Brisbane, Queensland, Australia. When I was the Director, the Center for Grazinglands and Ranch Management co-sponsored a binational project funded by USAID through two separate grants for improvement of livestock production systems and conservation of natural resources in the semi-arid lands of South Texas and Northern Mexico.

I have worked as a consultant for 16 large ranch properties in Texas, Arkansas and New Mexico. I also served as a consultant for two state agencies and a federal agency. I have served as an expert witness for multiple law firms on cases involving ranch properties.
External Grants and Other Research Funding (last five years)

DOD Ft. Hood, $1,350,000 funded through the Center for Natural Resources Information Technology (CNRIT) 2006-2010

USFS $310,000 development of the BRASS (Burning Risk Advisory Support System) (CNRIT) 2006-2010

Texas NRCS $163,000 FRAMS (Forage Risk Assessment and Management System) (CNRIT) 2007-2008

USDA RMA $200,000, FRAMS expansion Partnership (CNRIT) 2008-2010

USDA RMA Partnership $451,164, PestMan (Brush and weed management decision support system) 2006-2009 (GMS-CNRIT); USDA NRCS, $70,000, PestMan enhancement, 2009-2011 (CNRIT); USDA RMA, $66,900, PestMan enhancement, 2011-2012 (CNRIT)

DOD Ft. Hood, $150,000, Monitoring and maintenance of the BRASS-MIL system, 2011-2012 (CNRIT).

Texas Forest Service $72,000 20. Use of the PHYGROW model to predict fine fuel loads and fire danger in Jack, Stephens and Shakleford Counties, Texas, 2014, (CNRIT),
Stephan L. Hatch

**Academic Rank:** Professor  
**Specialization:** Plant Biosystematics  
**Appointment Basis:** 10-month

**Academic Education Background**  
Ph.D., Range Science/Taxonomy, Texas A&M University, 1971-1975  
M.S., Botany/Taxonomy, Utah State University, 1970-1972  
B.S., Range Science, Utah State University, 1965-1970

**Professional and Research Experience**  
1990-present Professor, Department of Ecosystem Science and Management, Texas A&M University (TAMU)  
1983-1990 Associate Professor, Department of Ecosystem Science and Management, Texas A&M University (TAMU)  
1979-1983 Assistant Professor, Department of Ecosystem Science and Management, TAMU  
1976-1979 Visiting Assistant(Professor), New Mexico State University, TAMU  
1979-1983 Visiting Assistant(Professor), Texas A&M University

**Teaching Experience**  
1990-present Professor, Department of Ecosystem Science and Management, Texas A&M University (TAMU)  
1983-1990 Associate Professor, Department of Ecosystem Science and Management, Texas A&M University (TAMU)  
1979-1983 Assistant Professor, Department of Ecosystem Science and Management, TAMU  
1976-1979 Visiting Assistant(Professor), New Mexico State University, TAMU  
1979-1983 Visiting Assistant(Professor), Texas A&M University

**Publications (last five years)**  

**Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)**
Ecological Consultant – Environmental Protection Agency (Forensic Botanist), Self Employed, 1983-Present

**Major Professional Self-improvement Activities (past 10 years, including sabbatical)**
Donovan Stewart Correll Memorial Award - Native Plant Society of Texas - Publication award for *The Checklist of the Vascular Plants of Texas*, 1994
Society for Range Management, Texas Section, Publication Award for *Texas Range Plants* (1995)
Society for Range Management - Outstanding Achievement Award - 2002
Wakonse South - Order of the Wakonse Bluebonnet Award for Service - 2002
Department of Rangeland Ecology and Management - “Outstanding Undergraduate Teaching Award-2003 and 2006
Robert W. Knight

Academic Rank: Associate Professor
Specialization: Watershed Management, Wildland Plants
Appointment Basis: 10-month

Academic Education Background
Ph.D., Range Watershed Management, Texas A&M University, College Station, 1980
M.S., Range Watershed Management, Oregon State University, Corvallis, 1977
B.S., Forest Management and Range Management, University of Nevada, Reno, 1975

Professional and Research Experience
1987-present Associate Professor of Rangeland Ecology and Management, TAMU
1992-2006 Associate Department Head for Academic and Student Affairs
1990-1992 Assistant Department Head for Student Affairs
1981-1987 Assistant Professor of Rangeland Ecology and Management, TAMU
1980-1981 Post-Doctoral Research Associate, TAMU

Teaching Experience
1987-present Associate Professor of Rangeland Ecology and Management, TAMU
1992-2006 Associate Undergraduate Department Head for Academic and Student Affairs
1990-1992 Assistant Department Head for Student Affairs
1977-1980 Graduate Teaching Assistant, TAMU - Range and Forest Watershed Management, Range Plants, Vegetation Evaluation
1976 Graduate Lecturer, Oregon State University - Range Ecology
1974-1975 Undergraduate Teaching Assistant, University of Nevada, Reno - Forest and Range Plants

Dates of Appointment and Promotions at Present Institution
Aug.1987-Present Associate Professor of Rangeland Ecology and Management, TAMU
1992-2006 Associate Department Head for Academic and Student Affairs
1990-1992 Assistant Department Head for Student Affairs
Jan.1981-Aug. 1987 Assistant Professor of Range Science, TAMU

Publications
Kevin L. Wagner, Larry A. Redmon, Terry J. Gentry, R. Daren Harmel, Robert Knight, C. Allan Jones, Jamie L. Foster. 2014. Effects of an off-stream watering facility on cattle behavior and instream E. coli levels. Texas Water Journal, Volume 4, Number 2, Pages 1–13

Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition
2014 Gamma Sigma Delta Teaching Award of Merit for Excellence in Teaching
2013 Texas Section Outstanding Achievement Award
1987-Present Certified Professional Soil Scientist
2000-Present Certified Professional in Rangeland Management
2006-Present Chair, COALS Undergraduate Program Committee
2008 Outstanding Undergraduate
2002-2012 Chair, TAMU University Curriculum Committee
2008  Teaching Award, Range Science Education Council and Society for Range Management
2006  Honorary Member - Golden Key Honor Society
2005  Outstanding Publication Award, Texas Section Society for Range Management
2005  Melvin and Annette Peters Advising Award, Texas A&M University
2005  Association of Former Students Distinguished College Level Teaching Award
2004  Mentor of the Year, Texas A&M University
2001  National Association of Colleges & Teachers of Agriculture Teaching Award of Merit
1999  Fellow Award - Society for Range Management
1997  Fellow Award - Texas Section, Society for Range Management
1988  Award in Excellence - Student Counseling, Texas A&M University
1979  W.G. Mills Memorial Fellowship in Hydrology

Membership and Offices Held in Professional Organizations
President, TAMU Chapter, Gamma Sigma Delta National Professional Agriculture Honor Society, 1994 and 2004

Texas Section, Society for Range Management
President, Texas Section, Society for Range Management, 2005
Chair, Texas Section Annual Meeting Committee, 2005

Texas Council of Chapters, Soil and Water Conservation Society

Society for Range Management

Member in the following Professional Societies
Alpha Zeta
American Society for Surface Mining and Reclamation
American Society of Mine Reclamation
American Society of Agronomy
American Water Works Association
Association of Undergraduate Advisors and Counselors
CAST
Gamma Sigma Delta
International Society of Soil Science
Society for Ecological Restoration
Sigma Xi
Society for Range Management
Soil and Water Conservation Society
Soil Science Society of America

Advising and Coaching Positions
1991-present Advisor, Texas Alpha Chapter of Alpha Zeta, National Agriculture Honor Society
1989-present Advisor, TAMU Student Chapter, Soil and Water Conservation Society
1983-present Coach, TAMU Plant Identification Team
1981-present Advisor, TAMU Range Club

Major Professional Self Improvement Activities
Participation in professional meetings

Teaching and Advising Improvement
Attend the Center for Teaching Excellence workshops (several each year)
Attend the TAMU University Counselors and Advisors workshops and meetings (several each year)
Merwyn Mortimer (Mort) Kothmann

Academic Rank: Professor
Specialization: Rangeland Management
Appointment Basis: 10-month

Academic Education Background
Ph.D., Range Science, Texas A&M University, 1964-68
MS, Range Management, Utah State University, 1961-63
BS, Range Management, Texas A&M University, 1957-61
Graduated, Mason High School, Mason, Texas, 1957

Professional and Research Experience
September 2009-Present  Professor & Associate Department Head, Ecosystem Science & Management
September 1979-2009  Professor, Rangeland Ecology & Management, Texas A&M University
September 1974-August 1979  Associate Professor, Range Science, Texas A&M University
August 1970-August 1974  Assistant Professor, Range Science, Texas A&M University
September 1967-August 1970  Assistant Professor, TAES Spur, Texas Agricultural Experiment Station
June 1965-August 1967  Research Assistant, Texas A&M University
March 1964-May 1965  Research Associate, Texas A&M University (Sonora)
June 1961-February 1964  Research Assistant, Utah State University
May 1960-September 1960  Range Conservationist, Student Trainee, Soil Conservation Service
1940 – 1960  Ranch Work, reared on a ranch in Mason County, Texas

Teaching Experience
September 2009-Present  Professor & Associate Department Head, Ecosystem Science & Management
September 1979-2009  Professor, Rangeland Ecology & Management, Texas A&M University
September 1974 -August 1979  Associate Professor, Range Science, Texas A&M University
August 1970-August 1974  Assistant Professor, Range Science, Texas A&M University

Dates of Appointment and Promotions at Present Institution
September 2009-Present  Professor & Associate Department Head, Ecosystem Science & Management
September 1979-2009  Professor, Rangeland Ecology & Management, Texas A&M University
September 1974-August 1979  Associate Professor, Range Science, Texas A&M University
August 1970-August 1974  Assistant Professor, Range Science, Texas A&M University
September 1967-August 1970  Assistant Professor, TAES Spur, Texas Agricultural Experiment Station
June 1965-August 1967  Research Assistant, Texas A&M University
March 1964-May 1965  Research Associate, Texas A&M University (Sonora)

Publications (last five years)
http://dx.doi.org/10.1080/17429145.2013.811547


Membership and Offices Held in Professional Organizations

Member, Society for Range Management (1959-present)
2nd VP, 1st VP, President, Society for Range Management, 2002-2005

Texas Section, Society for Range Management (1959-present)
Director, 1987-89

Member, American Forage & Grassland Council (1970-present)

Member, American Society for Animal Science (1963-2000)

Dept. Representative, Range Science Education Council (1988-present)

Secretary, 1988-89
Vice-chair, 1989-90
Chair, 1990-91

Chair, Task Force for Futures in Range Management Education, 1990-1995
Selection Committee for Outstanding Teacher, 1994-1997
Newsletter Editor, 1990-94

Major Professional Self-improvement Activities (past 10 years, including sabbatical)

Participated in many teaching, learning, and assessment workshops and conferences
Participated in Society for Range Management annual meetings
Led revision of undergraduate curricula and courses for five degree programs in ESSM (2009-present)
Coordinated Program Assessment for ESSM Department (2007-present)

External Grants and Other Research Funding (last five years)

Academy for Ranch Management (workshop fees) $53,420. (2011-2014)
USDA 3-E Grant $97,620. (2011-2015)
USDA Forest Service, Caddo National Grassland $1,587. (2013-2014)
Duncan Spade Ranch (Gift) $58,000. (2011-2014)
Sid Kyle $10,000. (2011-2014)
Undergraduate Teaching Assistants $6,720. (2011-2014)
Dean’s Grant for Development of Ecofolio $3,600. (2011)
Urs P. Kreuter

**Academic Rank:** Professor

**Specialization:** Human Dimensions of Ecosystem Management

**Appointment Basis:** 10-month

**Academic Education Background**
Ph.D., Range Science, Utah State University, Logan, Utah, 1992
M.A., Economics, Utah State University, Logan, Utah, 1989
M.S., Grassland Science, University of Natal, South Africa, 1985
B.S., Grassland Science (*cum laude*), University of Natal, South Africa, 1982

**Professional and Research Experience**
- Sept 2010-present: Professor, Department of Ecosystem Science & Management, TAMU
- Sept 2004-Aug 2008: Associate Professor, Department of Ecosystem Science & Management, TAMU
- Jan 1998-Aug 2004: Assistant Professor, Department of Rangeland Ecology & Management, TAMU
- Nov 1996-Dec 1997: Sales Manager/Assistant Product Line Manager, OI Corp, College Station, Texas
- Sept 1995-Oct 1996: Assistant Project Manager, Pioneer Environmental Services, Logan, Utah
- Aug 1994-Aug 1995: President, Vector Flow L.C., College Station, Texas
- Dec 1992-Jul 1994: Research Associate, Department of Rangeland Ecology & Management, TAMU
- Sept 1987-Dec 1989: Research/Teaching Assistant, Range Science Dept, Utah State Univ, Logan, Utah
- July 1984-Dec 1985: Lecturer, Grassland Science Department, University of Natal, South Africa
- Feb 1983-Jun 1984: Research Scientist, Department of Agriculture, South Africa

**Teaching Experience**
- Sept 2010-present: Professor, Department of Ecosystem Science & Management, TAMU
- Sept 2004-Aug 2008: Associate Professor, Department of Ecosystem Science & Management, TAMU
- Jan 1998-Aug 2004: Assistant Professor, Department of Rangeland Ecology & Management, TAMU
- Sept 1987-Dec 1989: Research/Teaching Assistant, Range Science Dept, Utah State Univ, Logan, Utah
- July 1984-Dec 1985: Lecturer, Grassland Science Department, University of Natal, South Africa

**Dates of Appointment and Promotions at Present Institution**
- Jan 1, 1998: Assistant Professor (initial appointment), Department of Rangeland Ecology and Management, TAMU
- Sept 1, 2004: Tenured and Promoted to Associate Professor, Department of Ecosystem Science and Management, TAMU
- Sept 1, 2010: Promoted to Full Professor, Department of Ecosystem Science and Management, TAMU

**Publications (last five years)**

David Toledo, Urs P. Kreuter, Michael G. Sorice, Charles A. Taylor, Jr. 2014. The role of Prescribed Burn Associations in the Application of Prescribed Fires in Rangeland Ecosystems. Journal of Environmental Management 132:323-328


David Toledo, Urs P. Kreuter, Michael G. Sorice, and Charles A. Taylor (Jr). 2012. To burn or not to burn: Ecological restoration, liability concerns and the role of prescribed burning associations. Rangelands 34: 18-23


Off-campus Consulting, Other Professional Activities, Special Honors and Recognition (past 5 yrs)
Society for Range Management Outstanding Achievement Award – Academia/Research, 2014
Texas Section of Society for Range Management Technical Publication Award, 2103
COALS Dean’s Award for Outstanding Achievement – Interdisciplinary Research Team, 2103
Assoc. Former Students’ Distinguished Achievement Award – College Level Teaching, 2013
PhD advisor: David Toledo who was awarded Texas A&M University Distinguished Graduate Award for Excellence in Research; and Dianne A. Stroman who was awarded Texas A&M University Distinguished Graduate Award for Excellence in Teaching, 2013
Senior Scientist, Norman Borlaug Institute for International Ag., Texas A&M Univ., 2011-2016
Distinguished Visiting Scientist, CSIRO, Townsville, QLD, Australia, 2011
Conference Summation Speaker: IX International Rangeland Congr., Rosario, Argentina, 2011
Department of Ecosystem Sci. & Management Graduate Professor of the Year, 2010

Membership and Offices Held in Professional Organizations
Society for Range Management: Member (1988-2014); Finance Committee (Feb 2013-2016); Editorial Board (Associate Editor), Rangeland Ecology & Management (Feb 2008- Feb 2011); Rangeland Ecology & Management Steering Committee (Feb 2004-Feb 2006); Journal of Range Management Task Force (Feb 2003-Feb 2004); Program Committee Co-chair for 58th Annual Meeting of SRM (Feb 2002-Feb 2005); International Affairs Committee Chair (Feb 2001-Feb 2002), Chair-elect (Feb 2000-Feb 2001), Member (Feb 1998-present)
International Rangeland Congress Continuing Committee for International Rangeland Congress (Elected, July 2003-June 2011)
International Association for Society and Natural Resources: Member (2002-2010); Scientific Advisory Committee for International Symposium on Society & Resource Management (January 2006-June 2007)
Grassland Society of Southern Africa: Member (1981-1995)

Major Professional Self-improvement Activities (past 10 years, including sabbatical)
Distinguished Visiting Scientist, CSIRO, Townsville, QLD, Australia, May 2011-Aug 2011
W-Course Workshop: “Integration of Writing in the Classroom: Development of a W Course,” Center for Teaching Excellence, TAMU, Mar 2006
Teaching Portfolio Workshop, Center for Teaching Excellence, TAMU, Feb 2001
External Grants and Other Research Funding (last five years)

Slowing the Expansion of Woodlands and Increasing the Resilience of Grasslands in the Southern Great Plains; NSF Dynamics of Coupled Human & Nat. Systems program, $1,369,990 (PI: B Wilcox, Co-PIs U Kreuter, M Sorice (UVT), W v. Leewen [UA], C Zou [OSU])

Impacts of oil and gas interests on private lands conservation in environmentally sensitive coastal areas of Texas; Houston Advanced Research Center $99,902 (PI with Zachary Hurst – Co-PI), 2013-2015

Restoring Ecosystem Services and Enhancing Livelihoods on Degraded Rangelands in Southern Africa through the Development of Culturally Appropriate Livestock Grazing Strategies; Ukulima Research Farm, South Africa. $74,122 (Co-PI with Richard Teague – PI; William Rogers – Co-PI), 2012-2014

Stakeholder Perceptions of Low-temperature Geothermal Energy Development in Environmentally Sensitive Coastal Areas in Texas; Houston Advanced Research Center. $75,000 (PI, Marian Higgins – Co-PI), 2011-2014

Assessing landowner incentives to improve range management practices that enhance sustainability and the quality of water discharging from the Burdekin Catchment in the Great Barrier Reef World Heritage Area, in the face of climate change; CSIRO, OCE Distinguished Visiting Scientist Award. A$12,500 (PI), 2011

Future Viability of Perpetual Conservation Easements as a Tool for Maintaining Ecosystem Integrity; The Nature Conservancy. $10,000 (PI with Dianne Stroman – Co-PI), 2010-2013


PROFESSIONAL PREPARATION

2012 Ph.D. Double Major, Indiana University
- Geological Sciences,
- Evolution, Ecology and Behavior
2007 M.S. Quantitative Biology, University of Texas at Arlington
2003 B.S. Biology, University of Texas at Arlington

ACADEMIC APPOINTMENTS

Jan 2014 – present Assistant Professor, Spatial Sciences Laboratory, Department of Ecosystem Science and Management, Texas A&M University, College Station, TX 77845
Dec 2012 – Dec 2013 Postdoctoral Fellow, National Institute for Mathematical and Biological Synthesis (NIMBioS), University of Tennessee, Knoxville, TN 37996

PUBLICATIONS (last 5 years)


Meik, Jesse M., Kirk Setser, Estrella Monciño-Deloya, and **A. Michelle Lawing**. 2012. Sexual


### Relevant Activities

2012 – present **Secretary**, Integrated Climate Change Biology (iCCB) Initiative, International Union of Biological Sciences

2014 **Core Faculty**, Ecology and Evolutionary Biology Interdisciplinary Research Program, Texas A&M University

2014 **Nominated Faculty**, Applied Biodiversity Sciences, Texas A&M University

### Select Awards

2013 National Center for Ecological Analysis and Synthesis (NCEAS) Summer Institute for Early Career Researchers (~5% acceptance)

2012 – 2013 National Institute for Mathematical and Biological Synthesis (NIMBioS), Postdoctoral Fellow, Knoxville, TN

2012 NatureServe Biodiversity Postdoc Fellow, SUNY Stony Brook, NY (Offer declined)

2011 Departmental Citizenship Award, IU Dept of Geological Sciences

2010 Best Publication Award, IU Dept of Geological Sciences

2009 Estwing Academic Achievement Award, IU Dept of Geological Sciences

2008 Paleobiology Database Intensive Summer Course UCSB, NCEAS

2007 – 2008 Galloway/Perry/Horowitz Graduate Fellowship, IU

2004 – 2006 College of Science Recognition of Academic Excellence, UTA

### Courses Taught in Past 3 Years

ESSM 462 Advanced GIS, 464 Spatial Project Management, 689 Special Topics in Quantitative Methods in Ecology, Evolution, and Biogeography

G116 Dinosaurs and their relatives

### Select Funding

2014 iCCB funding 21K Euros from the International Union of Biological Sciences

2012 – 2013 National Institute for Mathematical and Biological Synthesis (NIMBioS), Postdoctoral Fellow, Knoxville, TN $53K/year


2011 McCormick Science Grant, College of Arts and Sciences, IU - $2,500
2007 – 2008  Galloway/Perry/Horowitz Graduate Fellowship, IU - $18,000
Carol Loopstra

**Academic Rank:** Associate Professor  
**Specialization:** Forest Molecular Biology  
**Appointment Basis:** 10-month appointment

**Academic Education Background**
BS, Forest Management, Oregon State University, 1979  
MSc, Forest Science, Oregon State University, 1984  
PhD, Genetics and Forestry, North Carolina State University, 1992

**Professional and Research Experience**
2001-present  
Associate Professor, Dept. of Ecosystem Science and Management, Texas A&M University, College Station, TX, USA

2002-2006  
Associate Department Head for Graduate Programs, Dept. of Forest Science, Texas A&M University

1995-2001  
Assistant Professor, Dept. of Forest Science, Texas A&M University  
Member of the Faculty of Molecular and Plant Sciences, Texas A&M University

1995-present  
Member of the Faculty of Genetics, Texas A&M University

1993 - 1994  
Research Officer, The University of Queensland, Brisbane, Australia*  
Research Fellow, Griffith University, Brisbane, Australia*

1992 - 1993  
These were the same postdoctoral position. Our university affiliation changed.

1990 – 1992  
Graduate Research Assistant, North Carolina State University

1984 – 1989  
Biologist, Institute of Forest Genetics, USDA Forest Service, Pacific Southwest Research Station

**Teaching Experience**
1995-present  
Texas A&M University, Dept. of Forest Science/Dept. of Ecosystem Science and Management, Assistant/Associate Professor

1993-1994  
The University of Queensland, Research Officer, Supervised an honors student and a graduate student

1991  
North Carolina State University, Graduate Teaching Assistant

**Dates of Appointment and Promotions at Present Institution**
2001-present  
Associate Professor, Dept. of Ecosystem Science and Management

1995-2001  
Assistant Professor, Dept. of Forest Science, Texas A&M University

**Publications (last five years)**


**Off-campus Consulting, or Other Professional Activities, Special Honors, Recognition (past five years)**

Review Panelist for one National Science Foundation (NSF) grant program (Plant Genome 2011) and one US Department of Agriculture/Department of Energy grant program (Plant Feedstock Genomics 2005)

Review Panelist for Genome British Columbia (2008) and Genome Canada (2005, 2013)

Manuscript Reviews – numerous scientific journals including Plos One, BMC Genomics, Tree Genetics and Genomes, New Phytologist, Tree Physiology, Proceedings of the National Academy of Science

Reviewed Promotion or Tenure Dossier for faculty members at University of Florida, Mississippi State and Oregon State

**Major Professional Self-improvement Activities (past 10 years)**

Professional Development Leave, Spring 2012

Numerous workshops to improve teaching including participation in the Faculty Teaching Academy

**External grants and other research funding during the last five years**


Martin et al. (~54 co-PIs) Southern Conifer Climate Change Cap. 2011-2016. USDA AFRI, $20,000,000 total

Krutovsky et al. (12 co-PIs) A graduate program in forest resources: Developing integrated expertise in forest resource management, conservation, and restoration. 2009-14. USDA Food and Agricultural Sciences National Needs Graduate and Postgraduate Fellowship Grants Program, $234,000

Neale, de Jong, Langley, Loopstra, Main, Mockaitis, Salzberg, Wegrzyn, Yorke. Loblolly Pine Genome Project. 2011-2016. USDA AFRI, $14,994,424

Robert K. Lyons

Academic Rank: Professor
Specialization: Extension Range Specialist
Appointment Basis: 12-month

Academic Education Background
Ph.D., Range Science, Texas A&M University, 1990
M.S., Animal Science, Rutgers University, 1971
B.S., Animal Science, Rutgers University, 1969

Professional and Research Experience
1994 to present  Extension Range Specialist, Uvalde, TX
1990-1992  Post-Doctoral Research Scientist, Department of Rangeland Ecology &
Management, College Station

Teaching Experience
1992-1994  Visiting Assistant Professor, Department of Rangeland Ecology & Management,
Texas A&M University

Dates of Appointment and Promotions at Present Institution
September 1, 1994 Assistant Professor
September 1, 1999 Associate Professor
September 1, 2005 Professor

Publications (last five years)
Weed and Brush Control Suggestions for Rangeland, Texas AgriLife Extension Service.
Extension Publication ERM-001.
Service.
Service.
landowners, Texas AgriLife Extension Service.
Cattle, Texas AgriLife Extension Service.
Texas AgriLife Extension Service.
Service.

Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five
years)
TS-SRM Fellow Award 2014
TS-SRM Publication Award: Popular Article, B-5046, Pricklypear Biology and Management., Texas
AgriLife Extension Service. 2011
TS-SRM Publication Award: Popular Article, B-622, Estimating Grazeable Acres. Texas AgriLife Extension
Service. 2010
Membership and Offices Held in Professional Organizations

Member Society for Range Management, 1988 to present

Texas Section-Society for Range Management Board of Directors, 2005-2008

Associate Editor, Rangeland Ecology and Management (formerly Journal of Range Management), 2003-2005

Chairman, Publications Awards Committee, Texas Section-Society for Range Management, 2004

Co-Chairman, Technical Session Program, Texas Section-Society for Range Management Annual Meeting Committee, Texas Section-Society for Range Management Member, 2004

Chairman, Information and Education Committee, Texas Section-Society for Range Management, 1996

Major Professional Self-improvement Activities (past 10 years, including sabbatical)

2013 Society for Range Management Annual Meeting, Oklahoma City, OK

2011 Society for Range Management Annual Meeting, Billings, MT

2009 Society for Range Management Annual Meeting, Albuquerque, NM 4th National Conference on Grazing Lands, Reno, NV

2008 Society for Range Management Annual Meeting, Louisville, KY

External Grants and Other Research Funding (last five years)


Lyons, R.K. 2010. Lone Star Healthy Streams. $6,055 ($6,055 direct control).
Alyson K. McDonald

**Academic Rank:** Assistant Professor and Extension Range Specialist  
**Specialization:** Rangeland Hydrology  
**Appointment Basis:** 12-month, 100% Extension

**Academic Education Background**  
Ph.D., Water Management and Hydrological Science (Surface-Groundwater Interactions), Texas A&M University, 2002-2010  
M.S., Natural Resource Management (Upland Hydrology), Sul Ross State University, 1998-2001  
B.S., Animal Science (Range Management), Angelo State University, 1990-1994

**Professional and Research Experience**  
2011-present  Adjunct faculty, School of Agricultural and Natural Resource Sciences, Sul Ross State University, Alpine, Texas  
2010-present  Extension Specialist and Assistant Professor, Department of Ecosystem Science and Management  
2006-2010  Extension Program Specialist, Department of Ecosystem Science and Management  
2002-2006  Extension Assistant- Hydrology, Department of Rangeland Ecology and Management, Texas Cooperative Extension, Fort Stockton, Texas  
2000-2002  Compliance Specialist, Bureau of Feed, Seed, & Fertilizer, New Mexico Department of Agriculture, Las Cruces, New Mexico  
1996  Field Office Assistant, Highland Soil and Water Conservation District, Marfa, Texas  
1995  Soil Survey Assistant, USDA-Natural Resources Conservation Service, Presidio County Soil Survey, Marfa, Texas

**Teaching Experience**  
2011-present  Adjunct faculty, School of Agricultural and Natural Resource Sciences, Sul Ross State University, Alpine, Texas  
Spring 1999  Horticulture Laboratory, Graduate Teaching Assistant, Sul Ross State University, Alpine, Texas  
Spring 1998  Range Inventory and Analysis Laboratory, Graduate Teaching Assistant, Sul Ross State University, Alpine, Texas  
Fall 1998  Soils Laboratory, Graduate Teaching Assistant, Sul Ross State University, Alpine, Texas

**Dates of Appointment and Promotions at Present Institution**  
2010  Promoted to Assistant Professor and Extension Specialist, Department of Ecosystem Science and Management  
2006  Promoted to Extension Program Specialist, Department of Ecosystem Science and Management  
2002  Extension Assistant, Department of Ecosystem Science and Management (initial appointment)

**Publications (last five years)**  


**Membership and Offices Held in Professional Organizations**

Texas Water Foundation Young Professionals
Texas Section Society for Range Management
National Groundwater Association
Texas Ground Water Association
American Geophysical Union – Hydrology Section
Geological Society of America – Hydrology Section

**External Grants and Other Research Funding (last five years)**

Impacts of Creosotebush-tarbush Control on Rainfall Infiltration and Forage production in the Rio Grande Basin $16,135, with G. Gangegunte, 2012-2013
RiverWare model enhancement for water operations planning in irrigation districts, $51,963, with Z. Sheng and Y. Liu, 2012-2013
Characterization of the Hydrogeology within the Pecos River Ecosystem Study Area Using Resistivity Profiling Techniques, Mentone, Texas CSREES-RGBI Co-PI $10,000 direct control, with A. Teeple USGS, 2006
Monitoring and Evaluation of the Pecos River Ecosystem Project, Texas Water Resources Institute/US Geological Survey Graduate Student Grant. $4,185 direct control, 2006
Quantity and Fate of Water Salvage as a Result of Saltcedar Control, EPA 319 Program, Co-PI, $88,127 Total, 2004-2007
Rangeland Rehabilitation through Water Conservation/Concentration, Texas Water Resources Institute. $6,348 direct control, 2003
Binayak P. Mohanty

**Education**

1989-1992  Ph.D., Soil and Water Engineering (major) and Environmental Engineering (minor), Iowa State University, Ames, Iowa, USA

1986-1987  M.E., Soil and Water Engineering (major) and Water Resources Engineering (minor), Asian Institute of Technology, Bangkok, Thailand

1981-1985  B.Sc., Agricultural Engineering and Technology, Orissa University of Agriculture & Technology, Bhubaneswar, India

**Positions**

2014-  Regents Professor and College of Agriculture and Life Sciences (CoALS) Chair in Hydrologic Engineering and Sciences, Texas A&M University, College Station

2004-2014  Professor (Hydrology), Depts. of Biological and Agricultural Engineering and Ecosystem Science and Management, Texas A&M University, College Station

2001-2004  Associate Professor (Hydrology), Depts. of Biological and Agricultural Engineering and Ecosystem Science and Management, Texas A&M University, College Station

1993-2001  Associate, Assistant, and Post-Doctoral Researcher, Dept. of Environmental Sciences, University of California, Riverside; located at U. S. Salinity Laboratory, USDA-ARS

**Selected Honors and Awards**

2014  Don and Betty Kirkham Soil Physics Award, Soil Science Society of America (SSSA)

2014  Regents Professor, Texas A&M University System

2014  Inaugural Holder of College of Agriculture and Life Sciences (CoALS) Chair in Hydrologic Engineering and Sciences, Texas A&M University

2014  TEES Senior Fellow, Texas A&M Engineering

2013  NASA Group Achievement Award for a Successful Pre-Launch Field Campaign (SMAPVEX12) in Manitoba, Canada, in Support of SMAP Algorithm and Applications Development

2013,14 Protégé, The Academy of Medicine, Engineering, and Science of Texas (TAMEST)

2012  Fellow, Soil Science Society of America (SSSA) & Agronomy Society of America (ASA)

2012  Fellow, Texas AgriLife Research

**Significant Professional Activities**

- **PI, Co-PI, and Co-I of 35+ Competitive National and International Grants Totaling ~ US $ 55 million**
- **Membership: American Geophysical Union (AGU); Soil Science Society of America (SSSA); Agronomy Society of America (ASA); American Meteorological Society (AMS); American Association for the Advancement of Science (AAAS); also member of Interdisciplinary Water Management and Hydrologic Sciences (WMHS) Program and Institute for Scientific Computing (ISC) at Texas A&M University**
- **Organizing Committee Gordon research Conference in Flow and Transport in Porous Media (2008)**
- **CUAHSI Texas A&M University Representative, 2007-**
• **Member, Organizing Committee**, 2014 Texas Water Summit, The Academy of Medicine, Engineering, and Science of Texas (TAMEST) (2013-2014)
• **Chairman**, Symposium/Workshop on Arid Zone Hydrology under Climate Change Scenarios for the 21st Century, Institute of Applied Mathematics and Computational Science (IAMCS), Texas A&M University (2014)

**Journal Papers since 2010 (Career Total – 100+)**
[* indicates graduate student or postdoc under my supervision]*


Georgianne Moore

Academic Rank: Associate Professor
Specialization: Ecohdrology
Appointment Basis: 10-month

Academic Education Background
Ph.D., Environmental Sciences, Oregon State University, 2003
B.S., Biology, Georgia Institute of Technology, 1995

Professional and Research Experience
2012-present Associate Professor, Department of Ecosystem Science and Management, Texas A&M University (TAMU)
2005-2012 Assistant Professor, Department of Ecosystem Science and Management, Texas A&M University (TAMU)
2003-2004 Postdoctoral Research Associate, Texas Agricultural Experiment Station, Texas A&M University

Courses Taught (past 5 years)
Ecological Restoration of Wetland and Riparian Systems (ESSM 420 and ESSM 631). (2-2)
Advanced Restoration Ecology: Current Concepts and Emerging Issues (ESSM 430) (3-0)
Introduction to Ecological Restoration (RLEM 103) (1-0)

External Grants and Other Research Funding (past 5 years) ➔ Over $10 Million since 2005
NASA Rapid (8/14-7/17) Using LiDAR to develop a climate-driven model of the disintegration and decay of trees killed during a severe drought. S. Popescu (PI), G. Moore, J. Vogel. $396,750.
Texas Water Development Board. (1/10-1/11) Sabine River Riparian Vegetation Assessment Related to Flow Modifications. G. Moore (PI). $30,000
USDA National Institute of Food and Agriculture (7/06-6/11) Efficient Irrigation for Water Conservation in the Rio Grande Basin. B. Harris (PI) and 29 co-PI’s, including G. Moore. Six separate awards totaling $6,250,009: 2005 ($1,388,981), 2006 ($1,548,069), 2008 ($1,151,931), 2009 ($1,081,453), and 2010 ($1,079,575). Congressional appropriations. Annually, submit internal competitive proposals to B. Harris.
Publications (last five years)

Major Professional Self-improvement Activities (past 10 years, including sabbatical)
Faculty member of interdisciplinary interdepartmental research and graduate programs in Water Management and Hydrological Sciences, Ecology and Evolutionary Biology, Applied Biodiversity Sciences, and Molecular and Environmental Plant Sciences
Faculty mentor for Research Experience for Undergraduates program at the TAMU Soltis Center in Costa Rica, funded by the National Science Foundation
Educational outreach: President-Elect of Texas Riparian Association; host workshops for water resources personnel statewide in a variety of hydrology, water management, and resource policy topic areas
Research team member at Costa Rica AmeriFlux sites to study carbon exchange and water use in wet tropical forests
Research team member at Freeman Ranch AmeriFlux sites to monitor the impact of woody encroachment on carbon exchange and water use on the Edwards Plateau, TX
Developed new sapflow methodology for measurement of stand-level transpiration
NAME
William E. Pinchak

POSITION TITLE
Professor

EDUCATION/TRAINING

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE</th>
<th>YEAR(s)</th>
<th>FIELD OF STUDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angelo State University, San Angelo, TX</td>
<td>B.S.</td>
<td>1978</td>
<td>Biology/Chemistry</td>
</tr>
<tr>
<td>University of Wyoming, Laramie, WY</td>
<td>Ph. D.</td>
<td>1983</td>
<td>Range Science</td>
</tr>
</tbody>
</table>

Positions and Employment:

2007-   Professor, Range Animal Nutritionist, TAES, Vernon
1990-2006  Associate Professor, Range Animal Nutritionist, TAES-Vernon
1984-1989  Assistant Professor, Range Animal Nutritionist, TAES-Vernon
1983-1984  Assistant Professor, Range Science, Colorado State University
Range Animal Ecologist.

Professional Memberships and Honors:

American Society of Animal Science
Society for Range Management
Plains Nutrition Council
Outstanding Professor Award, CSU 1984
Outstanding Achievement Award, Society for Range Management, 2003.
W-1012 Project on Forage Based Beef Cattle Production (Chair, 2005)

Publication Summary (2009-2014):

<table>
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<tr>
<th>Publication Type</th>
<th>Number</th>
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<tr>
<td>Peer-Reviewed Publications</td>
<td>20</td>
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<tr>
<td>Abstracts at Scientific Meetings</td>
<td>13</td>
</tr>
<tr>
<td>Invited Presentations and Conference Proceedings</td>
<td>14</td>
</tr>
<tr>
<td>Experiment Station Reports and Popular Press Articles</td>
<td>5</td>
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</table>

Selected Publications (2010-2014):


*Rangeland Ecology and Management* 63:286-297


*Professional Animal Scientist* 28:464-472

*The Professional Animal Scientist* 29:179-187

*The Professional Animal Scientist* 29:179-187


Sorin Popescu

Academic Rank:  Associate Professor  
Specialization:  Forestry Remote Sensing  
Appointment Basis:  10-month

Academic Education Background  
Ph.D., Forestry, Virginia Tech University, Aug. 1997-May 2002  
Diploma Degree, Forest Engineering, Transylvania University of Brasov, Romania, 1987-1992

Professional and Research Experience  
Sept. 2009-present  Associate Professor with tenure, Department of Ecosystem Science and Management, Texas A&M University (TAMU)  
July 2003-Aug.2009  Assistant Professor Department of Ecosystem Science and Management, Texas A&M University (TAMU)  
June 2002-June 2003  Postdoctoral Research Associate, Dept. of Forest Resources and Environmental Conservation, Virginia Tech, USA  
Aug.1997-May 2002  Graduate Research and Teaching Assistant, Dept. of Forest Resources and Environmental Conservation, Virginia Tech  
June 1996-Aug. 1996  GIS Analyst, Canadian Geomatic Solutions, Calgary, Canada  
June 1996-Aug. 1996  Research Assistant, Dept. of Forest Biometrics, University of Freiburg, Germany  
Sept. 1992-May 1997  Assistant Lecturer, Transylvania University of Brasov, Romania

Teaching Experience  
Sept. 2009-present  Associate Professor with tenure, Department of Ecosystem Science and Management, Texas A&M University (TAMU)  
July 2003-Aug.2009  Assistant Professor Department of Ecosystem Science and Management, Texas A&M University (TAMU)  
Aug.1997-2003  Teaching and Research Assistant, Dept. of Forest Resources and Environmental Conservation, Virginia Tech, USA  
Sept. 1992-May 1997  Assistant Lecturer, Transylvania University of Brasov, Romania

Dates of Appointment and Promotions at Present Institution  
Sept 1, 2009  Associate Professor, Department of Ecosystem Science and Management, TAMU  
Sept 1, 2009  Tenured, Department of Ecosystem Science and Management, TAMU  
July 1, 2003  Assistant Professor (initial appointment), Department of Forest Sciences, TAMU  
Aug. 2002-June 2003  Postdoctoral Research Associate, Dept. of Forest Resources and Environmental Conservation, Virginia Tech, USA  
Aug. 1997-May 2002  Graduate Research and Teaching Assistant, Dept. of Forest Resources and Environmental Conservation, Virginia Tech  
Sept. 1992-May 1997  Assistant Lecturer, Transylvania University of Brasov, Romania

Publications (last five years; graduate students in italics)  
distribution in *Spartina alterniflora* dominated salt marshes. *Estuarine, Coastal and Shelf Science*


- **Book Chapters**


- **Editor of Proceedings** (peer-reviewed and edited)


**Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)**

Guest Editor, Photogrammetric Engineering & Remote Sensing, March 2011 issue

Editor in Chief, Annals of Forest Research, an ISI-ranked journal

NASA New Investigator in Earth Sciences 2008-2014

President, American Society for Photogrammetry and Remote Sensing (ASPRS) Mid-South Region, 2011-2012; Vice-President 2007-2010

Member of three departmental committees, Tenure and Promotion, Graduate Program, and Clientele Engagement Committee

Chair of one international conference on lidar remote sensing organized at TAMU in 2009; member of scientific committees of 5 international conferences on lidar remote sensing

Reviewer for federal granting agencies (NASA, NSF, NSERC -Canada) and numerous scientific journals
Invited keynote speaker at Silvilaser 2011 in Australia (Tasmania)
Developed software applications for lidar remote sensing of forest resources
2008 Graduate Professor of the Year, Department of Ecosystem Science and Management, Texas A&M University
Founder and current advisor for the TAMU ASPRS Student Chapter

Membership and Offices Held in Professional Organizations
American Society for Photogrammetry and Remote Sensing (ASPRS) Mid-South Region, President 2011-2012; Vice-President 2007-2010
Member, American Society for Photogrammetry and Remote Sensing, 1997-2012
Member, Society of American Foresters, 1997-2005
Xi Sigma Pi, The Honor Society of Forestry
Sigma Xi, The Scientific Research Society

Major Professional Self-improvement Activities (past 10 years, including sabbatical)
Peer review of teaching: Ms. Jean Layne, Program Coordinator, Center for Teaching Excellence, TAMU
   May 2006, FRSC 608/RENR 444 – observed classroom teaching, collected student feedback, and discussed teaching assessment with instructor
   October 2006, FRSC/GEOG 398 – observed classroom teaching and organized online student survey with the Measurement and Research Services
Faculty Teaching Academy, Center for Teaching Excellence, Texas A&M University, Sept 2007-March 2008
A+ Advantages: Using Technology to Help Your Students and You. Workshop on Technology-Mediated Instruction, College of Sciences, January 18, 2005
Professional Development Workshop, Dean of Faculties, TAMU: Do We Look at Teaching in the Tenure Review Process? Documenting Your Teaching for Promotion and Tenure. November 18, 2004
WebCT Quick Start Workshop, Computing and Information Services (CIS) Training Center, Texas A&M University, July 30, 2003

External Grants and Other Research Funding (last five years)
Summary: $1,712,993 grant funds directly available as PI at TAMU ($2,761,963 total at TAMU)
NASA Rapid Response: Using LiDAR to develop a climate-driven model of the disintegration and decay of trees killed during a severe drought, PI, 2014-2017, $347,426
TCEQ Land Use/Land Cover Mapping using Landsat 8 Imagery for Biogenic Emissions, PI, 2014-2015, $141,000
NASA ROSES: ICESat-2 Science Definition Studies to Measure Forest Structure, Co-PI, 2012-2014, $258,044
NSF IDR: Development of a monitoring system using UAVs for forest management, Co-PI, 2010-2013, $424,984
NASA New Investigator Program in Earth Sciences, PI, 2008-2012, $343,043
National Institute of Food and Agriculture, Food and Agricultural Sciences, National Needs, Graduate and Postgraduate Fellowship, 2009 – 2014, A Graduate Program in Forest Resources, Co-PI, 2009-2014, $234,000,
NASA: Satellite and airborne profiling laser sensors for multiscale vegetation assessment, PI, 2008-2010, $82,000
USDA Forest Service: Lidar-assisted Forest Inventory and Analysis (FIA), PI, 2009-2012, $60,000
Texas Commission for Environmental Quality: Urban Vegetation for Biogenic Emissions, PI, 2011, $145,000
Texas Commission for Environmental Quality: Spatial Analysis of Vegetation in Eastern Texas via Hyperspectral Imagery and LiDAR, PI, 2010, $100,000
Texas Bioenergy Initiative: Brush to biogas: potential for converting rangeland woods to biogas, Co-PI, 2009, $150,000
Texas Bioenergy Initiative: Biomass Availability and Feedstock Transport Logistics of Rangeland Woody Plants for Bioenergy Uses, Co-PI, 2009, $50,000
Texas Commission for Environmental Quality: Expansion of Texas Land Use/Land Cover Through Crosswalking and Lidar Parameterization of Arboreal Vegetation, PI, 2009, $110,000
William E. Rogers

Academic Rank: Professor
Specialization: Plant Ecology, Ecological Restoration
Appointment Basis: 9-month

Academic Education Background
Ph.D., Biology (Ecology Emphasis), Kansas State University, Manhattan, KS, 1998

Professional Research and Teaching Experience
2014-present Professor, Department of Ecosystem Science and Management
2008-2014 Associate Professor, Department of Ecosystem Science and Management
2005-2008 Assistant Professor, Department of Rangeland Ecology and Management, Texas A&M University
1999-2005 Huxley Research Instructor/Faculty Fellow, Department of Ecology & Evolutionary Biology, Rice University, Houston, Texas

Current Teaching Responsibilities

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hrs</th>
<th>Frequency Taught</th>
<th>Recent Student Evaluations (overall mean out of 5.0)</th>
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<tbody>
<tr>
<td>Undergraduate courses</td>
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<tr>
<td>ESSM 320</td>
<td>3</td>
<td>Annually Spring 2013-2014</td>
<td>‘13=4.66; ‘14=4.55</td>
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<tr>
<td>RLEM 320</td>
<td>2</td>
<td>Annually Spring 2006-2012</td>
<td>‘10=4.62; ‘11=4.68; ‘12=4.68</td>
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<tr>
<td>RLEM 321</td>
<td>1</td>
<td>Annually Spring 2006-2012</td>
<td>‘10=4.70; ‘11=4.84; ‘12=4.64</td>
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<tr>
<td>ESSM 416</td>
<td>3</td>
<td>Annually Fall 2007-2013</td>
<td>‘10=4.49; ‘11=4.82; ‘12=4.88</td>
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<tr>
<td>RLEM 485-RENR400</td>
<td>8</td>
<td>Summer 2012</td>
<td>4.71</td>
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<tr>
<td>Graduate courses</td>
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<td></td>
</tr>
<tr>
<td>ESSM 626</td>
<td>3</td>
<td>Annually Fall 2007-2013</td>
<td>‘10=4.78; ‘11=4.71; ‘12=4.79</td>
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<tr>
<td>RLEM 681</td>
<td>1</td>
<td>Spring 2007/Fall 2011</td>
<td>‘11=5.0</td>
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<tr>
<td>RLEM 685</td>
<td>1</td>
<td>Spring 2007</td>
<td>n/a</td>
</tr>
<tr>
<td>RLEM 691</td>
<td>variable</td>
<td>Spring/Summer/Fall</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Publications (past 5 years): Lifetime peer-reviewed publications=56; Extension publications=2; h-index=21; *undergraduate advisee; † graduate student advisee


**External Grants and Other Research Funding (past 5 years)**

- **Funding=>$4 million since 2000**
  - 2013-2015 Co-PI (w/ Gil Rosenthal and 10 others) Texas A&M University Reallocation Activity 2 “Tier One Program (TOP) interdisciplinary education grant in Ecology & Evolutionary Biology.” $300,000.
  - 2011-2014 Co-Investigator (w/ Fred Smeins), Brazos Valley Solid Waste Management Agency “Continuation of Interlocal Agreement Regarding Conservation Strategies for the Protection and Propagation of the Federally Endangered Orchid, Navasota Ladies Tresses (*Spiranthes parksii*)” $104,139.
  - 2011 Principal Investigator (w/ Dirac Twidwell), Rob & Bessie Welder Wildlife Foundation, “Continuation of Studies Investigating the Ecological Effects of Prescribed Extreme Fires in a Coastal Prairie Ecosystem.” $9,600.
  - 2010-2012 Co-Investigator (w/ Jason B. West and Bob Lyons). Wintergarden Groundwater Conservation District, “Effects of Mechanical Brush Removal and Fire on Plant
Community Dynamics and Distributed Recharge of the Carizzo-Wilcox aquifer.” $209,407.

2010-2012 Co-Investigator (w/ Fred Smeins, Bob Lyons, Wayne Hanselka and Josh McGinty), DuPont Crop Protection and Land Management Services, “A New Herbicide for Managing Woody Encroachment in South Texas: Rate and Season of Application of Aminocyclopyrachlor on the Control of Acacia farnesiana and Prosopis glandulosa.” $56,000

2010-2013 Co-PI (w/ PI-Kostya Krutovsky and 10 other TAMU faculty) United States Department of Agriculture-National Needs Initiative. “A Graduate Program in Forest Resources: Developing Integrated Expertise in Forest Resource, Management, Conservation, and Restoration.” $234,000 (plus $78,000 in internal matching funds to support additional student fellowships).


2006-2011 Principal Investigator (w/ Fred Smeins), BVSWMA & USFWS “Conservation Strategies for the Protection and Propagation of the Federally Endangered Orchid, Navasota Ladies Tresses (Spiranthes parksii).” $384,262

Membership and Offices Held in Professional Organizations
Member of Society for Range Management
Member of Ecological Society of America
Member of Society for Ecological Restoration
Member of American Botanical Society
Member of International Association of Vegetation Science

Professional Activities, Special Honors and Recognition (past 5 years)
Outstanding Undergraduate Instructor Award, TAMU ESSM Department, 2014-2015
Promotion to Full Professor in TAMU ESSM Department, 2014
Appointed Editor-in-Chief for Plant Ecology (published by Springer-Verlag), 2014
Associate Editor for Plant Ecology, 2010-2014
Mentor/Major Professor of Outstanding ESSM Doctoral student of the year, 2014
Mentor/Major Professor of Outstanding ESSM Masters student of the year, 2010 & 2014
Citation Classic (>400 references) milestone achieved for 2005 paper, 2014
More than 140 Professional Science Presentations (63 last 5 years)
Reviewer for NSF, other funding agencies, proceedings, book publishers and >90 articles in 38 journals since 2000
External evaluator of tenure and promotion dossier for University of Florida, Department of Environmental Horticulture (2012); Pennsylvania State University, Department of Ecosystem Science & Management (2014)
Developer, coordinator, and moderator for Organized Oral Session entitled “Sustaining Rangelands in the Southern Great Plains: Adapting to and Mitigating for Climate Change” at the 2011 Ecological Society of America 96th Annual Meeting, Austin, TX
Mentor for Sloan Foundation and Hispanic Leadership in Agriculture and Natural Resources
Faculty Advisor for Student Guild for the Society for Ecological Restoration (2010-2012)
Applied Biodiversity Science Program Member
Interdisciplinary Research Program in Ecology and Evolutionary Biology Member
ESSM Scholarship Committee (2010-2013)
ESSM Tenure & Promotion Committee (2010-present)
ESSM Graduate Admissions Committee and Curriculum Enhancement Team
ESSM Undergraduate Leadership Team
Morgan L. Russell

Academic Rank: Assistant Professor
Specialization: Prescribed Burning
Appointment Basis: 12-month

Academic Education Background
Ph.D., Range Science (prescribed burning emphasis), North Dakota State University, Fargo, ND, 2013
M.Sc., Range Science (grazing emphasis), New Mexico State University, Las Cruces, NM, 2010
B.S., Ag Communications and Animal Science, Utah State University, Logan, UT, 2008

Professional and Research Experience
January 2014-present  Assistant Professor and Extension Range Specialist, Department of Ecosystem Science and Management, Texas A&M University
May 2012-December 2013  Graduate Research Assistant, USDA-ARS Fort Keogh Livestock and Range Research Laboratory, Miles City, MT
January 2011-May 2012  Graduate Research Assistant, North Dakota State University, Fargo, ND
January 2009-December 2010  Graduate Research Assistant, New Mexico State University, Las Cruces, NM

Teaching Experience
January 2011-May 2012  Teaching Assistant, North Dakota State University, Fargo, ND
January 2009-December 2010  Teaching Assistant, New Mexico State University, Las Cruces, NM

Dates of Appointment and Promotions at Present Institution
January 2014  Assistant Professor and Extension Range Specialist, Department of Ecosystem Science and Management, Texas A&M University

Publications (last five years)

Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)
Angelo State University Adjunct Faculty
Great Plains Fire Science Exchange Board of Directors
Prescribed Burn Alliance of Texas Board of Directors
Edwards Plateau Prescribed Burn Association Board of Directors
San Angelo Stock Show and Rodeo Committee Member
Texas Section for Society of Range Management Youth Range Workshop Director
Texas Range Webinar Series Committee Member
STAC Grazingland Committee member
PLOS ONE, Ecology, Fire, Reviewer
TAMU Extension, Reviewer
Journal of Agriculture and Biodiversity Research, Grazing Management Reviewer
Journal of Animal Science, Grazing Behavior, Ecology Reviewer

Membership and Offices Held in Professional Organizations
Texas Section for Society of Range Management Awards Committee Chair
Society for Range Management Nominations Committee Member
Member of Society for Range Management
Member of Texas Southwestern Cattle Raisers Association
Member of Association for Fire Ecology

External Grants and Other Research Funding (last five years)
2015. Principle Investigator Texas GLCI, “Prescribed Burn Workshop” $10,000.00
2014-2015 CO-PI (w/M. Clayton and J. Jackson), IRNR-RREA “Generation Next: Our Turn to Ranch” $19,640.00
2014-2016 Principle Investigator, County Improvement Project, “Texas Fire Information Exchange” $20,000.00
2014-2016 Principle Investigator, DuPont Research, “Catclaw IPT Management” $4,000.00
2014-2016 Principle Investigator, DowAgrosciences “Pricklypear IPT Management” $3,800.00
2014-2016 Co-PI (w/ C. Taylor, Jr.), USDA-USFS Southern Research Station, “Integrating Prescribed Fire and Herbivory” $76,743.00
Robert B. Shaw

Academic Rank: Professor
Specialization: Agrostology, Resource Management
Appointment Rank: 9-month

Academic Education Background
Ph.D., Range Science, Texas A&M University, 1979
M.S., Range Science, Texas A&M University, 1976
B.S., Agriculture, Southwest Texas State University, 1973

Professional and Research Experience
June 2008-present  Professor, Department of Ecosystem Sciences & Management, Texas A&M University
November 2007-June 2008  Team Leader, Borlaug Institute for International Development, Northern Provinces, Iraq
April 2006- November 2007  Associate Director, Institute of Renewable Natural Resources, Texas AgriLife Research & Extension Service, Texas A&M University, and Coordinator, Cooperative Ecosystem Studies Unit – Gulf Coast Region
July 2002-April 2006  Professor, Department of Forest, Rangeland & Watershed Stewardship, and Director, Center for Environmental Management of Military Lands, Colorado State University
April 1996-July 2002  Professor, Department of Forest Science, and Director, Center for Environmental Management of Military Lands, Colorado State University
July 1991-April 1996  Professor, Department of Range Science, and Director, Center for Environmental Management of Military Lands, Colorado State University
July 1986-July 1991  Associate Professor, Department of Range Science, and Director, Center for Environmental Management of Military Lands, Colorado State University
August 1982-July 1986  Assistant Professor, Department of Range Science, Colorado State University
June 1980-August 1982  Assistant Professor, School of Forest Resources & Conservation, University of Florida
January 1980-May 1980  Instructor, Department of Biology, Southwest Texas State University

Dates of Appointment and Promotions at Present Institution
June 2008-present  Professor, Department of Ecosystem Sciences & Management, Texas A&M University
November 2006-June 2008  Team Leader, Borlaug Institute for International Development, Northern Provinces, Iraq
April 2006-November 2007  Associate Director, Institute of Renewable Natural Resources, Texas AgriLife Research & Extension Service, Texas A&M University, and Coordinator, Cooperative Ecosystem Studies Unit – Gulf Coast Region

Publications (last five years)

Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)
Certified Professional Agronomists (CPAg)
Certified Professional Soil Erosion and Sediment Control Specialist (CPESC)

Membership and Offices Held in Professional Organizations
American Botanical Society
American Society of Agronomy
American Society of Plant Taxonomists
Association for the Advancement of Science
Delta Tau Alpha (Agriculture)
Gamma Sigma Delta (Agriculture)
National Council of University Research Administrators
Phi Sigma (Biosciences)
Sigma Xi (Scientific Research)
Society for Range Management

External Grants and Other Research Funding (last five years)
1983-2011 Total Amount $204,560,000
2006 Peak Year $ 18,745,000
Fred E. Smeins

Academic Rank: Visiting Professor
Specialization: Plant and Range Ecology
Appointment Basis 9-month (75%)

Academic Education Background
B.A., Biology, Augustana College, Sioux Falls, SD, 1963
M.A., Plant Ecology, University of Saskatchewan, Saskatoon, 1965
Ph.D., Plant and Animal Ecology, University of Saskatchewan, Saskatoon, 1967

Professional and Research Experience
1963-1967 Research Assistant, Plant Ecology, University of Saskatchewan
1967-1969 Assistant Professor, Biology, University of North Dakota
1969-1973 Assistant Professor, Department of Rangeland Ecology and Management, TAMU
1973-1979 Associate Professor, Department of Rangeland Ecology and Management, TAMU
1980-present Professor, Department of Rangeland Ecology and Management (now Ecosystem Science and Management Department), TAMU
1988-present Adjunct Professor, Faculty of the Institute Agronomique et Veterinaire Hassan II, Rabat, Morocco
1979-present Adjunct Professor, School of Forestry, Stephen F. Austin State University
1990-present Adjunct Instructor, Bureau of Management, Phoenix Training Center
1990-present Adjunct Instructor, Natural Resources Conservation Service

Dates of Appointment and Promotions at Present Institutions
1969 Assistant Professor, Department of Rangeland Ecology and Management, TAMU
1973 Associate Professor, Department of Rangeland Ecology and Management, TAMU
1980 Professor, Department of Rangeland Ecology and Management (now Ecosystem Science and Management Department), TAMU

Publications (last five years)
Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)
Coastal Prairie Partnership, Board Member, 2000-present
Luminant Energy Research Steering Committee, 1995-present
Bamberger (Selah) Ranch Ranch Science Advisor 2002-present
Katy Prairie Conservancy Advisory Committee, 2006-present
Texas Plant Conservation Award from the Texas Plant Conservation Conference Board, LBJ Wildflower Center, Austin, 2010

Membership and Offices Held in Professional Organizations
Alpha Zeta Honor Society
American Institute of Biological Services
Beta Beta Beta National Honorary Society
Ecological Society of America
Gamma Sigma Delta Honor Society
International Association of Vegetation Science
National Wildlife Federation
Nature Conservancy
Sigma Xi
Society for Range Management
Society of Wetland Scientists
Southwestern Association of Naturalists

External Grants and Other Research Funding (last five years)
Raghavan Srinivasan

Academic Rank: Professor and Director of Spatial Sciences Laboratory
Specialization: Agriculture Engineering
Appointment Basis: Teaching 33%, Research 67%

Academic Education Background
Ph.D., Agricultural Engineering, Purdue University, May 1992
M.S., Agricultural Engineering, Asian Institute of Technology (Bangkok), 1989
B.E., Agricultural Engineering, TNAU (India), 1984

Professional and Research Experience
September 2011-present – Senior Scientist of Borlaug Institute
September 2004-present – Professor, TAMU and Texas AgriLife Research (TALR)
August 2000-present – Director of Spatial Sciences Laboratory, Texas A&M University
September 1999-August 2004 – Associate Professor, TAMU and Texas Agricultural Experiment Station
April 1999-July 2000 – Assistant Director of Mapping Science Laboratory, TAMU
1998-present – Adjunct Professor, School of Rural Public Health, Health Science Center
1996-1999 – Assistant Professor, TAES, Temple
1992-1996 – Agricultural Engineer and Associate Research Scientist, TAES, Temple
1989-1992 – Graduate Research Assistant, Purdue University, W. Lafayette, IN
1988-1989 – Graduate Research Assistant, AIT, Bangkok

Teaching Experience
September 2004-present – Professor, TAMU and Texas AgriLife Research (TALR)
September 1999-August 2004 – Associate Professor, TAMU and Texas Agricultural Experiment Station
1998-present – Adjunct Professor, School of Rural Public Health, Health Science Center,
1996-1999 – Assistant Professor, TAES, Temple

Dates of Appointment and Promotions at Present Institution
September 2011-present – Senior Scientist of Borlaug Institute
September 2004-present – Professor, TAMU and Texas AgriLife Research (TALR)
August 2000-present – Director of Spatial Sciences Laboratory, Texas A&M University
September 1999-August 2004 – Associate Professor, TAMU and Texas Agricultural Experiment Station
April 1999-July 2000 – Assistant Director of Mapping Science Laboratory, TAMU
1998-present – Adjunct Professor, School of Rural Public Health, Health Science Center
1996-1999 – Assistant Professor, TAES, Temple
1992-1996 – Agricultural Engineer and Associate Research Scientist, TAES, Temple
1989-1992 – Graduate Research Assistant, Purdue University, W. Lafayette, IN
1988-1989 – Graduate Research Assistant, AIT, Bangkok

Publications (last five years)


Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)
2015 College of Agriculture Distinguished Agriculture Alumni Award, Purdue University
2014 Vice Chancellor's Award in Excellence for International Involvement
2014 Texas A&M AgriLIFE Research Faculty Fellow Award
2014 College of Agriculture and Life Sciences Dean outstanding Achievement Award in the category of Interdisciplinary Research Team "Bacterial Source Tracking Team"
Honored with Docteur Honoris Causa from Paul Sabatier University – Toulouse III, July 2013.
Recipient of the 2012 Norman Hudson Memorial Award from the World Association of Soil and Water Conservation for the development and world wide application of SWAT.
Honorary appointment as Senior Scientist of Borlaug Institute for a five year period from 2011
Awarded 2010 Scientist of the year by the Biological and Agricultural Engineering Department, Texas
A&M University

Membership and Offices Held in Professional Organizations
American Society of Agricultural and Biological Engineers (ASABE)
American Water Resource Association (AWRA)

External Grants and Other Research Funding (last five years)
  Technologies and Agricultural Water Management, Co-PI: Drs. Neville Clarke, Tom Gerik, James
  Richardson, Total Grant: $2,767,075, Sponsor: USAID, Sponsor funding: $2,767,075, Funding for
  which I had Primary Responsibility: $219,685, Duration: 8-12-13 to 8-11-18, Project Summary:
  Develop integrated modeling system of field, farm, watershed and economic analysis for small-scale
  farmers in irrigation technologies at Ethiopia, Tanzania and Ghana. Also develop capacity building in
  cooperation with IWM, ILRI, IPRI CG systems for various local stakeholders.
  Demonstration of the Global Decision Support System, Co-PI: Drs. Neville Clarke, Tom Gerik, James
  Richardson, Total Grant: $152,702, Sponsor: Bill and Melinda Gates Foundation, Sponsor funding:
  $152,702, Funding for which I had Primary Responsibility: $30,000, Duration: 4-11-13 to 3-31-14,
  Project Summary: Develop GDSS modeling framework and demonstrate it for couple of watersheds
  in Ethiopia.
  To implement the STAR Resource inventory tool utilizing the APEX model in Navarro and Ellis
  counties, Total Grant: $88,213, Sponsor: USDA-NRCS, Sponsor funding: $88,213, Funding for
  which I had Primary Responsibility: $88,213, Duration: 9-17-13 to 9-16-14, Project Summary: Test
  and deploy a web-based interface for the APEX model for any fields in Texas for the USDA-NRCS
  field office tool for evaluate the resource assessment tool and develop conservation plans for Navarro
  and Ellis Counties.
  Impacts of Decadal Droughts on the Agricultural Economy of the Missouri River Basin, Co-PI: Bruce
  McCarl, Total Grant: $150,758, Sponsor: Center of research for changing earth systems and NOAA,
  Sponsor funding: $150,758, Funding for which I had Primary Responsibility: $75,379, Duration: 8-1-
  2012 to 7-31-2014, Project Summary: Analyze the impact of decadal drought impacts on agricultural
  production in Missouri River Basin. Develop high resolution SWAT model for Missouri River Basin
  and apply the decadal climate variability to study how the agricultural production are impacted.
  HAWQS (Hydrologic Water Quality System) project, Total Grant: $242,587, Sponsor: Indus Corporation
  and USEPA, Sponsor funding: $242,587, Funding for which I had Primary Responsibility: $242,587,
  Duration: 2-6-2013 to 4-30-2014, Project Summary: Develop HAWQS modeling system for the entire
  US at three spatial and temporal resolutions. Develop web-based modeling system for water quality
  analysis for policy analysis framework.
  Hydrology Modeling of Al-Hawezih Marsh, Iraq, Total Grant: $40,000, Sponsor: ISWEEP LLC, Sponsor
  funding: $40,000, Funding for which I had Primary Responsibility: $40,000, Duration: 8-1-2013 to 4-
  30-2014, Project Summary: Develop detailed model of Tigris and Euphrates River basins and assess
  the impact of Al-Hawezih marsh land in Iraq.
  Surface Water Quality Monitoring to Support the Implementation of the Lampasas River Watershed
  Protection Plan, Total Grant: $206,109, Sponsor: TSSWCB, Sponsor funding: $206,109, Funding for
  which I had Primary Responsibility: $206,109, Duration: 10-1-2013 to 9-30-2016, Project Summary:
  To develop water quality implementation plan for the Lampasas River Watershed.
  Database development and maintenance for TSSWCB, Total Grant: $136,592, Sponsor: TSSWCB,
  Sponsor funding: $136,592, Funding for which I had Primary Responsibility: $136,592, Duration: 8-1-
  2013 to 5-31-2015, Project Summary: Develop water quality databases and online tools to query,
  access, modify and create reports by watershed, county, congressional districts, etc.
Resource Conservation Assessment: A Tool for Natural Resource Impact and Assessment In Conservation Planning, Total Grant: $150,000, Sponsor: USDA-NRCS, Sponsor funding: $150,000, Funding for which I had Primary Responsibility: $150,000, Duration: 9-30-12 to 9-30-13, Project Summary: Test and deploy a web-based interface for the APEX model for any fields in Texas for the USDA-NRCS field office tool for evaluate the resource assessment tool.

Water Intensity and Footprint of Advance Feedstock, Total Grant: $100,000, Sponsor: Shell Oil Inc., Sponsor funding: $100,000, Funding for which I had Primary Responsibility: $100,000, Duration: 1-05-12 to 9-30-12, Project Summary: Develop methods to assess water availability for the Midwestern and southern regions for a biofuel plant.

Citywide water quality modeling project, Total Grant: $100,000, Sponsor: City of Austin, Sponsor funding: $100,000, Funding for which I had Primary Responsibility: $100,000, Duration: 5-21-2012 to 5-22-2013, Project Summary: Develop LID conservation practices algorithms and implement in the SWAT model for sub-daily and daily simulations.

Database development and maintenance for TSSWCB, Total Grant: $46,000, Sponsor: TSSWCB, Sponsor funding: $46,000, Funding for which I had Primary Responsibility: $46,000, Duration: 12-1-2012 to 8-31-2013, Project Summary: Develop water quality databases and online tools to query, access, modify and create reports by watershed, county, congressional districts, etc.

The Southern Region Water Quality Coordination Project Phase II, Co-PI: Dr. Mark McFarland, Total Grant: $21,000, Sponsor: USDA-CSREES, Texas AgriLife Extension Service, Sponsor funding: $21,000, Funding for which I had Primary Responsibility: $21,000, Duration: 8-30-2012 to 8-30-2013, Project Summary: This is a multi-state and institutional project where TAMU is the leading agency to develop comprehensive web-based water quality information delivery for the 13 Southeastern states.

Development of Watershed Protection Plan for Atoyou Bayou, Total Grant: $617,829, Sponsor: TSSWCB and EPA, Sponsor funding: $370,697, Funding for which I had Primary Responsibility: $7,575, Duration: 1-1-2012 to 10-31-2013, Project Summary: Assist with landuse/land cover development for the Attoyou Bayou watershed to develop watershed protection plan using remotely sensed data sources.

Hydrologic Water Quality System II (HAWQS II), Co-PI: Jeff Arnold, Total Grant: $60,000, Sponsor: US EPA and USDA-ARS, Sponsor funding: $60,000, Funding for which I had Primary Responsibility: $60,000, Duration: 5-1-2010 to 3-31-2013, Project Summary: Develop online national level database system at three watershed resolutions (NhdPlus, 10-digit and 8-digit) for the SWAT and SPARROW models so that USEPA and their contractors can use to assess the national water quality system.

Application of the Swat Model To Determine the Environmental Sustainability of Feedstock Product of Biofuels In Hawaii, Co-PI: Jeff Arnold, USDA-ARS, Total Grant: $431,225, Sponsor: USDA-ARS and Naval Academy, Sponsor funding: $431,225, Funding for which I had Primary Responsibility: $391,225, Duration: 1-1-2012 to 9-30-2014, Project Summary: Apply real-time SWAT model for the Hawaii sugarcane plantation to estimate the hydrological budget and feedstock production in a sustainable manner.


Coordinating the Implementation of the Lampasas Watershed Protection Plan, Total Grant: $205,305, Sponsor: TSSWCB and US EPA, Sponsor funding: $205,305, Funding for which I had Primary Responsibility: $205,305, Duration: 11-1-2012 to 10-31-2014, Project Summary: Coordinate the implementation of the Lampasas watershed protection plan that was developed using the previously funded project.

Predictability and Prediction of Decadal Climate and its Impacts in the Missouri River Basin with Climate, Hydrologic, and Crop, Co-PI: Bruce McCarl, Total Grant: $386,858, Sponsor: Center of research for changing earth systems and USDA-AFRI, Sponsor funding: $386,858, Funding for which I had Primary Responsibility: $193,429, Duration: 5-15-2011 to 5-14-2014, Project Summary:
Develop methodology and automate the calibration and validation of hydrology and water quality for non pilot 5-4digit watersheds around the USA to evaluate the SWAT model for studying 14 climate change impact scenarios on agriculture, water and environment.

Resource Conservation Assessment: A Tool for Natural Resource Impact and Assessment In Conservation Planning, $500,000, 2010-2012, USDA-NRCS.

Collaborative Research: Northern Gulf of Mexico Hypoxia and Land Use in the Watershed: Feedback and Scale Interactions, $1.5M, 2010-2013, NSF, (with Jeff Arnold and Iowa State University, CARD and various other universities)(Co-PI)

Development of Landuse for Leona Creek Watershed, $34,000, 2011-2012, TAIER and TSSWCB.

Water Intensity and Footprint of Advance Feedstock, $200,000, 2010-2011, Shell Oil Inc.

Estimation of irrigated agricultural land using time-integrated remotely sensed images for Texas, $275,000, 2009-2014, TWDB, Drs. Taesoo Lee and Pushpa Tuppad (CO-PI)

Modeling Support for Little Brazos River Tributaries Bacteria Assessment, $51,534, 2008-2011, TSSWCB

Assist in developing SWAT model for biofuel application for the entire USA, $10,000, 2010-2011, UT-Battle and Oakridge National Laboratory

Applicability of SWAT model in Texas Coastal Watersheds: phase II, $35,000, 2010-2011, TWDB, Dr. Taesoo Lee (Co-PI)

Comprehensive assessment of climate and emission changes on US water quality: an integrated approach, $100,375, 2009-2023, US EPA STAR grants, Drs. Liang and Jeff Arnold (Co-PI)

Hydrologic Water Quality System II (HAWQS II), $350,000, 2010-2012, US EPA and USDA/ARS, Jeff Arnold (Co-PI)

Watershed modeling to evaluate potential impacts of climate and environment. $150,000, 2010-2011, US EPA and Tetra Tech Inc.

Assist in developing SWAT model for biofuel application for the entire USA, $10,000, 2010-2011, UT-Battle and Oakridge National Laboratory

Applicability of SWAT model in Texas Coastal Watersheds: phase II, $35,000, 2010-2011, TWDB, Dr. Taesoo Lee (Co-PI)

The Southern Region Water Quality Coordination Project Phase II, $51,000, 200-2010, USDA-CSREES, Texas AgriLIFE Extension Service, Dr. Mark McFarland (Co-PI)

Comprehensive assessment of climate and emission changes on US water quality: an integrated approach, $100,375, 2009-2012, US EPA STAR grants, Drs. Liang and Jeff Arnold (Co-PI)

Develop a watershed protection plan for Geronimo Creek watershed, $53,000, 2009-2011, US EPA and TSSWCB, R. Karthikeyan, Mark McFarland (Co-PI)

Hydrologic Water Quality System II (HAWQS II), $350,000, 2010-2011, US EPA and USDA/ARS, Jeff Arnold (Co-PI)

Web-based hunting permitting program for Lake Levon, Texas, $35,000, 2010-2011, US COE

Watershed modeling to evaluate potential impacts of climate and environment, $50,000, 2010-2011, US EPA and Tetra Inc.

Estimation of irrigated agricultural land using time-integrated remotely sensed images for Texas $275,000, 2009-2012, TWDB, Drs. Taesoo Lee and Pushpa Tuppad (Co-PI)

Statewide implementation of watershed stewards program in Texas, $34,000, 2009-2010, USDA-CSREES, Texas AgriLIFE Extension Service, Dr. Mark McFarland (Co-PI)

Development of a National Air Quality Self-Assessment Tool, $83,968, 2009, USDA-NRCS and Michigan State University

Watershed modeling: Improving water management in rainfed agriculture, $30,000, 2009, World Bank.

Construction of a computer model of the St. Croix River watershed, $110,500, 2009-2011, USFWS and Science museum of Minnesota

Assist in developing SWAT model for biofuel application for the entire USA, $20,000, 2009-2010, UT-Battle and Oakridge National Laboratory
Tim Steffens

**Academic Rank:** Assistant Professor  
**Specialization:** Rangeland Management  
**Appointment Basis:** 12-month

**Academic Education Background**
Ph.D., Range Science, Colorado State University, Ft. Collins, CO, 1994  
M.S., Animal Nutrition, Texas Tech University, Lubbock TX, 1984  
B.S., Agriculture Education, Tarleton State University, Stephenville, TX, 1982

**Professional and Research Experience**
- Oct. 2013-present: Assistant Professor Department of Agriculture West Texas A&M and Texas A&M AgriLife Extension Specialist, Amarillo
- Sep. 2002-Sep. 2003: Manager, Mescalero Apache Cattle Growers, Mescalero, NM

**Teaching Experience**
- Oct. 2013-present: Assistant Professor Department of Agriculture West Texas A&M and Texas A&M AgriLife Extension Specialist, Amarillo

**Dates of Appointment and Promotions at Present Institution**
October 2013: Assistant Professor Department of Agriculture West Texas A&M and Texas A&M AgriLife Extension Specialist, Amarillo

**Publications (last five years)**
Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)
Publication award for scientific publication from Texas Section Society for Range Management, 2013
Chair, Advisory Council; Society for Range Management 2010.

Membership and Offices Held in Professional Organizations
Member of Society for Range Management
- Texas Section Chairman, Outstanding Rangeland Management/Outstanding Rangeland Conservation Awards committee 2014, 2015
- Chair, Advisory Council; Society for Range Management 2010.
- Chair-elect, Advisory Council; Society for Range Management 2009.
- President Colorado Section 2009
- Incoming President Colorado Section 2008.
- Excellence in Rangeland Conservation Committee member 2004-2007, chair 2007
- Director of Colorado Section, 1998-2000.
- Member of Excellence in Range Management Committee Texas section, 1996-1997.
- Member of Information and Education Committee Texas section, 1996

External Grants and Other Research Funding (last five years)
2016-2017. Co-PI (w/ Chuck West, Texas Tech University) Legislative exceptional item budget request: Sustainable Land and Water Use for Semi-Arid Texas: joint proposal with Texas Tech University “Sustainable Land and Water Use for Semi-Arid Texas” $1,997,000 total; WTAMU portion $597,000; submitted
2015-2016. Principal Investigator. Texas Water Resources Institute Grant. Mesquite effects on grass and soil ecology. $4,983
William Richard Teague

Professional title: Professor, and Associate Resident Director, Ecosystem Science and Management

Mailing Address: Texas A&M AgriLife Research, P.O. Box 1658, Vernon, TX 76384

E-mail address: r-teague@tamu.edu Current Position: 100 Percent research

Position description:
• Assess the effect of different management actions on rangeland hydrology, soil carbon and nitrogen, plant productivity, livestock productivity, and economics. To achieve this, organize, conduct, interpret, and report results from modeling and scientific studies designed to clarify important biological processes and economic consequences in rangeland ecosystems.
• Interact in a positive manner with the ranch community to identify researchable problems of importance to the ranching industry.
• As Associate Resident Director: Represent the Resident Director and the Research Unit to external and internal stakeholders. Support and represent faculty and staff to the Resident Director regarding ideas, needs, capabilities and programs of the research faculty. Support and facilitate operational aspects of the Research Unit.

Education:
• B.S. (Agriculture - Grassland Science); University of Natal, Pietermaritzburg, 1972.
• Ph.D. (Botany/Ecology), University of the Witwatersrand, Johannesburg, 1987.

Employment Experience:
• Range Ecologist, Professor and Associate Resident Director, Texas AgriLife Research, 2008 to date
• Range Ecologist, Professor, Texas Agricultural Experiment Station, 2003 to 2008
• Range Ecologist, Associate Professor, Texas Agricultural Experiment Station, 1991-2003
• Agricultural Research Officer, Senior ARO and Specialist Researcher, South Africa 1982-1991
• Pasture science lecturer, University of Fort Hare, South Africa, 1982
• Agricultural Research Officer, Matopos, 1978

Professional Memberships:
• Society for Range Management
• Ecological Society of America.
• International Soil and Water Conservation Society
• Society for Ecological Restoration

Grants received:
Acquired over $1,600,000 research funds as PI or co-PI since joining Texas A&M; and have been responsible for directing over $1,400,000 of these funds as PI. The major portion (80%) was from the USDA National Research Initiative, Agricultural Systems competitive grants program.

Publications (last 5 years):
External Grants and Other Research Funding (last 5 years)


2008-2012. PI. Use of Liquid Biological Amendments (LBA) in Restoration of Tallgrass Prairie at LLELA. Dixon Water Foundation $50,050.


Awards


Other professional activities

2014. Gave testimony to the US Congressional committee on public rangelands June 25.

2013. Invited participant to Natural Resource Defense Council “Grazing Metrics Summit” to begin developing a sustainability index for the beef industry. 3rd to 5th June, Sacramento, CA.

2012-2014. Invited participant in the Farm Foundation and Noble Foundation “Soil Renaissance” initiative to head a national initiative involving research, consultation and education on regenerating soil ecological function on cropping and grazing ecosystems.

2012-2014. External auditor for Ovis XXI Consulting Company in Argentina with scientists from The Nature Conservancy, and INTA (Argentina) to verify requirements for Patagonia apparel company who purchases products and pays according to level of compliance with environmental goals.

2012. Gave testimony for Texas A&M AgriLife Research to the Texas Agriculture Standing Committee on the problems posed by Ashe and Redberry juniper in Texas and management required to minimize the impact on livelihoods and ecosystem service delivery in Texas, Austin, TX, September 11th.

2010. Member of the team reviewing the USDA-ARS 10-year research program, El Reno Oklahoma, 29th and 30th March.

Evaluation team for Vice Chancellor’s Awards (2 years)

Give invited field day presentations on rangelands in US (every year).
Jason G. Vogel

Academic Rank: Assistant Professor
Specialization: Forest Ecosystem Science
Appointment Basis: 10-month

Academic Education Background
Ph.D., Forest Ecology, University of Alaska-Fairbanks, 2004
M.S., Forest Science, University of Wisconsin-Madison, 1997
B.S., Soil and Forest Science, University of Wisconsin-Madison, 1989

Professional and Research Experience
2010-present Assistant Professor, Texas A&M University, Department of Ecosystem Science and Management
2010 Courtesy faculty appointment, Univ. of Florida, School of Forest Resources and Conservation
2007-2009 Postdoctoral Associate, Univ. of Florida, School of Forest Resources and Conservation and the Forest Biology Research Cooperative
2004 -2007 Postdoctoral Fellow, Univ. of Florida, Botany Department
1998 Consultant and co-owner, MDV Resources LLC, Antigo, WI
1997-1998 Research Specialist, Univ. of Wisconsin-Madison, Free Air Carbon Enhancement (FACE) Study
1994 Research Specialist, Univ. of Wisconsin-Madison, Boreal Ecosystem-Atmosphere Study
1992 – 1994 National Science Foundation-Research Experience for Undergraduates and Laboratory research assistant, Univ. of Wisconsin-Madison.

Teaching Experience
2010-present Assistant Professor, Texas A&M University – Spring 2010, 2011, 2012, Silviculture, FRSC 305 (ESSM 319 in Spring 2013); Spring 2011 and Fall 2013, Isotope Use in Ecology; ESSM 689, with Jason West and Tom Boutton; Summer 2011, Forestry Practices; FRSC 300; Fall 2011, 2012, Forest Ecology; FRSC 304 (now ESSM 309); Spring 2012, Seminar, ESSM 681; Fall 2012, Directed Studies, ESSM 485
2003 Course instructor, University of Alaska Fairbanks, Fall 2003, Soils and the Environment, NRM 380

Dates of Appointment and Promotions at Present Institution
January 1, 2010 Assistant Professor (initial appointment), Department of Ecosystem Science and Management, TAMU

Publications (last five years)
*authors contributed equally to the paper as noted in publication
#graduate student mentored by Dr. Vogel as a committee member
‡graduate student supervised by Dr. Vogel


**Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition**

Teaching Award, 2013, Gamma Sigma Delta Faculty Award of Merit for Excellence in Teaching “High Impact” contribution by a research article, 2012, Vogel et al. 2011 (CJFR) article selected by the University of Florida, Institute of Food and Agricultural Sciences as having the potential for high impact in forest science.

**Membership and Offices Held in Professional Organizations**

American Geophysical Union
Society of American Foresters
Soil Science Society of America
Ecological Society of America

**Major Professional Self-improvement Activities (past 10 years, including sabbatical)**

Silvicultural Instructors Tour (2008, 2012)
Wakonse South, Center for Teaching Excellence (2011)
External Grants and Other Research Funding (last five years)

Co-Investigator, RAPID response program, NASA, Fall 2014-Fall 2017, *Using LiDAR to develop a climate-driven model of the disintegration and decay of trees killed during a severe drought.* Sorin Popescu, Texas A&M (lead investigator) and Georgianne Moore ($115,809 to Vogel of $347,426).

Co-Investigator, AFRI-Climatic change, USDA, March 2011-September 2015, ($590,746 to Vogel of $19.1 million). Timothy Martin-University of Florida and Tom Fox-Virginia Tech, (primary investigators)

Co-Investigator, AFRI-Soil Processes, USDA, September 2009-September 2012, ($344,700), with Eric Jokela (primary investigator) and Edward Schuur

Co-Investigator, National Institute of Climate Change Research, Department of Energy, September 2006-September 2009, ($336,789), with Edward Schuur (primary investigator) and Stith Gower


Neuhaus-Shepardson Faculty Development Grant, October 2012, used to attend Silviculture Instructor’s tour in Spokane and Washington ($1130).
John W. Walker

**Academic Rank:** Professor – Research  
**Specialization:** Foraging ecology, grazing management  
**Appointment Rank:** 12-month

**Academic Education Background**
Ph.D., Range Science, Texas A&M University, 1988  
M.S., Range Science, Colorado State University, 1981  
B.S., Wildlife Science, Texas A&M University, 1976

**Professional and Research Experience**
1997-present  
Professor and Resident Director of Research, Texas A&M AgriLife Research and Extension Center, San Angelo, TX – Adjunct Professor Animal Science, Angelo State University

1988-1997  
Rangeland Scientist (GM-13), USDA-ARS Sheep Experiment Station, Dubois, ID – Adjunct faculty appointment at University of Idaho, Utah State and Washington State Universities

1985-1988  
Graduate Research Assistant, Department of Range Science, Texas A&M University, College Station, TX

1980-1985  
Research Associate, Texas Agricultural Experiment Station, Seymour, TX

1978-1980  
Research Associate, Department of Range Science, Colorado State University, Fort Collins, CO

**Dates of Appointment and Promotions at Present Institution**
1997  
Professor and Resident Director of Research, Texas A&M AgriLife Research and Extension Center, San Angelo, TX – Adjunct Professor Animal Science, Angelo State University

**Publications (last five years)**


Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)

Publication Award Special Category Texas Section SRM, 2012
Publication Award Technical Writing Texas Section SRM, 2008
Outstanding Achievement Award Society for Range Management, 2007

Membership and Offices Held in Professional Organizations

American Sheep Industry Association – Prescribed Grazing Committee, 2006-present
Council for Agricultural Science and Technology
Gamma Sigma Delta Honor Society for Agriculture
Society for Range Management – Chair & Organizer Targeted Grazing Committee, 2009-2011 – Member Nomination Committee, 2011 – Program Chair TX Section Annual Meeting, 2011 – Second Vice-President, TX Section, 2012; First Vice-President, TX Section 2013; President, TX Section 2014

World Future Society

External Grants and Other Research Funding (last five years)

NSIIC Wool Research and Outreach Montana State University Texas A&M University, ($20,000), 2014
Integrated Ruminant Crop Production Focus Group: Integration of animal foraging into conservation agriculture to intensify and diversify sustainable crop production systems in South Africa. Norman Borlaug Institute for International Agriculture. (70,000), 2012
NSIIC Wool Research and Outreach Montana State University Texas A&M University, ($20,000), 2013
NSIIC Wool Research and Outreach Montana State University Texas A&M University, ($20,000), 2012
TDA Instrumentation for Objectively Measuring Animal Fibers, ($70,000), 2011
TDA Natural Fibers Research Grants Comparison of Texas Rambouillet Sheep and Australian Merino F1 Crosses, ($20,000), 2011
Jason B. West

**Academic Rank:** Associate Professor  
**Specialization:** Ecosystem Ecology  
**Appointment Basis:** 9 month

**Academic Education Background**
Ph.D., Botany, University of Georgia, 2002  
B.S., Range Science, Utah State University, 1996

**Professional and Research Experience**
2014-present  
Associate Professor, Ecosystem Science and Management, Texas A&M University

2010-2014  
Assistant Professor, Ecosystem Science and Management, Texas A&M University

2008-2010  
Assistant Professor, Texas A&M AgriLife Research, Uvalde

2006-2008  
Research Assistant Professor, University of Utah, Department of Biology

2004-2005  
Research Associate, University of Utah, Department of Biology

2002-2004  
Postdoctoral Fellow, University of Minnesota, Dept. of Ecology, Evolution, and Behavior

**Teaching Experience**
2014-present  
Associate Professor, Ecosystem Science and Management, Texas A&M University

2010-2014  
Assistant Professor, Ecosystem Science and Management, Texas A&M University

**Dates of Appointment and Promotions at Present Institution**

September 2014  
Associate Professor, Ecosystem Science and Management, Texas A&M University

July 2010  
Assistant Professor, Ecosystem Science and Management, Texas A&M University

July 2008  
Assistant Professor, Texas A&M AgriLife Research, Uvalde

**Publications (last five years)**


**Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)**

- Associate Editor - Plant Ecology (2014 - present)
- Subject Editor - Ecosphere (2013 - present)

**External Grants and Other Research Funding (last five years)**

- Texas A&M University - CAPES Grant Program, 2014-2016. Wilcox, B, J West. The influence of land use on the ecohydrology and biogeochemistry of the Brazilian Caatinga. $50,000. *Internal competitive*.
- United States Department of Agriculture, AFRI. 2011-2016. Martin, TA and the PINEMAP team (55 Co-PIs including West) PINEMAP: Integrating research, education and extension for enhancing southern pine climate change mitigation and adaptation, $19,100,000. *External competitive*.
Steven G. Whisenant  
Professor  
(979) 458-9776  
email  s-whisenant@tamu.edu  
Regional Director – Middle East and North Africa  
Norman Borlaug Institute for International Agriculture  
Department of Ecosystem Science & Management  
Texas A&M University  
College Station, Texas 77843-2138  
218 AGSV

Education:  
1982  Ph.D.  Range Science, Texas A&M University  
1978  M.S.  Biology (chemistry minor), Angelo State University  
1975  B.S.  Wildlife Management, Texas Tech University (with Honors)

Professional Experience:  
2013-  Regional Director, Middle East and North Africa, Norman Borlaug Institute for International Agriculture, Texas A&M University System.  
2012 -2013  Chief of Party, John Garang Memorial University of Science and Technology: a consortium for development. Bor, South Sudan. The Norman Borlaug Institute for International Agriculture. USAID funding.  
2003-2004  Interim Head, Dept. of Rangeland Ecology & Management, Texas A&M Univ. (8 months)  
2003  Acting Head, Dept. of Rangeland Ecology & Management, Texas A&M Univ. (3 months)  
1995-  Professor, Dept. of Rangeland Ecology & Management, Texas A&M Univ.  
1988-1995  Associate Professor, Dept. of Rangeland Ecology & Management, Texas A&M Univ.  
Tenured 9-1-91  
1987-1988  Associate Professor, Dept. of Botany & Range Science, Brigham Young Univ.  
Tenured 9-1-87  
1982-1987  Assistant Professor, Dept. of Botany & Range Science, Brigham Young Univ.  
1976-1980  Research Associate, Texas Agricultural Experiment Station, San Angelo, Texas  

Teaching Experience (last five years)  
Restoration Ecology.  ESSM 630.  1993 – present  
Taught as web only course, beginning Jan. 2002.  
International Sustainable Community Development.  ESSM 675.  2013 – present.  
Leadership, Development and Management of Environmental NGO.  ESSM 676.  2013 – present.  

Awards and Honors  
Outstanding Service Award, Dept. of Botany & Range Science, Brigham Young University, 1988.

Elected Offices and Appointments  
Whisenant

Chair, Association of University Rangeland Resource Programs (AURRP), January 2006 – February 2008. Ex-Officio member of the Board of Natural Resources (BNR) of the National Association of State University Land Grant Colleges (NASULGC).
Executive Board Member, Texas Forestry Association. 2006 - 2012.

Editorial Experience:
Member, Faculty Advisory Committee, Texas A&M University Press, 2009 – 2013.

Publications (last five years)

International Programs and Activities (last five years)
Bangladesh. 2014. Pre-solicitation and fact finding trip to prepare proposal for for Bangladesh Livestock project to be funded by USAID.
South Sudan. 2012-2014. Chief of Party, John Garang Memorial University of Science and Technology: a consortium for development. Bor, Jonglei, South Sudan. USAID funding.
Bradford Wilcox

Academic Rank: Professor
Specialization: Ecohydrology
Appointment Basis: 9-month

Academic Education Background
Ph.D., Rangeland Hydrology, New Mexico State University, 1986
M.S., Rangeland Ecology, Texas Tech University, 1982
B.S., Rangeland Ecology, Texas Tech University, 1979

Professional and Research Experience
Sept 2006-present Professor, Department of Ecosystem Science and Management, Texas A&M University
2004–2006 Professor, Rangeland Ecology and Management, Texas A&M University
2000–2004 Associate Professor, Rangeland Ecology and Management, Texas A&M University
1996–2000 Chief Scientific Officer, Inter-American Institute for Global Change Research, Sao Jose dos Campos, Brazil
1991–1996 Research Hydrologist, Los Alamos National Laboratory, Los Alamos, New Mexico
1985–1988 Visiting Assistant Professor, Watershed Science, Department of Earth Resources, Colorado State University, Fort Collins, Colorado

Teaching Experience
ESSM 305 – Watershed Analysis and Planning (3 Credit Hours)
ESSM 635-600 – Ecohydrology (3 Credit Hours)
ESSM 635-700 – Ecohydrology (3 Credit Hours-online)

Publications (last five years)


Honors and Recognition (past five years)
2014: Fulbright Fellow
2013: Invited Visiting Scholar, Science without Borders, Brazil
2011: Outstanding Contribution to Rangeland Management Award, Texas Section of the Society for Range Management
2011: Ming Ko Woo Lecturer for the Canadian Geophysical Union
2010: Outstanding Technical Publication, Texas Section of the Society for Range Management

Professional Affiliation
Society for Range Management
American Geophysical Union
Ecological Society of America

Editorial Service
Associate Editor, Water Resources Research, 2011-present
Associate Editor, Ecological Applications, 2010-present
Associate Editor, Ecohydrology, 2011-present
Editorial Board, Catena 2008-2013
Editorial Board, Water 2009-2013
Guest Editor, Ecohydrology, Examining Ecohydrological Feedbacks of Landscape Change Along Elevation Gradients in Semiarid Regions, 2011

External Grants and Other Research Funding (last five years)
- Wilcox, B.P. (P.I) and J. West. Ecohydrology and Carbon Budgets in the Brazilian Caatinga, TAMU Office of Research, $50,000, 2014-2016.
- Wilcox, B. P. Examining ecohydrological feedbacks of landscape change along elevation gradients, USDA-CSREES, 2009, $10,000. (Proposal submitted under
• Wilcox, B. P. Examining ecohydrological feedbacks of landscape change along elevation gradients. National Science Foundation, 2009, $15,000. (Proposal submitted under auspices of the AGU.).

• B. P. Wilcox (PI), et al. A graduate program in forest resources: developing integrated expertise in forest resource management, conservation and restoration, USDA CSREES National Needs Fellowship Program, 2010–2013, $234,000.

• Wilcox, B. P. (PI), M. Sorice, W. Fox, C. Hart, and J. Angerer. Managing rangeland watersheds for enhanced ecosystem services: learning from the past and planning for the future. USDA CSREES Managed Ecosystems, 2009–2010, $100,000.
X. Ben Wu

Academic Rank: Professor
Specialization: Landscape Ecology and Ecology Education
Appointment Basis: 10-month

Academic Education Background
Postdoctoral, Wetland Ecology, The Ohio State University, 1992-1995
Ph.D., Ecology, University of Tennessee, 1991
M.S., Management Science, University of Tennessee, 1990
M.S., Ecology, University of Tennessee, 1988
B.S., Botany, Lanzhou University (China), 1982

Professional and Research Experience
1995-present Texas A&M University: John Kincaid University Professor for Undergraduate Teaching Excellence (2012-present); Presidential Professor for Teaching Excellence (2009-present); Associate Dean of Faculties and Director of the Center for Teaching Excellence (2009-2014); Associate Department Head for Graduate Programs (2007-2009); Professor (2007-present); Associate Professor (2001-2006), and Assistant Professor (1995-2000), Department of Ecosystem Science and Management.
1992-1995 The Ohio State University: Adjunct Assistant Professor (1994-95); Postdoctoral Research Associate (1993-1995); and University Postdoctoral Fellow (1992-1993), School of Natural Resources
1982-1984 Lanzhou University, China: Assistant Lecturer, Department of Biology

Teaching Experience
Served as chair/co-chair for 15 PhD and 16 MS students and committee member for 54 PhD and 31 Masters students from 13 departments in 6 colleges/campuses.

Dates of Appointment and Promotions at Present Institution
Sept. 1, 2007  Professor
Sept. 1, 2001  Associate Professor
July 15, 1995  Assistant Professor

Publications (last five years)


**Off-campus Consulting, or Other Professional Activities, Special Honors and Recognition (past five years)**

Member of the Steering Committee for the NSF-funded *Faculty Development Network for Undergraduate Biology (FDN-UB)*, 2014-present

Member of National Research Council’s *Committee on Barriers and Opportunities in Completing 2- and 4-Year STEM Degrees*, 2013-present

Member of *Acta Prataculturae Sinica* editorial board, 2015-present

Member of *Ecological Processes* editorial board, 2011-present

Member of International Advisory Committee of the Computer Network Information Center, Chinese Academy of Sciences, 2009-present

Co-facilitator (with C. Sandoval and J. August) of a 3-day workshop “*Advanced Training Program for Academic Administrators on Teaching and Learning*”, Nanjing, China, November 2014

Co-facilitator (with V. Lee) of a 5-day workshop “*Academic Leadership in the Learning-centered University*”, Durham, NC, August 2014

Co-facilitator (with B. Harmon) of a 2-day workshop “*Inquiry-based Approaches in Undergraduate Science Courses: Learning Science through Science Process*”, at *The Institute for Pedagogy in the Liberal Arts*, Oxford, GA, May 2014

Co-facilitator (with V. Lee) of a 2.5-day workshop “*Teaching & Learning Workshop at Jazan University*”, Jazan, Saudi Arabia, February 2013

Co-facilitator (with V. Lee) of a 5-day workshop “*Building a Culture of Teaching Excellence at Jazan University*”, Ann Arbor, MI, July 2012

John Kincaid University Professor for Undergraduate Teaching Excellence, 2012

Member of a NSF grant review panel, 2011

**Membership and Offices Held in Professional Organizations**

Member, Ecological Society of America (ESA)

Member, International Association of Landscape Ecology (IALE)

Member, Professional and Organizational Development (POD) Network in Higher Education

Member, Society for Range Management (SRM)

**Major Professional Self-improvement Activities (past 10 years, including sabbatical)**

2-day “STRIDE committee training”, ADVANCE Center, 2014

1-day workshop “Quality Matters”, College of Education and Human Development, 2013

2-day “Difficult Dialogues Program”, Office of the Vice President for Diversity, 2012

1-day workshop “Course design series”, Center for Teaching Excellence, 2012

5-day “Mediation Training”, Office of the Dean of Faculties, 2011

2.5-day workshop “Designing Courses for Significant Learning”, Chicago, 2010

1-day workshop “Calibrated Peer Review”, Center for Teaching Excellence, 2006

0.5-day workshop “EndNote Training”, Libraries, 2006

1-day workshop “Pathways to Scientific Teaching”, Ecological Society of America, 2005

**External Grants and Other Research Funding (last five years)**

Virtual Ecological Inquiry (VEI) – A virtual environment for inquiry-based learning and education research, NSF-CCLI, $199,950, 2010-2014, PI

Sustaining Rangelands in the Southern Great Plains in the 21st Century: Adapting to and Mitigating for Climate Change (planning grant), USDA-AFRI, $50,000, 2010-2011, co-PI
Strengthening Educational Capacities in Geospatial Science and Technology for Agricultural and Natural Resources Management, USDA CSREES-HSI, $290,000, 2008-2011, co-PI (PI for Texas A&M subproject)

Development of data-based validation framework for state-and-transition models, USDA CSREES, $464,000, 2007-2011, co-PI.

Enhancing the Teaching Capacity of Urban Forestry Program at Southern University and A&M College, USDA CSREES, $200,000, 2008-2010, co-PI (PI for Texas A&M subproject)
Appendix C – Faculty Qualifications
DEPARTMENT OF ECOSYSTEM SCIENCE AND MANAGEMENT

POSITION VACANCY ANNOUNCEMENT
Assistant Professor of Genomics
Department of Ecosystem Science and Management

WORK LOCATION: Texas A&M University, College Station, TX

POSITION DESCRIPTION: The position is 10-month; tenure track; 2/3 research, 1/3 teaching. The successful candidate is expected to develop a research program in population genetics with an emphasis on tree species that will be competitive for outside funding. He/she will be expected to use molecular techniques to study issues in population genetics such as genetic diversity, allele frequencies and distributions, and allele discovery. He/she will contribute to both undergraduate and graduate teaching through classroom teaching and graduate student advising. He/she will have the opportunity to form a research relationship with the Texas A&M Forest Service tree improvement program, and to interact with existing and emerging programs of excellence at Texas A&M University in genomics, molecular biology, ecophysiology, genetics, including interdisciplinary faculties in Molecular and Environmental Plant Sciences (http://meps.tamu.edu/), Genetics (http://genetics.tamu.edu/), and Ecology and Evolutionary Biology (http://eeb.tamu.edu). The college is especially interested in qualified candidates who can contribute, through their research, teaching, and/or service to the diversity and excellence of the academic community.

Funding for this position is provided by Texas A&M AgriLife Research (AgriLife Research), the College of Agriculture and Life Sciences (AGLS), the Texas A&M Forest Service (TFS), and the USDA Forest Service Southern Research Station. AgriLife Research and AGLS fulfill the university’s land-grant responsibility of combining teaching and research to create new knowledge and technology. TFS serves the people of Texas in providing statewide leadership to assure the state’s forests, trees, and related natural resources are used wisely, nurtured, protected and perpetuated for the benefit of all Texans. USDA Forest Service Southern Research Station develops forest management strategies to enhance and conserve forest species while mitigating threats to forest health and losses in productivity across the Southern region.

The Department occupies modern teaching, research, and outreach facilities on the College Station campus of Texas A&M University. The Texas A&M Forest Service has facilities located throughout the state, and has headquarters in College Station. The successful candidate will have a dedicated laboratory in the Department of Ecosystem Science and Management. The on-campus Institute for Plant Genomics & Biotechnology, housed at the Borlaug Center for Southern Crop Improvement, provides access to modern genomics equipment and plant growth facilities.

QUALIFICATION REQUIREMENTS: PhD in forestry, genetics, genomics or related biological science required with demonstrated experience in molecular techniques to study issues in population genetics.

SALARY AND BENEFITS: Commensurate with qualifications and experience.

DATE AVAILABLE: December 1, 2013 or upon completion of the selection process.

APPLICATION DEADLINE: Review of applications will begin September 10, 2013 and continue until the position is filled.

APPLICATION PROCEDURE: Qualified individuals are invited to submit a letter of application including formal, one-page statements of teaching philosophy and research interests; a complete curriculum vitae; copies of university transcripts; copies of recent major publications; and complete contact information for five references via the GreatJobs website (https://greatjobs.tamu.edu; NOV #07161). Contact Tom Byram (t-byram@tamu.edu) for additional information. Applications will be evaluated beginning upon receipt following this announcement and will continue until a suitable candidate has been identified.

The Texas A&M University System is committed to the fundamental principles of academic freedom, equality of opportunity and human dignity. To fulfill its multiple missions as an institution of higher learning, Texas A&M encourages a climate that values and nurtures collegiality, diversity, pluralism and the uniqueness of the individual within our state, nation and world. All decisions and actions involving students and employees should be based on applicable law and individual merit. Texas A&M University, in accordance with applicable federal and state law, prohibits discrimination, including harassment, on the basis of race, color, national or ethnic origin, religion, sex, disability, age, sexual orientation, or veteran status.
POSITION VACANCY ANNOUNCEMENT
Assistant Professor of Human Dimensions in Natural Resources
Department of Ecosystem Science and Management

WORK LOCATION: Texas A&M University, College Station, TX

POSITION DESCRIPTION: Applications are invited for a 10-month, tenure accruing assistant professor position emphasizing the human dimensions of the natural resources to contribute to a social-ecological systems emphasis in the Department of Ecosystem Science and Management (ESSM) at Texas A&M University, College Station. All applicants with a PhD and expertise in social sciences that directly pertains to natural resource management and the environment will be considered. Preference will be given to those with multi-disciplinary research experience and expertise in one or more of the following areas: 1) environmental policy and governance, 2) adaptive natural resource management, and 3) social-ecological systems.

ESSM is one of 14 academic departments within the College of Agriculture and Life Sciences. It consists of 48 faculty members affiliated with various agencies within the state, 20 staff members, 100 graduate and 180 undergraduate students on the College Station campus (essm.tamu.edu). The programmatic mission of ESSM is to “solve real world problems with research-based solutions.”

QUALIFICATION REQUIREMENTS: A doctoral degree in human dimensions of natural resources, rural sociology, political science, human geography, or a related discipline and demonstrated expertise and accomplishment in one or more of the above emphasis areas is required. The ability to develop an internationally recognized research program; conduct collaborative, multidisciplinary research; solicit extramural contracts and grants, and effectively contribute to graduate and undergraduate teaching programs is essential. The incumbent will be responsible for teaching a senior undergraduate course in Natural Resource and Environmental Policy, and contribute to a second undergraduate course in Coupled Social-Ecological Systems or Environmental Impact Assessment or Ecosystem Management, and development of a graduate course in their area of expertise.

SALARY AND BENEFITS: Salary will be commensurate with qualifications and experience. A guide to the benefits offered can be found at http://www.tamus.edu/assets/files/benefits/pdf/GuideBooklet.pdf.

DATE AVAILABLE: May 1, 2013 or upon completion of the selection process.

APPLICATION DEADLINE: March 1, 2013 or until a suitable candidate is identified.

APPLICATION PROCEDURE: Qualified individuals are invited to submit a letter of application, curriculum vita, statements of research and teaching philosophy, and names and contact information of three references via the GreatJobs website (https://greatjobs.tamu.edu). Contact David D. Briske (dbriske@tamu.edu or 979-845-5581) for additional information. Applications will be evaluated beginning March 1, 2013 and will continue until a suitable candidate has been identified.

The Texas A&M University System is committed to the fundamental principles of academic freedom, equality of opportunity and human dignity. To fulfill its multiple missions as an institution of higher learning, Texas A&M encourages a climate that values and nurtures collegiality, diversity, pluralism and the uniqueness of the individual within our state, nation and world. All decisions and actions involving students and employees should be based on applicable law and individual merit. Texas A&M University, in accordance with applicable federal and state law, prohibits discrimination, including harassment, on the basis of race, color, national or ethnic origin, religion, sex, disability, age, sexual orientation, or veteran status.
POSITION VACANCY ANNOUNCEMENT
Assistant Professor of Spatial Sciences
Department of Ecosystem Science and Management

WORK LOCATION: Texas A&M University, College Station, TX

POSITION DESCRIPTION: The Department of Ecosystem Science and Management (ESSM, http://essm.tamu.edu/) at Texas A&M University invites application for an Assistant Professor position in Spatial Sciences. This position is 10-month, tenure-track, 50% teaching 50% research. We seek a creative, dynamic, ambitious and dedicated scientist who has potential to collaborate with and build a multi-disciplinary program in Spatial Sciences relevant for ecosystem studies.

The general duties and responsibilities would be to develop an internationally-recognized teaching and research program focused on spatial sciences and particularly on Geographic Information Systems (GIS) and applications in ecosystem science and management. The incumbent will be expected to develop a strong interdisciplinary research program in applying and developing geoinformatics tools and spatial analysis to current and diverse issues affecting vegetated ecosystems at various scales, from local to global. Research focus should include an applied component of spatial sciences to the study of relevant issues in ecosystem science such as, but not limited to, regional to global environmental change, the urban/wild land interface, environmental monitoring and assessment, or carbon science. The incumbent will also contribute to the teaching mission of the ESSM Department by teaching undergraduate and graduate courses in GIS and spatial sciences with natural resources applications.

The department is recruiting candidates for several new positions as we build on existing strengths to achieve our shared goal of becoming a premier ecosystem science and management program by advancing knowledge and management approaches, while delivering the broad-based education future leaders in ecosystem science need. ESSM occupies modern teaching, research and outreach facilities on the flagship campus of Texas A&M University.

The position is located within the Spatial Sciences Laboratory (SSL, http://ssl.tamu.edu/), which is a state-of-the-art teaching and research facility under the ESSM department. SSL operates two server rooms and three GIS/RS computer labs with a total of 50 teaching workstations running GIS and remote sensing software, in addition to computing facilities for research and graduate students and geospatial equipment.

QUALIFICATION REQUIREMENTS: Required – PhD in relevant discipline. Demonstrated ability to conduct research and teach at college level on topics related to GIS and spatial sciences applied to ecosystems studies. Preferred – Publication record and ability to acquire extramural funding and to develop and maintain a competitive research program.

SALARY AND BENEFITS: Salary will be commensurate with qualifications and experience. A guide to the benefits offered can be found at http://www.tamus.edu/assets/files/benefits/pdf/GuideBooklet.pdf.

DATE AVAILABLE: June 1, 2013 or upon completion of the selection process.

APPLICATION DEADLINE: March 31, 2013 or until a suitable candidate is identified.

APPLICATION PROCEDURE: Qualified individuals are invited to submit a letter of application, curriculum vita, statements of research and teaching philosophy, and names and contact information of three references via the GreatJobs website (https://greatjobs.tamu.edu). Contact Sorin C. Popescu (s-popescu@tamu.edu or 979-862-2614), Search Committee Chair, for additional information. Applications will be evaluated beginning March 31, 2013 and will continue until a suitable candidate has been identified.
Course title and number: ESSM 102 Introduction to Natural Resources and Ecosystem Management

Term: Fall 2014

Meeting Times and Location: Thursday 2:20 – 3:10 pm TBD

Course Description and Prerequisites:

Introduction to natural resources and ecosystem system approach to wildland management; survey of the field of natural resources and related industries. No prerequisites.

Course Learning Outcomes:

At the end of the course you should be able to:

- Describe the various rangeland resources and their values
- Summarize ecosystem concepts and natural resource management processes
- Distinguish between current and historical principles of range management
- Build awareness of professional skills

Instructor Information:

Name: Dr. Robert W. Knight
Telephone number: 979-845-5557 Office, 979-324-6980 Cell
NO PHONE CALLS AFTER 9:00 PM UNLESS IT IS AN EMERGENCY

Email address: bob-knight@tamu.edu (no e-mails from eCampus please)
Office hours: Anytime I am in the office
Office location: 322 ANIN

Grades:

The completed course work will be weighted as follows for determining the final grade:

Two quizzes: 49%
Projects and Homework (5 points each) 25%
One point off for every two business days late. Ten days late is zero points.

- Email
- eCampus access
- Job listing from the web
- Personality test (Jung)
- Resume
Attendance 2 points per class day 26%
A 90 - 100
B 80 - 89
C 70 - 79
D 60 - 69
F 59 - Below

Text:
No assigned text. Lecture notes and required readings will be distributed in class or made available at Copy Corner.

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<thead>
<tr>
<th>Month</th>
<th>Day</th>
<th>Topic Outline</th>
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<tbody>
<tr>
<td>September</td>
<td>4</td>
<td>Introduction, Class Procedures, Pictures, Send e-mail to <a href="mailto:bob-knight@tamu.edu">bob-knight@tamu.edu</a> by September 10, 4:30 pm, send from your own email address (you login to the computer, do not use a friend’s address) and access eCampus by September 10, 4:30 pm.</td>
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<td>11</td>
<td>Professional Organizations, Web Jobs, and Personality Test; Find and print out a job listing in your desired career – Due September 18; Take the Humanmetrics Jung Typology Test and print out the results page. Print out the D. Keirsey Test description (follow links from Jung results page) Due September 25; Developing a Resume - Resume Due October 2.</td>
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<td>18</td>
<td>Natural Resources Management and Definitions - Web Job Listing Due</td>
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<td></td>
<td>25</td>
<td>Ecology - Dr. Fred Smeins - Jung Personality Test Due</td>
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<tr>
<td>October</td>
<td>2</td>
<td>Lands of the World and Their Uses</td>
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<td>9</td>
<td>Plant Identification - Dr. Steve Hatch - Resume Due</td>
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<td>16</td>
<td>QUIZ 1</td>
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<td>23</td>
<td>Environmental Management</td>
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<td>30</td>
<td>Review of resumes, personality tests, Quiz 1</td>
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<tr>
<td>November</td>
<td>6</td>
<td>Soil and Water Conservation</td>
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<td>13</td>
<td>Principles of Natural Resource Management</td>
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<td>20</td>
<td>Future of Natural Resources of the World, Ethics and Professionalism</td>
</tr>
<tr>
<td>December</td>
<td>4</td>
<td>Final QUIZ for ESSM 102</td>
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</tbody>
</table>
Attendance and Late Work Policy

The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07.

Late work will be accepted in the case of a University Excused Absence with no penalty, all other work will be given a 20% penalty for every day it is late, including weekends. University Excused Absences must have written verification, like a doctor’s note. There will be no makeup for missed exams, except in the case of a University Excused Absence.

Other Pertinent Course Information

NO cell phones, texting, twittering, etc. during class. I can tell when you are using them below the desktop. NO computers unless being used to take notes. NO electronic devices except in the case of disability.

ADA (Americans with Disabilities Act) Statement

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

Copyright Notice

The handouts used in this course are copyrighted. By "handouts," I mean all materials generated for this class, which include but are not limited to the syllabus, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless I expressly grant permission.

Academic Integrity Statement

"An Aggie does not lie, cheat or steal, or tolerate those who do."

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or processes of the Honor System.

For additional information please visit: http://aggiehonor.tamu.edu

Statement on Plagiarism

As commonly defined, plagiarism consists of passing off as one’s own ideas, words, writing, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section "Scholastic Dishonesty."
ESSM 102 Fall 2014

Assignments are due at the start of class. Late assignments will have 1 point deducted for every working day late. After 5 working days, you will get a 0 for the assignment.

Assignment #1

Must be done by September 10th, 4:30 pm.

Send an e-mail to bob-knight@tamu.edu with and tell me what your major, option, emphasis etc. is currently. Where did you grow up? I also would like to know your career plans. Where do you hope to work? What type of job? etc.?

DO NOT USE eCampus TO SEND ME E-MAILS. I do not get them.

Assignment #2

Must be done by September 10th, 4:30 pm.

Go to http://ecampus.tamu.edu

1. Go to ESSM 102 in ecampus.tamu.edu

2. Look at your grades and attendance.

You must shut down the browser to logout of eCampus so the next person using the computer does not have access to your information.
Assignment #3

Must be done by September 18, 12:45 pm.

Go to the site http://essm-jobs.tamu.edu/employment-links or search the web for employment, job, internship, etc.

Find a job, either summer, temporary or full-time related to your career interests (not necessarily natural resources related, print it out and turn it in to me in class. **DO NOT EMAIL IT TO ME!**

You can also search the Web for other job listings not on my list. If you find one that has multiple listings related to agriculture and natural resources that is not on the above web page give me the full URL and I will give you 2 bonus points on your final grade. Please write BONUS SITE on the printout with the URL. I generally do not accept sites from state agencies or universities, but if it is a good one I will give you credit.

Assignment #4

Must be done by September 25, 12:45 pm.

Access the WEB and go to:

http://www.humanmetrics.com/cgi-win/JTypes2.asp

1. Take the Humanmetrics Jung Typology Test and hit submit. Print out the results page, then follow the link to the D. Keirsey (http://keirsey.com/) description and print out that page. This test will take about 20 minutes.

2. Turn in the results from the Humanmetrics site and the Keirsey description page.

3. Compare your type to the descriptions given the Keirsey Web page (http://keirsey.com/cgi-bin/stats.cgi)

4. **DO NOT EMAIL IT TO ME!**

Assignment #5

Must be done by October 2, 12:45 pm.

Please prepare a resume using the guidelines given in class. Do not use a template from a program like Word, make your own. Be creative. I am willing to review your resume with you before it is due. **DO NOT EMAIL IT TO ME!**
Course: ESSM 201 Exploring Ecosystem Science and Management (1-0) Credit 1
Term: Fall 2014
Meeting time: Lecture: W 8:00-8:50
Location: 127 KLBG (SCC 210F on 9/17)

Course Description and Prerequisites
Explore and understand the knowledge, skills and abilities required for varied careers within ecosystem science and management; Develop a professional electronic portfolio, resume, and letter of application; Work in teams to explore career options; Conduct/participate in at least one service project and write a reflection on your experience. Develop improved time-management/study skills; Focus priorities; Learn to work and think metacognitively.
Prerequisites: New student in an ESSM degree program

Learning Outcomes or Course Objectives
PLO 10: Illustrate critical thinking and demonstrate problem solving skills
PLO 11: Demonstrate an ability to acquire and interpret information and present conclusions orally and in writing.
PLO 12: Demonstrate the ability to work collaboratively in teams and exercise leadership skills on projects
PLO 13: Demonstrate environmental stewardship and professional and ethical behavior
PLO 14: Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge
PLO 15: Demonstrate civic responsibility and global citizenship

Instructor Information
Name: M. M. Kothmann
Telephone number: 979-845-5575 (Cell: 979-229-7410; I receive text messages)
Email address: m-kothmann@tamu.edu
Office hours: By appointment (send me an email or text to schedule an appointment)
Office location: KLBG 119

Textbook and/or Resource Material
TEXT: Class notes available: All course reference materials, tests, and assignments will also be delivered on-line through eCampus on the course webpage.

GRADING:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tests</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Assignments</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>Class attendance</td>
<td></td>
<td>20 (&gt;2 unexcused absences = 0 points; &gt; 4 = F)</td>
</tr>
<tr>
<td>ePortfolio</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

ANY STUDENT RECEIVING >4 UNEXCUSED ABSENCE WILL FAIL (F)
A = 90-100; B = 80-89; C = 70-79; D = 60-69; F < 60
ATTENDANCE POLICY
1. “The University views class attendance as the responsibility of an individual student. Attendance is essential to complete this course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07.”
2. Assignments shall be submitted on or before the date due. Work not received by the posted time/date will not be accepted, except in the case of a university excused absence.
3. Students with excused absences must contact the instructor within 1 week after returning to class and schedule a date for submission of missed work or it is considered late. It is the student’s responsibility to make arrangements with the instructor to make up work missed because of excused absences. Do not procrastinate!

AMERICANS WITH DISABILITIES ACT (ADA)
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Refer to the new Aggie Honor System website and learn the “definitions of academic misconduct”

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Expectations for this course!
You have work for this course every week. I expect you to DO your work on time.

I EXPECT THAT YOU WILL....
• NOT PROCRASTINATE!
• THINK POSITIVE!
• Be present every scheduled class day and in your seat ready for class before 8:00 AM.
• Read and understand the entire course syllabus.
• Read instructions, clarify as necessary, complete, and submit all Assignments and Tests on or before the date/time assigned.
• Use this course as an opportunity to understand yourself better and to determine what you can do to increase your effectiveness, efficiency, and professional development
• Not be required to “memorize” for this course.
• Take tests early. They are ‘open-notes’ and you may take them multiple times.
• Be introduced to concepts, skills, and practices of “Professionalism”.
# LECTURE SCHEDULE

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>DATE</th>
<th>TOPIC</th>
<th>Info</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9/03</td>
<td>Course introduction, policies, and overview (Syllabus, Schedule, Learning Outcomes, and Assignments)</td>
<td>MMK</td>
</tr>
<tr>
<td>2</td>
<td>9/10</td>
<td>Study Skills</td>
<td>MMK</td>
</tr>
<tr>
<td>3</td>
<td>9/17</td>
<td>ePortfolio</td>
<td>Meet in SCC 210F</td>
</tr>
<tr>
<td>4</td>
<td>9/24</td>
<td>How to increase study effectiveness</td>
<td>Kathleen Speed</td>
</tr>
<tr>
<td>5</td>
<td>10/01</td>
<td>Job Applications, Cover Letter, Resumes</td>
<td>MMK</td>
</tr>
<tr>
<td>6</td>
<td>10/08</td>
<td>What do employers look for when hiring?</td>
<td>Adam Jarrett</td>
</tr>
<tr>
<td>7</td>
<td>10/15</td>
<td>Service Learning-What is it? What should I do?</td>
<td>Tia Crawford</td>
</tr>
<tr>
<td>8</td>
<td>10/22</td>
<td>ePortfolio, Resume and Cover Letter</td>
<td>Cindy Raisor</td>
</tr>
<tr>
<td>9</td>
<td>10/29</td>
<td>Faculty &amp; Students from degree programs</td>
<td>Student Club Reps.</td>
</tr>
<tr>
<td>10</td>
<td>11/05</td>
<td>Professionalism and networking</td>
<td>Paul Pausky</td>
</tr>
<tr>
<td>11</td>
<td>11/12</td>
<td>Group Presentations of Team Careers Reports</td>
<td>Student groups by major</td>
</tr>
<tr>
<td>12</td>
<td>11/19</td>
<td>Group Presentations of Team Careers Reports</td>
<td>Student groups by major</td>
</tr>
<tr>
<td>13</td>
<td>11/26</td>
<td>Group Presentations of Team Careers Reports</td>
<td>Student groups by major</td>
</tr>
<tr>
<td>14</td>
<td>12/03</td>
<td>What's next?</td>
<td>MMK</td>
</tr>
</tbody>
</table>

## ASSIGNMENTS

<table>
<thead>
<tr>
<th>ASSIGNMENT</th>
<th>DATE DUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submit your ePortfolio</td>
<td>9/10</td>
</tr>
<tr>
<td>Program Learning Outcomes</td>
<td>9/17</td>
</tr>
<tr>
<td>ePortfolio Template Created with Biography (send link)</td>
<td>9/17</td>
</tr>
<tr>
<td>Resume and Cover Letter</td>
<td>10/08</td>
</tr>
<tr>
<td>Exploring Careers Power Point (Group)</td>
<td>11/12</td>
</tr>
<tr>
<td>Career Reports Reflection (Individual)</td>
<td>11/28</td>
</tr>
<tr>
<td>Service Learning Reflection</td>
<td>12/01</td>
</tr>
<tr>
<td>ePortfolio</td>
<td>12/03</td>
</tr>
</tbody>
</table>

## TESTS

<table>
<thead>
<tr>
<th>TEST</th>
<th>DATE DUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test 1- Program Learning Outcomes</td>
<td>9/10</td>
</tr>
<tr>
<td>Test 2- Time Management Skills</td>
<td>9/30</td>
</tr>
</tbody>
</table>
Course: ESSM 201 Exploring Ecosystem Science and Management (1-0) Credit 1  
Term: Fall 2014  
Meeting time: Lecture: W 8:00-8:50  
Location: 127 KLBG (SCC 210F on 9/17)

Print your name
Initial each item below

I understand that my grade will be based on the following grading scheme.

\[ A = 90-100; \quad B = 80-89; \quad C = 70-79; \quad D = 60-69; \quad F < 60 \]

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tests</td>
<td>10</td>
</tr>
<tr>
<td>Assignments</td>
<td>40</td>
</tr>
<tr>
<td>Class attendance</td>
<td>20</td>
</tr>
<tr>
<td>EPortfolio</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

I understand that attendance will be based on each student’s signature on the attendance roll sheet. It is your responsibility to be sure you sign the roll sheet before class. Arriving after 8:00 AM will result in a reduction in my attendance grade.

I understand that the Attendance grade will be calculated as described below.

<table>
<thead>
<tr>
<th>Unexcused Absences</th>
<th>Grade**</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>1</td>
<td>95</td>
</tr>
<tr>
<td>2</td>
<td>90</td>
</tr>
<tr>
<td>3 or 4</td>
<td>80</td>
</tr>
<tr>
<td>&gt;4</td>
<td>F Failure for the course</td>
</tr>
</tbody>
</table>

** Late attendance (after 8:00 AM): 5 points will be deducted from your attendance grade for each 'tardy'.

I understand that on September 17th class meets in SCC 210F from 8:00-8:50 AM.
Course title and number: ESSM 203
Term: Fall 2014
Meeting times and location:
Lectures: MW 1:50 – 2:40; HFSB 102

Course Description and Prerequisites

Taxonomy, phylogeny, and identification of the important forest trees of North America and their ecological and social uses and benefits.

Prerequisites: BIOL 111 or equivalent

Learning Outcomes or Course Objectives

1. Identify plants and other organisms in their genetic and evolutionary context.
   a. Demonstrate an ability to identify common tree species
   b. Describe evolutionary relationships among tree species, using phylogeny and taxonomy
2. Describe how geology, climate, and soils interact with the biota to influence energy flow, hydrology, biogeochemistry, and other key ecosystem functions.
   a. Compare the biogeography of common tree species in relation to climate, topography, and soils
3. Explain and use the concepts and applications of geographic information systems and remote sensing.
   a. Interpret maps of current and future geographic range distributions of common tree species
4. Demonstrate environmental stewardship and professional and ethical behavior.
   a. Describe the value of forest trees in biodiversity and environmental stewardship
5. Demonstrate civic responsibility and global citizenship.
   a. Explain the multiple roles of forest trees in providing social benefits and in social-ecological conflicts

Instructor Information

Name: Dr. Carol Loopstra
Telephone number: 979-862-2200
Email address: c-loopstra@tamu.edu
Office hours: By appointment
Office location: 324 Horticulture Forest Science Building

Textbook and/or Resource Material

Considerable resources are provided through eCeLearning including Powerpoint presentations, lab outlines, links to other web pages
Grading Policies

Lecture: The lecture grade is worth 60% of the final course grade. Three midterm exams and the final exam each count as 15% of the course grade.

Lab: The laboratory grade for the field trip project, quizzes, a midterm, and a final exam will make up 40% of the final course grade.

Midterm – 10%
Final - 15%
Quizzes - 10%
Project (field trip) – 5%

Make ups will be allowed for authorized, excused absences only. If possible, students must contact the instructor within 48 hours if an exam is missed.

The Bastrop field trip is required and is a University Authorized Excuse for missing class. If you absolutely cannot make any of the field trip dates, see Dr. Loopstra about a make-up assignment.

Cheating in any form will not be tolerated and will result in a zero for that quiz or exam, plus potentially other disciplinary actions per the TAMU rules and regulations.

Grades:
90%+ A
80 – 89 B
70 – 79 C
60 – 69 D
<60 F

Attendance Policy

"The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07."

Course Topics, Calendar of Activities, Major Assignment Dates

Lecture Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Required Reading *</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (September 1)</td>
<td>Introduction to Dendrology</td>
<td>Text – lab species</td>
</tr>
<tr>
<td>2 (September 8)</td>
<td>Plant Identification, World Forests</td>
<td>Text – lab species</td>
</tr>
<tr>
<td>3 (September 15)</td>
<td>Forests of North America/ Exam 1</td>
<td>Text – lab species</td>
</tr>
<tr>
<td>4 (September 22)</td>
<td>Northeastern U.S.</td>
<td>Text – lab species</td>
</tr>
<tr>
<td>5 (September 29)</td>
<td>Appalachian and Central Regions</td>
<td>Text – lab species</td>
</tr>
<tr>
<td>6 (October 6)</td>
<td>Review / Exam 2</td>
<td>Text – lab species</td>
</tr>
<tr>
<td>7 (October 13)</td>
<td>Bastrop Field Trip – no lectures</td>
<td>Text – lab species</td>
</tr>
<tr>
<td>8 (October 20)</td>
<td>Lake States Region / Southern Region</td>
<td></td>
</tr>
<tr>
<td>9 (October 27)</td>
<td>Rocky Mountain Regions/ California</td>
<td></td>
</tr>
<tr>
<td>10 (November 3)</td>
<td>California cont. / Exam 3 Review</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Event</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------------------</td>
<td></td>
</tr>
<tr>
<td>11 (November 10)</td>
<td>Exam 3, Pacific Northwest</td>
<td></td>
</tr>
<tr>
<td>12 (November 17)</td>
<td>Alaska and Temperate Forests</td>
<td></td>
</tr>
<tr>
<td>13 (November 24)</td>
<td>Lab Review / Thanksgiving</td>
<td></td>
</tr>
<tr>
<td>14 (December 1)</td>
<td>Tropical Forests / Ornamentals</td>
<td></td>
</tr>
<tr>
<td>December 16; 3:30-5:30</td>
<td>Final Exam</td>
<td></td>
</tr>
</tbody>
</table>

**Laboratory Schedule**

<table>
<thead>
<tr>
<th>Lab#</th>
<th>Date - Week of</th>
<th>Lab Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>September 1</td>
<td>HFSB 126</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Introduction, plant parts and shapes, keys, HFSB area</td>
</tr>
<tr>
<td>2</td>
<td>September 8</td>
<td>Quiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Creek behind HFSB – meet in HFSB 126</td>
</tr>
<tr>
<td>3</td>
<td>September 15</td>
<td>Quiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Research Park - meet in the Centex Parking lot</td>
</tr>
<tr>
<td>4</td>
<td>September 22</td>
<td>Quiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agronomy Road – meet in HFSB 126</td>
</tr>
<tr>
<td>5</td>
<td>September 29</td>
<td>Quiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Main campus - meet by Nagel Hall</td>
</tr>
<tr>
<td>6</td>
<td>October 6</td>
<td>Quiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Horticultural Gardens - meet at the gardens on Hensel Dr.</td>
</tr>
<tr>
<td>7</td>
<td>October 13</td>
<td>Quiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All Day Field Trip – Bastrop Fire – meet in HFSB 126</td>
</tr>
<tr>
<td>8</td>
<td>October 20</td>
<td>Quiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Midterm Exam - Research Park - meet in Centex Parking lot</td>
</tr>
<tr>
<td>9</td>
<td>October 27</td>
<td>Quiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>East coast and Appalachian species - HFSB 126</td>
</tr>
<tr>
<td>10</td>
<td>November 3</td>
<td>Quiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Southern species - HFSB 126</td>
</tr>
<tr>
<td>11</td>
<td>November 10</td>
<td>Quiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rocky Mountain Species - HFSB 126</td>
</tr>
<tr>
<td>12</td>
<td>November 17</td>
<td>Quiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>West Coast species - HFSB 126</td>
</tr>
<tr>
<td>13</td>
<td>November 24</td>
<td>Quiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Review for Final Exam - HFSB 126</td>
</tr>
<tr>
<td>14</td>
<td>December 1</td>
<td>Quiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Final Exam - HFSB 126</td>
</tr>
</tbody>
</table>

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**Academic Integrity**

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"An Aggie does not lie, cheat, or steal, or tolerate those who do."
### Course title and number
- Field Studies in Forest Ecosystems (3 credit), ESSM 300

### Term
- Summer 2014, May 11th to May 23rd

### Meeting location
- Class: Piney Woods Conservation Center (PWCC), Lufkin, TX
- Chem-In-Haut Camp, Bastrop, LA

### Times
- Leave at 2 pm May 11th and through May 19th we will be in east Texas, and May 19th and May 23rd in Bastrop, Arkansas. We will be back in the early afternoon (~1:30 pm) of the 23rd.

### Instructor’s Information
- **Name**: Jason G. Vogel
- **Telephone number**: 979 845 5580 *Cell phone numbers of instructors will be provided on first day of course.*
- **Email address**: jason_vogel@tamu.edu
- **Office hours**: Open door or by appointment
- **Office location**: Room 114 Animal Sciences

- **Name**: Marian Erickson

### Course Motto
“Nothing in the world can take the place of persistence. Talent will not; nothing is more common than unsuccessful men with talent. Genius will not; unrewarded genius is almost a proverb. Education will not; the world is full of educated derelicts. Persistence and determination alone are omnipotent. The slogan “Press On!” has solved and always will solve the problems of the human race,” – Calvin Coolidge.

### Course Description
A field-oriented class focused on forest ecosystem science and management. Students will problem-solve management questions through data collection and team-based research, with field and classroom exercises used to investigate the relationships between landowner objectives, mensuration, silviculture, ecology, soils, and regeneration-focused harvesting systems. In addition, this ‘summer camp’ is expected to foster the development of student-faculty relationships, and enhance the professional knowledge and skills of the students. The course will run two weeks.

**Prerequisites**: Junior or Senior classification or approval of instructor.
Course Learning Objectives
At the end of this course, students will be able to:
1. Describe the basic components of coupled socio-ecological systems
   a. Interpret how forest ecological processes interact with human decision-making at landscape to global levels.

2. Identify forest tree and understory species, and critical animal species
   a. Be able to place tree species in the context of their use in forest industry and the ecological roles of different species, and for understory species, the use of the species as an indicator of ecological characteristics.
   b. Be able to identify the endangered or threatened animals in southern region that affects forest management decisions
   c. Be able to identify critical forest pathogens for the southern region

3. Describe how geology, climate, and soils interact with the biota to influence energy flow, hydrology, biogeochemistry, and other key ecosystem functions.
   a. Be able to identify the critical pools and fluxes in a forest ecosystem that characterize one of a forest’s functions.

4. Illustrate critical thinking and demonstrate problem solving skills.
   a. Students will be given assignments that require inquiry based learning and problem solve questions related to common forestry management tradeoffs

5. Demonstrate an ability to acquire and interpret information and form conclusions about forest management decisions
   a. Conclusions will be presented both in writing and orally

6. Demonstrate the ability to work collaboratively in teams and exercise leadership skills on projects.
   a. Team projects will form the basis of demonstrating most of the course learning objectives.

Reading materials will be made available during the course in the form of handouts.

Fees
There is a $250 per student fee associated with this course that partly pays for food, gasoline, and housing.

Attendance and Late Work Policy
The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07.

Late work will be accepted in the case of a University Excused Absence with no penalty, all other work will be given a 20% penalty for every day it is late, including weekends. University Excused Absences must have written verification, like a doctor’s note. There will
be no makeup for missed exams, except in the case of a University Excused Absence.

Grading

1) Class participation: Students are expected to attend the entire course and be on time for departure times, fully participate in field work, and ask questions of faculty and guest speakers. (10% of total, individually scored) Students will start with 5% of this grade and can only lose points through tardiness. Those who are late for assigned departure times more than one time will lose 5% of their grade, and 5% for each additional bout of tardiness. For 5% of their grade, students will grade one another’s participation in field exercises and the plant press exercise. The remaining 5% will be based on participation with guest speakers—each student is expected to ask at least one question of each speaker. Failure to do this will result in loss of 5% of one’s grade. A missed class day will result in an automatic loss of the participation grade, except in the case of verified university excused absence. See Student Rule#7.

2) If you see wildlife and throw something at them, chase them, molest them in any way, you will lose your participation grade.

3) Satisfactory completion of all laboratory and field reports (50% of total, team and individually scored)

4) Final presentations (15% of total, team and individually scored)

5) Field journal and oral exam (15% of total, individually scored)

6) Dendrology (Pass/Fail; 10% of total). If you fail to collect 12 species and have described them, you will have failed this part of the course and will drop one letter grade. This is a self-directed, group activity.

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this law requires that all students with disabilities be guaranteed a learning environment that provide reasonable accommodation of their disabilities. If you believe you have a disability requiring accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

Academic Integrity

For additional information please visit: http://www.tamu.edu/aggiehonor

“An Aggie does not lie, cheat, or steal, or tolerate those who do.”

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the
rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.

Field Studies in Forest Ecosystems Itinerary:
The following itinerary is approximate and it is very likely that the times of departure and return might change for some activities because we are highly dependent on other people’s schedules. Also note that we will often be leaving very early in the morning and returning late because of the travel times involved. This schedule is for your benefit as we are trying to fit as much into this course as possible. Note that breakfast is from 6:00 am - 6:30 am at Piney Woods conservation Center (PWCC) during the week and that we will be responsible for cooking our own meals on the weekends. Camp fees will cover these expenses. Please let me know if you have any food allergies.
The topics covered during this 2-week course will include:

- Forest Measurements
- Forest Ecology
- Soils
- Harvesting/Site preparation methods
- GPS in forest operations
- Forest products/Wood use
- Longleaf Pine Restoration (endangered species)
- Density management
- Forest Insects
- Forest Management

<table>
<thead>
<tr>
<th>Sunday</th>
<th>Monday, May 12th</th>
<th>Tuesday, May 13th</th>
<th>Wednesday, May 14th</th>
<th>Thursday, May 15th</th>
<th>Friday, May 16th</th>
<th>Saturday, May 17th</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 11th</td>
<td>Pacing, compass, and measurements</td>
<td>Data Analysis</td>
<td>Diboll Mill Tour 9:30-11:30 AM (Pat Petrenelli, 936-829-1625)</td>
<td>Msmnts Am</td>
<td></td>
<td>Finish journals for the week; plant identification</td>
</tr>
<tr>
<td>Leave at 2 pm</td>
<td>LIDAR Measurements</td>
<td>Todd Nightingale Noon at 1 pm at Boykin springs. Finish at 2:30 pm</td>
<td>Wayne Pflueger; TBD</td>
<td>2:00 pm Melissa Fischer Texas A&amp;M Forest Service</td>
<td></td>
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<tr>
<td>Drive to Piney Woods Conservation Center</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Sunday</th>
<th>Monday, May 19th</th>
<th>Tuesday, May 20th</th>
<th>Wednesday, May 21st</th>
<th>Thursday, May 22nd</th>
<th>Friday, May 23rd</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 18th</td>
<td>Drive to Chemi-In-Haut Camp</td>
<td>Meet Don Bragg USFS; Tour Crossett Experimental Forests</td>
<td>Plum Creek Site preparation, Operations, Research, Business Model; Traci Rickman</td>
<td>Black Bayou Refuge; Chris Foster 9 am</td>
<td>Leave LA. Drive back to College Station. We’ll be in town early in the afternoon (~1:30 pm).</td>
</tr>
<tr>
<td>Dr. Vogel arrives.</td>
<td>Forest Ecology Measurement on-site</td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>
Course title and number: Wildland Watershed Management ESSM 301 (2-2). Credit 3
Term: Spring 2014
Meeting times and Location: Lecture - MW 11:30-12:20 ENPH 202
Lab - M 1-3, 3-5; T 12:10-2; T 2:10-4, W 1-3, 3-5; ANIN 317

Course Description and Prerequisites

Elements of watershed management and principles and practices of wildland management for protection, maintenance and improvement of water resource values.

Prerequisites: Junior or senior classification or approval of instructor.

Learning Outcomes or Course Objectives

1. Describe how climate and soils interact with the biota to influence energy flow, hydrology, and other key ecosystem functions.
   a. Draw the hydrologic cycle
   b. Describe how climate influences hydrologic processes
   c. Describe the hydrological functioning of ecosystems
   d. Describe the function of vegetation and soil in water infiltration
   e. Describe the role of land management and disturbance (e.g., fire, drought, soil perturbation) on biotic and abiotic processes

2. Demonstrate an ability to acquire, interpret, and present conclusions orally and in writing.
   a. Acquire Information about runoff and water quality
   b. Interpret Information on factors influencing infiltration rates

3. Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge.
   a. Read professional literature and apply information to the solution of real world problems

Instructor Information

Name: Dr. Robert W. Knight
Telephone number: 979-845-5557 Office, 979-324-6980 Cell
Email address: bob-knight@tamu.edu (DO NOT use my neo account)
Office hours: Anytime I am in the office – open door policy
Office location: 322 ANIN

Textbook and/or Resource Material

Photocopy packets of class notes and lab exercises will be available at the Texas Aggieland Bookstore next to the Copy Corner. Readings will be posted on eCampus.
Grading Policies

Performance in the course will be evaluated as follows when determining the final grades:

- Three 1-hour exam (100 pts., each) 300 pts. 57%
- Attendance - Lecture 52 pts. 10%
- Lab grades 172 pts. 33%
- TOTAL 522 pts. 100%

470 - 522 pts. 90% A  
418 - 470 pts. 80% B  
365 - 418 pts. 70% C  
313 - 365 pts. 60% D  
< 313 pts. F

Attendance and Late Work Policy

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Course Topics, Calendar of Activities, Major Assignment Dates

WILDLAND WATERSHED MANAGEMENT

ESSM 301

I. Introductory Materials

A. Introduction to Range and Forest Watershed Management (1 lecture)  
B. Ecological Importance of the Unique Properties of Water (1 lecture)  
C. Water Resource Distribution and Use Patterns (1 lecture)  
D. Solutions to Water Problems (1 lecture)  
E. History of Hydrology and Watershed Management (1 lecture)  
F. Water Law & Water Regulations (1 lecture)

II. Hydrologic Processes – The Hydrologic Cycle (1 lecture)

A. Inflow  
   1. Global Precipitation Patterns (0.5 lecture)  
   2. Storm Characteristics (1 lecture)  
   3. Acid Rain (0.5 lecture)

No Lecture February 13 and 15

EXAM I February 24

B. Transit Through the Terrestrial System (0.5 lecture)  
   1. Interception (0.5 lecture)  
   2. Infiltration (2 lecture)
C. Outflows (1 lecture)
   1. Runoff (2 lecture)
   2. Evapotranspiration (2 lecture)
   3. Groundwater (1 lecture)

EXAM II April 2

III. Erosion

   A. Water Erosion (1 lecture)
   B. Wind Erosion (1 lecture)

IV. Hydrologic Considerations Associated with Non-Point Pollution and Hydrology

   A. Grazing (1 lecture)
   B. Forestry (1 lecture)
   C. Fire/Shrub Control & Land Surface Modifications (1 lecture)

V. Hydrologic Considerations Associated with Riparian and Wetland Systems (2 lecture)

EXAM III April 23

LABORATORY SCHEDULE

LABORATORY MEETING AND LAB REQUIREMENTS

Laboratory 1: Jan. 13-15
Topic: Map Reading
Lab Requirement: Report based upon results of lab exercises (5 points)

No labs week of January 20.

Laboratory 2: Jan. 27-29
Topic: Geomorphic Parameters
Lab Requirement: Report based upon results of lab exercises (5 points)

Laboratory 3: Feb. 3-5
Topic: Precipitation Records
Lab Requirement: Calculations for Isohyetal and Thiessen Methods (5 points)

Laboratory 4: Feb. 10-12
Quiz - Map Reading, Geomorphic Parameters, Storm Characteristics and Precipitation Records (10 points)
Topic: Evapotranspiration
Lab Requirement: Calculations for Evapotranspiration Determination (5 points)

Laboratory 5: Due by Feb. 17, 18, 19
Topic: Concepts of Riparian Rehabilitation
Lab Requirement: Read this article before your next lab. Send an e-mail to your Teaching Assistant with a one to two paragraph summary of the article (10 points).
Laboratory 6: Feb. 17-19  
Topic: Stream Discharge (Field)  
Post Lab Requirement: Calculations for Stream Discharge (5 points)

Laboratory 7A: Feb. 24-26  
**Quiz** - Evapotranspiration and Stream Discharge (10 points)  
Topic: Water Quality Testing Training (Lab maybe field), Attendance (5 points)

Laboratory 7: Mar. 3-5  
Topic: Water Quality Testing (Field)  
Post Lab Requirement: Report of Field Water Quality Findings Combined with Stream Discharge  
Due: Mar. 18, 19, 20, 21 (22 points), Attendance (5 points)

Spring Break: Mar. 10 – 14

Laboratory 8: Mar. 17-19  
Topic: Wastewater Treatment Facilities (Field)  
Lab Requirement: Attendance (5 points)

Laboratory 9: Mar. 24-26  
Topic: Estimating Peak Rate of Runoff  
Lab Requirement: Calculations for Peak Rate of Runoff (5 points)

Laboratory 10: Mar. 31-Apr. 2  
**Quiz** - Water Quality, Waste Water Treatment and Estimating Peak Rate of Runoff (10 points)  
Topic: Estimating Sediment Loss  
Lab Requirement: Calculations for Sediment Loss (5 points)

Laboratory 11: Apr. 7-9  
Topic: Rainfall Simulation (Field)  
Lab Requirement: Attendance (5 points)

Laboratory 12: Apr. 14-16  
**Quiz** - Estimating Sediment Loss and Rainfall Simulation (10 points)  
Topic: Analysis of Factors  
Post Lab Requirement: Report on Factors Influencing Infiltration Rates Due in Lab on April 22, 23, 24, 25 (40 points) Attendance (5 points)

Laboratory 13: April 21-23  
Turn in lab report on factors influencing infiltration rates

Laboratory grade is based on 172 points. It is 33% of the class grade.
Other Pertinent Course Information

NO cell phones, texting, twitering, etc during class. NO computers unless being used to take notes. NO electronic devices except in the case of disability.

Laboratory Safety Guidelines

Hazards for labs will be detailed the week prior and during the lab in enough detail so that students know appropriate dress and equipment to bring to lab. See Faculty Senate website for additional information on: http://facultysenate.tamu.edu/Forms/FS.1110.J.AAC.Lab.%20Safety%20Guidelines.pdf

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"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Wildland Plants of North America

Course title and number: Wildland Plants of North America ESSM 302 (2-2) Credit 3
Term: Fall 2014
Meeting times and location: Lecture - TR 8:00-8:50 TBD
Lab - M 1:20-2:50, 3:40-5:00 T - 12:45-2:35, W 1:20-2:50, 3:40-5:00; TBD

Course Description and Prerequisites

Familiarize students with the distribution and economic value of important wildland plants in Texas and North America and teach fundamentals of sight identification of these plants. Plant collection required.

Prerequisite: Junior or senior classification or approval of instructor.

Learning Outcomes

Learning Outcome 1. Identify plants and other organisms.

a. Demonstrate ability to sight identify wildland plants
b. Recognize the important plants in various regions of Texas, and the U.S. and the World, and know their value (livestock, wildlife, poisonous)
c. Describe the morphological differences between grasses, forbs, and woody plants
d. Describe the floral parts of the various types of plants
e. Demonstrate knowledge of plant classification and taxonomy

Learning Outcome 2. Illustrate critical thinking and demonstrate problem solving skills.

a. Identify unknown plants

Learning Outcome 3. Demonstrate an ability to acquire, interpret, and present conclusions in writing.

a. Identify and properly reference relevant scientific information
b. Collect data from field, electronic, and lab sources
c. Communicate knowledge and information

Learning Outcome 4. Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge.

a. Locate references papers available on the USDA Plants web site
### Instructor Information

- **Name**: Dr. Robert W. Knight  
- **Telephone number**: 979-845-5557 Office, 979-324-6980 Cell  
- **Email address**: Bob-knight@tamu.edu  
- **Office hours**: Anytime I am in the office and by appointment  
- **Office location**: Kleberg 122C  
- **Lecture location**: TBD  
- **Lab location**: TBD

### Textbook and/or Resource Material

Photocopy packets of class notes and lab exercises will be available at the Texas Aggieland Bookstore next to the Copy Corner. Either Texas Range Plants or Wildland Plants of North America is the recommended text for this class (both are best).

### Grading Policies

#### Lecture

- **Hour Exams**: 2 @ 100 points each  
  - Total: 200
- **Final Exam**: 1 @ 100 points  
  - Total: 100

#### Laboratory

- **Attendance lab**: 1 and 2 @ 5 points each  
  - Total: 10
- **Plant Value and Uses**: 3 @ 10 points each  
  - Total: 30
- **Plant Comp.**: 10 @ 5 points each  
  - Total: 80
- **Quizzes**: 6 @ 15 points each  
  - Total: 90
- **Sight tests**: 3 @ 50 points each  
  - Total: 150

**Plant Collection**

- 30 plants (18 grasses, 6 forbs, 6 woody)  
- Choose plants in consultation with instructor  
- Graded on:  
  - Identification (1 pt each): 30  
  - Quality of specimen (2 pt each): 60  
  - Label (1 pt each): 30  
  - Field book (1 pt per plant): 150

- Plants must be identified correctly to get credit for Identification, quality of specimen and label

- **Lab points for overall grade**: 510*0.333  
  - Total: 170

**Total class points**: 470
### Attendance and Late Work Policy

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### Course Topics, Calendar of Activities, Major Assignment Dates

**ESSM 302 Fall 2014**

**Lecture Schedule**

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Lecture Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept. 2</td>
<td>Introduction</td>
</tr>
<tr>
<td>Sept. 4</td>
<td>Descriptive Terms</td>
</tr>
<tr>
<td>Sept. 9</td>
<td>Descriptive Terms</td>
</tr>
<tr>
<td>Sept. 11</td>
<td>Keying</td>
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<tr>
<td>Sept. 16</td>
<td>Plant Classification</td>
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<tr>
<td>Sept. 18</td>
<td>Family Characteristics</td>
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<tr>
<td>Sept. 23</td>
<td>Family Characteristics</td>
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<tr>
<td>Sept. 25</td>
<td>Family Characteristics</td>
</tr>
<tr>
<td>Sept. 30</td>
<td>Exam I</td>
</tr>
<tr>
<td>Oct. 2</td>
<td>Southeastern U.S.A.</td>
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<tr>
<td>Oct. 7</td>
<td>Great Plains Grassland</td>
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<tr>
<td>Oct. 9</td>
<td>Texas Section SRM Annual Meeting</td>
</tr>
<tr>
<td>Oct. 14</td>
<td>Great Plains Grassland</td>
</tr>
<tr>
<td>Oct. 16</td>
<td>Desert Grasslands</td>
</tr>
<tr>
<td>Oct. 21</td>
<td>Desert Grasslands</td>
</tr>
<tr>
<td>Oct. 23</td>
<td>Southern Desert Shrub</td>
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<tr>
<td>Oct. 28</td>
<td>Northern Desert Shrub</td>
</tr>
<tr>
<td>Oct. 30</td>
<td>Exam II</td>
</tr>
<tr>
<td>Nov. 4</td>
<td>Mountain Brush</td>
</tr>
<tr>
<td>Nov. 6</td>
<td>Return Test, Annual Grasslands and Palouse Prairie</td>
</tr>
<tr>
<td>Nov. 11</td>
<td>Forest Types</td>
</tr>
<tr>
<td>Nov. 13</td>
<td>Alpine</td>
</tr>
<tr>
<td>Nov. 13-Dec. 2</td>
<td>Preregistration for Spring 2014</td>
</tr>
<tr>
<td>Nov. 18</td>
<td>Invasive Plants</td>
</tr>
<tr>
<td>Nov. 21</td>
<td>Last day to q-drop, change KINE 198/199 grade type, withdraw</td>
</tr>
<tr>
<td>Nov. 20</td>
<td>Range Seeding – Species</td>
</tr>
<tr>
<td>Nov. 25</td>
<td>No class – finish plant collection</td>
</tr>
<tr>
<td>Nov. 27</td>
<td>Thanksgiving - no class</td>
</tr>
<tr>
<td>Dec. 2</td>
<td>Poisonous Plants</td>
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<tr>
<td>Dec. 4</td>
<td>Help session</td>
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<tr>
<td>Dec. 12</td>
<td>Final Exam 3:00-5:00 pm</td>
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</tbody>
</table>
WEEK 1
Sept. 1, 2, 3  Plant Names, Plant Collecting, Labeling

WEEK 2
Sept. 8, 9, 10  Kind of Plants and Plant Parts

WEEK 3
Sept. 15, 16, 17  Quiz 1 - first two lectures (15 points)

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<thead>
<tr>
<th>No. Plants</th>
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<tr>
<td>9</td>
<td>Andropogoneae</td>
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<td>2</td>
<td>Aristideae</td>
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<tr>
<td>2</td>
<td>Anacardiaceae</td>
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<tr>
<td>1</td>
<td>Aquifoliaceae</td>
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<tr>
<td>5</td>
<td>Chenopodiaceae</td>
</tr>
</tbody>
</table>

Sept. 21, 4:00 pm  Plant collecting at Range Area past Nuclear Reactor

WEEK 4
Sept. 22, 23, 24  Plant Comparisons 1 (5 points)
Quiz 2- 15 plants (15 points)

<table>
<thead>
<tr>
<th>Plant Family</th>
<th>No. Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asteraceae</td>
<td>21</td>
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</tbody>
</table>

Sept. 28, 4:00 pm  Plant collecting off White Creek Road

WEEK 5
Sept. 29, 30, Oct. 1  Plant Comparisons 2 (5 points)
Quiz 3 - 15 plants (15 points)
First 5 plants of Collection Due (25 points)

<table>
<thead>
<tr>
<th>Plant Family</th>
<th>No. Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aveneae</td>
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</tr>
<tr>
<td>Cynodonteae</td>
<td>12</td>
</tr>
<tr>
<td>Cupressaceae</td>
<td>2</td>
</tr>
<tr>
<td>Cyperaceae</td>
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</tbody>
</table>

WEEK 6
Oct. 6, 7, 8  Plant Comparisons 3 (5 points)
Sight Identification Test 1 - 50 plants (50 points)

WEEK 7
Oct. 13, 14, 15  Plant Values & Uses 1(10 points)

<table>
<thead>
<tr>
<th>Plant Family</th>
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</thead>
<tbody>
<tr>
<td>Eragrostae</td>
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<td>Pappophoreae</td>
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<tr>
<td>Dennstaedtiaceae</td>
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<tr>
<td>Ephedraceae</td>
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</tr>
<tr>
<td>Ericaceae</td>
<td>1</td>
</tr>
<tr>
<td>Euphorbiaceae</td>
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</tbody>
</table>

Oct. 18  Plant collecting trip, leave at 7 am from the Range Area by the Nuclear Reactor
WEEK 8
Oct. 20, 21, 22

**Plant Comparisons 4** (5 points)

**Quiz 4** - 15 plants (15 points)

- Paniceae 15
- Fagaceae 3
- Krameriaceae 1

WEEK 9
Oct. 27, 28, 29

**Plant Comparisons 5** (5 points)

**Quiz 5** - 15 plants (15 points)

- Stipeae 4
- Bromeeae 4
- Fabaceae 11

Oct. 25

Plant collecting trip, leave at 7 am from the Range Area by the Nuclear Reactor

WEEK 10
Nov. 3, 4, 5

**Plant Comparisons 6** (5 points)

**Sight Identification Test 2** - 50 plants (50 points)

WEEK 11
Nov. 10, 11, 12

**Plant Values & Uses 2** (10 points)

- Poaceae 7
- Lamiaceae 1
- Liliaceae 1
- Pinaceae 3
- Plantaginaceae 2
- Rosaceae 5

WEEK 12
Nov. 17, 18, 19

**Plant Comparisons 7** (5 points)

**Quiz 6** - 15 plants (15 points)

- Triticeae 10
- Cannabaceae 1
- Rhamnaceae 3
- Salicaceae 2
- Sapotaceae 1
- Solanaceae 1
- Verbenaceae 1
- Zygophyllaceae 1

WEEK 13 - Thanksgiving
November 26

**Plant Collections** Due by 4 pm (125 points), No lab assignments

WEEK 14
Dec. 1, 2, 3

**Plant Comparisons 8** (5 points)

**Sight Identification Test 3** - 50 plants (50 points)

WEEK 15 - Redefined
Other Pertinent Course Information

NO cell phones, texting, twittering, etc during class. NO computers unless being used to take notes. NO electronic devices except in the case of disability.

Laboratory Safety Guidelines

Hazards for labs will be detailed the week prior and during the lab in enough detail so that students know appropriate dress and equipment to bring to lab. See Faculty Senate website for additional information on: http://facultysenate.tamu.edu/Forms/FS.1110.J.AAC.Lab.%20Safety%20Guidelines.pdf

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

Academic Integrity

For additional information please visit: http://aggiehonor.tamu.edu

"An Aggie does not lie, cheat, or steal, or tolerate those who do."

Copyright Notice

The handouts used in this course are copyrighted. By "handouts," I mean all materials generated for this class, which include but are not limited to the syllabus, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless I expressly grant permission.

Statement on Plagiarism

As commonly defined, plagiarism consists of passing off as one's own ideas, words, writing, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section "Scholastic Dishonesty."
# ESSM 303/647

## AGROSTOLOGY

### Laboratory Notes 2014

**Stephan L. Hatch**

<table>
<thead>
<tr>
<th>Quizzes</th>
<th>Tests (100 pts)</th>
<th>Sight I.D. Tests</th>
<th>Keying Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept. 4</td>
<td>Sept. 30</td>
<td>Oct. 23</td>
<td>Oct. 7</td>
</tr>
<tr>
<td>Sept. 9</td>
<td>Nov. 4</td>
<td>Dec. 2</td>
<td>Oct. 28</td>
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<td>Sept. 11</td>
<td>Dec. 12</td>
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<td>Nov. 13</td>
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<td>Sept. 16</td>
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<td>Dec. 9</td>
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<td>Sept. 18</td>
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<td>Sept. 23</td>
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<td>Oct. 2</td>
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<td>Oct. 9</td>
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<tr>
<td>Oct. 16</td>
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<tr>
<td>Oct. 21</td>
<td><strong>Field Trip</strong></td>
<td></td>
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<tr>
<td>Nov. 6</td>
<td>TBA</td>
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<td>Nov. 11</td>
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<tr>
<td>Nov. 18</td>
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<td></td>
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<tr>
<td>Nov. 20</td>
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</tr>
<tr>
<td>Nov. 25</td>
<td><em>domestic grasses only</em></td>
<td></td>
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</tr>
</tbody>
</table>

**Collection Due**

1st Oct. 14, 2014

2nd Dec. 8, 2014
COURSE DESCRIPTION:
Classification and identification of grasses based on macro-and micromorphological variation of spikelets; interpretation of spikelets variation and use of diagnostic keys to identify important species of North American grasses; a grass collection is required.

OBJECTIVES:
The course is designed to help students learn about current and past systems of grass classification, familiarize students with grassland geography, learn the variation and interpretation of grass spikelet structure, and to become proficient in using diagnostic keys for grass identification and verification of identifications using descriptions or specimens. In summary, LEARN TO IDENTIFY GRASSES.

1. Recognize and interpret plant morphology; draw and label spikelets of important grass genera; construct and write keys to separate 45 grass genera based on morphological characters; collect and identify 55 different grass species; distinguish 63 genera of grasses through sight identification
2. Apply plant identification terminology for use in plant classification and identification
3. Acquire expertise in the interpretation of spikelet structure through keying exercises
4. Analyze grass morphology that infers phylogenetic relationships
5. Critique of historical plant classification systems and current alignment of genera
6. Recognize and interpret plant disturbance, colonization or climax communities; identify grassland communities and dominant species in North America

INSTRUCTOR:  Name: Stephan L. Hatch
Department of Ecosystem Science and Management
Office location: University Services Building, Room 131 B
Animal Industries Annex, Room 101
Office hours: By appointment
Telephone: 845-4328
E-mail: s-hatch@tamu.edu

Hatch, S.L. 2014. Laboratory notes. Available at "Copy Corner."

PREREQ: None

GRADING:

1. Quizzes (15), worth 10 points each ......................................................... 150
2. Keying Tests (4), worth 20, 40, 60 and 80 points, respectively .................. 200
3. Exams (3), worth 100 points each ............................................................... 300
4. Participation and attendance ...................................................................... 30
5. Major Sight Identification Tests (2), worth 50 points each ......................... 100
6. Plant collection (1" 5 species, field book, labels) ...................................... 30
7. Plant collection, field book, and disk, a collection of 50 species of identified specimens from at least 25 different genera ................................ 100
8. Laboratory projects ................................................................................... 70

Total 1000
COLLECTION SUPPLIES
1. Plant Press
2. Collection notebook (field book)
3. Dissecting needles
4. Single edge razor blade
5. Forceps (needle nose or watchmaker)
6. One 6 in (15 cm) ruler
7. 10 X hand lens

- Failure to complete a satisfactory plant collection will result in an "F" grade for the semester, regardless of total points in class.
- 5 specimens etc. due . . . . 10/14/2014
- 50 specimens etc. due . . . . 12/8/2014
- Unexcused absence - 3 pts

Attendance Policy
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Aggie Integrity Statement
"AGGIES DO NOT LIE, CHEAT, or STEAL nor TOLERATE THOSE WHO DO!"

Lecture Schedule
Fall 2014

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept. 2</td>
<td>1</td>
</tr>
<tr>
<td>Sept. 9</td>
<td>2</td>
</tr>
<tr>
<td>Sept. 16</td>
<td>3</td>
</tr>
<tr>
<td>Sept. 23</td>
<td>4</td>
</tr>
<tr>
<td>Sept. 30</td>
<td>5</td>
</tr>
<tr>
<td>Oct. 7</td>
<td>6</td>
</tr>
<tr>
<td>Oct. 14</td>
<td>7</td>
</tr>
<tr>
<td>Oct. 21</td>
<td>8</td>
</tr>
</tbody>
</table>

- Introduction of syllabus and instructor. Growth and development of grasses (Gould & Shaw 1983, Chapter 2)
- Spikelets, spikelet formulae (Hatch, 2014)
- Keys
- History of Plant Classification
- Test 1
- Review test/ History of grass classification (Gould & Shaw 1983, Chapter 1)
- Species concepts/Chromosomes/Ploidy/Microsporogenesis
- Megasporogenesis
<table>
<thead>
<tr>
<th>Date</th>
<th>Lab #</th>
<th>Activity Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept. 2</td>
<td>1</td>
<td>Vegetative parts of a grass plant. <em>Poa annua, Sorghum halepense,</em> and <em>Monanthochloa litoralis.</em> <a href="#">Project</a>. Draw and label 3 ligule types.</td>
</tr>
<tr>
<td>Sept. 4</td>
<td>2</td>
<td>Quiz; introduction to plant collections (press collections, collecting, notebook, data, labels, and mounting specimens.) Herbarium tour.</td>
</tr>
<tr>
<td>Sept. 9</td>
<td>3</td>
<td>Quiz; introduction to spikelet variation and interpretation.</td>
</tr>
<tr>
<td>Sept. 11</td>
<td>4</td>
<td>Quiz; inflorescence types, terminology, and problems.</td>
</tr>
<tr>
<td>Sept. 16</td>
<td>5</td>
<td>Quiz; construction of diagnostic keys for identification.</td>
</tr>
<tr>
<td>Sept. 18</td>
<td>6</td>
<td>Quiz; <em>Poeae</em> and <em>Bromeae</em> tribe spikelet variation, interpretation, and keying. Prepare key to separate genera keyed within this tribe. <a href="#">Project</a>. Prepare cards to genera dissected.</td>
</tr>
<tr>
<td>Sept. 23</td>
<td>7</td>
<td>I.D. Quiz * Aveneae tribe spikelet variation, interpretation, and keying.</td>
</tr>
<tr>
<td>Sept. 25</td>
<td>8</td>
<td>* Triticeae tribe spikelet variation, interpretation, and keying. *Meliceae and <em>Stipeae</em> tribe spikelet variation, interpretation, and keying. Prepare a key to separate genera keyed today in lab. <a href="#">Project</a>. Prepare cards to genera dissected.</td>
</tr>
<tr>
<td>Sept. 30</td>
<td>9</td>
<td>Key your own collection.</td>
</tr>
</tbody>
</table>
Oct. 2 10 I.D. Quiz. FIELD TRIP - Vegetative keys and identification. Range Area

Oct. 7 11 Keying Test. Key your own collection.


Oct. 14 Collections due 5:00 pm

Oct. 16 13 I.D. Quiz Key your own collection.

Oct. 21 14 I.D. Quiz * Cynodonae tribe spikelet variation, interpretation, and keying.


Oct. 28 16 Keying Test.

Oct. 30 17 * Paniceae tribe spikelet variation, interpretation, and keying. Prepare a key to separate genera keyed today in lab. Project: Prepare cards for genera dissected.

Nov. 4 18 Paniceae tribe spikelet variation, interpretation, and keying continued.

Nov. 6 19 I.D. Quiz * Andropogoneae tribe spikelet variation, interpretation, and keying. Prepare a key to separate genera keyed today in lab. Project: Prepare cards for genera dissected.

Nov. 11 20 I.D. Quiz * Andropogoneae tribe spikelet variation, interpretation, and keying continued.

Nov. 13 21 Keying Test.

Nov. 18 22 I.D. Quiz * Aristideae, Arundineae, Danthoniaeae, Centotheceae, Bambuseae, Oryzeae tribe spikelet variation, interpretation, and keying. Prepare a key to separate genera keyed today in lab. Project: Prepare cards for genera dissected.

Nov. 20 23 I.D. Quiz * Key your collection.

Nov. 25 24 I.D. Quiz (on domestic grasses ONLY) * Key your collection.


Dec. 4 26 Key your collection.
Dec. 8  
Collection due 5:00 p.m.

Dec. 9  
27  Keying Test.

Dec. 12  
Test (Final) 12:30-2:30 p.m. - Friday

* Note specimens for study, representing subfamilies, tribes, and genera. Start to learn the names and the spelling.

COURSE OUTLINE

ONE HOUR LECTURE AND TWO (THREE-HOUR) LABORATORIES PER WEEK  
(Cr. 3) FALL SEMESTER

Study of the classification, nomenclature, and identification of grasses with emphasis on the use of diagnostic keys for identification. Vegetative and floral characters will be stressed to learn sight recognition of important U.S. genera. A grass collection with identification of 50 species from 25 genera is required.

Outline by major topic:

I. Introduction  (Mini lectures)  
   a. Orientation, course objectives, grading, texts, and supplies.  
   b. Importance of grasses to man.  

II. The Structure of Grasses  (Mini lectures and laboratory)  
   a. Caryopsis, embryo, germination, growth, and development.  
   b. Spikelet - floret structure and variation.  
   c. Inflorescence types, problems of terminology.

III. Grass Classification  (Mini lectures)  
   a. Criteria for subfamilies, tribes, and genera.  
      1. Macro- and micromorphology  
      2. Nonmorphological characters  
   b. Systems of classification.  
   c. Rules of nomenclature.

IV. Identification of Grasses  (Laboratory)  
   a. Diagnostic key construction.  
   b. Construction and use of vegetative keys.  
   c. Interpretation of spikelet structure and variation by specific tribes.
GRADING PLANT COLLECTIONS
First Installment

Requirements:
No less than 5 specimens (species) in collection
No less than 5 genera in collection, with field book, labels for each specimen and summary sheet

Grading Structure:
30 points total possible

<table>
<thead>
<tr>
<th>Item</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification</td>
<td>10</td>
</tr>
<tr>
<td>Specimen Quality</td>
<td>10</td>
</tr>
<tr>
<td>Labels</td>
<td>5</td>
</tr>
<tr>
<td>Notebook</td>
<td>5</td>
</tr>
<tr>
<td>Summary Sheet (1st Installment)</td>
<td>Required</td>
</tr>
<tr>
<td>TOTAL</td>
<td>30</td>
</tr>
<tr>
<td>w/o Summary Sheet</td>
<td>-2 pts.</td>
</tr>
<tr>
<td>Late/day</td>
<td>-5 pts.</td>
</tr>
</tbody>
</table>

DO NOT COLLECT
See next page!!!!

These specimens, labels, identifications, and summary sheets are to be saved and turned in as the first part of the second installment.

ATTENTION:

Collections due October 14, 2014 at or before 4:59 pm in 103 A, Animal Industries Building.

Grading of this installment of the plant collection is intended to help you make a better grade on the second installment. This will also help reduce the time spent on the collection at the end of the semester.
Course title and number  ESSM 304/689
Term                  Spring 2014
Meeting times and location  Lecture: Mon & Wed 9:10-10:00 am, ANIN 317
                           Lab: 501 Tue & Thur 12:10 - 3:00 pm
                           502 Tue & Thur 3:10 - 6:00 pm
                           ANIN 103a

Course Description and Prerequisites

Interpretation of vascular plant morphology for keying and identification of wildland plants; relationship and other applied parts of science; vegetative and floral characters for important plant families; a plant collection is required.

Prerequisites: None

Learning Outcomes or Course Objectives

1. Learn, recognize, and interpret vascular plant morphology for ferns, gymnosperms, and angiosperms.
2. Contrast the morphological, floral and vegetative characteristics of angiosperms.
3. Learn scientific terminology used for morphological and anatomical characteristics.
4. Critique historical plant classification systems and compare with current classification.
5. Recognize similarities and differences in life cycles of ferns, gymnosperms and angiosperms.
6. Critique methods used in experimental plant systematic.
7. Apply plant identification terminology in classification and identification.
8. Acquire expertise in interpretation of reproductive and vegetative structures through keying.
9. Construct and write keys to separate families, etc.
10. Collect, preserve and identify 35 different vascular plant species of vascular plants with reproductive parts.

Attendance Policy

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ESSM 304
RANGELAND PLANT TAXONOMY
4 cr. (2-6)
Spring 2014

OBJECTIVES:
The course is designed to help students learn the basic morphology of rangeland forbs and shrubs, learn how plants are named and why names change, and learn to use and construct vegetative and floral keys for identification of plants. Proper techniques for collecting, pressing, and mounting plant specimens will be emphasized while students learn to recognize rangeland plant families using vegetative and floral characteristics. Plants that poison domestic livestock will be discussed along with their specific poisons.

INSTRUCTOR:
Dr. Stephan L. Hatch
S. M. Tracy Herbarium
Department of Ecosystem Science and Management
University Services Building, Room 131
Telephone: 845-4328
E-mail: s-hatch@tamu.edu

Aggie Integrity Statement
"Aggies do not LIE, CHEAT, or STEAL nor TOLERATE those who do!"

TEXTS:
Hatch, S.L. 2014. Laboratory notes. Available at Copy Corner.

PREREQUISITES:
BOTN 101 - Sophomore classification

GRADING:
Lecture Exams (3) .......................................................... 300 pts
Lecture Quizzes (4) ......................................................... 40 pts
Weekly Laboratory Quizzes ........................................... 120 pts
(5 and drop 1 lowest scores of 5)
Sight Identification Laboratory Tests (4) ...................... 120 pts
Plant collection first installment, labels, fieldbook, and summary sheet ........... 20 pts
(a collection of 5 species from 4 different families*)
Plant collection second installment, labels, disks, summary sheet, and field book .......... 100 pts
(a collection of 35 species from 23 different families*)
Attendance and Participation (-3 pts/ absence) ................. 50 pts
Key Tests (25,35,40, and 50 points) ......................... 150 pts

Course Total .................................................. 900 pts

= 810 - 900
B = 720 - 809
C = 630 - 719
D = 540 - 629
F = 0 - 539

* Failure to complete a satisfactory plant collection will result in an F for the class (60%).

ADA Policy Statement:
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ESSM 304
RANGELAND PLANT TAXONOMY
TWO LECTURES AND TWO (3-HOUR) LABORATORIES PER WEEK (4 cr.)
Spring Semester

Course Syllabus

Outline of lecture by major topics

I. Introduction

A. Orientation, course objectives, grading, texts, and supplies
B. Importance of taxonomy to ecological study
C. Classification systems for vascular plants

II. Nomenclature

A. Practical problems of nomenclature that affect range plant taxonomists and the lay user of the taxonomy
B. Rules governing changes of scientific names

III. Vegetative and floral characteristics of important rangeland plants

A. Identification process
B. Diagnostic keys for identification using floral characters
C. Diagnostic keys for identification using vegetative characters
D. Family characteristics of important rangeland plants
   1. Vegetative characters
   2. Floral characteristics
   3. Fruit types
   4. Ecological importance
   5. Economic value

IV. History of plant classification for North American rangelands

V. Experimental plant systematics

Laboratory:
Study of major rangeland plant families with emphasis on the use of diagnostic keys for identification. Vegetative and floral characters of families will be stressed to learn sight recognition. A plant collection with identification of 35 species from 23 families is required.
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 13</td>
<td>Introduction, learning outcomes, grading, attendance</td>
</tr>
<tr>
<td>Jan. 15</td>
<td>Quiz. Why taxonomy is important to science - Chapter 1 &amp; 2 VPT</td>
</tr>
<tr>
<td>Jan. 20</td>
<td>Holiday. No class.</td>
</tr>
<tr>
<td>Jan. 22</td>
<td>Quiz. Ferns and fern life cycle - Chapter 9 VPT</td>
</tr>
<tr>
<td>Jan. 27</td>
<td>Gymnosperm and gymnosperm life cycles; Angiosperm life cycle - Chapter 10 VPT</td>
</tr>
<tr>
<td>Jan. 29</td>
<td>Quiz. Comparison of Liliopsida and Magnoliopsida</td>
</tr>
<tr>
<td>Feb. 3</td>
<td>Identification; communication; nomenclature; classification; tasks of the taxonomist; names; plant information; floral formula, diagrams, longitudinal sections</td>
</tr>
<tr>
<td>Feb. 5</td>
<td>Taxonomic classification; flower part; terminology - Chapter 3 VPT</td>
</tr>
<tr>
<td>Feb. 10</td>
<td>Test 1</td>
</tr>
<tr>
<td>Feb. 12</td>
<td>Review Test, Magnoliopsida families; Asteraceae, Fabaceae - Chapters 8-15</td>
</tr>
<tr>
<td>Feb. 17</td>
<td>Solanaceae, Rosaceae, Brassicaceae</td>
</tr>
<tr>
<td>Feb. 19</td>
<td>Chenopodiaceae, Apiaceae, Asclepiadaceae</td>
</tr>
<tr>
<td>Feb. 24</td>
<td>Fagaceae, Ranunculaceae, Salicaceae</td>
</tr>
<tr>
<td>Feb. 26</td>
<td>Geraniaceae, Euphorbiaceae, Cactaceae</td>
</tr>
<tr>
<td>Mar. 3</td>
<td>Malvaceae, Lamiaceae, Onagraceae</td>
</tr>
<tr>
<td>Mar. 5</td>
<td>Test 2</td>
</tr>
<tr>
<td>Mar. 10</td>
<td>SPRING BREAK</td>
</tr>
<tr>
<td>Mar. 12</td>
<td>SPRING BREAK</td>
</tr>
<tr>
<td>Mar. 17</td>
<td>Review Test</td>
</tr>
<tr>
<td>Mar. 19</td>
<td>Liliaceae, Cyperaceae, Juncaceae</td>
</tr>
<tr>
<td>Mar. 24</td>
<td>Liliaceae, Alismataceae, Commelinae, Iridaceae</td>
</tr>
</tbody>
</table>
Mar. 26  Brief history of plant classification - Chapter 6 VPT

Mar. 31  Brief history of plant classification - Chapter 6 VPT

Apr. 2   Brief history of plant classification - Chapter 6 VPT

Apr. 7   Introduction to poisonous plants

Apr. 9   Milkweed, threadleaf groundsel, false hellabore, bitterweed, phenols, nitrates

Apr. 14  Broom snakeweed, hydrocyanic acid, larkspur, cocklebur, water hemlock

Apr. 16  Bluebonnet, brackenfern, mesquite, oak, locoweed, selenium, oxalate.

Apr. 21  Quiz. Photosensitization

Apr. 23  Rare and endangered taxa

Apr. 28  Course evaluation and review

May 5   Final. 8:00-10:00 am
<table>
<thead>
<tr>
<th>Date</th>
<th>Lab #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 14</td>
<td>1. Introduction to laboratory, learning to write “keys”</td>
</tr>
<tr>
<td>Jan. 16</td>
<td>2. Key writing</td>
</tr>
<tr>
<td>Jan. 21</td>
<td>3. Life cycle of Pinophyta; Pinophyta terms; keying selected Pinophyta</td>
</tr>
<tr>
<td>Jan. 23</td>
<td>4. Keying selected Pinophyta</td>
</tr>
<tr>
<td>Jan. 28</td>
<td>5. Key Pinophyta</td>
</tr>
<tr>
<td>Feb. 4</td>
<td>7. Keying selected fern and fern allies species</td>
</tr>
<tr>
<td>Feb. 6</td>
<td>8. Key, floral formula, draw flower longitudinal section, floral diagram; <em>Sonchus, Stellaria, Lamium</em>, etc.</td>
</tr>
<tr>
<td>Feb. 11</td>
<td>9. Collecting, pressing, and labeling plant collections</td>
</tr>
<tr>
<td>Feb. 13</td>
<td>10. <strong>Sight I.D. Test 2</strong> Ferns [Family, Species, spelled correctly]; Fruit Lab</td>
</tr>
<tr>
<td>Feb. 18</td>
<td>11. Keying Magnoliophyta</td>
</tr>
<tr>
<td>Feb. 20</td>
<td>12. <strong>Keying Test</strong> (2 hrs.), key your own specimens</td>
</tr>
<tr>
<td>Feb. 25</td>
<td>13. Key Magnoliophyta</td>
</tr>
<tr>
<td>Feb. 27</td>
<td>14. Keying Magnoliophyta</td>
</tr>
<tr>
<td>Mar. 4</td>
<td>15. Keying Magnoliophyta. Collection 1 due <strong>BEFORE</strong> lab.</td>
</tr>
<tr>
<td>Mar. 6</td>
<td>16. Keying Test</td>
</tr>
<tr>
<td>Mar. 11</td>
<td><strong>SPRING BREAK</strong></td>
</tr>
<tr>
<td>Mar. 13</td>
<td><strong>SPRING BREAK</strong></td>
</tr>
<tr>
<td>Mar. 18</td>
<td>19. Keying Magnoliophyta</td>
</tr>
<tr>
<td>Mar. 20</td>
<td>20. Keying Magnoliophyta</td>
</tr>
</tbody>
</table>
Mar. 27  22. Sight I.D. Test 3. Poisonous Plant Group 1 (Family and Species) Key your own collection.

Apr. 1   23. Keying Magnoliophyta

Apr. 3   24. Keying Test

Apr. 8   25. Keying Magnoliophyta

Apr. 10  26. Keying your own specimens

Apr. 15  27. Sight I.D. Test 4. Poisonous Plant Groups 1 & 2 (Family and species) Key your own collection.

Apr. 17  28. Key your own specimens

Apr. 22  29. Key your own specimens

Apr. 24  30. Key your own specimens

Apr. 29  31. Collection 2 due @ 4:59 pm

**Weekly laboratory quizzes will be given toward the END of the three hour laboratory (30 minutes or more before the end of lab).**

---

NO cell phones, texting, twittering, etc during class.
NO computers unless being used to take notes.
NO electronic devices except in the case of disability.

**Americans with Disabilities Act (ADA)**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

**Academic Integrity**

*For additional information please visit: http://aggiehonor.tamu.edu*

"An Aggie does not lie, cheat, or steal, nor tolerate those who do."
Course title and number: Watershed Analysis and Planning ESSM 305
Term: Fall 2014
Meeting times and location: Tuesday/Thursday 11:10-12:25

Course Description and Prerequisites

This course provides an integrated framework for watershed planning that addresses the biophysical, social, and economic issues affecting water resources. The comprehensive scope and approach used here will introduce students to the fundamental issues related to water planning and water resources. Students will become acquainted with water problems across the globe and apply this understanding to address Texas water issues. Various media will be incorporated to communicate information; including lectures, guest speakers, documentaries, a textbook and online materials. This course relies on active learning, and students are expected to participate in discussions both in class and online. Student performance will be evaluated on the basis of performance on exams, level of knowledge demonstrated through discussion, online contributions, and short weekly summaries of course topics; and a group project at the end of the semester. The group project will require a final written report and an oral presentation.

Learning Outcomes

• An understanding of contemporary issues of water quantity and quality at local, state, national, and global scales
• Development of the ability to analyze and interpret basic information related to water resources
• Improved critical thinking skills
• Improved professional written and oral communication skills

Instructor Information

Name: Bradford P. Wilcox
Telephone number: bwilcox@tamu.edu
Email address: bwilcox@tamu.edu
Office hours: Open by appointment
Office location: HFSB 319

Textbook and/or Resource Material


Grading Policies

Weekly Participation (in class and on-line): 10%
Weekly summary: 15%
4 Exams: 40% : Sept 16, Oct 2, Oct 28, Nov 18
Group presentation and paper: 35%
Attendance and Make-up Policies

University attendance policies are included here: http://student-rules.tamu.edu/rule07. Weekly summaries are due the week of the assignment and unless approval is obtained from the instructor, late assignments will not be accepted. Role will be called periodically throughout the semester. Attendance is strongly encouraged throughout the semester and is required for all the days when groups are presenting.

Course Topics, Calendar of Activities, Major Assignment Dates

Test Dates:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Required Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Sept 2, 4</td>
<td>Introduction, Water Budgets</td>
<td>Chapter 1</td>
</tr>
<tr>
<td>2: Sept 9, 11</td>
<td>Water Budget</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>3: Sept 16, 18</td>
<td>Test 1, Water Quality</td>
<td>Chapter 2</td>
</tr>
<tr>
<td>4: Sept 23, 25</td>
<td>Water Quality, Urban Hydrology</td>
<td>Section 8.6</td>
</tr>
<tr>
<td>5: Sept 30 Oct 2</td>
<td>Climate Change, Test 2</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>6: Oct 7, 9</td>
<td>Water Supply</td>
<td>Chapter 3</td>
</tr>
<tr>
<td>7: Oct 14, 16</td>
<td>Flooding, Groundwater</td>
<td>Chapter 4</td>
</tr>
<tr>
<td>8: Oct 21, 23</td>
<td>Technologies for Water Mgt</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>9: Oct 28, 30</td>
<td>Test 3, River Authorities</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>10: Nov 4, 6</td>
<td>Water Scarcity, Agriculture</td>
<td>Chapter 9, 10</td>
</tr>
<tr>
<td>11: Nov 11, Nov 13</td>
<td>Wildlife, Hydrologic Alteration, Energy</td>
<td>Chapter 8, 11</td>
</tr>
<tr>
<td>12: Nov 18, 20</td>
<td>Test 4, Municipal Use</td>
<td>Required attendance</td>
</tr>
<tr>
<td>13: Nov 25</td>
<td>Group Presentations (groups 1 and 2)</td>
<td>Required attendance</td>
</tr>
<tr>
<td>14: Dec 2, Dec 4</td>
<td>Group Presentations (groups 3, 4, 5, 6)</td>
<td>Required attendance</td>
</tr>
<tr>
<td>15: Dec 9</td>
<td>Group Presentation (groups 7)</td>
<td>Required attendance</td>
</tr>
</tbody>
</table>

Guest Speakers

<table>
<thead>
<tr>
<th>Date</th>
<th>Speaker</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept 25</td>
<td>John Jacob</td>
<td>Smart Growth, Urban Hydrology</td>
</tr>
<tr>
<td>Sept 30</td>
<td>Matt Berg</td>
<td>Climate Change</td>
</tr>
<tr>
<td>Oct 9</td>
<td>Steven Bereyso</td>
<td>SAWS</td>
</tr>
<tr>
<td>Oct 16</td>
<td>Marcus Gary</td>
<td>Edwards Aquifer Authority</td>
</tr>
<tr>
<td>Oct 23</td>
<td>Sky Lewey</td>
<td>Nueces River Authority</td>
</tr>
<tr>
<td>Oct 30</td>
<td>Steve Raabi</td>
<td>San Antonio River Authority</td>
</tr>
<tr>
<td>Nov 11</td>
<td>Matt Wagoner</td>
<td>Texas Parks and Wildlife</td>
</tr>
<tr>
<td>Nov 20</td>
<td>Willy Conrad</td>
<td>City of Austin</td>
</tr>
</tbody>
</table>

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Academic Integrity
For additional information please visit: http://eggiehonor.tamu.edu

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SYLLABUS

ESSM 307, FOREST PROTECTION

Pathology Section (March 4 - May 2, 2014)
Lecture; TR 11:35 am - 12:25 pm HPCT 205
Lab; R 12:45 pm - 3:35 pm HPCT 205
Instructor; Dr. David Appel
Dept. Plant Pathology and Microbiology
Rm. 120 L.F. Peterson Building (845-8273)
appel@tamu.edu

The Pathology Section of FRSC 307 consists of a brief overview of the agents responsible for tree diseases. These discussions include the types of problems they cause, and how they are controlled to reduce losses and minimize threats to forest management objectives. One objective of the course is to familiarize the student with the agents responsible for causing diseases (e.g., fungi, viruses, bacteria, nematodes, mycoplasmas, abiotic agents). A second objective is to examine and compare the tissues affected, e.g. foliar diseases, vascular diseases, stem and trunk cankers, root rots. Diseases of complex etiology and forest declines will also be considered. The impacts, causes, and management of specific diseases will comprise the main part of the subject matter. Many of these examples will represent diseases important to southern forest ecosystems, although diseases unique to forests in other parts of the world will be discussed. Special topics will include how tree diseases relate to forest health issues and how they influence ecosystem management objectives.

Laboratory sessions will focus on the steps necessary to examine diseased trees and tissues toward diagnosis of tree diseases. This will be accomplished by inspecting samples collected locally and viewing slides of signs and symptoms.

There will be three examinations, each worth 25% of the final grade in the Pathology Section. The remaining 25% will derive from "pop" quizzes and completion of a laboratory exercise. This grade will then be combined with your grade from the Entomology Section to arrive at a final, composite grade for the course.

The Pathology Section will begin on Tuesday, March 4, 2014, with the last class lecture scheduled for Tuesday, April 30, 2013. May 3 (Friday), 3:00 pm – 5:00 pm is the date and time scheduled for the final examination.

Assigned readings will be made in the following text, which will be provided via email prior to class.
Forest and Shade Tree Pathology, by D.W. French (Professor Emeritus, University of Minnesota).

An important website you will be required to visit to supplement the text is:
http://forestpathology.org/
LECTURE OUTLINE - FOREST PROTECTION

SPRING, 2013: PATHOLOGY SECTION

1  March 4  LEC: Concepts in forest pathology.
    Chapter 1, Introduction - French

2  March 6  LEC: Pathogen types, fungi, bacteria
    http://www.forestpathology.org/fungi.html

3  March 6  LAB: Pathogen types cont'd. Foliar pathogens
    http://www.forestpathology.org/foliage.html

[SPRING BREAK March 10 – 14]

4  March 18 LEC: Vascular wilts
    http://www.forestpathology.org/wilt.html

5  March 20 LEC: Vascular wilts, cont'd.
    Stem diseases, cankers.
    http://www.forestpathology.org/canker.html

6  March 20 LAB: Inspection of signs and symptoms.

7  March 25 LEC: Cankers, cont'd.

8  March 27 EXAM 1

9  March 27 LAB: Isolation of plant pathogens.

10 April 1  LEC: Mistletoe.
    http://www.forestpathology.org/mistle.html

11 April 3  LEC: The rusts and their life cycles.
    http://www.forestpathology.org/rust.html

12 April 3  LAB: Inspection of signs and symptoms.

13 April 8  LEC: Rust diseases, cont'd.

14 April 10 LEC: Rust diseases, cont'd

15 April 10 EXAM 2

16 April 15 LEC: CODIT, discoloration and decay.
    http://www.forestpathology.org/decay.html#terms
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
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</thead>
<tbody>
<tr>
<td>April 17</td>
<td>LAB: Field trip - Lick Creek Park.</td>
</tr>
<tr>
<td>April 17</td>
<td>LEC: Root rots, canker rots. <a href="http://www.forestpathology.org/root.html">Link</a></td>
</tr>
<tr>
<td>April 22</td>
<td>LEC: Decay, cont’d.</td>
</tr>
<tr>
<td>April 25</td>
<td>LEC: Stress and strain, predisposition.</td>
</tr>
<tr>
<td>April 24</td>
<td>LAB: Abiotic pathogens, air pollution.                                <a href="http://www.forestpathology.org/root.html">Link</a></td>
</tr>
<tr>
<td>April 29</td>
<td>LEC: Decline spirals.                                               <a href="http://www.forestpathology.org/decline.html">Link</a></td>
</tr>
</tbody>
</table>
| May 2    | **EXAM 3** (Final – 3:00 pm – 5:00 pm).      

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**AGGIE HONOR CODE**

"An Aggie does not lie, cheat, or steal or tolerate those who do."

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.

For additional information please visit [http://www.tamu.edu/aggiehonor/](http://www.tamu.edu/aggiehonor/)
Fundamentals of Environmental Decision-Making (ESSM 308)  
Spring 2014

Instructor  
Jianbang Gan  
Professor  
311 Horticulture/Forest Science Building (HFSB)  
Phone: 862-4392  
Email: j-gan@tamu.edu  
Office hours: 3:45 p.m.-5:00 p.m. TR or by appointment

Teaching Assistant  
Hyunjin An  
Email: hjan713@gmail.com  
Office hours: 3:00 p.m.-5:00 p.m M, 1:00 p.m.-2:00 pm. TR, or by appointment

Class Schedule and Location  
2:20 - 3:35 p.m. TR  
HELD 105

Prerequisites  
Junior classification or approval of instructor

Textbook  
There is no required textbook. All reading materials are accessible from eCampus (http://ecampus.tamu.edu/).

Course Objectives  
(1) To introduce students to major environmental issues in natural resource management and the environmental decision-making (EDM) process;  
(2) To instruct principles and analytical methods/tools used in environmental decision-making; and  
(3) To develop/strengthen students' skills and ability to apply the principles and tools to environmental decision-making.
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16</td>
<td>Lecture 2: Current major environmental issues in natural resource management</td>
<td>The 2012 Living Planet Report (<a href="http://www.panda.org/about_our_earth/all_publications/living_planet_report/">http://www.panda.org/about_our_earth/all_publications/living_planet_report/</a>)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Millennium Ecosystem Assessment (<a href="http://www.maweb.org/en/index.aspx">http://www.maweb.org/en/index.aspx</a>)</td>
</tr>
<tr>
<td>Date</td>
<td>Topic</td>
<td>Reading materials</td>
</tr>
<tr>
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<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>2/11</td>
<td>Exam #1</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Topic</td>
<td>Reading materials</td>
</tr>
<tr>
<td>-------</td>
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<td>-------------------------------------------------------------------------------------------------------------------------------------------------</td>
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<tr>
<td></td>
<td>Final grouping for project 1; identifying team leaders; deciding on who does what and when</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assigning project 2</td>
<td></td>
</tr>
</tbody>
</table>
### Lecture Schedule, Topics, and Reading Materials (cont.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/6</td>
<td>Exam #2</td>
<td></td>
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<tr>
<td>3/10-3/14</td>
<td>Spring break</td>
<td></td>
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</tbody>
</table>

**Project 1: Class simulations of EDM -- the case of global climate change**

*Requirements for students:* Study the case, and prepare for and participate in class presentation, debates, and decision-making simulations. In addition, each group needs to submit a project summary report (no more than 3 pages, single spaced) and a PowerPoint presentation.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading materials</th>
</tr>
</thead>
</table>
| 3/18     | Overview of global climate change (issues, impacts, and mitigation and adaptation) | Climate change 2007: IPCC fourth assessment report.  
http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml#1  
U.S. national assessment of the potential consequences of climate variability and change.  
http://www.usgcrp.gov/usgcrp/nacc/  
The Kyoto Protocol.  
http://unfccc.int/resource/docs/convkp/kpeng.pdf  
The Copenhagen Accord.  
Most recent documents on climate negotiations (http://unfccc.int/documentation/documents/items/3595.php) |
| 3/20     | Students work on assigned topics and prepare for class presentation |                                                                                                                                                |
| 3/25     | Group presentation                                                   |                                                                                                                                                |
| 3/27     | Group presentation                                                   |                                                                                                                                                |
| 4/1      | Group presentation                                                   |                                                                                                                                                |
| 4/3      | Group presentation                                                   |                                                                                                                                                |
| 4/8      | Assignment for EDM simulation                                        | In this exercise, you will represent a country or a group of countries to negotiate a global agreement for response to climate change.       |
| 4/10     | Preparation for EDM simulation                                       | Questions to think about:  
Is there a problem/issue?  
What would be the impacts (negative and positive) and their magnitude?  
What would be adaptation and mitigation options and costs?  
Are there any uncertainty and externalities?  
Where should we go from here? |
| 4/15     | Global climate change Decision-making simulations:  
Role-play simulation on global response to climate change |                                                                                                                                                |

*Project 1's reports (including a 3-page summary and PowerPoint presentation) due*
Lecture Schedule, Topics, and Reading Materials (cont.)

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading materials</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Project 2: Application of the EDM principles and tools to solving real-world problems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Students can select topics from the following suggested list: biodiversity, food safety, invasive species, old-growth forests, pest and disease control, protection of endangered species, renewable energy, restoration of ecosystems, soil conservation, tropical deforestation, urban-wildland interface, water conservation and quality, wildfire, and others (to be approved by the instructor).</td>
<td></td>
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<tr>
<td></td>
<td>Requirements for students: Identify an issue/problem, define goal(s)/objective(s), identify alternatives, evaluate the alternatives, make a decision to resolve/alleviate the issue/problem, and submit a written project report for each group.</td>
<td></td>
</tr>
<tr>
<td>4/17</td>
<td>Introduction to project 2</td>
<td></td>
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<tr>
<td></td>
<td>Students work on project 2:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identify problems and define goals/objectives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Identify alternatives</td>
<td></td>
</tr>
<tr>
<td>4/22</td>
<td>Students work on project 2:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gather and analyze data/information</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Apply decision tools</td>
<td></td>
</tr>
<tr>
<td>4/24</td>
<td>Students work on project 2:</td>
<td></td>
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<tr>
<td></td>
<td>Make decisions and write project reports</td>
<td></td>
</tr>
<tr>
<td>4/29</td>
<td>Redefined day</td>
<td></td>
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<tr>
<td>5/7,</td>
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<tr>
<td>1-3 PM</td>
<td>Final exam</td>
<td></td>
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</tbody>
</table>

Note: The schedule and content are subject to change. Please check the course syllabus regularly for updates.

Grouping for Team Projects
Students are encouraged to form their own project teams. Each team is limited to 5-6 members to ensure maximum participation of each student and meaningful interactions among the group members. The instructor will also coordinate the forming of teams so that students' interests will be balanced.

Participation of each and every student is the key to the success of the team projects. To encourage full participation of all students in the entire project, each team is allowed to fire non-participating member(s) based on at least 2/3 votes of all the team members. A 25% of the project grade will be deducted for fired students. The fired students will not be allowed to form a new group. They must negotiate with other existing groups to earn their new membership in
another group. This policy is by no means to punish students, but to encourage their participation and teamwork.

**Grading Policy**

Students’ performance in this class will be evaluated using the following weights and grading scale:

*Weights:*

- Homework/assignments and class participation: With final: 25%, Without final: 31%
- Team projects (2): With final: 20%, Without final: 25%
- Midterm exams (2): With final: 35%, Without final: 44%
- Final exam (optional): With final: 20%

*Grading scale:*

- A: 90-100%
- B: 80-89%
- C: 70-79%
- D: 60-69%
- F: < 60%

Students are required to turn in their homework and other assignments at the time specified by the instructor. Late returns of assignments will be discounted at a 25% daily rate. This course emphasizes critical thinking, problem solving, and teamwork skill development. Student participation in class activities is vitally important and will be monitored and evaluated.

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**Academic Integrity Statement**

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Course title and number  
Forest Ecology, ESSM 309

Term  
Fall 2014

Meeting times and Location  
Tuesday and Thursday: 2:20 – 3:35 PM  
Emerging Technologies Building [ETB in aggiemap.tamu.edu]  
Room 1034

Instructor Information

Name  
Jason G. Vogel

Telephone number  
979 845 5580

Email address  
jason_vogel@tamu.edu

Office hours  
Open door or by appointment

Office location  
Room 209C Animal Sciences

Prerequisites
Introductory courses in ecology and chemistry are recommended but not required.

Instructor

Dr. Jason G. Vogel  
Office: 209C Animal Industries  
Phone: 845-5580  
Email: jason_vogel@tamu.edu  
Website: http://vogellab.tamu.edu

Course Description
This course will introduce students to ecology with a special focus on forest ecosystems. Students will learn the life history and general characteristics of trees; structure and function of forest ecosystems; fundamental principles of forest biogeochemistry and ecology applied to an analysis of tree growth in relation to environmental factors and present day forest management, global change, and disturbance.

Course learning objectives
Upon completion of this course you will be able to:
- Describe the key interrelationships among plants, animals, microorganisms and their environments in forest ecosystems.
- Define the structure and function of trees and forests and the ecosystem services they provide.
- Evaluate the impacts of environmental change, including climate change and human impacts on forest ecosystems in an earth system context.
- Synthesize, interpret, and communicate science-based information on forest ecosystems and management.

Format
Forest Ecology 309 is a 3-credit lecture course. We will explore basic concepts and current topics in forest ecology through assigned readings, student presentations and writing assignments, classroom discussion, lectures, and in-class activities. Occasional, outside excursions near the classroom building may be conducted to demonstrate
equipment. I believe in active engagement by you the student with the reading material, me, and your fellow students. I will lecture and try to teach, but how much you learn is really up to you.

Office hours
I can meet on Tuesday and Thursday after class from 3:45-4:45 PM in ETB or by appointment.

Contacting me
Feel free to send me email (jason_vogel@tamu.edu) with questions, comments, or to arrange a meeting in person at my Animal Industries office. I will typically reply to email within 24 hours. **Note: I rarely check the messages on eCampus or eLearning so please do not use these venues to communicate with me.**

Web-based course materials
A companion website for the course is located in eCampus (Blackboard Vista). As a registered student, you will have access to the website. The website is an essential course tool.

1. You can access eCampus through the TAMU Howdy
2. Login using your official TAMU user name and password. Click on “OK”.
3. Complete your discussion assignments, submit papers, and reviews of papers. You can also email me papers, but this is less desirable.

Textbook
The required textbook is a key course component. You will use the text to complete most reading assignments.


Other recommended books
These texts are an excellent source for further information and perspectives on forest ecology.

Major course activities, assignments, and projects

1) **Required readings from the textbook**
You will be expected to read assigned material (from the course textbook) **before** each class period and participate in discussions, lectures, and activities. To excel in this course, your attendance at all class sessions is expected and will help you progress in your study throughout the semester. The lectures and class activities will typically focus on the same topics you have read about, but may address different materials, depending on the importance of the reading, its difficulty, and the information that needs to be covered. In addition to the chapter assignments, supplemental readings may be assigned for some topics. These readings will be posted on the course website.

2) **Online discussion questions or comments and classroom discussion**
For each assigned reading throughout the course, you will have the opportunity to post a question or comment. Ideally, you comment or question is based on the assigned reading for the day or on relevant related topics. These daily questions or comments should be brief (1-3 sentences in length), and **posted online on the course website**. Postings are due prior to the beginning of class. **Late postings (after 2:20 pm on the due date shown)** will not receive credit.
1) I encourage you to generate an exam question from your reading. Provide only the question, and as a group, we will discuss in class the possible answer for the better questions. For each exam, I will try to pull between 15-25% of the questions from our discussion group.

Why are the online questions or comments important?
The objectives of these required "daily questions" are to:
- Assist you in organizing and studying the course material
- Enhance your online and classroom experience
- Practice critical thinking and evaluation
- Provide valuable feedback on your level of understanding
- Move classroom focus to issues you find interesting and important
- Create interaction among you and your classmates

In addition, I will post online replies to your questions. Please visit the discussion post area to read the posted discussion questions and responses. This often proves to be a helpful study aid.

What types of questions or comments are you looking for?
A good question or comment indicates some depth of thought. A question could be something specific that you don't understand (e.g., "what is soil nitrogen mineralization and its role in forest ecosystems?") or that seems to contradict something else we've read or covered in lecture (e.g., "how can we reconcile these results with those of Sarah Smith who found opposite results in Siberia?"). Comments could for instance, indicate what you think is an important policy implication or linkage to other aspects of forest ecology. In addition, you can suggest interesting internet links to your classmates.

How will the online discussion questions be evaluated?
Questions or comments will be evaluated based on clarity, quality, relevance, and mechanics (grammar, spelling). A good question or comment indicates depth of thought and evidence of critical thinking. Questions will be individually graded on a five-point scale (5= excellent, 4=good, 3=average, 2=below average, 1=unacceptable).
Unexcused late submissions will not be accepted. There are a total of 12 posting assignments. For full credit, you are required to complete 10 postings. This means you may elect for any reason not to complete two daily question postings without penalty. If you complete all the daily question postings, the extra points you earn (maximum of 10 points) will be included as extra credit and added to your course total points.

3) Midterm exams----GREY SCANTRON SCORE SHEETS ARE NEEDED
There will be four in-class midterm exams with your lowest score being thrown out. These exams will largely cover the material presented since the last exam; however, this course builds on basic principles that are revisited and so exams are effectively cumulative. The exam format will include vocabulary matching and multiple-choice.

4) Paper and presentation (50 pts)

   Oral Presentation and Writing assignment: Student groups will give a 7-8 minute talk. Students will pick a topic related to forest ecology; some possible topics are listed at the end of syllabus. Students will form a 2 person team. This will halve the presentation time for each, and although each student will be graded separately for their presentation style and their paper, other things like use of allotted time, poor graphics will be the foundation for the group grade. Your presentation must be less than 8 minutes. You must do both a 3-5-minute part of the presentation and the writing assignment to receive credit.

   The presentation must fall between 7-8 minutes and each presentation will include:
   1) Background on the question
   2) Problem statement or question
3) Notable recent research and graphs. The graphs must come from the scientific literature.

I will provide an example presentation to help guide your presentation.

A 2 page paper (including 5 scientific citations (no websites)) will be required that covers your topic and follows the sections above. You must write a separate paper from what your teammate writes and so I would recommend that you do not share this part of your work. Plagiarism rules apply. This should be on some unique aspect of your overall project; I will help you with making papers distinct.

You will create an exam question with your paper. This can be in the form of a multiple choice or as a fill in the blank. I will be using a set of these for exam 4. When creating your question, ask yourself what is the most important aspect of this material? What should my classmates remember or what will most affect their ability to make decisions as a voting citizen regarding this aspect of forest ecology? Each of the team members will produce one of these questions. For exam 4, 75% of the questions will derive from student questions.

Peer evaluation: You will grade two other team's presentations and one other student's paper. The grading will be anonymous and you will be given a rubric for making your assessment. You must do this to receive your own grade for the project so it is a pass/fail effort. I will incorporate your comments into mine and give feedback to your classmates.

5) Final exam There is no final exam in this course.

6) Extra Credit

Extra credit will only be made available to the entire class (see “Postings” and “Concept Map: Changes through time” assignments). There will be no ‘extra-extra’ credit assigned to individuals.

**Concept map:** During the second week of class you will receive a blank X-Y graph where the X is ‘time’. You will pick a forest ecosystem and a process or characteristic (eg ecosystem nutrient change, plant biodiversity, microbial diversity) and start from the ecosystem’s beginning you will estimate how this characteristic(s) changes through time. I don’t expect you to get the ‘right’ answer on this first try. At the end of the semester, you will do this exercise again and I will compare the result. If you do this and attempt to do good work, both at the beginning and end of the class, you will receive full points. I will not downgrade you for ‘wrong’ answers, but you must attempt to fill in at least 4 different ‘stages’.

---

### Points and percentage for non-honors students.

<table>
<thead>
<tr>
<th>Course assignment</th>
<th>Possible Points</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Discussion postings(^1)</td>
<td>50</td>
<td>13</td>
</tr>
<tr>
<td>Paper/Exam Question</td>
<td>25</td>
<td>6</td>
</tr>
<tr>
<td>Oral Presentation</td>
<td>25</td>
<td>6</td>
</tr>
<tr>
<td>Exam 1 – midterm</td>
<td>100*</td>
<td>25</td>
</tr>
<tr>
<td>Exam 2 – midterm</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>Exam 3 – midterm</td>
<td>100</td>
<td>25</td>
</tr>
<tr>
<td>Exam 4 – midterm</td>
<td>100*</td>
<td>*</td>
</tr>
<tr>
<td><strong>Course total</strong></td>
<td><strong>400</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

\(^*\)Your lowest exam score will be dropped

**Extra credit**

<table>
<thead>
<tr>
<th>Extra credit</th>
<th>Possible Extra Points</th>
<th>Percentage of course total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Extra Postings</td>
<td>10</td>
<td>Add these to course total</td>
</tr>
<tr>
<td>Concept Map</td>
<td>20</td>
<td>20%</td>
</tr>
</tbody>
</table>

\(^1\)Ten postings must be completed out of 12 possible posting assignments. You may complete two extra postings for a 10-points extra credit. These points, and the oral and writing assignment, will be added to the course total.
Course point totals and letter grade

<table>
<thead>
<tr>
<th>Total points</th>
<th>Percentage</th>
<th>Course letter grade</th>
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<tbody>
<tr>
<td>360 – 400</td>
<td>≥ 90</td>
<td>A</td>
</tr>
<tr>
<td>320 – 359</td>
<td>≥ 80</td>
<td>B</td>
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<tr>
<td>280 – 319</td>
<td>≥ 70</td>
<td>C</td>
</tr>
<tr>
<td>240 – 279</td>
<td>≥ 60</td>
<td>D</td>
</tr>
<tr>
<td>&lt; 239</td>
<td>&lt; 60</td>
<td>F</td>
</tr>
</tbody>
</table>

Course policies

**Classroom environment.** Please silence cell phones, pagers, and other electronic devices before class. Laptops are permitted for taking notes but do not watch movies or Youtube during class time. It is distracting to other students and I will ask you to leave. Please respect your classmates by arriving on time, remaining the entire class period, and refraining from eating, drinking, or sleeping during class. As a courtesy, please let me know prior to the beginning of class if you must leave while class is in session.

**Late assignments.** No credit is given for late assignments. Late assignments will accepted only for university-authorized excused absences. Please contact your instructor prior to the assignment due date. No points will be recorded for online discussion entries posted after 2:20 P.M. on the due date.

**Missed exams.** Make-up exams are not permitted except for extenuating circumstances (e.g. illness, injury, or other emergency) that include both prompt written notification (acknowledged e-mail message is acceptable) and proper proof to document the reason for missing the exam. If you are not able to take the exam, please contact your instructor prior to the scheduled exam time. In cases where advance notification is not feasible (e.g., accident, or emergency) you must provide written notification (acknowledged email is acceptable) by the end (5 P.M.) of the second day after the absence (within 48 hours). This notification should include an explanation of why notice could not be sent prior to the class. Late notifications (after 48 hours) are not accepted and a grade of 0 will be recorded. If needed, the student must provide additional documentation substantiating the reason for the absence that is satisfactory to the instructor, within one week of the last date of the absence.

**Excused absences.** Students who are requesting an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. The student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for an absence that results in a missed exam or assignment. Injury or illness is among the reasons absences are considered excused by University policy. A medical confirmation note must contain the date and time of the illness and medical professional’s confirmation of needed absence. An absence for a non-acute medical service does not constitute an excused absence (from Student Rules at http://student-rules.tamu.edu/). If the absence is excused, you will be provided with an opportunity to make up an exam or other graded activities or be provided a satisfactory alternative to be completed as soon as possible, but no later than 30 calendar days from the last day of the absence.

**Appeals.** Appeals for reevaluation of any assignment or exam will be accepted in writing. You are granted until 5 P.M. on the second full working day following the return of an exam to present your case. Your argument must be a written statement concerning why you think a particular answer was correct or did not receive the credit it deserved.

**Course incompletes.** The University regulations are: "The instructor shall give this grade only when the deficiency is due to an authorized absence or other cause beyond the control of the student."

**Promoting academic integrity**

"An Aggie does not lie, cheat or steal or tolerate those who do."
Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. For additional information please visit: http://www.tamu.edu/aggiehonor/.

Texas A&M University expects academic integrity and strictly enforces policies against any form of scholastic dishonesty. Please review the Student Rules for more information. The usual penalty for an initial violation shall be an “F*” in the course and “Honor Violation Probation”. Depending upon the facts of the case and the nature of the honor code violation and whether or not a repeat offender, additional sanctions may be imposed. Sanctions may include suspension and expulsion from the University.

In Forest Ecology 309, cheating or complicity in cheating on an exam, or fraudulent requests for excused absences assignment among other forms of academic dishonesty will result in an “F” in the course and “Honor Violation Probation”. If circumstances warrant, a lesser penalty consisting of grade of 0 on the work in question will apply. A grade of 0 on the work in question is the minimum penalty in this course.

The Texas A&M University Student Rules and Honor System define several forms of academic dishonesty, these include, but are not limited to:

1. **Cheating**: Intentionally using or attempting to use unauthorized materials, information, notes, study aids or other devices or materials in any academic exercise. Cheating also includes unauthorized copying or removal of an exam (in whole or in part) from the examination room.
2. **Fabrication**: Making up data or results, and recording or reporting them; submitting fabricated documents. This also includes material (email, documents) to support an excused absence.
3. **Falsification**: Manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record. This also includes material (email, documents) to support an excused absence.
4. **Multiple Submissions**: Submitting substantial portions of the same work (including extra credit reports) for credit more than once without authorization from the instructor of the class for which the student submits the work.
5. **Plagiarism**: The appropriation of another person’s ideas, processes, results, or words without giving appropriate credit.
6. **Complicity**: Intentionally or knowingly helping, or attempting to help, another to commit an act of academic dishonesty.

**Americans with Disabilities Act (ADA)**
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu
# ESSM 309 FOREST ECOLOGY

**Fall 2014 Class Schedule**

**Tuesday, Thursday, 2:20 – 3:35 PM**

Emerging Technologies Building [ETB in aggiemap.tamu.edu] Room 1034

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture or activity¹</th>
<th>Chapter reading list²/ Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sep 2</td>
<td>Introduction to forest ecology</td>
<td>Ch. 1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Landscape variation in ecosystems</td>
<td>Ch. 2 and 3</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>Forest Types and Climate</td>
<td>Ch. 4 (posting 1)/<strong>Extra Credit Concept Map</strong></td>
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<tr>
<td></td>
<td>11³</td>
<td>Film ‘Forests’</td>
<td>Ch. 6</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>Disturbance</td>
<td>Ch. 7 (posting 2)</td>
</tr>
<tr>
<td></td>
<td>18</td>
<td>Succession/Review</td>
<td>Ch. 8 (posting 3)</td>
</tr>
<tr>
<td>4</td>
<td>23</td>
<td>Exam 1 (midterm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>Succession/Size density relationships</td>
<td>Ch. 12 (posting 4)</td>
</tr>
<tr>
<td>5</td>
<td>30</td>
<td>Management, Animals, and Succession Hansen et al. 1995 (posting 5)</td>
<td></td>
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<tr>
<td>Oct 2</td>
<td>7</td>
<td>Structure of Local Ecosystems</td>
<td>Ch. 9 (posting 6)</td>
</tr>
<tr>
<td>6</td>
<td>14</td>
<td>Biological Web/Review</td>
<td>Ch. 10 (posting 7)</td>
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<tr>
<td></td>
<td>16¹</td>
<td>Exam 2</td>
<td>Ch. 11</td>
</tr>
<tr>
<td>8</td>
<td>21</td>
<td>Soil</td>
<td>Ch. 14 (posting 9)</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Primary Productivity</td>
<td>Ch. 15 (posting 10)</td>
</tr>
<tr>
<td>9</td>
<td>28</td>
<td>Primary Productivity/Forest Nutrition</td>
<td>Ch. 16 (posting 11)</td>
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<tr>
<td></td>
<td>30</td>
<td>Forest Nutrition</td>
<td>Aber et al. 2003</td>
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<tr>
<td>10</td>
<td>Nov 4</td>
<td>Biogeochemical Cycling/Review</td>
<td>Ch. 17 and Odum 1985 (posting 12)</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Exam 3</td>
<td></td>
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<tr>
<td>11</td>
<td>11</td>
<td>Herbivores in Forest Ecosystems</td>
<td>Ch. 18</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Student Presentations⁴</td>
<td>All papers due at beginning of class (eCampus)</td>
</tr>
<tr>
<td>12</td>
<td>18</td>
<td>Student Presentations⁴</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Student Presentations⁴</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>25</td>
<td>Student Presentations⁵/ The Future</td>
<td>Ch. 23 (Peer evaluations due for papers and <strong>Extra Credit Concept Map</strong>)</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>Thanksgiving no class</td>
<td>--</td>
</tr>
<tr>
<td>14</td>
<td>Dec 2</td>
<td>Review (we will build an exam)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Exam 4 (75% student derived exam questions)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Review of Exam results</td>
<td></td>
</tr>
</tbody>
</table>

¹Lecture order may vary slightly from the schedule described above
²Readings and discussion question postings are due prior to lecture on the date shown. The chapter assignments are found in: Perry, D.A., Oren, R., Hart S.C. 2008. *Forest Ecosystems. 2nd edition*. The Johns Hopkins University Press, Baltimore. Maryland, 606 pp. **Additional brief supplemental readings may also be assigned for some topics.**
³I will be attending professional meetings on these dates.
Potential Topics for your 10 minute talk and paper. You can propose another. One way to decide on another topic is to peruse the discussion threads and student questions.

1) What is albedo and how does it change across types of forest vegetation?
2) How do mycorrhizae respond to changes in nutrient availability?
3) Can a plant sense an insect threat before the insect directly attacks it? How?
4) Describe an endangered plant or animal species and its habitat.
5) Describe an example of a species refugia.
6) How do forests affect atmospheric CO₂ levels? O₂ levels?
7) How do forests respond to atmospheric deposition of N? or S? or P?
8) Describe the global or regional cycle of C, N, S, or P.
9) This invasive [insect/disease] wiped out this species of tree because it does this [mechanism].
10) Why do lead and mercury cycle through forests and what does this mean for humans?
11) What are the trends in forest biomass across the United States? The world?
12) What is forest ‘structure’ and why is it important? How does structure vary among different ecosystem types?
13) What is the frequency of forest fire in different ecosystems?
14) What effects do different types of disturbance (fire, logging, hurricanes) have on diversity?
15) What is soil organic matter and what effect does it have on any physical or biological property of an ecosystem?
16) Describe a drug or chemical that has been extracted from a forest ecosystem.
17) What are the different ways that a plant defends itself? Spreads its seed?
18) How can we determine past climate regimes for a region and the planet?
19) What is a nitrogen fixing species and what effect does it have on an ecosystem?
20) What are the different types of diversity and what ecosystems have the highest levels for plants and microbes.
21) What is natural selection? What are the types of conditions needed for natural selection to drive species differentiation? How are forests different from grasslands in terms of how they affect natural selection?
Course title and number: ESSM 311
Term: Spring 2014
Meeting times and location: Tuesdays and Thursdays, 9:35-10:50 AM, TBD

Course Description and Prerequisites

The biogeochemical cycles of carbon, nitrogen, sulfur, and phosphorus have tremendous contemporary significance due to their critical roles in determining the structure and function of ecosystems, and their influence on atmospheric chemistry and the climate system. Human impacts on these biogeochemical cycles are now responsible for a multitude of global changes that threaten the sustainability of ecosystem services essential to mankind. This course provides a framework for understanding biogeochemical cycles, their significance at global and ecosystem levels of organization, and their contemporary relevance to ecosystem science and management.

Prerequisites: RENR 205, RENR 215, any BIOL and/or CHEM, Junior or Senior classification or approval of instructor.

Learning Outcomes or Course Objectives

1. Describe how geology, climate, and soils interact with the biota to influence energy flow, hydrology, biogeochemistry, and other key ecosystem functions.
   
   a. Draw energy flow through the earth-atmosphere-biosphere system
   b. Draw the hydrologic cycle at ecosystem and global scales
   c. Draw the carbon cycle at ecosystem and global scales
   d. Draw the nitrogen cycle at ecosystem and global scales
   e. Draw the phosphorus cycle at ecosystem and global scales
   f. Draw the sulfur cycle at ecosystem and global scales
   g. Demonstrate ability to describe key pools and processes in each biogeochemical cycle
   h. Describe human industrial and land use impacts on biogeochemical cycles
   i. Describe biogeochemical cycles in forest, grassland, urban, and agricultural ecosystems
   j. Describe how changes in biogeochemical cycles influence the climate system
   k. Describe how changes in the climate system could have feedbacks on biogeochemistry

2. Design ecosystem management strategies for restoring and sustaining biogeochemical processes critical to providing ecosystem goods and services essential for human well-being.

   a. Describe how common land uses in agricultural, rangeland, and forest ecosystems influence ecosystem biogeochemistry
   b. Identify a problem situation and be able to design a plan to change the situation
3. Demonstrate an ability to acquire, interpret, and present conclusions orally and in writing.
   a. Acquire Information
   b. Interpret Information
   c. Communicate knowledge and information

4. Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge.
   a. Read professional literature and apply information to the solution of real world problems
   b. Locate the research papers through the TAMU library and web sites maintained by professional and governmental organizations (such as those maintained by USDA, USGS, NASA, DOE, etc.)

**Instructor Information**

<table>
<thead>
<tr>
<th>Name</th>
<th>Jason West</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone number</td>
<td>979-845-3772</td>
</tr>
<tr>
<td>Email address</td>
<td><a href="mailto:jbwest@tamu.edu">jbwest@tamu.edu</a></td>
</tr>
<tr>
<td>Office hours</td>
<td>Tuesdays and Thursdays 11:00-12:00</td>
</tr>
<tr>
<td>Office location</td>
<td>ANIN 413</td>
</tr>
</tbody>
</table>

**Required Textbook**


*Note: Please read assigned chapters or papers before coming to class. Students will be asked to answer questions about the chapters in class.*

**Additional Required Readings (available on eLearning)**


# Course Topics, Calendar of Activities, Exam Dates

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Required Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/15</td>
<td>Introduction, Overview, Expectations</td>
<td>None</td>
</tr>
<tr>
<td>1/17</td>
<td>Origins</td>
<td>Ch.1 and Ch. 2</td>
</tr>
<tr>
<td>1/22</td>
<td>The Atmosphere</td>
<td>Ch. 3</td>
</tr>
<tr>
<td>1/24</td>
<td>The Atmosphere</td>
<td>Ch. 3</td>
</tr>
<tr>
<td>1/29</td>
<td>The Lithosphere</td>
<td>Ch. 4</td>
</tr>
<tr>
<td>1/31</td>
<td>The Lithosphere</td>
<td>Ch. 4</td>
</tr>
<tr>
<td>2/5</td>
<td>Terrestrial carbon cycling</td>
<td>Ch. 5</td>
</tr>
<tr>
<td>2/7</td>
<td>Terrestrial carbon cycling</td>
<td>Ch. 5</td>
</tr>
<tr>
<td>2/12</td>
<td>Midterm Exam 1</td>
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<tr>
<td>2/14</td>
<td>Terrestrial nutrient cycling</td>
<td>Ch. 6</td>
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<tr>
<td>2/19</td>
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<td>Ch. 6</td>
</tr>
<tr>
<td>2/21</td>
<td>Terrestrial nutrient cycling</td>
<td>Ch. 6</td>
</tr>
<tr>
<td>2/26</td>
<td>Biogeochemistry of freshwater ecosystems</td>
<td>Ch. 7</td>
</tr>
<tr>
<td>2/28</td>
<td>Biogeochemistry of freshwater ecosystems</td>
<td>Ch. 8</td>
</tr>
<tr>
<td>3/5</td>
<td>Biogeochemistry of the oceans</td>
<td>Ch. 9</td>
</tr>
<tr>
<td>3/7</td>
<td>Biogeochemistry of the oceans</td>
<td>Ch. 9</td>
</tr>
<tr>
<td>3/12</td>
<td>Spring Break – No Class</td>
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<tr>
<td>3/14</td>
<td>Spring Break – No Class</td>
<td></td>
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<tr>
<td>3/19</td>
<td>Coupled biogeochemical cycles</td>
<td>Schlesinger et al.2011</td>
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<tr>
<td>3/21</td>
<td>Midterm Exam 2</td>
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<tr>
<td>3/26</td>
<td>The global water cycle</td>
<td>Ch. 10</td>
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<td>3/28</td>
<td>The global carbon cycle</td>
<td>Ch. 11</td>
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<tr>
<td>4/2</td>
<td>The global nitrogen and phosphorous cycles</td>
<td>Ch. 12</td>
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<tr>
<td>4/4</td>
<td>The global sulfur cycle</td>
<td>Ch. 13</td>
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<tr>
<td>4/9</td>
<td>The biogeochemistry of rangelands</td>
<td>Asner et al. 2004</td>
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<tr>
<td>4/11</td>
<td>The biogeochemistry of forests</td>
<td>Ch. 17-18 in Perry et al.</td>
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<tr>
<td>4/16</td>
<td>The biogeochemistry of agroecosystems</td>
<td>Drinkwater&amp;Snapp.2007</td>
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<tr>
<td>4/18</td>
<td>The biogeochemistry of urban ecosystems</td>
<td>Kaye et al.2006</td>
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<td>4/23</td>
<td>Global change and biogeochemistry</td>
<td>Ch. 14</td>
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<tr>
<td>4/25</td>
<td>Global change and biogeochemistry</td>
<td>Ch. 14</td>
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<tr>
<td>Final Week</td>
<td>Final Exam (May 3, 12:30-2:30)</td>
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</table>

**Grading Policies**

Grades will be based on in-class participation and homework (50 points total), two midterm exams (100 points each) and a cumulative final exam (200 points). Class grades will be determined from the percentage of points earned out of a total of 450: 90%+ = A; 80-89% = B; 70-79% = C; 60-69% = D; and <60% = F. Rescheduled exams will only
be permitted with letter of explanation from an approved university organization or a medical doctor, or a University Excused Absence.

Attendance Policy

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Academic Integrity

"An Aggie does not lie, cheat, or steal, or tolerate those who do." For additional information please visit: http://aggiehonor.tamu.edu
Sampling Methods and Designs in Ecosystems

Course title and number: ESSM 313 Sampling Methods and Designs in Ecosystems (2-2) Credit 3
Term: Spring 2014
Meeting times and location: TIME: MW 10:20-11:10  Lab: M 1:00-2:50; 3:00-4:50
LOCATION: LEC-BLOC 113; LAB 102B SCC

Instructor Information

<table>
<thead>
<tr>
<th>Instructor</th>
<th>Phone</th>
<th>Office</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. M. M. Kothmann</td>
<td>979-229-7410</td>
<td>206 ANIN</td>
<td><a href="mailto:mkothmann@tamu.edu">mkothmann@tamu.edu</a></td>
</tr>
<tr>
<td>Dr. Marian Eriksson</td>
<td>979-224-2648</td>
<td>320 HFSB</td>
<td><a href="mailto:m-eriksson@tamu.edu">m-eriksson@tamu.edu</a></td>
</tr>
<tr>
<td>Phillip Steigerwald</td>
<td>830-279-6087</td>
<td>232 CENTEO</td>
<td><a href="mailto:Pss2ace@tamu.edu">Pss2ace@tamu.edu</a></td>
</tr>
</tbody>
</table>

Course Description

Basis for vegetation sampling in ecosystems; methods for conducting sampling; selection of sampling unit appropriate for vegetation type; sampling statistics; mean comparisons with t-tests and \( \chi^2 \) tests (chi square); regression analysis; sampling design principles for simple random, stratified, and cluster sampling; development of sampling plan; presentation and interpretation of sampling data. Prerequisites: MATH (University Core Curriculum)

Learning Outcomes or Course Objectives

PLO 5 Apply basic statistics concepts and methods to develop sampling designs and collect analyze and interpret natural resources.
- Identify different sampling units and describe their advantages and limitations
- Describe and evaluate alternative sampling methods for inventorying different kinds of vegetation
- Apply sampling statistics to normal and binomially distributed resource inventory data
- Interpret and explain sampling statistics
- Demonstrate the ability to apply t test and Chi Square analyses to vegetation inventory data
- Demonstrate the ability to use Microsoft Excel effectively for statistical analysis of data and development of figures and tables
- Describe different sampling designs and where they should be used for resource inventory
- Design field sampling plans using appropriate sampling methods and design concepts

PLO 10 Illustrate critical thinking and demonstrate problem solving skills
- PLO 12 Demonstrate the ability to work collaboratively in teams and exercise leadership skills on projects
- Work collaboratively on assignments
- Demonstrate the ability to take on the leadership role when working in groups
- Demonstrate the responsibility for learning the material associated with group assignments

PLO 14: Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge
- Appreciate the importance of quantitative and computational skills as a life-long goal

Textbook and/or Resource Material

TEXT:

Selected Readings will be required from the following:
Grading Policies

<table>
<thead>
<tr>
<th>Grading</th>
<th>Percent</th>
<th>A ≥ 90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>30</td>
<td>B ≥ 80</td>
</tr>
<tr>
<td>Sampling Design Plan</td>
<td>15</td>
<td>C ≥ 70</td>
</tr>
<tr>
<td>Sampling Design Presentation</td>
<td>5</td>
<td>D ≥ 60</td>
</tr>
<tr>
<td>Exams (three)</td>
<td>30</td>
<td>F &lt; 60</td>
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<tr>
<td>Final Exam</td>
<td>20</td>
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<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Attendance bonus (Grades will not be “curved”. Round your final average by attending class!)
- 3 pt for ≤ 2 unexcused absences (lecture and laboratory combined)
- 2 pt for 3-4 unexcused absences (lecture and laboratory combined)
- 0 pt for > 4 unexcused absences (lecture and laboratory combined)

Attendance Policy

COURSE POLICIES:
1. “The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07).”

2. Assignments shall be submitted on the date due. Work not received by the end of class on the due date is considered late. Work missed because of unexcused absences will receive a grade of zero.

3. Students with excused absences must contact the instructor within 1 week after returning to class and schedule a date for submission of missed work or it is considered late. It is the student's responsibility to make arrangements with the instructor to make up work missed because of excused absences.

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As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. If you have any questions regarding plagiarism, please consult the latest issue of the Texas
A&M University Student Rules, under the section “Scholastic Dishonesty.” You may also contact the Texas A&M Writing Center's website for guidance on how to avoid plagiarism: [http://uwc.tamu.edu/](http://uwc.tamu.edu/). Allowing someone to copy your work is a violation of the Aggie Honor Code. Refer to the new office Aggie Honor System website and learn the “definitions of academic misconduct”: [http://www.tamu.edu/aggiehonor/acadmisconduct.htm](http://www.tamu.edu/aggiehonor/acadmisconduct.htm)

<table>
<thead>
<tr>
<th>WEEK</th>
<th>SCHEDULE FOR ASSIGNMENTS AND EXAMS</th>
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<tbody>
<tr>
<td>1/13</td>
<td>Assignment 1</td>
</tr>
<tr>
<td>1/20</td>
<td>Assignment 2 (Given in Lecture 1/23; due 1/28)</td>
</tr>
<tr>
<td>1/27</td>
<td>Review Problems for Quiz A</td>
</tr>
<tr>
<td>2/3</td>
<td>Quiz A</td>
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<tr>
<td></td>
<td>Assignment 3 (Given in Lecture 2/6; due 2/11)</td>
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<tr>
<td>2/17</td>
<td>Assignment 4</td>
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<tr>
<td>2/10</td>
<td>Assignment 5</td>
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<tr>
<td>3/3</td>
<td>Quiz B</td>
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<td></td>
<td>Assignment 6 (Given in Lecture 3/6; due 3/11)</td>
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<td>3/10</td>
<td>Spring Break</td>
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<tr>
<td>3/17</td>
<td>Assignment 6</td>
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<td>3/24</td>
<td>Assignment 7</td>
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<tr>
<td>3/31</td>
<td>Assignment 8</td>
</tr>
<tr>
<td>4/7</td>
<td>Sampling design reports</td>
</tr>
<tr>
<td>4/14</td>
<td>Sampling design reports Due</td>
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<tr>
<td>4/21</td>
<td>Quiz C</td>
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<tr>
<td>4/28</td>
<td>Review for Final Exam</td>
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<tr>
<td>5/6</td>
<td>Final Exam (8:00-10:00) SCC 102B</td>
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**TENTATIVE LECTURE SCHEDULE**

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<thead>
<tr>
<th>LECTURE</th>
<th>TOPIC</th>
<th>ASSIGNMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/13</td>
<td>Course introduction, policies, &amp; overview;</td>
<td>Syllabus &amp; Ch 5</td>
</tr>
<tr>
<td>1/15</td>
<td>Principles of sampling</td>
<td>Ch 5; App 8</td>
</tr>
<tr>
<td>1/20</td>
<td>MLK (Holiday- no class)</td>
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<tr>
<td>1/22</td>
<td>Measurement units; sampling methods;</td>
<td>Ch 7 (97-158);</td>
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<tr>
<td>1/27</td>
<td>Detecting significance of sampling data; Testing hypotheses</td>
<td>Ch 5 (61-74) Ch 11 (234-236)</td>
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<tr>
<td>1/29</td>
<td>Sampling errors (MDC)</td>
<td>Ch 5 (72-88); Ch 6</td>
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<tr>
<td>2/3</td>
<td>Review for Quiz A</td>
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<tr>
<td>2/3</td>
<td><strong>Quiz A (during Lab)</strong></td>
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<tr>
<td>2/5</td>
<td>Statistical Analysis (t test)</td>
<td>Ch 11 (236-239) App 8 (370-371)</td>
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<tr>
<td>2/10</td>
<td>Sample Size to detect significant differences</td>
<td>Ch 7 (141-155) App 7 (345-360)</td>
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<tr>
<td>2/12</td>
<td>Statistical Analysis (Chi square)</td>
<td>Ch 11 (241-244)</td>
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<tr>
<td>2/17</td>
<td>Conducting regression analysis</td>
<td>Vista</td>
</tr>
<tr>
<td>2/19</td>
<td>Regression ( purpose, limitations, and applications)</td>
<td>Vista</td>
</tr>
<tr>
<td>2/24</td>
<td>Applying regression analysis to inventory data</td>
<td>Vista</td>
</tr>
<tr>
<td>2/26</td>
<td>Correlation</td>
<td>Vista</td>
</tr>
<tr>
<td>3/3</td>
<td>Review for Quiz B</td>
<td></td>
</tr>
<tr>
<td>3/3</td>
<td><strong>Quiz B (during Lab)</strong></td>
<td></td>
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<tr>
<td>3/5</td>
<td>Assign &amp; discuss Sampling Design Report</td>
<td>Ch 7 (110-152)</td>
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<tr>
<td>3/10-12</td>
<td><strong>SPRING BREAK</strong></td>
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<tr>
<td>3/17</td>
<td>Sampling design (simple random, stratified &amp; cluster)</td>
<td>Ch 7 (113-152); App 9 (373-391)</td>
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<tr>
<td>3/19</td>
<td>Analysis of stratified sampling data</td>
<td>&quot;</td>
</tr>
<tr>
<td>3/24</td>
<td>Analysis of cluster sampling data</td>
<td>&quot;</td>
</tr>
<tr>
<td>3/26</td>
<td>Review of sampling design and analysis</td>
<td>&quot;</td>
</tr>
<tr>
<td>3/31</td>
<td>Discuss Sampling Design Report</td>
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</tr>
<tr>
<td>4/2</td>
<td>Data Collection and Data Management</td>
<td>Ch 11 (260-269)</td>
</tr>
<tr>
<td>4/7</td>
<td>Data Presentation and Interpretation</td>
<td>Ch 11 (257-260)</td>
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<tr>
<td>4/9</td>
<td>Field Techniques for Measuring Vegetation</td>
<td>Ch 8 (159-205); App 12</td>
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<tr>
<td>4/14</td>
<td>Field Techniques for Measuring Vegetation</td>
<td>Ch 8 (159-205); App 12</td>
</tr>
<tr>
<td>4/16</td>
<td>Completing Monitoring and Reporting Results</td>
<td>Ch 13 (299-303)</td>
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<tr>
<td>4/21</td>
<td>Review for Quiz C</td>
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<tr>
<td>4/21</td>
<td><strong>Quiz C (during Lab)</strong></td>
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</tr>
<tr>
<td>4/28</td>
<td>Review for Final Exam</td>
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<tr>
<td>May 6</td>
<td>Final Exam (2 hours)</td>
<td>Comprehensive</td>
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<tr>
<td>8-10 AM</td>
<td>Held in SCC computer lab</td>
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</tr>
<tr>
<td>WEEK</td>
<td>TOPIC</td>
<td>ASSIGNMENT</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------</td>
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</tr>
<tr>
<td>1/13</td>
<td>Calculation of sampling statistics for normal &amp; frequency distribution.</td>
<td>App 8; Vista; Assignment 1</td>
</tr>
<tr>
<td>1/20</td>
<td>MLK HOLIDAY</td>
<td>Assignment 2</td>
</tr>
<tr>
<td>1/27</td>
<td>Review for Quiz A</td>
<td>Assignment 3</td>
</tr>
<tr>
<td>2/3</td>
<td>Quiz A</td>
<td></td>
</tr>
<tr>
<td>2/10</td>
<td>Mean Comparisons (T- and ( \chi^2 ) tests); Begin regression</td>
<td>Ch 11 (241-250) App 8, pp 371 Assignment 4</td>
</tr>
<tr>
<td>2/17</td>
<td>Regression Analysis problems</td>
<td>Assignment 5</td>
</tr>
<tr>
<td>2/24</td>
<td>Review for Quiz B</td>
<td>Vista</td>
</tr>
<tr>
<td>3/3</td>
<td>Quiz B</td>
<td></td>
</tr>
<tr>
<td>3/10</td>
<td>Spring Break</td>
<td></td>
</tr>
<tr>
<td>3/17</td>
<td>Stratified Sampling problems</td>
<td>Vista; Ch 7 (pp 131-132) Assignment 6</td>
</tr>
<tr>
<td>3/24</td>
<td>Cluster Sampling problems</td>
<td>Vista; Ch 7 (pp 131-132) Assignment 7</td>
</tr>
<tr>
<td>3/31</td>
<td>Presenting inventory data in tables and figures</td>
<td>Assignment 8</td>
</tr>
<tr>
<td>4/07</td>
<td>Groups Work on Sampling Design Reports</td>
<td>No new assignments</td>
</tr>
<tr>
<td>4/14</td>
<td>Presentation of <strong>Sampling Design Reports</strong></td>
<td>Sampling design reports Due</td>
</tr>
<tr>
<td>4/21</td>
<td>Quiz C</td>
<td></td>
</tr>
</tbody>
</table>
ESSM 314 (3-0) 3 credits
Principles of Rangeland Management Around the World

Instructor

Dr. Robert B. Shaw
Room 122c Kleberg Center (KLCT)
rbshaw@tamu.edu
979-845-8642

Office Hours (or by appointment)

Monday & Wednesday – 10:00–11:00 am
Tuesday & Thursday – 9:30 – 11:00 am

Course Description

Rangeland management around the world will present an overview of rangelands; the history of their management, the many different kinds of rangelands (climates, soils, plants, animals, and products), and the management strategies and practices used to restore degraded rangelands and maintain healthy rangelands to produce the goods and services desired by society. We will accomplish this through assigned weekly readings in the textbook, posting of lectures notes, videos, on-line weekly quizzes, and on-line examinations.

Course Learning Outcomes

☐ Describe major rangeland types in relation to climate, soils, and vegetation.
☐ Name and describe key components and biological processes of rangeland ecosystems.
☐ Name and describe basic concepts of plant ecology related to range condition, monitoring and rangeland health.
☐ Identify the basic principles and practices of rangeland management.
☐ Identify key factors affecting rangeland management in developing countries.
☐ Stimulate an interest in the art and science of rangeland ecology and management.

Prerequisites

Junior or senior classification or approval of instructor.

Textbook (required)


On-Line Quizzes and Exams

All quizzes and exams will be taken on eCampus. It is your responsibility to check on the dates and times of quiz availability. "I forgot" or "the internet was down in my apartment" are not excuses for missing an assessment. There will be one quiz per week so put it on your calendar and don't wait until the last minute! You will have two opportunities to take each quiz; the highest score will be recorded.

Each assessment has a limited time for you to save answers. Weekly quizzes allow 30 minutes, major tests allow 75 minutes, and the final allows 2 hours. After the time expires, you will not be able
to save more answers. Always submit the assessment before you log out. If you do not submit it, you will not be able to access it again later. So, take the quiz, answer all of the questions before the allotted time expires, and submit it.

Grades

- Quiz Average: 100 points
- 2 Major Tests: 200 points
- Final Examination: 100 points

A = 90% or above (400-360 points), B = 89-80% (359-320 points), C = 79-70% (319-280 points), D = 69-60% (279-240 points), F = 59% or below (239 or fewer points)

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You are accessed individually for this class; it is not a group exercise. You are permitted to have open note and open book during quizzes and tests. You are not; however, permitted to have someone else take the quiz or test for you or are you permitted to take them as a group. Also, you are not permitted to copy nor share the quiz and test materials. Not following these guidelines is a violation of the Aggie Honor Code.

Materials

The handouts and files posted on eCampus for this course are copyrighted. Handouts include but are not limited to syllabus, quizzes, exams, lab problems, on-line materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the materials, without prior permission of the instructor.
## ESSM 314 Schedule

<table>
<thead>
<tr>
<th>Week*</th>
<th>Topic</th>
<th>Readings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (9/1)</td>
<td>Rangelands &amp; Man</td>
<td>HPH 1</td>
</tr>
<tr>
<td>1 (9/1)</td>
<td>History of Rangeland Management and Use</td>
<td>HPH 2</td>
</tr>
<tr>
<td>2 (9/8)</td>
<td>The Greatest Good - Video, part 1</td>
<td>-</td>
</tr>
<tr>
<td>2 (9/8)</td>
<td>Physical Characteristics of Rangelands</td>
<td>HPH 3</td>
</tr>
<tr>
<td>3 (9/15)</td>
<td>Great Plains of the Planet - Video</td>
<td>-</td>
</tr>
<tr>
<td>3 (9/15)</td>
<td>Rangeland Types – World Wide</td>
<td>HPH 4</td>
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<tr>
<td>4 (9/22)</td>
<td>Rangeland Types – North America</td>
<td>HPH 4</td>
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<tr>
<td>4 (9/22)</td>
<td>Plant Development &amp; Grazing Responses</td>
<td>HPH 5</td>
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<td>5 (9/29)</td>
<td>Test 1</td>
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<td>5 (9/29)</td>
<td>Rangeland Ecology</td>
<td>HPH 6</td>
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<tr>
<td>6 (10/6)</td>
<td>Rangeland Succession</td>
<td>HPH 6</td>
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<td>6 (10/6)</td>
<td>Rangeland Condition</td>
<td>HPH 7</td>
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<tr>
<td>7 (10/13)</td>
<td>Rangeland Inventory and Monitoring</td>
<td>HPH 7</td>
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<tr>
<td>7 (10/13)</td>
<td>Carrying Capacity and Stocking Rates</td>
<td>HPH 8</td>
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<tr>
<td>8 (10/20)</td>
<td>Stocking Rate Calculations</td>
<td>HPH 8</td>
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<tr>
<td>8 (10/20)</td>
<td>Grazing Management (Concepts)</td>
<td>HPH 9 &amp;10</td>
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<tr>
<td>9 (19/27)</td>
<td>Grazing Management (Systems)/video</td>
<td>HPH 9 &amp;10</td>
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<td>9 (10/27)</td>
<td>Test 2</td>
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<td>10 (11/3)</td>
<td>Range Nutrition - Plants</td>
<td>HPH 11</td>
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<td>10 (11/3)</td>
<td>Range Nutrition - Animals</td>
<td>HPH 11</td>
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<tr>
<td>11 (11/10)</td>
<td>Multiple Use of Public Rangelands</td>
<td>HPH 12</td>
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<tr>
<td>11 (11/10)</td>
<td>Rangeland Hydrological Processes</td>
<td>HPH 12</td>
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<tr>
<td>12 (11/17)</td>
<td>Rangeland-Wildlife Interactions/video</td>
<td>HPH 14</td>
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<tr>
<td>12 (11/17)</td>
<td>Rangeland Manipulation</td>
<td>HPH 15</td>
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<tr>
<td>13 (11/24)</td>
<td>Prescribed Fire/video</td>
<td>HPH 15</td>
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<td>13 (11/24)</td>
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<td>Range Management in Developing Countries</td>
<td>HPH 16</td>
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<tr>
<td>14 (12/1)</td>
<td>Greatest Good – Video, part 2</td>
<td>-</td>
</tr>
<tr>
<td>15 (12/8)</td>
<td>FINAL EXAM</td>
<td>-</td>
</tr>
</tbody>
</table>

*Week (Month/Monday beginning the week)
Course number: ESSM 315
Term: Fall 2014
Meeting times and location: M 3:00-4:50 (Lecture 0, Lab 1 (0-2)); SCC 102B

Course Description and Prerequisites
Theory and methods to inventory rangeland vegetation; sampling design; analysis of inventory data; interpretation of sampling data; technical writing; presenting inventory data in text, tables, and graphs using the style of the Rangeland Ecology and Management discipline; presentation of inventory data using PowerPoint. Prerequisite: ESSM 313, Junior or Senior classification or approval of Instructor

Learning Outcomes or Course Objectives
PLO 5. Apply basic statistical concepts and methods; develop sampling designs; collect, analyze, and interpret rangeland inventory data.
- Describe and compare the primary concepts, tools and methods used for vegetation sampling.
- Demonstrate proficiency in statistical analysis and interpretation of vegetation sampling data.
- Demonstrate the ability to present statistical data in tables, graphs, and reports.
PLO 11. Demonstrate an ability to acquire, interpret, and present conclusions orally and in writing.
- Demonstrate the ability to write technical reports
- Develop and present Power Point presentations based on vegetation sampling data.
PLO 12. Demonstrate the ability to work collaboratively in teams and exercise leadership skills on projects.
- Participate and contribute effectively in group projects.

Instructor Information
Name: M. M. Kothmann
Telephone number: 979-229-7410
Email address: m-kothmann@tamu.edu
Office hours: Any day by appointment
Office location: KLCT 119

Textbook and/or Resource Material


Selected papers and materials posted in course webpage in eCampus.
Grading Policies
GRADING: Percent
Draft Writing Assignments 20
Peer Review contributions 10
Final Report 60
Team Presentation 10
Total 100
Attendance Bonus (No unexcused absences = 2pts; one unexcused absence = 1pt)
A ≥ 90   B 89-80   C 79-70   D 69-60   F < 60

Americans with Disabilities Act (ADA)
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Academic Integrity
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Plagiarism
Plagiarism consists of passing off as one's own the ideas, words, writings, etc., which belong to another. You are committing plagiarism if you copy the work of another person and turn it in as your own without full credit (citation) to the author, even if you have the permission of that person. Evidence of plagiarism will result in an automatic null mark for the assignment or test. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section "Scholastic Dishonesty."

Other Pertinent Course Information
Class attendance and participation is essential! Unexcused absences will result in late work that will be penalized. Students will receive instruction on technical writing with guidelines for style and content and relevant examples. They will submit writing assignments, one complete technical report (1,500 words minimum), and one Power Point Presentation (15-minutes). Total writing will exceed 3,000 words. Students will utilize peer review, but all writing assignments will be graded by the instructor. Students will receive written and oral feedback on writing assignments. The Final Report will require students to demonstrate technical writing skills for a complete technical paper. Students will be expected to access, review, and utilize published information from various sources and to discuss and relate the published work to their sampling data in the development of their report. Assignments submitted late will be penalized, unless excused by the instructor.
# Calendar of Activities, Course Topics, and Due Dates

<table>
<thead>
<tr>
<th>Wk</th>
<th>Date</th>
<th>Topic</th>
<th>Required Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9/1</td>
<td>Course overview; Writing Technical Reports; Review Statistical Terms and Formulas</td>
<td>eCampus week 1; App 8;</td>
</tr>
<tr>
<td>2</td>
<td>9/8</td>
<td>Review sampling design; plan sampling and assign responsibilities to teams and individuals</td>
<td>Instructions for Report eCampus</td>
</tr>
<tr>
<td>3</td>
<td>9/15</td>
<td>Summary and Analysis of Veg. Sampling Data Data Presentation and Interpretation</td>
<td>Ch 9; App 15; APP 7; Liability Waivers due</td>
</tr>
<tr>
<td>4</td>
<td>9/22</td>
<td>Sampling Design, Measurement Units &amp; Sampling Units; Data Collection and Data Management,</td>
<td>Ch 7 (pp 97-152); App 7; Ch 8; App 12 &amp; 15</td>
</tr>
<tr>
<td></td>
<td>9/26</td>
<td><strong>Field Trip to Warren Ranch during class</strong> (Measure density, cover, frequency) (all day field trip)</td>
<td>Depart 7:30 AM; Return 6:00 PM</td>
</tr>
<tr>
<td>5</td>
<td>9/29</td>
<td><strong>Summarize sampling data and review procedures</strong></td>
<td>Work with your team</td>
</tr>
<tr>
<td>6</td>
<td>10/6</td>
<td>Review statistical analysis of sampling data</td>
<td>Work with your team Ch. 5 &amp; 11; App 7 &amp; 8;</td>
</tr>
<tr>
<td>6</td>
<td>10/13</td>
<td>Analysis &amp; Interpretation of sampling data</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>10/20</td>
<td>Data Presentation and Interpretation Assign 5* (Presenting a Report Using Power Point)</td>
<td>Ch 11 Assign 5 Due Oct 28</td>
</tr>
<tr>
<td>8</td>
<td>10/27</td>
<td>Completing Monitoring and Reporting Results Work in Teams on presentation &amp; report</td>
<td>Ch 13</td>
</tr>
<tr>
<td>9</td>
<td>11/3</td>
<td>Submit Draft of Warren Ranch Report for review</td>
<td>Peer review of plans</td>
</tr>
<tr>
<td>10</td>
<td>11/10</td>
<td>Discussion and analysis of technical writing</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>11/17</td>
<td><strong>KPC Team presentations (Power Point)</strong></td>
<td>Presentations due 3:00 PM 11/17</td>
</tr>
<tr>
<td>12</td>
<td>11/24</td>
<td>Complete Warren Ranch Vegetation Sampling Report</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>12/1</td>
<td><strong>Warren Ranch Report due (No class meeting)</strong></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>12/8</td>
<td>No class meeting</td>
<td></td>
</tr>
</tbody>
</table>

Submit all Assignments, Reports, and Power Point through the Assignment Links in eCampus.

*The assignments will be posted in eCampus and first drafts are due the following week at the start of class. Students will provide peer review during the class meeting time. Assignments not submitted by 3:00 PM ON THE DATE DUE will be LATE.*
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Unacceptable</th>
<th>Acceptable</th>
<th>Exceeds Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Style</strong> (5 pts)</td>
<td>Does not follow style manual; Headings/sections not used properly, sources not cited (0-2.9 pts)</td>
<td>Generally follows the style manual; Headings/sections present and sources cited (3.0-3.9 pts)</td>
<td>Closely follows the style manual; All headings/sections present and all sources properly cited (4-5 pts)</td>
</tr>
<tr>
<td><strong>Abstract</strong> (10 pts)</td>
<td>Absent, incomplete and/or poorly organized (0-5.9 pts)</td>
<td>Abstract mostly complete; Organization could be improved (6.0-7.9 pts)</td>
<td>All components present and information clearly and concisely presented (8-10 pts)</td>
</tr>
<tr>
<td><strong>Introduction</strong> (10 pts)</td>
<td>Introduction absent or with limited description of the scope and relevance of the study (0-5.9 pts)</td>
<td>Introduction states both the scope and relevance of the study; Literature is cited to support statements (6.0-7.9 pts)</td>
<td>Introduction clearly states both the scope and relevance of the study; All statements are supported by literature citations (8-10 pts)</td>
</tr>
<tr>
<td><strong>Objectives</strong> (5 pts)</td>
<td>Objectives absent or not focused or relevant; Hypotheses absent or irrelevant (0-2.9 pts)</td>
<td>Objectives present and relevant; some hypotheses are stated (3.0-3.9 pts)</td>
<td>Objectives present, complete and clearly stated with hypotheses (4/5 pts)</td>
</tr>
<tr>
<td><strong>Methods and Materials</strong></td>
<td>Site description missing or very incomplete; Not all methods described (0-7.9 pts)</td>
<td>Site description adequate; Methods descriptions are generally complete and clear (8.0-11.9 pts)</td>
<td>Site description complete; All methods clearly and completely described (12-15 points)</td>
</tr>
<tr>
<td><strong>Results and Discussion</strong></td>
<td>Tables and figures are disorganized or missing; Headings incomplete or missing; Text generally does not present results; No discussion of significance of results; No evidence of critical thinking (0-17.9 pts)</td>
<td>Most data presented in tables and figures; Table/figure headings present but not well written; Some discussion of significant results in text; Little evidence of critical thinking (18.0-24.9 pts)</td>
<td>Tables and figures clear &amp; complete; Headings and footnotes fully developed; All significant results described in text; Discussion relates results to other studies; Shows clear evidence of critical thinking (25-30 pts)</td>
</tr>
<tr>
<td><strong>Conclusions</strong> (10 pts)</td>
<td>Significant information not presented; Not clearly based on results and discussion (0-5.9 pts)</td>
<td>Some significant conclusions presented; Linkage to results and discussion could be improved; Some evidence of critical thinking (6.0-7.9 pts)</td>
<td>Clear, concise, complete presentation of significant conclusions; Clearly linked to results; Evidence of critical thinking (8-10 pts)</td>
</tr>
<tr>
<td><strong>Literature Cited</strong> (5 pts)</td>
<td>Many sources not cited or not properly cited (0-2.9 pts)</td>
<td>Literature cited present; style mostly correct; Some citations used in text (3-3.9 pts)</td>
<td>Literature cited complete and style correct; correct citations used in text (4-5 pts)</td>
</tr>
<tr>
<td><strong>Grammar and clarity</strong> (10 pts)</td>
<td>Frequent grammatical errors, misspelling, wordiness; Convoluted word order makes writing difficult to read; Sentences do not follow logically; Paragraphs not internally cohesive or logically organized (0-7.9 pts)</td>
<td>Occasional grammatical errors; Some wordiness; Some sentences are poorly written; A few paragraphs are not well developed; Writing sometimes difficult to read; (8.0-11.9 pts)</td>
<td>Writing is clear, concise and easy to read; Few grammatical and spelling errors; Sentences follow logically and smoothly; Paragraphs are internally cohesive and logically organized (12-15 pts)</td>
</tr>
</tbody>
</table>
RANGE ECOLOGY
ESSM 316
3 credits
Spring 2014
TT 11:10-12, F 8:00-8:50
ANIN 317

Instructor

Dr. Robert B. Shaw
Professor, ESSM
ANIN 225D
Email: rbshaw@tamu.edu
Office Hours: MW 9-3, 1-3 TT or by appointment

Course Description

The purpose of this course is to provide students with an introductory understanding of the interrelationships between the abiotic and biotic components of rangeland communities and ecosystems. Specific topics include: the individual, populations, communities, ecosystems, landscapes, and global patterns. The course will be divided into two sections, first - autecology and second - synecology.

Course Learning Outcomes

Students will be able to:
1. Differentiate the three photosynthetic pathways and describe the ecological ramifications of them.
2. Describe the importance of water relations and energy balance to rangeland plants.
3. Explain population structure, growth and decline.
4. Identify range community properties; describe competition, herbivory impacts and other interactions among plants.
5. Discuss the theories and mechanisms of primary and secondary succession and how this applies to range ecology and management.
6. Describe rangeland ecosystem structure, function and processes
7. Explain basic concepts of landscape ecology, temporal and spatial patterns and the relevance of scale.
8. Significance and interaction of geology, climate, physiognomy, and soils to characterization of vegetation types, ecological sites, land forms, ecoregions, etc. Texas will be used as an example.

**Prerequisites**
Required: RENR 205, 215, ESSM 303 or 304, 314, 315
Preferred: AGRO 301

**Grading**

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm</td>
<td>100</td>
</tr>
<tr>
<td>Final</td>
<td>100</td>
</tr>
<tr>
<td>Laboratory/Exercises</td>
<td>100</td>
</tr>
<tr>
<td>Participation</td>
<td>100</td>
</tr>
<tr>
<td>TOTAL POINTS</td>
<td>400 total points</td>
</tr>
</tbody>
</table>

March 6 - Midterm
April 18 - Field Trip, Friday
May 2 - Final Examination, 3-5 pm

No sleeping in class
No open lab tops, cell phones, iPads, etc.

YOU WILL NEED AN iClicker2 for this class.
Policy Statements

Attendance policy
(see Rule 7, link on Homepage WebCT)

Make-up Examinations
Only University excused absences will be accepted for scheduling make-up exams. An excused absence means that illness or some other problem beyond your control prevented you from taking an exam at its scheduled time. If you miss an exam, you must make it up within one week. Present written documentation (e.g., doctor statement, official school activity, etc.) to the Instructor. If you are going to be absent during the scheduled time for an exam for an official school activity, bring a written note, signed by proper authority, prior to the date of absence.

Handouts
The handouts and files posted on WebCT for this course are copyrighted. Handouts include but are not limited to syllabus, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, without prior permission of the instructor.

Academic Integrity Statement
"An Aggie does not lie, cheat, or steal or tolerate those who do."
As a student at Texas A&M University, it is your duty to know and live by the Aggie Honor Code. This includes getting outside assistance with on-line quizzes, exams, etc. For details, please refer to the Honor Council Rules and Procedures on the web at www.tamu.edu/aggiehonor
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Introduction, Orientation, Expectations

Individual & Its Environment (Autecology)
  Ecological Morphology & Anatomy
  Physiological Plant Ecology
  Photosynthesis
  Water Relations
  Belowground Interactions

Populations
  Structure, Growth, Decline
  Growth & Reproduction
  Plant Life Histories

Communities (Synecology)
  Community Properties
  Competition
  Herbivory
  Disturbance & Succession
  Abundance, Diversity, Rarity

Ecosystems & Landscapes
  Ecosystem Structure
  Ecosystems Function & Processes
  Energy & Productivity
  Landscape Ecology

Global Patterns
  Climate
  Physiognomy
  Biomes
  Paleoecology
  Global Change
Course title and number   ESSM 317
Term                      Spring 2014
Meeting times and location TR 8:00-9:15

**Course Description and Prerequisites**
To familiarize students with practices that cause changes in rangeland vegetation composition to meet management objectives for multiple uses. To develop a working understanding of criteria for selection of range improvement practices and to compare expected responses of livestock forage production, watershed parameters and wildlife to vegetation changes following range improvements. To introduce the systems concept for planning, analysis and implementation of range improvement practices.

Prerequisites: ESSM 314, Junior or Senior classification or approval of instructor

**Learning Outcomes or Course Objectives**

PLO 7 Design management strategies for restoring and sustaining ecosystem goods and services and adaptive management concepts.
- Analyze specific ecosystems and design practices that will enhance production of desired ecosystem goods or services
- Develop an appreciation of ecological and engineering approaches to ecosystem restoration and stabilization
- Identify a problem situation and be able to design a plan to change the situation; Present write-up of plan
- Recognize management practices that can be used in situations to increase the overall rangeland health; Compare and contrast management options
- Recognize contributions of "relevant" vegetation components
- Develop goals that meet landowner needs
- Develop goals that enhance ecosystem function
- Recognize management practices that can be used in situations to increase the overall rangeland health

PLO 10. Illustrate critical thinking and demonstrate problem solving skills.
PLO 11. Demonstrate an ability to acquire, interpret, and present conclusions orally and in writing.
PLO 12. Demonstrate the ability to work collaboratively in teams and exercise leadership skills on projects.

**Instructor Information**

Name             W. T. Hamilton & M. M. Kothmann  
Telephone number 979-845-5589 (wth) 845-5575 (mmk)  
Email address    wt-hamilton@tamu.edu  
Office hours     Appointment  
Office location  ANIN 213 (wth) ANIN 206 (mmk)
<table>
<thead>
<tr>
<th>Grading Policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>10% Vegetation Management Plan</td>
</tr>
<tr>
<td>5% Optional Field Trip Report or term paper</td>
</tr>
<tr>
<td>10% POP Quizzes</td>
</tr>
<tr>
<td>50% Exams I-IV</td>
</tr>
<tr>
<td>25% Final Exam</td>
</tr>
</tbody>
</table>

Dates for major exams and the due date for the Vegetation Management plan are shown in the class schedule, but may be adjusted based on need. You will be notified in class of any changes to the exam schedule. The final will be comprehensive. “Pop” quizzes, that will not be announced, may be given during any class period on material covered in the last class period. You will be allowed to make up scheduled exams and “pop” quizzes with a written excuse for a university excused absence.

Late Work Policy

Late work will be accepted in the case of a University Excused Absence with no penalty, all other work will be given a 20% penalty for every day it is late, including weekends.

Attendance Policy

“The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07.”

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Academic Integrity

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Textbook (required)


Resource Materials


### Course Topics, Calendar of Activities, Major Assignment Dates

<table>
<thead>
<tr>
<th>Date</th>
<th>Instr.</th>
<th>Topic</th>
<th>Required Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-14</td>
<td>WTH</td>
<td>Course orientation</td>
<td>1. Ch. 1; 2. Ch. 1</td>
</tr>
<tr>
<td>1-16</td>
<td>MMK</td>
<td>Range plant physiology; how rangeland plants grow and respond to management practices; morphology and physiology of important woody species</td>
<td>2. Ch. 4</td>
</tr>
<tr>
<td>1-21</td>
<td>MMK</td>
<td>Secondary succession; Importance of range plant diversity; Evolution of philosophies for rangeland vegetation management; EXAM 1 (TAKE-HOME ASSIGNMENT)</td>
<td>2. Ch. 5, Exam due 1/29</td>
</tr>
<tr>
<td>1-23</td>
<td>WTH</td>
<td>What is a rangeland weed? The role of vegetation manipulation practices as basic range improvement tools</td>
<td>3. Ch. 1</td>
</tr>
<tr>
<td>1-28</td>
<td>WTH</td>
<td>Major brush/weed control methods, Description of vegetation manipulation practices and their advantages/disadvantages; Mechanical brush/weed management alternatives</td>
<td>1. Ch. 2, 3; 5. Ch. 3</td>
</tr>
<tr>
<td>1-30</td>
<td>WTH</td>
<td>Mechanical brush/weed management alternatives</td>
<td>1. Ch. 4</td>
</tr>
<tr>
<td>2-4</td>
<td>WTH</td>
<td>Mechanical and Chemical vegetation management alternatives</td>
<td></td>
</tr>
<tr>
<td>2-6</td>
<td>WTH</td>
<td>Chemical brush/weed management alternatives.</td>
<td>1. Ch. 4, 5, 6</td>
</tr>
<tr>
<td>2-11,13</td>
<td></td>
<td>SRM MEETING FEB. 11, 13</td>
<td></td>
</tr>
<tr>
<td>2-18</td>
<td>WTH</td>
<td>Chemical brush/weed management alternatives (cont.).</td>
<td>1. Ch. 5, 6</td>
</tr>
<tr>
<td>2-20</td>
<td>WTH</td>
<td>Mixing/calibration and problems.</td>
<td>Class handouts</td>
</tr>
<tr>
<td>2-25</td>
<td>WTH</td>
<td>Fundamentals of rangeland revegetation following brush management</td>
<td>Handouts</td>
</tr>
<tr>
<td>Date</td>
<td>Instructor</td>
<td>Topic</td>
<td>Notes</td>
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<tr>
<td>2-27</td>
<td>WTH</td>
<td><strong>MAJOR EXAM II (IN CLASS)</strong></td>
<td></td>
</tr>
<tr>
<td>3-4</td>
<td>MMK</td>
<td>Developing vegetation management plans. <strong>This will be a group project with a presentation on 4/29</strong></td>
<td></td>
</tr>
<tr>
<td>3-6</td>
<td>MMK</td>
<td>Stocking Rates and Carrying Capacity</td>
<td></td>
</tr>
<tr>
<td>3-18</td>
<td>MMK</td>
<td>Grazing Management Systems</td>
<td></td>
</tr>
<tr>
<td>3-20</td>
<td>MMK</td>
<td>Vegetation management using grazing animals</td>
<td></td>
</tr>
<tr>
<td>3-25</td>
<td>MMK</td>
<td>Integration of grazing and fire for vegetation management (Fuels management) and <strong>MAJOR EXAM III (TAKE-HOME ASSIGNMENT)</strong></td>
<td></td>
</tr>
<tr>
<td>3-27</td>
<td>WTH</td>
<td>Prescribed fire for vegetation manipulation</td>
<td></td>
</tr>
<tr>
<td>3-29 Sat.</td>
<td>WTH</td>
<td><strong>REQUIRED CLASS FIELD TRIP</strong></td>
<td></td>
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<tr>
<td></td>
<td>MMK</td>
<td></td>
<td></td>
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<tr>
<td>4-1</td>
<td>WTH</td>
<td>Prescribed fire for vegetation manipulation (cont.)</td>
<td></td>
</tr>
<tr>
<td>4-3</td>
<td>WTH</td>
<td>Use of the BRASS system for predicting fire behavior</td>
<td></td>
</tr>
<tr>
<td>4-8</td>
<td>WTH</td>
<td>Current software for use in selection of brush and weed management technologies (PestMan)</td>
<td></td>
</tr>
<tr>
<td>4-10</td>
<td>WTH</td>
<td>Wildlife/livestock/vegetation interactions with brush management</td>
<td></td>
</tr>
<tr>
<td>4-15</td>
<td>WTH</td>
<td>Biological brush/weed management alternatives;</td>
<td></td>
</tr>
<tr>
<td>4-17</td>
<td>WTH</td>
<td>Integrated brush management systems (IBMS). Treatment combinations and synergisms.</td>
<td></td>
</tr>
<tr>
<td>4-22</td>
<td>WTH</td>
<td>Response curves and their use in economic analyses of improvement practices and economic analysis problem.</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Instructor</td>
<td>Event/Activity</td>
<td>Notes</td>
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<td>----------------------------------------------------</td>
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</tr>
<tr>
<td>4-29</td>
<td>WTH</td>
<td>EXAM IV (IN-CLASS)</td>
<td></td>
</tr>
<tr>
<td>4-29</td>
<td>MMK/WTH</td>
<td>Teams present vegetation management plans</td>
<td></td>
</tr>
<tr>
<td>5-5</td>
<td>WTH/MMK</td>
<td>Final Exam</td>
<td>1-3:00 PM</td>
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Coupled Human-Ecological Systems
ESSM 318
FALL 2014

Objectives
Most ecosystems throughout the globe are human dominated and possess strong linkages between human actions and ecological outcomes. This course investigates the importance and complexity of human-ecological interactions on natural resource management, the flow of ecosystem services, and human well-being. The role of science in society, human cognition and behavior, and environmental ethics on these interactions will be investigated from the perspective of individuals and social organizations. Adaptive management and social learning will be emphasized as the means to guide change in human-ecological systems through the frameworks of vulnerability, resilience and transformation. Resilience thinking will be presented as a means to integrate these diverse concepts and guide management under conditions of incomplete knowledge, disputed values and urgent timelines. High profile, contemporary issues within the State and Nation will be used to illustrate the consequences and relevance of these transformative concepts.

Learning Outcomes
Course completion will contribute to the following learning outcomes:

- Understand the importance of human-ecological systems to natural resource management, flow of ecosystem services, and human well-being.
- Appreciate that novel and diverse approaches are required to manage human-ecological systems under conditions of increasing resource demand and unprecedented global change.
- Identify the role of human cognition, ethics, norms and behaviors in the creation and resolution of problems involving renewable resource management.
- Recognize the importance of social institutions and governance in shaping both natural resource problems and potential solutions.
- Apply course concepts to diverse, contemporary environmental issues to demonstrate their societal relevance.
- Develop skill sets and perspectives that are necessary for application of ‘resilience thinking’ to renewable resource management and global change.

Instructor
Dr. David D. Briske
Department of Ecosystem Science & Management
CenVe Building (CEN), Room 130C
Phone: 979-845-5581
Email: @tamu.edu

Meeting Time and Location
Tuesday and Thursday 9:35 – 10:50 am; HECC 200

Reading Assignments
A reading and video list will be assigned by subject matter section on eCampus ESSM 318. Assigned papers and videos represent a central feature of the course by providing content for critical thinking and higher cognitive learning developed through discussion, peer surveys and reflection.

Prerequisites
RENR 205 – Fundamentals of Ecology and AGEC – 105 and Introduction to Agricultural Economics or equivalent course content.
Educational Approach
The course will emphasize collaborative learning by blending reading and video content acquired outside of class with in-class discussion, mini-lectures, peer surveys and reflection to promote critical thinking and higher cognitive learning. I-clickers will be used each class period to encourage active learning, provide immediate feedback, survey class perspectives, and evaluate student performance. Students must have a functioning i-clicker that is appropriately registered for the class.

Discussion is the prototypic teaching method for active learning. Research has established that memory is affected by how deeply we process new. Elaboration of knowledge by explaining, questioning, and summarizing contributes to greater cognitive learning and critical thinking skills. Students have been shown to be more attentive and think more deeply in a discussion than in a more passive learning format.

Benefits of learning through discussion:
• Practice critical thinking
• Evaluate logic and evidence
• Engage in collaborative learning
• Receive immediate feedback from peers
  from ‘McKeachie’s Teaching Tips. 2011, Ed., Wadsworth’.

Evaluation Procedures
Evaluation will be based on a combination of in-class exams, frequent in-class e-dialogues, class participation, and two reflective essays. Exams will be taken in class, consist of multiple choice and scenario analysis questions, and will be scantron graded. Class participation requires that students read assigned material before each class period and respond to questions and participate in class discussion. Reflective essays prepared at the beginning and end of the course will enable students to analyze and interpret their class experience. Students that take all 10 e-dialogues can add the final two scores as extra credit at the end of the semester.

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<th>Points</th>
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<tr>
<td>Exams (2 @ 100 pts)</td>
<td>200</td>
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<tr>
<td>Final Exam (comprehensive)</td>
<td>100</td>
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<tr>
<td>In-class e-dialogues (12 @ 10 pts)</td>
<td>100</td>
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<tr>
<td>Participation (10 @ 3pts)</td>
<td>30</td>
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<tr>
<td>Reflective Essay (2 @ 35pts)</td>
<td>70</td>
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<tr>
<td>Total Points</td>
<td>500</td>
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Grade Distribution:
A=90%
B=80-89%
C=70-79%
D=60-69%
F=0-59%

Make-Up Examinations and Late Assignments
Make-up examinations and e-dialogues will be given provided that students present a documented University-excused absence within 1 week of the scheduled exam. An excused absence means that illness or some other problem beyond your control prevented you from taking the scheduled exams. Make-up work must be completed within 4 weeks of the originally scheduled time. Instructors are under no obligation to provide an opportunity for students to make up course work missed because of unexcused absences (TAMU Regulations). These policies will be strictly enforced.

Attendance
Regular class attendance is expected and will be evaluated with i-clicker as a component of class participation. Students who consistently attend class attain the highest performance.
ESSM 318 on eCampus
ESSM 318 on eCampus (eCampus.tamu.edu) will contain the syllabus, webnotes, readings and links to videos, assignments, special instructions, and grade information for the course. It will be an important means of communication throughout the semester so check it regularly. An eCampus page will be set up automatically for each student and this page will contain a link to their ESSM 318 page. The user name and password for your eCampus page are the same as those for your NEO account.

I-clicker Registration
Instructions for I-clicker registration can be found on your course eCampus page or at http://www.iclicker.com/ to register your I-clicker. For remote registration can be found at://wikis.tamu.edu/display/itsdocs/Register+your+iclicker+for+each+academic+year
Please note that i-clickers must be registered each academic year.

Learning Environment
Please contribute to a positive and constructive learning environment throughout the semester by:
- Attending class on time and staying through the entire session
- Turning off all electronic devices (except if you take notes on a laptop or ipad)
- Minimize talking and other distracting activities
- Respecting all student comments and perspectives

Americans with Disabilities Act
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities in Room B118 in Cain Hall (845-1637).

Academic Integrity Statement
"An Aggie does not lie, cheat, or steal or tolerate those who do."
Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not excuse any member of the TAMU community from the requirements or the processes of the Honor System. For additional information please visit: tamu.edu/aggiehonor. All infractions will result in a grade of zero for the evaluation in question and it will be reported as an honor code violation.
Course Syllabus
ESSM 318

I. Introduction
   A. Course content and goals
   B. Learning outcomes and evaluation procedures
   C. This course is important

II. Welcome to the Anthropocene
   A. Global change indicators
   B. Challenges and ‘wicked’ problems
   C. Management frameworks
      1. Sustainability
      2. Vulnerability
      3. Resilience

III. Human-ecological Systems
   A. Ecological systems
      1. Structure
      2. Function
      3. Drivers
   B. Human (social) systems
      1. Structure
      2. Function
      3. Drivers
   C. Critical interactions
      1. Ecological-human dynamics
      2. Human-ecological dynamics
      3. Case studies

IV. Ecosystem Services
   A. Categories
      1. Provisioning
      2. Supporting
      3. Regulating
      4. Cultural
   B. Managing trade offs
   C. Valuation methods
   D. Human well-being
      1. Physical
      2. Psychological
      3. Indices and trends

V. Human Knowledge and Behavior
   A. Mental models
   B. Human cognition
   C. Knowledge sources
      1. Local
      2. Professional manager
      3. Scientific
   D. Knowledge production
   E. Attitudes, norms and behaviors
   F. Environmental Ethics

EXAM I (Scheduled 1-week in advance)
VI. Role of Science in Society
   A. Limits of scientific knowledge
   B. Natural resource management models
      1. Steady state management
      2. Ecosystem management
      3. Resilience-based management
   C. Normal, post-normal and post-modern approaches
   D. Trans-disciplinary science

VII. Resilience Thinking
   A. Equilibrium and nonequilibrium ecology
   B. Resilience theory
      1. Engineering vs ecological resilience
      2. Thresholds and alternative stable states
      3. Feedback mechanisms
   C. State-and-transition models
   D. Resilient social systems
   E. Adaptive cycles and panarchy

VIII. Collaborative Adaptive Management
   A. Process components
   B. Passive vs active management
   C. Monitoring management outcomes
   D. Challenges to implementation
   E. Social learning
      1. Effective dialogue
      2. Linking knowledge sources

EXAM II (Scheduled 1-week in advance)

IX. Navigating System Change
   A. Vulnerability
      1. Exposure
      2. Sensitivity
      3. Adaptive capacity
   B. Adaptation
      1. No regrets
      2. Planned
      3. Anticipatory
      4. Societal sectors
   C. Transformation
      1. Recognize system failure
      2. Create alternatives
      3. Initiate and manage change

X. Environmental Governance
   A. The role of institutions
      1. Institutions and human behavior
      2. Policy development and impacts
   B. Hybrid governance systems
      1. State, market and community
      2. Decentralization and federalism
Course title and number  Principles of Forestry, ESSM 319
Term  Spring 2014
Meeting times and location  Class: MWF 9:10-10:00 am, 133 Animal Industries Bldg
Lab: Wednesday 1:50-4:50 pm, 124 HFSB (unless otherwise noted in schedule)

Instructor Information
Name  Jason G. Vogel
Telephone number  979 845 5580
Email address  jason_vogel@tamu.edu
Office hours  Open door or by appointment
Office location  Room 209C Animal Sciences
Teaching Asst.  Elizabeth Wilson
Email address  ewilson07@tamu.edu
Office hours  By appointment

Course Description
The theory and practice of forestry in controlling forest establishment, composition, structure and growth; principles of natural and artificial regeneration; intermediate cultural operations; silvicultural systems; use and control of fire in forests. Principles of sustainable stand management for a broad array of ecosystem values and social and ecological benefits, including forest products, ecological restoration, wildlife, biodiversity, and ecosystem services.

The course has a lecture and laboratory component. The lectures have a traditional powerpoint structure with classroom discussion, while the laboratory has scheduled in-class computer work, field trips to meet with forestry professionals and to practice forestry techniques, guest speakers, and presentations by students.

Learning Outcomes or Course Objectives

1. Apply basic statistics concepts and methods to develop sampling designs and collect, analyze, and interpret natural resources inventory and monitoring data.
   a. Collect, analyze, and interpret forest resource data

2. Design management strategies for restoring and sustaining ecosystem goods and services and adaptive management concepts.
   a. Compare and contrast forest stand management options for a broad array of ecosystem values
   b. Describe appropriate uses of fire, mechanical, and chemical methods in forestry and their environmental consequences
   c. Evaluate methods of regeneration, stand development, and harvesting
3. Interpret socio-economic and business environments relevant to ecosystem management.
   a. Interpret and apply economic analyses to management of forest resources and ecosystem services

4. Demonstrate an ability to acquire, interpret, and present conclusions orally and in writing.
   a. Prepare a written/oral paper or report

5. Demonstrate environmental stewardship and professional and ethical behavior.
   a. Identify practices that adhere to ethical and professional standards of forestry

**Resource Material**

Required readings will be available at the bookstore next to Copy Corner on Texas Ave (~$10) and posted on elearning or blackboard, with some handouts in class and some sent via email. The following are suggested reading materials.


**AVAILABLE ON WEB**
The Silvics of North America

**Grading Policies**

1) Examinations covering lectures, laboratory topics, and assigned readings (Mid-Term I - 10%; Mid-Term II - 10%, Mid-Term III -10%)(30% of total). Exams will cover lecture, readings, and laboratory material. **There is no final exam in the class.**

2) Satisfactory completion of all laboratory reports (30% of total), including participation and attendance (5% of total). A missed laboratory or a guest speaker will result in an automatic loss of the participation grade, except in the case of verified university excused absence or an inability to receive an excused absence from another professor. See Student Rule#7.

3a) Two oral presentations: (1) Silvics and uses of tree species (10% of total) and (2) development and presentation of silvicultural prescriptions (25% of total). The first presentation is individually graded and the second is a team graded exercise. Note that part of your grade will be your participation and grading of other’s work, and the grade you receive from your teammates. Mistakes can be corrected and turned back in for this project for ¾ of the total points. To receive your final grade on the silvicultural prescription, you and your group must answer the questions posed to you during the oral presentations and in your text. These will then be turned again on April 17th.

3b) **Honors students** will prepare a separate subsection of the group report for the silvicultural prescription that includes a separate analysis section. Although their work will be part of the larger
group’s report, the analysis section will be more detailed and involve a greater amount of writing in the larger report (3-5 pages). This section will be delineated from the rest of the group’s efforts.

4) Examinations must be taken when scheduled, except in the case of verified university excused absence. See Student Rule #7.

5) Any late work on class assignments will be lowered by 10% for each day it is overdue, except in the case of verified university excused absence. See Student Rule #7.

6) No “extra” extra credit will be assigned to individuals. Extra credit during the semester will only be made available to the entire class.

7) Grades - The boundaries for each grade (% of total points) are:
   A 90-100%
   B 80-89%
   C 70-79%
   D 60-69%
   F <60%

LECTURE OUTLINE

Week (approximate), Topic, and Reading Packet or Handout. For reading packet (available at the Copy Corner), use page number in upper left hand corner as reference. For the lab schedule, some flexibility will be required to accommodate guest speaker schedules and/or weather. In addition, some field labs may run over our allotted time and one will occur on a Saturday.

I. Introduction: Silviculture as a Part of Forestry
II. Landuse Ethics and Public sector forest management
III. Stand Development, Forest Composition and Stand Structure
IV. Site Quality Evaluation - Purpose and Methods

Exam 1: 2/5/2014 (practice quiz before this exam)

V. Tending and Intermediate Cuttings: Reading Packet pp 1-31
   --Release Cuttings
   --Cleavings and Liberation Cuttings
   --Herbicide Treatments in Silviculture
   --Herbicide Fate in the Environment
   --Thinning Concepts and Thinning Effects
   --Methods and Application of Thinning
   --Low, Crown, Selection, Mechanical, Free Thinning
   Improvement Cuttings
   --Salvage and Sanitation Cuttings
   --Pruning

VI. Forest - Wildlife Interactions
VII. Tree Nutrition and Forest Fertilization
VIII. Regeneration Activities and Fire management
      --Preparation and Treatment of the Site
      --Mechanical, Chemical and Prescribed Fire

Exam 2: 3/7/2014
 IX. Ecology of Regeneration
  --Seed Biology and Seed Ecology
  --Fire for release
  --Tree Improvement and Species Selection
X. Artificial Regeneration
  --Direct Seeding
  --Planting
XII. Reproduction Methods and Silvicultural Systems
  --Clearcutting
  --Coppice
  --Seed Tree and Shelterwood
XIII. Multiple Use Silvicultural Systems and Adaptive Management (Handout)
  --Watershed Ecosystems

Exam 3: 4/11/2014

There is no final exam in this course

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<tr>
<th>Laboratory Schedule. Note there will need to be some flexibility around field trips dates because of weather. Lightning or high-winds will cause us to cancel a trip, but light rain and we will still go out.</th>
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Course title and number  ESSM 320
Term  Spring 2014
Meeting times and location  MWF 12:40-1:30PM, HELD 105

Course Description and Prerequisites

The primary objective of this course is to present a basic conceptual framework for restoration ecology and ecological restoration. Throughout the course, major principles of ecology are related to practical problems confronting humankind, such as, environmental pollution and degradation, exotic species invasions, land use and management tradeoffs and consequences, importance of biological diversity, etc.

Prerequisites: RENR 205 & 215 or equivalent

Learning Outcomes or Course Objectives

1. Describe the basic components of coupled socio-ecological systems and interpret processes at the organism, population, community, ecosystem, landscape and global levels.
   a. Characterize how humans shape ecological systems (e.g. exploitation, conservation, sustainability, preservation)
   b. Define social vs. ecological tradeoffs
   c. Describe the dependence of humans on ecosystem services
   d. Describe the ecosystem components (abiotic/biotic)
   e. Describe how and why plants compete and how competition can be measured
   f. Describe processes of ecological succession
   g. Describe the relationships between organisms, populations, communities at local and landscape scales.

2. Identify plants and other organisms in their genetic and evolutionary context.
   a. Describe how and why landscape fragmentation affects biodiversity and conservation (e.g., endangered species, invasive species, habitat degradation)
   b. Identify the benefits of plant adaptations

3. Describe how geology, climate, and soils interact with the biota to influence energy flow, hydrology, biogeochemistry, and other key ecosystem functions.
   a. Describe the integration/interaction of plants, soil, and mycorrhizae
   b. Describe the function of vegetation and soil in water infiltration
   c. Describe trophic cascades and top-down influences on community structure and ecosystem processes
   d. Describe the role of disturbance (e.g., fire, drought, soil perturbation) on biotic and abiotic processes

4. Illustrate critical thinking and demonstrate problem solving skills.
   a. Predict outcomes and forecast change in coupled social-ecological systems
   b. Recognize problematic situations and predict possible outcomes
   c. Identify tradeoffs inherent in problem-solving to mitigate human impacts while sustaining goods and services
   d. Identify and defend your assumptions and those of stakeholder groups
Instructor Information

Dr. William E. Rogers  
Associate Professor of Plant Ecology and Ecosystem Restoration  
Department of Ecosystem Science & Management  
Animal Industries Building, Room 305  
Telephone: 979-845-0317  
E-mail: wer@tamu.edu (preferred method of communication - do not use eCampus email)  
Office hours: MW 10:00 - 11:00 AM & by appointment

Textbook and/or Resource Material


Grading Policies

Course Grade based on a total of 400 possible points.  
Two 1-hour Unit Exams (@ 100 points each): 200 points combined  
Comprehensive Final Exam (@ 150 points): 150 points  
Three Quizzes/Homework Assignments (@ 20 points each): 40 points * lowest score will be dropped  
Class Participation/Guest Lecture Attendance: 10 points

Grading Scale
Final grades will likely be based on a curve and your grade will partially reflect your ranking among fellow classmates and the distribution of mean point totals. As a result, it is impossible to determine now what the cut-off will be for an "A", "B", etc., however, at the very least I will adhere to the traditional standard of A ≥ 90; B ≥ 80; C ≥ 70; D ≥ 60; F < 60. Consequently, the flexibility to grade on a curve is in your best interest because it will provide me with an opportunity to elevate the final grades of many students.

Exams
The lecture exams will be closed-book and will largely cover the material presented since the last exam; however, this is a course that builds on basic principles that should not be forgotten as the course progresses. Therefore, you may encounter a question that forces you to recall material from an earlier segment of the course. Material you may see on exams will come from lectures given by your instructor and by outside guests, assignments, videos and slide shows, and the textbooks and supplemental readings. The final exam will be comprehensive with most questions formulated and structured in the same manner as those in the previous exams. Experience shows that those students who attend class have the greatest likelihood of obtaining a good grade. If you choose not to attend class, it is your responsibility to keep up with assignments and exam dates. The final exam will be comprehensive and include all material covered in class.

No make-up exams will be given unless a University-excused absence occurs for the unit exam. An excused absence means that illness or some other problem beyond your control prevented you from taking the scheduled exams (see TAMU Regulations). You must register your excused absences with Dr. Rogers within the time frame as stated in the TAMU Student Rules (Section 7) of the missed make-up exam. http://student-rules.tamu.edu

Specifically, as stated in Section 7.5:
"Students may be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Section 7.1, or other reason deemed appropriate by
the student's instructor. To be excused the student must notify his or her instructor in writing (acknowledged e-mail message is acceptable) prior to the date of absence if such notification is feasible. In cases where advance notification is not feasible (e.g. unanticipated illness, accident, or emergency) the student must provide notification by the end of the second working day after the absence. This notification should include an explanation of why notice could not be sent prior to the class."

If notification is not provided within this time frame, make-up work will not be made available. Moreover, the format/composition of the make-up work will be at the discretion of the instructor. For instance, a make-up exam might entail all essay questions, whereas, the original exam consisted of multiple choice, true/false and essay questions.

Quizzes/Homework
Quizzes will be given at the discretion of the instructor. These will be given over the course of the semester and will cover general concepts, terminology, and notable scientists that have been discussed in class. The quiz will consist of short answers and matching terms to definitions or scientist to accomplishment. The instructor may opt to substitute out-of-class homework assignments in lieu of impromptu quizzes. Homework assignments will consist of writing a synopsis or answering questions from readings associated with the course textbook or relevant scientific literature. All homework assignments must be typed and turned in as a hardcopy (email attachments sent to the instructor will not be accepted). The first homework assignment will require you to attend one of the seminars being presented at the TAMU graduate student organized Ecological Integration Symposium (http://theesis.tamu.edu/) and write a one-page, single-spaced synopsis of the talk you attended. Each quiz and/or homework assignment will be worth 20 points. A maximum of 40 total points will contribute to the final grade. The lowest grade of the three assignments will be dropped.

No make-up quizzes or assignments will be given unless a University-excused absence occurs during the class. An excused absence means that illness or some other problem beyond your control prevented you from taking the quizzes (see TAMU Regulations). You must register your excused absences with Dr. Rogers within the time frame as stated in the TAMU Student Rules (Section 7) of the missed make-up exam. http://student-rules.tamu.edu (see additional detail under Exams section).

Class Participation
Although class attendance is not mandatory during the regular lecture presentations (albeit highly encouraged!), all students are required to attend presentations of invited speakers. Your presence and attention are considered a professional courtesy and will be used to assign your participation grade.

Attendance Policy

"The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07."

Attendance in lecture is not mandatory with the exception of days we have a guest speaker. My philosophy is that it is your education, your tuition, and your grade, so it is your choice to attend my presentations of the course material. Nevertheless, it is highly encouraged that you consistently attend regular class lectures. You will eventually learn for yourself that sporadic attendance (and attention) will catch up to you sooner or later. You will find that it is virtually impossible to perform well in ESSM 320 with sporadic attendance. Every year I have at least one student whom I have only seen a couple of times during the semester approach me upon his/her realization that s/he is failing the class and asking for opportunities to make-up missed work or earn "extra-credit." I do not offer extra-credit in this or any other course and certainly not in instances where a student failed to act responsibly and regularly attend class lectures. Although I will not perform regular roll-call attendance for lectures, active class participation is an integral part of this course and should be viewed as important practice for
your professional career. Please read and understand the descriptions for how these activities are graded, and feel free to ask for clarification if you have questions. I reserve the right to add accountability for reading via "reading quizzes", if necessary. If classes are missed without acceptable justification, please do not request notes or other assistance. Make-up exams are allowed only in extenuating circumstances, and only with proper proof and prior notification. If you miss an exam for no good reason, a make-up is impossible and unfair to the rest of the class.

ONLINE COURSE MATERIALS
ESSM 320 on eCampus (http://ecampus.tamu.edu/) will contain the syllabus, lecture outlines, additional resources, grade information, etc. An eCampus page will be set up automatically for each student and this page will contain a link to the ESSM 320 page. The user name and password for your page are the same as those for your NetID student computing account. Instructions for how to log into eCampus are available at http://ecampus.tamu.edu/.

Course Topics, Calendar of Activities, Major Assignment Dates

Course Schedule
January 13 - 17
1. Introduction – Course overview
2. Restoration in a Changing World
3. Millennium Ecosystem Assessment

January 20 School Holiday – no classes

January 22 - 24
4. Recognizing Threshold Transitions
5. Assisting Autogenic Recovery (Chapter 1)

January 27 - 31
6. Utilizing Ecological Succession
7. Landscape Degradation and Repair
8. Restoring Ecosystem Function (Chapter 2)

February 3 – 7
9. Placing Initial Emphases on Process Repair
10. Assessing Primary Processes
11. Repairing Primary Processes (Chapter 3)

February 10 - 14
12. Promoting Healthy Soil Feedbacks
13. Directing Vegetation Change via Facilitation
14. Continuation & Review

February 17 - 21
15. **Exam I**
16. Ecological Niche Concepts
17. Biological Diversity-Ecosystem Productivity & Stability Debate

February 24 – 28
18. Film - Cane Toads: An Unnatural History (subject to date change)
19. Causes and Consequences of Species Invasions  
20. Case Studies with Chinese Tallow Tree Invasions

March 3 - 7  
21. Bottomland Hardwood Forest Restorations  
22. Concerns regarding Endangered Species & Global Change  
23. Habitat Restoration for an Endangered Terrestrial Orchid (guest lecture)

March 10 - 14  
Spring break – No class

March 17 - 21  
24. Strategies for Directing Vegetation (Chapter 4)  
25. Directing Vegetation Change using Mechanical Methods  
26. Ecological Integration Symposium (http://theis.tamu.edu/) – Homework #1

March 24 - 28  
27. Directing Vegetation Change using Fire  
28. Succession Management and Differential Site Availability  
29. Differential Species Availability and Performance

March 31 - April 4  
30. Assessing Resource Availability and Competitive Interactions  
31. Continuation & Review  
32. **Exam II**

April 7 - 11  
33. Consumer-Resource Relationships  
34. Herbivore Influences on Plant Community Restorations  
35. Mutualisms & Symbioses

April 14 - 16  
36. Promoting Biotic Interactions thru Site Improvements  
37. Selecting Plant Material (Chapter 5)

April 18 Reading Day – no classes

April 21 - 25  
38. Site Preparation & Seedbed Management (Chapter 6)  
39. Planting Strategies for Restoration (Chapter 7)  
40. Planning and Developing Repair Projects (Chapter 8)

April 28 - 29 (Tuesday is a reassigned day where Friday classes meet)  
41. Using Community Assembly Rules to Select Plant Species and Mixtures  
42. Course Summary & Review Session

Comprehensive Final Exam – Monday, May 5th 10:30am-12:30pm
Other Pertinent Course Information

KEYS TO SUCCESS IN ESSM 320
As all the study guides you've ever read will say, THERE IS NO SUBSTITUTE FOR DAILY PREPARATION. A night-before-the-exam cram session will not yield the same results as continual review of the material as it is presented throughout the semester. A large amount of diverse material will be covered in this course at a fairly rapid pace. It is very easy to get behind and have your grade suffer as a consequence. A second piece of advice, which may seem obvious but is often overlooked by students, is REALLY KNOW THE MATERIAL. In other words, do not simply memorize definitions or lists of facts, but listen to the lectures and study the material as though you are actively applying it on a daily basis and have to make decisions on when, how, why, where, etc. This will prepare you for the type of exam wherein you are often called upon to formulate a concise, complete answer when presented with a situation instead of being asked to define a word or provide a list. Lecture notes will be posted on eCampus, but these notes will be of little use to a student who has not attended lecture and recorded the context in which the material is delivered. I highly recommend printing the lecture notes in advance and bringing them to class on the day of lecture in order to take additional notes on the material being delivered. Exams will contain a mixture of question types (multiple choice, true/false, short answer, and essay) but all questions will attempt to have you reason and thereby demonstrate an understanding of concepts. Study and prepare yourself accordingly. If you approach this course seriously and maturely, you will experience much more success than if you approach it casually.

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu.

Academic Integrity

ESSM 320 will operate under the Aggie Honor Code:

"An Aggie does not lie, cheat or steal, or tolerate those who do"

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the Texas A&M University community from the requirements or the processes of the Honor System. For additional information please visit: www.tamu.edu/aggiehonor/
Introduction to Geographic Information Systems
ESSM 351/651 (and BAEN 651)
Spring 2014

Instructor: Dr. Rusty Feagin
Office: 221C Centeq Building B, 1500 Research Parkway
Phone: 862-2612
E-mail: feaginr@tamu.edu
TA:

Office Hours: By appointment. Please contact through e-mail.

Lecture: All Sections—MW 11:40 pm -1:30 pm. Room HFSB 102

Labs: ESSM 351 Section 501/201--- T 3-5 pm, Room HFSB 124
ESSM 351 Section 502/202--- M 3-5 pm, Room HFSB 124
BAEN Section 600--- T 3-5 pm, HFSB 124
ESSM Section 600--- M 3-5 pm, HFSB 124

Required Text: None.

Course Web Page and eCampus site: http://ecampus.tamu.edu

Bus Route to Centeq: http://transport.tamu.edu

Attendance: Make-ups on class tests, quizzes, and lab homework assignments will not be allowed unless the student has a university-excused absence.

Late Work Policy: No late work accepted without a university-excused absence. If the student has a university-excused absence, assignments are worth full credit.

Prerequisites: None

Grading: A = 90-100, B = 80-89, C = 70-79, D = 60-69, F = 0-59

Undergraduates (ESSM 351)
Two Tests 40 pts. (20 pts. each)
Lab 60 pts.

Graduates (ESSM/BAEN 651)
Two Tests 40 pts. (20 pts. each)
Lab 50 pts.
Term Project 10 pts.
Course Learning Objectives:
- Integrate data and information from a variety of sources, from both spatial and non-spatial databases.
- Identify data needs and appropriate processing methods in the context of a GIS project
- Formulate and assess spatial models and their applicability for solving problems in natural resources
- Generate and organize a plan for geoprocessing that leads to a desired project outcome
- Interpret and discuss the principles of GPS technologies, combine that information in the context of a GIS
- Design maps as a form of visual communication according to cartographic principles
- Display a recognition of the responsibility of adhering to ethical standards in decision-making on behalf of clients and the public, in the context of managing a project, collaborating within a project team
- Prepare and deliver a technical presentation that outlines a natural resource problem of a spatial nature and justifies its solution as a series of steps using spatial technologies

Topics Covered:
What is GIS?/Components of GIS
Scale and Projections
Attribute Data, Vector Database Structure, Enterprise GIS
Input: Data Sources
Classic Operations/Geoprocessing

Test #1 – Wednesday, Feb. 26
Test #2 – Mon/Wed, April 7/9

Raster & Imagery: GRID, DEM, LIDAR
Spatial Analyst, 3D Analyst, ModelBuilder, Google Earth
GPS
Remote Sensing
Output: Maps and Cartography

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Aggie Code of Honor: An Aggie does not lie, cheat or steal or tolerate those who do. Please see the Honor Council Rules and Procedures on the web http://www.tamu.edu/aggiehonor

Plagiarism or copying from the internet will result in a failing grade for the course, and all associated individuals will be reported to the Aggie Honor System Office.

When using the eCampus website, a failure to properly handle account or computer settings, etc. are not grounds for an excuse. Do not wait until the last minute to upload items that are due.
Lab Schedule

Course Objectives: This course uses ArcGIS software by ESRI to apply the concepts of GIS discussed in the lecture. Three components will be involved. The first is an in-class project and will be completed with step-by-step leadership from the instructor. The second is composed of 9 mini homework projects. The third is a final project and each team will choose one of two problems to be solved using GIS. Lab facilities will be made available outside lab hours to allow students ample time to complete projects.

Grading: Grades for the lab will be based on attendance (8 pts. = 2 /absence), completion of homework assignments (27 pts. = 3/homework), and the final project (25 pts. = 10 written report + 15 oral report). NOTE: These percentages comprise a grade that is 60% of the total class grade for undergraduates and 50% for graduate students (The numbers will be adjusted for the grad. grade). Lab attendance will affect the total class grade.

<table>
<thead>
<tr>
<th>Week of</th>
<th>Topic:</th>
<th>Assignment:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/13</td>
<td>Introduction to Lab &amp; ArcGIS</td>
<td>Homework #1</td>
</tr>
<tr>
<td>1/27</td>
<td>Projections</td>
<td>Homework #2</td>
</tr>
<tr>
<td>2/3</td>
<td>Attribute Data &amp; Database Structure</td>
<td>Homework #3</td>
</tr>
<tr>
<td>2/10</td>
<td>Data Sources, Converting, Georeferencing, &amp; Digitizing</td>
<td>Homework #4</td>
</tr>
<tr>
<td>2/17</td>
<td>Geoprocessing</td>
<td>Homework #5</td>
</tr>
<tr>
<td>2/24</td>
<td>Tables, Interpolation, &amp; Layouts</td>
<td>Homework #6</td>
</tr>
<tr>
<td>3/3</td>
<td>GNSS in the Field</td>
<td>Homework #7</td>
</tr>
<tr>
<td>3/17</td>
<td>Aerial Photos/Remote Sensing</td>
<td>Homework #8</td>
</tr>
<tr>
<td>3/24</td>
<td>Tentative Project Plans</td>
<td>Homework #9</td>
</tr>
<tr>
<td>3/31</td>
<td>Final Project Work</td>
<td></td>
</tr>
<tr>
<td>4/7</td>
<td>Final Project Work</td>
<td></td>
</tr>
<tr>
<td>4/14</td>
<td>Final Project Presentations</td>
<td>Final Presentations</td>
</tr>
</tbody>
</table>

**BE ADVISED: Loss of data due to disk damage, failure, or misplacement will not be accepted as reason for grade alteration or deadline extension. Routine data backups are recommended for your own protection.**
Course title and number  ESSM 405  
Term (e.g., Fall 200X)  Spring 2014  
Meeting times & location  Lectures 8:00-8:50 a.m. W, Lab 1-3 p.m. F, 124 HFSB  

Course Description and Prerequisites  
Ecosystem analysis and planning (capstone course comprised of student-led case studies) to include forests, rangelands, wetlands, and other ecosystems. Integration of biophysical, economic and social factors in ecosystem analysis, management planning and decision making; applications of interdisciplinary knowledge and multiple-use principles to practical ecosystem management problems. This also is a W course.  

Prerequisites: Senior classification or approval of instructor  

Learning Outcomes or Course Objectives  
1. Describe how geology, climate, and soils interact with the biota to influence energy flow, hydrology, biogeochemistry, and other key ecosystem functions.  
   a. Determine the biophysical attributes of an ecosystem and its management implications  
2. Evaluate conceptual, statistical, and quantitative ecological models and systems thinking.  
   a. Apply conceptual, statistical and ecological models to management plan development  
   b. Apply systems thinking to management plan development  
3. Design management strategies for restoring and sustaining ecosystem goods and services and adaptive management concepts.  
   a. Analyze specific ecosystems and design practices that will enhance production of desired ecosystem goods or services  
4. Interpret socio-economic and business environments relevant to ecosystem management.  
   a. Apply economic principles to planning processes  
5. Assess past, present, and future policy options relevant to ecosystems.  
   a. Identify policies pertinent to the management of natural resources at hand  
   b. Incorporate policy consideration into management plan development  
6. Illustrate critical thinking and demonstrate problem solving skills.  
   a. Predict outcomes and forecast change in coupled social ecological systems
7. Demonstrate an ability to acquire, interpret, and present conclusions orally and in writing.
   a. Identify and properly reference relevant scientific information
   b. Collect data from field, electronic, and lab sources
   c. Analyze and interpret scientific data

8. Demonstrate the ability to work collaboratively in teams and exercise leadership skills on projects.
   a. Participate in group projects and make meaningful inputs
   b. Lead an aspect of a team project

Instructor Information

Name: Jianbang Gan
Telephone number: 2-4392
Email address: j-gan@tamu.edu
Office hours: 3:45 p.m.-5 p.m. TH or by appointment
Office location: 311 HFSB

TA Information

Name: TBD
Telephone number:
Email address:
Office hours:
Office location:

Textbook and/or Resource Material


Grading Policies

Weights

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm exams (two)</td>
<td>20%</td>
</tr>
<tr>
<td>Forest resource assessment report or reflection essay</td>
<td>10%</td>
</tr>
<tr>
<td>Biweekly reports (self-evaluation)</td>
<td>5%</td>
</tr>
<tr>
<td>Team leader evaluation</td>
<td>5%</td>
</tr>
<tr>
<td>Presentations and interactions with clients/landowners</td>
<td>10%</td>
</tr>
<tr>
<td>Management plan (writing: 25%, technical: 25%)</td>
<td>50%</td>
</tr>
</tbody>
</table>

Notes:
- Students can choose to write either a forest resource assessment report or a reflection essay on her/his experience at TAMU. If a student chooses to do both, she/he can earn extra points
(up to 5 points) toward the final grade.

- Scores for each item above will be normalized to 100 before applying the weights.
- Problem sets, though not graded, will be provided to students to facilitate learning and preparation for exams.

Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
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<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>
</tbody>
</table>

Late submissions of assignments

All assignments should be turned in at the time specified by the instructor. Late submissions will be discounted at a 25% daily rate. Attendance at all class sessions including labs and field trips is required unless valid written excuses are provided.

Attendance Policy

“The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07.”

Course Topics, Calendar of Activities, Major Assignment Dates

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Required Reading</th>
</tr>
</thead>
</table>
| 1    | Course introduction  
Lab: Forest resource assessment (local and regional) | Ch. 1 & 2 & selected reading |
| 2    | Stand management planning  
Lab: Forest resource assessment (national) | Ch. 3, 4 & 5 & selected readings |
| 3    | Stand management planning  
Lab: Forest resource assessment (global) | Ch. 3, 4 & 5 & selected readings |
| 4    | The process for developing forest management plans  
Lab: Field trip to project sites and team building  
**Forest resource assessment report due** | Ch. 3 & selected readings |
| 5    | Forest management planning  
Lab: Developing a work plan for the team project | Ch. 3, 6, 10, 11 & selected readings |
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Reading Material</th>
</tr>
</thead>
</table>
| 6    | Forest management planning  
Lab: Collecting field data                                                                       | Ch. 3, 6, 10, 11 & selected readings |
| 7    | Ecological criteria and evaluation in forest management  
Lab: Designing management alternatives                                          | Ch. 4, 5 & 9             |
| 8    | Economic criteria and evaluation in forest management  
Lab: Evaluating management alternatives                                                 | Ch. 7, 8 & 9             |
| 9    | Spring break                                                                       | Ch. 9                    |
| 10   | Social criteria and evaluation in forest management  
Lab: Evaluating management alternatives                                                 | Ch. 9                    |
| 11   | Multiple-objective forest management  
Lab: Selecting alternatives for the management plan                          | Ch. 12, 13 & 14          |
| 12   | Sustainable forest management certification  
Lab: Documenting the management plan                                                   | Selected readings        |
| 13   | Global change and forest management  
Lab: Documenting the management plan                                                   | Selected readings        |
| 14   | Student presentations of forest management plans  
Lab: Revising and finalizing the management plan                                    |                          |
| 15   | Final management plan due                                                            |                          |

**Other Pertinent Course Information**

*Team project and evaluation*

Students in this course will be trained as professionals helping their clients (landowners or decision-makers) to conduct forest resource assessments and develop a forest management plan. They are requested to use their knowledge learnt from this and other related courses and appropriate analytical tools to fulfill the course requirements.

One major assignment is the team project, developing a management plan for an assigned forest. Students will work on this project as teams. An elected leader of each team will coordinate the team’s efforts and evaluate the members’ performance. The team leader position can be rotated if
needed during the semester to ensure that each team member has an equal opportunity to serve. Each team will be assigned a specific project site (forest) with several tasks. To ensure the successful completion of the team's tasks, each team is asked to develop a work plan (contract for each team member). The contract should clearly state each student's responsibilities (what to do and when to complete) and will serve as a basis for evaluation.

Students should be responsible for all assignments including reports, presentations, and the entire process of forest management plan development and are held accountable for the professional and timely completion of all tasks. Each team is required to submit a professional, comprehensive, and well-documented management plan for the assigned forest at the end of the semester. Clients/Landowners should be involved in all phases of management plan development as much as possible. Each team should make arrangements with its client in a professional manner for identification of management objectives, collection of field data, review of the management plan, and other necessary consultations. The instructor and the assistant will serve as facilitator to guide students in developing their forest management plan.

Students' performance in this course will be jointly evaluated by the instructor, TA, team leader(s), and students themselves. Each student is required to turn in a self-evaluation every two weeks to report her/his accomplishments and contributions to the team project. Team leader(s) will also provide performance evaluation of all members in the team at the end of the semester. The self-evaluations and team leader reports plus the assessment by the instructor and the TA will serve as the basis for evaluating a student's participation (efforts made) and contributions to the team project. The presentation will be judged based on contents, delivery, and responses to questions. The management plan will be evaluated based on both its technical merits and the quality of the writing.

All assignments should be turned in at the time specified by the instructor. Late submissions will be discounted at a 25% daily rate. Attendance at all class sessions including labs and field trips is required unless reasonable written excuses are provided.

Americans with Disabilities Act (ADA)

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Academic Integrity
For additional information please visit: http://aggiehonor.tamu.edu

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Natural Resource Policy (ESSM 406)
Fall 2014

Course Goal: Students should be able to apply theories about environmental policy & human-environment interactions to solving practical problems in ecosystem management, and should be able to communicate the application of these theories clearly in writing.

Learning Objectives:

1. Students will develop an understanding of fundamental theories about environmental policy and be able to apply them to specific environmental problems.
2. Students will develop the ability to write clear and concise briefs about environmental policy problems.
3. Students will develop knowledge about specific environmental policies of general importance, as well as environmental policies in their area of interest.
4. Students will develop skills at collaborating with interdisciplinary groups of their peers.

Instructor:
Forrest Fleischman, Assistant Professor
310 Horticulture/Forest Science Building (HFSB)
forrestf@tamu.edu
Office hours: Wednesday & Thursday, 1:30 pm – 3:30 pm or by appointment. For distance-ed students, I can also arrange to have skype videoconferences or phone conversations.

Teaching Assistants:
Szu-Hung “Vickey” Chen, Lecturer,
Department of Ecosystem Science and Management
253 Centeq Building (CEN)
vchencilass@gmail.com
Office hours: Tuesday and Thursday 10 am - 111 AM or by appointment.

Amelia Min-Venditti, Graduate TA
Department of Ecosystem Science and Management
123 Animal Industries Building (ANIN)
aminvenditti@tamu.edu
Office hours: Monday and Friday 11:30-1:30 (except on Mondays and Fridays when assignments are due). Please email if possible prior to meeting.

Berry W. Isenee, Undergraduate TA.
bwi1011@neo.tamu.edu
Office hours: Weds and Thursday, 3-6 pm (email him to make an appointment)

Please note that Teaching Assistants do not make final determinations of grades, and cannot grant extensions or change grades. Concerns about grades need to be addressed to Dr. Fleischman
Class Schedule & Prerequisites:
This course is taught online. There is no regularly scheduled class meeting time. Students should expect to spend 8-10 hours per week on the course, most of it online, and will be responsible for collaborating with other students via online platforms and handing in written assignments on a weekly or bi-weekly basis. Thus, students must have regular access to a computer with a high-speed internet connection to participate in the course. Students are expected to be familiar with, or rapidly familiarize themselves with the eCampus learning environments. Students having trouble with the system should contact the TAs for assistance immediately. There are no formal prerequisites for this course at this time, however a minimum of a prior course in ecology and a prior course in economics is strongly recommended.

Textbook & Readings:
This course has no required textbook. Readings and video lectures will be posted on eCampus. Students are responsible for accessing and downloading reading assignments. Supplemental readings are also posted under “Resources.”

Assessment:
In order to assess whether students have achieved the course goals, students will write a final paper in which they apply theories of environmental policy to understanding an environmental policy problem within their specific area of interest. The paper will be based on a series of shorter assignments written over the course of the term. Students will receive feedback on these short writing assignments, which they can use both in improving their final assignment, as well as in the group assignments (described below). Students who receive low grades on their short individual writing assignments should pay close attention to the feedback they receive, as the larger number of points in the final projects means that they can earn good grades if they use this feedback to improve. This course satisfies the criteria for a “W” course set forth by the university. Students who enrolled in the distance-ed sections of the course (section numbers beginning with 7) will not receive “W” credit, but will complete the same assignments. Nearly all of the grade for this course will be based on written work.

In addition to individual writing assignments, students will also work with a team of students with similar interests to prepare memos. The purpose of these group assignments is two-fold. First, professional workplaces in the ecosystem science and management field are highly collaborative places, and employers are looking for new hires who know how to work in teams – thus, these assignments allow students to practice an essential job skill. Second, research shows that students learn more effectively when they can try their ideas out with their peers, and not only with their professors. In a normal classroom based class, students have plentiful opportunities to learn from their peers, but in this online course, students’ opportunity to learn from their peers comes primarily from collaborating on writing these assignments. Through these collaborative assignments, students will benefit from being exposed to a greater diversity of opinions and working styles. Students may find that their individual papers improve due to their participation in groups. Students may find collaborative tools such as the online videoconferencing provided by Skype or Google, Google docs, or Dropbox particularly useful in completing these assignments. Upon completing each team project, you will be responsible for filling out a peer assessment, which will be sent to you via email. You will receive 10 points for
completing the assessment, and the collected results of the assessment will be utilized to form part of your grade for the team assignment.

The specific form of writing emphasized in this class is the policy memo. This is the form of communication that advisors and consultants give to their superiors to communicate core ideas. Writing of this type is expected to be concise, straightforward, and avoid jargon as much as possible. Passive voice is avoided and writers use the first person. This style may be somewhat different from writing styles you have learned in other classes, so during the first unit of the class we will read more about the specific form policy memos should take.

Each unit in this class will have 2 quizzes are designed to facilitate your learning process, to provide feedback to the instructor about what elements of the course are working well, and to provide a forum for peer grading. The instructor will be experimenting with new software to conduct these quizzes more effectively, so please be patient with possible technical glitches. While some elements of the quizzes may be graded (to test your reading comprehension), in most cases you will receive credit merely for completing the assignment.

Help with Writing:

Recent studies of employers hiring college graduates have found that communication skills, including writing, along with critical thinking and problem solving, are the skills most valued by employers (e.g. see https://chronicle.com/article/Giving-Employers-What-They/139877/). It is thus imperative that students improve their writing skills. Thus, in addition to the feedback and practice students will receive in this class, I strongly encourage all students, regardless of ability, to take advantage of the resources provided by the University Writing Center (http://www.writingcenter.tamu.edu). These services include *free* consultations at any stage of the writing process, and can conduct consultations in person, over the phone, or through email. Actually these consultations are not really free — students pay for them in student fees, so not using them is like throwing your fee money away. Students will get the most benefit out of these consultations if they attend them well before deadlines, and go to the consultations with complete information about the assignments, including the posted grading rubrics. Students can receive 10 points of extra credit if they submit proof of having visited the writing center for this class prior to October 15th.

Expectations & Workload: This course is taught entirely online. The online format gives students considerable flexibility in when they do the work for the class, however students should not mistake this flexibility for a lack of work. Because a typical 3 unit course requires 3 hours of in-class time plus approximately 2 hours outside of class for every hour in class, students should expect to spend 8-10 hours per week working on this class. Students should expect approximately 100 pages of challenging reading per week, and a writing assignment due approximately every 2 weeks, along with substantial group work.

Honor code, fair use, and collaboration:

"An Aggie does not lie, cheat or steal, or tolerate those who do."

Students are expected to be familiar with the Aggie honor code: http://aggiehonor.tamu.edu/. In this course there are two honor code issues that students should be particularly aware of:
1. Fair use. Students are expected to be familiar with the principles of fair use prevalent in academic life. Further instruction on these principles will be offered during the first week of class, however a summary is as follows: students should give credit whenever they present the ideas of others, and should not attempt to pass off others ideas or words as their own.

2. Collaboration. Students are expected to complete both individual and collaborative projects as part of this course. It is essential that students complete individual assignments individually without discussing details of the writing assignment with members of your collaborative group. Because we will be grading all of your writing assignments, it will be easy for us to detect if you are violating this expectation.

Late Assignments, Extensions, Re-grades:

Because the online nature of this course provides great flexibility for students in terms of when they work on and complete assignments, students are expected to complete work by the prescribed deadlines. Students who are not available to hand in an assignment on the day it is due for whatever reason are responsible for handing it in ahead of time. Assignments handed in up to 24 hours late will receive 50% credit, and assignments will not be accepted after this time, except in the case of excused absences, as defined by university policy (http://studentrules.tamu.edu/academicrules). Students who have excused absences, as outlined in university policy, are required to contact the professor via email at the earliest possible date to make alternate arrangements.

Regrades: Even professors make mistakes. If you are concerned that your grade is in error on any assignment, you may request a re-grade. Regrades requests must be submitted via email to professor Fleischman within 72 hours of the release of the problematic grade. The email should clearly state the reason the grade is incorrect, with reference to the specific part of the grading rubric & memo where the mistake was made. The professor will regrade the entire assignment, thus a regrade may result in the student receiving a lower grade.

Americans with Disabilities Act Policy Statement:

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Course Grading Rubric

- There will be 5 unit pre-quizzes, 5 unit post-quizzes, 5 peer evaluations, a team-maker survey, a plagiarism tutorial, and a final post-test, each worth 10 points. (180 points total)
- The individually written memos will be worth 60 points each (250 points total)
- Group written memos will be worth 50 points each. (250 points total) Grades on group memos will be adjusted based on the peer evaluations mentioned above.
• The final memo is worth 330 points.
• Total = 1010 points

Grading Scale:
• 900-1010 = A
• 800-899 = B
• 700-799 = C
• 600-699 = D
• Below 599 = F

Note that by making the course 110 points, I effectively allow a student to drop one quiz grade without affecting their average.

In the unusual case that a student has a grade between the 99 and the 00 (eg. 899.4), conventional rounding rules will be followed (i.e. 899.4 is rounded down to 899, a B, 899.5 will be rounded up to 900, an A)

Course outline *Subject To Change* Please check the latest version on eCampus.

Unit 1: September 1 - September 16: Course Introduction

Policy is a word that refers to authoritative decisions made by groups of people. The most prominent policies are national laws, such as the Endangered Species Act or the Clean Water Act, but policies exist at many levels – for example, the Aggie Honor Code is a policy of Texas A&M University. Even small groups of people often have policies – for example, in my house we clean every Tuesday.

In this unit we will read the introductory chapters of three widely utilized policy textbooks, which will give a background in three different approaches to understanding what policy is and how the study of policy can be approached.

Assignment #1: Unit 1 quiz. Due Wednesday September 3rd at 11 AM Central Time. 10 points.

Assignment #2: Individual Memo 1: Topic Proposal. Due Friday September 5th at 11 AM Central time. 50 points, 400 words. Students will write a short proposal for the ecosystem policy they wish to study for the remainder of the term, and will be responsible for locating 5 sources of information about this topic. In assignment 4, students will share these proposals with members of their team (teams will be assigned by the instructor), and select the proposal they most wish to pursue as a team. Further details will be provided in the rubric. A series of readings, posted under the Resources tab in eCampus provide further details of how to write a policy memo, how to conduct research, and provide examples of appropriate topics.

Assignment #3: Team Maker Survey: Due Friday, September 5th, at 11 AM, Central Time. Students will take a short survey to help the faculty make teams for the group projects.
Assignment #4: Plagiarism Tutorial. Due Monday September 8th at 11 AM Central Time. 10 points. Students will study the plagiarism tutorial available at the Indiana University Bloomington, School of Education Tutorial home page (https://www.indiana.edu/~istd/) and will take the included test. At the end of this test they will be able to print out a “confirmation certificate” which will indicate the exact date, time, and IP address from which they completed the test. Students will submit this confirmation certificate via a link on eCampus.

Assignment #5: Group Memo 1: Group topic proposal. Due Monday, September 15th at 11 AM Central Time. 50 points, 500 words. On Tuesday, September 9th, students will be assigned to groups of 4-6, based on the interests expressed in assignments 2 & 3, and will be responsible for writing an memo in which they justify the selection of a group topic and provide a list of 10 references on this topic. Students should take into account feedback received on their individual project proposals in drafting these group topics. Groups will be required to continue working on this topic for the remainder of the term.

Assignment #6 & 7: Post-unit quiz & Peer Assessment: due September 16th at 11 AM Central, 10 points each.

Unit 1 reading list:

- Introductory articles on policy:

- Review the information on the ecampus page under Resources, much of which is designed to help you get started researching and writing your policy memos.

Unit 2: September 16-October 6: Justifications for public decision-making about natural resources:

In this unit we will focus on understanding the conceptual frameworks that justify most kinds of ecosystem policies. Students may have encountered some of these frameworks in previous coursework, as they are widespread not only in resource studies, but also in other policy areas. The goal of this unit is to help students understand and identify the kinds of policy problems they are dealing with. This in turn serves as a foundation for understanding what kinds of politics may occur and what kinds of solutions may be effective.

Assignment #8: Unit 2 quiz. Due Friday September 19th at 11 AM Central Time.

Assignment #9: Individual Memo #2. Due Monday September 22nd at 11 AM Central Time. 50 points, 800 words. In this individual memo, students will begin a structured analysis of the
environmental problem their group has selected to focus on. Students must work alone on this assignment, but will have a chance to collaborate for group memo #2. In this assignment, students should analyze which of the four classes of justifications for environmental policy apply to their problem (these are externalities, public goods, common-pool goods, and social justice).

**Assignment #10: Group Memo #2. Due Monday October 6th at 11 AM Central Time. 50 points, 800 words.** In this group memo, students will synthesize what they’ve learned from their work on individual memos to address how the four classes of justifications for environmental policy apply to their problem.

**Assignment #11 & 12: Post-unit quiz & Peer Assessment. Due Tuesday October 7th at 11 AM Central, 10 points each.**

**Readings for Unit 2:**

- **Externalities & Public Goods**
- **Common Pool goods:**
- **Social Justice**

**Unit 3: October 6th – November 5th: Policy Solutions**

In this unit we examine the successes and failures of different approaches to policy problems. Because there are many such solutions, we divide this into two sub-units.

**Unit 3.1: October 6th – October 21st: Markets and Governments as environmental problem-solvers.**
Assignment #13: Unit 3.1 quiz: Due Friday October 10th at 11 AM - 10 points

Assignment #14: Individual Memo 3: Due Monday October 13th at 11 AM. 50 points. 800 words. In this memo students will explain the relationship of “traditional” solutions to environmental problems, such as private property, market mechanisms, and command and control regulation to the environmental problem they are studying. Students will explain what approaches are in use, what would be appropriate, the reasons these approaches are in use, and the costs and benefits of using the approach.

Assignment #15: Group memo 3: Due Friday October 24th at 11 AM. 50 points. 800 words. In this memo students will build on their individual memo to write a group paper in which they explain the relationship of “traditional” solutions to environmental problems, such as private property, market mechanisms, and command and control regulation to the environmental problem they are studying.

Assignment #16 & 17: Post-unit Quiz & Peer Assessment. Due Monday October 27th at 11 AM. 10 Points each.

Readings

- Command & control regulation
- Property & markets

Unit 3.2: October 27th - November 11th: Collaboration and Community as environmental problem-solvers.

Assignment #18: Unit 3.2 quiz: Due Weds. Oct 29th at 11 AM. 10 points.
Assignment #19: Individual Memo 4: Due Friday October 31st at 11 AM. 50 points. 800 words. In this memo students will explain the role of communities and collaborative efforts in solving the environmental problem they are studying. Students will explain what approaches are in use, what would be appropriate, the reasons these approaches are in use, and the costs and benefits of using the approach.

Assignment #20: Group memo 4: Due Monday November 10th at 11 AM. 50 points. 800 words. In this memo students will build on their individual memo to write a group paper in which they explain the role of communities and collaborative efforts in solving the environmental problem they are studying.

Assignment #21 & 22: Post-unit Quiz & Peer Assessment. Due Tuesday November 11th at 11 AM. 10 Points each.

Readings:


Unit 4: November 11th-December 2nd: Implementing and Changing Ecosystem Policies

Assignment #23: Unit 4 quiz. Due Monday Nov. 17 at 11 AM. 10 points

Assignment #24: Individual Memo 5: Due Friday November 21st at 11 AM. 50 points. 800 words. In this memo students will discuss tools for policy change & implementation that are in use. Students will explain what approaches are in use, what would be appropriate, the reasons these approaches are in use, and the costs and benefits of using the approach.
Assignment #25: Group memo 5: Due Monday Dec 1st at 11 AM. 50 points. 800 words. In this memo students will build on their individual memo to write a group paper in which they explain the role of communities and collaborative efforts in solving the environmental problem they are studying.

Assignment #26 & 27: Post-unit Quiz. Due Tuesday December 2nd at 11 AM. 10 points each

Readings:

- Reason, P., Coleman, G., Ballard, D., W

Final Memo: Assignment #28: Final Assessment: Due December 9th at midnight, Central Time. 2500 words. 320 points. Individual memo in which students describe the primary cause of the problem they are writing about and explain what they think the most effective solution to the problem is & why.

Assignment #29: Final Post quiz. Due December 9th at midnight, Central Time. 10 points. The purpose of the final posttest is solely to get feedback on the success of the class, and to allow the students to compare their answers from the pre and post tests to see how their knowledge has grown over the course of the semester.

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I encourage you to choose a subset of the case studies in this publication to read. The introduction helps situate the case studies but is not required, and the conclusion (after page 85) is not necessary. You are not required to read all of the cases, but you should read a few that you find more interesting.
Course title and number: Range Analysis and Management Planning, RLEM 415

Term: Fall 2014

Meeting times/Location: Lecture 9:10-10 MWF, ANIN 133
Lab 1-3 Tue, SCC 114

Course Description and Prerequisites

This course has been designed to address the resource assessment and decision making skill requirements of grazinglands managers worldwide. Developing skills to understand the interface between land managers and technical consultants will be the primary thrust of this course. Students will become familiar with the basics of planning and use of advanced planning tools. The resource planning process will form the core of the program. Students will develop teamwork, task planning, leadership, analysis and reporting skills through working as a contributing member of a consulting team. Each team will work with a unique case study (client) of an actual ranch. Background information will be provided while on campus and via a midterm, 3-day field trip to collect supporting resource information.

Prerequisites: RLEM 314

Learning Outcomes or Course Objectives

2. Identify plants and other organisms in their genetic and evolutionary context.
   a. Identify species present and relative abundance in all different plant communities on client ranch
   b. Formulate recommendations to client relative to appropriate grazing management and vegetation manipulation practices based on land use objectives.

4. Explain and use the concepts and applications of geographic information systems and remote sensing.
   a. Develop maps showing locations of fences, water points, gates and other aspects of facilities and landscape features to communicate recommendations to client

5. Apply basic statistics concepts and methods to develop sampling designs and collect, analyze, and interpret natural resources inventory and monitoring data.
   a. Recognize and create meaningful data presentation (eg, tables, graphs, oral reports)
   b. Measure vegetation on a grass dominated landscape
   c. Quantify the influence of woody vegetation on range landscapes (density, canopy)
   d. Demonstrate ability to apply an array of sampling methods: Point, Area, Distance
   e. Know why we sample and the need for systematic data collection
   f. Demonstrate the ability to conduct an inventory of an area, and analyze the data collected

6. Evaluate conceptual, statistical, and quantitative ecological models and systems thinking.
   a. Use and apply decision support systems pertinent to ecosystem management
7. Design management strategies for restoring and sustaining ecosystem goods and services and adaptive management concepts.
   a. Explain pros and cons of alternative vegetation manipulation systems to client

8. Interpret socio-economic and business environments relevant to ecosystem management
   a. Explain pros and cons of alternative natural resource based enterprises to client
   b. Make recommendations regarding natural resource based enterprises to client consistent with client’s goals and managerial and financial capabilities

9. Assess past, present and future policy options relevant to ecosystems.
   a. Explain the features and potential usefulness of state and federal government conservation and risk management programs in assisting achievement of client’s goals

10. Illustrate critical thinking and demonstrate problem-solving skills
    a. Delineate and describe alternative natural resource enterprises that are feasible based on a thorough assessment of both resources and client’s goals and financial and managerial capabilities
    b. Make recommendations regarding natural resource based enterprises to client consistent with client’s goals and managerial and financial capabilities

11. Demonstrate an ability to acquire, interpret, and present conclusions orally and in writing.
    a. Collect data from field, electronic, and lab sources
    b. Demonstrate ability to assimilate technical/scientific information
    c. Demonstrate ability to formulate data presentations suitable for the client’s understanding.

12. Demonstrate the ability to work collaboratively in teams and exercise leadership skills on projects.
    a. Work collaboratively in teams
    b. Participate in group projects and make meaningful inputs
    c. Demonstrate the ability to respect and interact with others in a group effort
    d. Exercise leadership skills
    e. Lead an aspect of a team project
    f. Learn to evaluate team members and encourage participation

13. Demonstrate environmental stewardship and professional and ethical behavior.
    a. Design a sound management plan that sustains natural resource uses

14. Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize and reorganize new knowledge.
    a. Gather, organize and communicate the information necessary to enable the client to achieve his/her goals relative to the subject ranchland property
    b. Demonstrate the ability to acquire and utilize new knowledge and technologies in the conduct of professional activities

**Instructor Information**

Wayne T. Hamilton (845-5589, wt-hamilton@tamu.edu), J. Richard Conner (845-7456, jrc@tamu.edu) and Doug Tolleson, (doug@cals.arizona.edu). Several other instructors will be in the course through the semester. The TA for this course will be Phillip Steigerwald (830-279-6087, psysteigerwald@gmail.com).
Textbook and/or Resource Material

Materials will be handed out in the class as needed but we will depend largely on software accessed over the web. Many of the lectures, but not necessarily all, will be available on WebCT.

Grading Policies

Each student's grade for the course will consist of grades assigned to teams and applied uniformly to team members and grades assigned to individuals based on each student's performance and participation. The team grade (22% of each student's grade) will be made up of the weighted average of the team's grade for their performance in the first interview & introduction of the company to their client (10%), and the average of the grades for each planning step in the final written report to their client (12%). Each planning step leader will be assigned a leadership grade by the instructors based on performance in their oral presentation (15%) and the quality/clarity/practical applicability of a 500 word executive summary of the section(s) of their company’s recommendations to the client they are leading (15%). Written and oral feedback is provided to each student within 48 hours of the completion of the oral presentation. Each planning step leader is also assigned an individual grade for the section(s) of the team’s final report (minimum of 1500 words) written by the student (18%). Written feedback is provided by the end of the last day of final exams. The remaining 30% of each individual's grade will consist of the weighted average of 3 grades submitted by each teammate; first on the first class period following the team's presentation of their cost bid to their client (5%), second on the first class meeting after the field trip (10%) and the third at the time the team's final written report is turned in (15%). Students must receive a passing grade on the written assignments to receive "W" credit for the course.

Attendance Policy

The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07. The field trip for this class is of signal importance and as such there are no excused absences. Any potential problems that could affect student attendance on the field trip MUST be brought to the attention of the instructors at least 3 weeks prior to the trip.

Course Topics and Calendar of Activities

**Wk/Date/Day Activity**

1- Sept 1 M Course Orientation (WTH, JRC, TA)  
1- Sept 2 T Lab - Course overview and resume development (JRC, WTH, TA)  
1- Sept 3 W Consulting business considerations and cost estimates for clients (JRC, TA)  
1- Sept 5 F Resource assessment & assembling photography, maps, etc. (WTH, TA)  

2- Sept 8 M Enterprise Budgets (JRC, TA)  
2- Sept 9 T Lab - Team formation and orientation for problem (JRC, WTH, TA)  
2- Sept 10 W Pro-forma income statements (JRC, TA)  
2- Sept 12 F Professionalism (WTH, TA)  

3- Sept 15 M Conducting a forage inventory to assess stocking rate (WTH, TA)  
3- Sept 16 T Lab - IBMS Integrated Brush Mgt. Systems - the planning process (WTH, TA)
3- Sept 17 W  Dealing with risk and uncertainty- PRFRI & PRFVI crop insurance (WTH, TA)
3- Sept 19 F  Mapping key habitat for target wildlife species (TS, TA)

4- Sept 22 M  Grazing leases (JRC, TA)
4- Sept 23 T  Lab - Matching land treatments with needs using Pestman (JRC, WTH, TA)
4- Sept 24 W  Marketing / Hunting lease arrangements (JRC, TA)
4- Sept 26 F  Current practices, costs and contracting issues for IBMS (JRC, TA)

5- Sept 29 M  Population survey and analysis by species of interest (BP, TA)
5- Sept 30 T  Lab - Teams conduct interviews with clients (JRC, WTH, TA)
5- Oct 1 W  Mapping ecological sites (WTH, TA)
5- Oct 3 F  Assessing Stocking for mixed animal populations (DT, TA)

6- Oct 6 M  Grazing management and grazing systems (DT, TA)
6- Oct 7 T  Lab - Emerging early warning systems for adjusting animal demand (DT, TA)
6- Oct 8 W  Integrated ranch management with livestock (DT);
6- Oct 10 F  Projecting land treatment response (JRC, WTH, TA)

7- Oct 13 M  Managing for and during a drought (WTH, TA)
7- Oct 14 T  Lab – GIS, GPS, Mapping (ER, TA)
7- Oct 15 W  Vegetation manipulation – the methods and why is it important (WTH, TA)
7- Oct 17 F  Characterization of herds/husbandry practices (DT, TA)

8- Oct 20 M  Nature-based enterprise characterization and assessment (JRC, TA)
8- Oct 21 T  Lab – Using the NIRS/NUTBAL PRO nutritional management system (SP, TA)
8- Oct 22 W  Trip Planning (JRC, WTH, TA)
8- Oct 23 Th Leave on field trip (12:00 PM)
8- Oct 24 F  Conduct field survey
8- Oct 25 S  Complete field trip

9- Oct 27 M  Discuss field trip & forage inventory Protocol (WTH, JRC, TA)
9- Oct 28 T  Work on forage inventory & guidelines for assessment reports (WTH, JRC, TA)
9- Oct 29 W  BRASS (WTH, JRC, JJ, TA)
9- Oct 31 F  Group planning tasks (TA)

10- Nov 3 M  Group planning tasks with instructors (JRC, WTH, TA)
10- Nov 4 T  Leadership assessment of forage inventory (JRC, WTH, TA)
10- Nov 5 W  Group planning tasks with instructors (JRC, WTH, TA)
10- Nov 7 F  Group planning tasks with instructors (JRC, WTH, TA)

11- Nov 10 M  Group planning tasks with instructors (JRC, WTH, TA)
11- Nov 11 T  Leadership assessment of livestock husbandry/management (JRC, WTH, TA)
11- Nov 12 W  Leadership assessment cont.; Group planning with instructors (JRC, WTH, TA)
11- Nov 14 F  Group planning tasks with instructors (JRC, WTH, TA)

12- Nov 17 M  Group planning tasks with instructors (JRC, WTH, TA)
12- Nov 18 T  Leadership assessment of grazing management (JRC, WTH, TA)
12- Nov 19 W  Leadership assessment cont.; Group planning with instructors (JRC, WTH, TA)
12-Nov 21 F Group planning tasks with instructors (JRC, WTH, TA)
13- Nov 24 M Group planning tasks with instructors (JRC, WTH, TA)
13- Nov 25 T Leadership assessment for vegetation manipulation (JRC, WTH, TA)
13- Nov 26 W Leadership assessment cont.; Group planning with instructors (JRC, WTH, TA)
13- Nov 28 F No class – Thanksgiving Holidays

14- Dec 1 M Group planning tasks with instructors (JRC, WTH, TA)
14- Dec 2 T Leadership assessment for nature-based enterprise planning (JRC, WTH, TA)
14- Dec 3 W Leadership assessment cont.; Group planning with instructors (JRC, WTH, TA)
14- Dec 5 F Group planning tasks with instructors (JRC, WTH, TA)

15- Dec 8 M Leadership assessment for economic analysis (JRC, WTH, TA)
15- Dec 9 T Leadership assessment for economic analysis cont. (JRC, WTH, TA)
15- Dec 12 F Team plans are due at 10:00 am on December 12, 2014.

Americans with Disabilities Act (ADA)
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

Academic Integrity
For additional information please visit: http://aggiehonor.tamu.edu

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Course title and number  ESSM 416 / ESSM 626  
Term  Fall 2014  
Meeting times and location  Tuesday & Thursday 2:20-3:35PM, ANIN 317

Course Description and Prerequisites

The goal of this course is to introduce you to the major aspects of wildland fire science including theoretical, empirical and practical components of fire research and management in a variety of ecosystems. Through formal lectures, multi-media presentations, assigned readings and group discussions we will cover a broad spectrum of the classic and current scientific fire literature. We will also attempt to provide you with hands-on prescribed burning experiences as circumstances and weather permit.

Following successful completion of this course, you should be able to discuss the ecological effects of fire in different ecosystems, identify the factors that influence wildland fire behavior, justify the use of prescribed burning, write an acceptable prescribed burning plan, conduct a search for pertinent fire literature and critically review and analyze research and management endeavors utilizing fire.

Prerequisites: RENR 205 or equivalent

Learning Outcomes or Course Objectives (ESSM Program Learning Outcomes 1, 2, 7, 9, and 12)

1: Describe the coupled socio-ecological systems that are relevant to managing ecosystems prone to fire and burned as part of a management prescription (PLO 1)  
   a. Identify fire-sensitive or dependent organisms, populations, and communities at the landscape and global levels.

2: Identify plants and other organisms in their genetic and evolutionary context (PLO 2)  
   a. Identify species whose evolution has been shaped by fire.

3. Design prescribed fire and wildfire management strategies for restoring and sustaining ecosystem goods and services (PLO 7)  
   a. Managing fuel loads to minimize potential catastrophic fires  
   b. Design prescribed burning regimes for various species.  
   c. Develop a prescribed burning plan  

4. Assess past, present, and future government policies related to fire (PLO 9)  
   a. Identify relevant laws and policies related to using fire as a management tool

5. Demonstrate the ability to work collaboratively in teams and exercise leadership skills on projects (PLO 12)
Instructor Information

Dr. William E. Rogers
Department of Ecosystem Science and Management
305 Animal Industries Building
979-845-0317
wer@tamu.edu
Office hours: by appointment

Dr. M. Mort Kothmann
Department of Ecosystem Science and Management
119 Kleberg
979-845-5575
m-kothmann@tamu.edu
Office hours: by appointment

Textbook and/or Resource Material

There is no assigned textbook for this course. We have required readings from a variety of sources and will make this material available to you on eCampus (see calendar of activities).

Grading Policies

Because this is a stacked undergraduate/graduate course, we have designed separate grading systems for graduate and undergraduate students. Although both groups of students will take the same semester exams and final exam, graduate students and undergraduate students will be graded separately. Some assignments will be different for graduate and undergraduate students.

Undergraduate students - will conduct a group project in teams of four to five students each. The final deliverable for this project will be a 20-minute presentation in class, likely a PowerPoint presentation, wherein each team member must speak. The teams will pick an ecosystem (approval required) and describe its characteristics, including location, size, major plant species and vegetation types, topography, climate, and so forth. The talk will then detail the occurrence and behavior of fire in that ecosystem, how the ecosystems rely upon fire for their maintenance or collapse, how fire exclusion might affect succession, how fire might be used by humans there, and so forth. All team members who participate in the development of the report will share the same grade. More details will be provided in a separate handout.

Graduate students - will individually prepare a poster presentation using PowerPoint, print it, and present it during a poster session scheduled during class. This exercise will be similar to the process of preparing and presenting a poster presentation at a scientific conference. These posters will be on topics pertinent to the course and will be delivered during the last three regular lecture periods. More details will be provided in a separate handout.
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<th>Undergraduate</th>
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<tr>
<td>Exam I (take-home)</td>
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<td>Exam II (closed-book)</td>
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<td>Final Exam (closed-book)</td>
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<td>Oral Presentation</td>
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<td>Prescribed Burn Assignments</td>
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<td>Class Participation</td>
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Final grades may be based on a curve and your grade will partially reflect your ranking among fellow classmates and the distribution of mean point totals. As a result, it is impossible to determine now what the cut-off will be for an "A", "B", etc., however, at the very least we will adhere to the traditional standard of A ≥ 90%; B ≥ 80%; C ≥ 70%; D ≥ 60%; F < 60%. Consequently, the flexibility to grade on a curve is in your best interest because it will provide the instructors with an opportunity to elevate the final grades of many students. Final grades for undergraduate and graduate students will not be based upon the same curve.

Exam I will be a ‘take-home’ essay exam. Instructions for this Exam will be provided in the Exam file on eCampus.

Exam II will be closed-book in-class and will largely cover the material presented and in assigned readings since the last exam; however, this is a course that builds on basic principles that should not be forgotten as the course progresses. Therefore, you may encounter a question that forces you to recall material from an earlier segment of the course. Material you may see on exams will come from lectures given by your instructor and by outside guests, assignments, videos and slide shows, and the textbooks and supplemental readings. The final exam will be comprehensive with most questions formulated and structured in the same manner as those in the previous exams.

Our experience has shown us that the fairest way to handle permanent return of closed-book exams is simply not to return them. Old exams can never really be distributed equitably leaving students from outside disciplines at a particular disadvantage. Another alternative is putting exams on reserve, but exams on reserve invariably mysteriously disappear whether in the library or in the department. Furthermore, we plan to develop several questions that we regard as excellent indications of your learning. These will be tested for imperfections through the years, and we will reserve them for repeated use. Therefore, we will return the exams to you only for the class period during which we present the correct answers. We will then collect and keep them for you to view later, for example when studying for the final, but they must be used in our offices and will be destroyed 180 days after final grades are issued, as per university regulations.

A special note about incompletes. In an attempt to slow down the abuse of Q-drops, TAMU several years ago decreed that all students may normally have only three Q-drops during their entire university career. This rule has led to a proliferation of grades of "incomplete". Students sometimes have the mistaken impression that they can choose an incomplete when they discover that their performance in a course is very poor and that they cannot drop. A forgotten illness that occurred earlier in the semester is suddenly remembered, and this becomes the cause of the poor performance. The student then tries to coerce the professor into awarding an incomplete and allowing him/her to return the following semester to re-take all or part of the course. This will not be tolerated in this course. The
official regulations concerning incompletes are: "The instructor shall give this grade only when the deficiency is due to an authorized absence or other cause beyond the control of the student." If you become ill for an extended period and feel that this will negatively impact your performance, you must notify us immediately. If the illness is serious enough to warrant an incomplete, we will require that you first gain permission from your appropriate academic dean.

A special note about extra credit. Occasionally we have a student who is apparently satisfied with his/her performance throughout the semester until the final week. S/he then suddenly becomes unhappy with his/her progress, comes into our office with a narrative of anguish, and asks if there is something he/she can do for extra credit. We never provide last-minute extra credit opportunities in this course for several reasons. First, a 14-week semester is a long time for a student to work on getting an acceptable grade. A rush job for extra credit at the end of the semester is illogical if the job could not be done in the preceding 14 weeks. Second, our number one priority at all times is fairness, both to the student and to us. If we allow a student with a "D" to work on extra credit to get a "C", then we should also allow a student with a "B" to work on getting an "A". Therefore, to be fair to everyone, we do not allow extra credit. In summary, it is far easier to simply work hard from day one to get a good grade than to involve all of us in something awkward at the end.

**Attendance Policy**

"The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07).

Attendance in lecture is not mandatory, but is highly encouraged. Our philosophy: it's your education, it's your tuition, and it's your grade, so it's your choice to attend. However, you will eventually learn for yourself that sporadic attendance (and attention) will catch up to you sooner or later. You will find that it is virtually impossible to perform well in ESSM 416 & 626 with sporadic attendance. Active class participation is an integral part of this course and should be viewed as important practice for your professional career. Although we will not perform regular roll-call attendance for lectures, your class participation grade is derived from regular attendance, active participation in class discussions, satisfactory completion of in-class assignments, attendance during guest lectures and student presentations, and meaningful peer review during student presentations. Please read and understand the descriptions for how these activities are graded, and feel free to ask an instructor for clarification if you have questions. Instructors reserve the right to add accountability for reading via "reading quizzes", if necessary. If classes are missed without an excused absence, please do not request notes or other outside assistance. Lectures will be made available online and you may obtain missed notes from a fellow classmate. Make-up exams are allowed only in extenuating circumstances, and only with proper proof of an excused absence and prior notification. If you miss an exam for no good reason, a make-up is impossible and unfair to the rest of the class.
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<tr>
<th>Lec.</th>
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<td>1*</td>
<td>Sept 2</td>
<td>Course Introduction</td>
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<tr>
<td>2*</td>
<td>4</td>
<td>Chemistry, Physics and the Nature of Fire</td>
<td>Pyne 3-36; DeBano 20-35</td>
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<td>3*</td>
<td>9</td>
<td>Chemistry, Physics and the Nature of Fire (cont.)</td>
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<td>Fire Behavior</td>
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<td>Fire Behavior</td>
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<td>Wildland Fuels</td>
<td>Pyne 90-127</td>
</tr>
<tr>
<td>7*</td>
<td>23</td>
<td>Wildland Fuels</td>
<td>Scott &amp; Burgan 2005; Frost 1998; Pyne 171-180</td>
</tr>
<tr>
<td>8*</td>
<td>25</td>
<td>Fire Weather</td>
<td>Pyne 128-168</td>
</tr>
<tr>
<td>9*</td>
<td>30</td>
<td>Prescribed Burning/ Smoke Management</td>
<td></td>
</tr>
<tr>
<td>10*</td>
<td>Oct 2</td>
<td>Prescribed Burning Plan and Implementation</td>
<td>Assignment</td>
</tr>
<tr>
<td>11**</td>
<td>7</td>
<td>History of Fire on Earth</td>
<td></td>
</tr>
<tr>
<td>12**</td>
<td>9</td>
<td>Fire Suppression &amp; Fuels Management (guest speaker)</td>
<td></td>
</tr>
<tr>
<td>13**</td>
<td>14</td>
<td>Fire as a Cultural Factor in Human History</td>
<td>Whelan 294-308</td>
</tr>
<tr>
<td>14**</td>
<td>16</td>
<td>Fire Policy and Public Perceptions</td>
<td>Donato et al. 2006; Twidwell et al. 2013a</td>
</tr>
<tr>
<td>15**</td>
<td>21</td>
<td>Disturbance and Ecological Succession</td>
<td>Whelan 57-104</td>
</tr>
<tr>
<td>16**</td>
<td>23</td>
<td>Plant Adaptations to Fire</td>
<td>Whelan 116-134</td>
</tr>
<tr>
<td>17**</td>
<td>28</td>
<td>Fire in Long-leaf Pine and other Forest Ecosystems</td>
<td>Noss et al. 2006</td>
</tr>
<tr>
<td>18**</td>
<td>30</td>
<td>Linking Fuels, Fire Behavior, and Fire Ecology</td>
<td>Twidwell et al. 2013b</td>
</tr>
<tr>
<td>19</td>
<td>Nov 4</td>
<td>Exam II (in-class, closed book)</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>6</td>
<td>Fire Wars: a NOVA film</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>11</td>
<td>Fire Wars: a NOVA film – part II</td>
<td>Pyne 171-211</td>
</tr>
<tr>
<td>23</td>
<td>18</td>
<td>Fire in Tallgrass Prairie Ecosystems</td>
<td>Collins &amp; Calabrese 2012</td>
</tr>
<tr>
<td>25</td>
<td>25</td>
<td>Fire in Chaparral Ecosystems</td>
<td>Keeley &amp; Fotheringham 2001</td>
</tr>
<tr>
<td>26</td>
<td>27</td>
<td>No Class - Thanksgiving Recess</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Dec 2</td>
<td>Undergraduate Student Oral Presentations</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>4</td>
<td>Undergraduate Student Oral Presentations</td>
<td>Submit PP on line</td>
</tr>
<tr>
<td>29</td>
<td>9</td>
<td>Graduate Student Poster Presentations</td>
<td></td>
</tr>
</tbody>
</table>

* Material covered in open-book, take-home Exam I to be turned in via eCampus.
** Material covered in closed book, in-class Exam II.
***The Comprehensive Final Examination will be a closed book, in-class exam that has been scheduled by the University Registrar for 17 December, 2014 from 1-3pm in ANIN 317.

**Other Pertinent Course Information**

ONLINE COURSE MATERIALS
ESSM 416 & 626 on eCampus http://eCampus.tamu.edu will contain the syllabus, lecture outlines, additional resources, grade information, etc. The user name and password for eCampus is the same as for your NEO account.
KEYS TO SUCCESS IN ESSM 416 & 626
As all the study guides you've ever read will say, THERE IS NO SUBSTITUTE FOR DAILY PREPARATION. A night-before-the-exam cram session will not yield the same results as continual review of the material as it is presented throughout the semester. A large amount of diverse material will be covered in this course at a fairly rapid pace. It is very easy to get behind and have your grade suffer as a consequence. A second piece of advice, which may seem obvious but is often overlooked by students, is REALLY KNOW THE MATERIAL. In other words, do not simply memorize definitions or lists of facts, but listen to the lectures and study the material as though you are actively applying it on a daily basis and have to make decisions on when, how, why, where, etc. This will prepare you for our type of exam wherein you are often called upon to formulate a concise, complete answer when presented with a situation instead of being asked to define a word or provide a list. Exams will contain a mixture of question types, but all questions will attempt to have you reason and thereby demonstrate an understanding of concepts rather than a simple regurgitation of facts. True/false, multiple choice, and matching questions may be on the exams, but they will not be the standard, old-fashioned version; ours will be designed to make you THINK. For instance, our true/false questions will likely require an explanation for why they are true or false, thereby reflecting our persistent attempt to have you reason, think, and deduce. Study and prepare yourself accordingly. If you approach this course seriously and maturely, you will experience much more success than if you approach it casually. Finally, if you have been in college for at least one semester, you will have noted that absenteeism is rampant. It should be apparent without mentioning it here, but missing lectures, or attending while succumbing to debilitating somnolence is not a recipe for success in college.

Americans with Disabilities Act (ADA)

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Academic Integrity

For additional information please visit: [http://aggiehonor.tamu.edu](http://aggiehonor.tamu.edu)

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Course title and number  ESSM 420
Term (e.g., Fall 200X)  Fall 2014
Meeting times and location  ANIN 317 at 10:20-11:10 MW, Lab TBA

Course Description and Prerequisites

How wetland and riparian areas link terrestrial and aquatic systems and function hydrologically and ecologically within watersheds; integrated approaches for restoration of degraded wetland and riparian systems; improving water resources through vegetation management and restoration.

Prerequisites: RENR 205 or approval of instructor.

Learning Outcomes or Course Objectives

1. Describe the basic components of coupled socio-ecological systems and interpret processes at the organism, population, community, ecosystem, landscape and global levels.
   a. Characterize how humans shape wetland ecosystems (e.g. exploitation, conservation, sustainability, preservation)
   b. Describe the dependence of humans on wetland ecosystem services
   c. Define the functions of wetlands at the different levels
   d. Describe the wetland ecosystem components (abiotic/biotic)
   e. Identify which organisms, populations, etc. are most relevant in a given wetland
   f. Integrate human activities and system functions that impact wetlands
   g. Describe processes of ecological succession in wetlands
   h. Interpret temporal and spatial dynamics in wetlands

2. Describe how geology, climate, and soils interact with the biota to influence energy flow, hydrology, biogeochemistry, and other key ecosystem functions.
   a. Describe chemical and water cycles and energy flow in ecosystems
   b. Identify the effects that climate has on the biota, soils, and other functions
   c. Draw the water cycle
   d. Describe the hydrological functioning of wetland ecosystems
   e. Describe the function of vegetation and soil in water infiltration
   f. Link soil formation/erosion to biota
   g. Describe the role of disturbance (e.g. fire, drought, soil perturbation) on biotic and abiotic processes in wetlands

3. Apply basic statistics concepts and methods to develop sampling designs and collect, analyze, and interpret natural resources inventory and monitoring data.
   a. Demonstrate the ability to conduct an inventory of an area, and analyze the data collected
   b. Collect and analyze water quality data
   c. Recognize the best technique to use for sampling in certain situations
   d. Interpret data to write and present a report

4. Evaluate conceptual, statistical, and quantitative ecological models and systems thinking.
   a. Utilize an ecological model to analyze and interpret specific system functions and processes
   b. Design a wetland assessment tool and apply it quantitatively to field sites
c. Draw a basic flow chart to represent ecological processes

5. Illustrate critical thinking and demonstrate problem solving skills.
   a. Identify the critical variables in a given problem
   b. Apply critical thinking to the design of a wetland assessment tool
   c. Forecast a range of outcome that may arise from climate change
   d. Demonstrate willingness to seek and integrate information outside one's expertise

6. Demonstrate an ability to acquire, interpret, and present conclusions orally and in writing.
   a. Identify and properly reference relevant scientific information
   b. Collect data from field, electronic, and lab sources
   c. Read and comprehend a journal, article, book

Instructor Information

Name: Dr. Georgianne W. Moore
Telephone number: 979-845-3765
Email address: gwmoore@tamu.edu
Office hours: M 11:10-noon, or by appointment
Office location: ANIN 329

Textbook and/or Resource Material

Wetlands 4th Ed. Mitsch and Gosselink (2007) and selected readings posted on class website.

Grading Policies

<table>
<thead>
<tr>
<th>Student Assessment</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Trips</td>
<td>30</td>
</tr>
<tr>
<td>Homework and Labs</td>
<td>25</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>15</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20</td>
</tr>
<tr>
<td>Participation &amp; Reading Quizzes</td>
<td>10</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>100%</td>
</tr>
</tbody>
</table>

Grade Distribution: 90-100% = A; 80-89% = B; 70-79% = C; 60-69% = D; <59% = F

Attendance Policy

"The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located online at http://student-rules.tamu.edu/rule07." For illnesses, please turn in an Explanatory Statement and/or Physician confirmation note (section 7.1.6.2) on the date you return to class. Field trips are a very important component of this course. Thus, attendance is **required** for all three field trips. See the teaching schedule for dates of each field trip and make arrangements in advance to be there! Only University Excused Absences will be accepted as reasons for non-attendance. Students who miss a field trip will be required to complete an additional report on a topic assigned by the instructor.

Missed or Late Assignments: In cases of excused absence, missed assignments (exams, homework, etc.) can be made up in a timely manner (See Student Rules #7). You are responsible for notifying the instructor immediately to make arrangements. Substitute make-up work may be necessary at the instructor's discretion.
Regarding unexcused absences or late assignments, you are responsible for notifying the instructor immediately to make arrangements. In most cases a penalty of 10% will be incurred each class meeting day items are late, beginning after class on the due date. If unexcused, the instructor retains the right to refuse late work and assign zero for the grade. No assignment will be accepted 2 weeks past due or after the final class meeting.

Course Topics, Calendar of Activities, Major Assignment Dates

<table>
<thead>
<tr>
<th>Wk</th>
<th>Date</th>
<th>Topic</th>
<th>Meets</th>
<th>Subject</th>
<th>Readings</th>
<th>Assnmts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-Sep</td>
<td>Introduction</td>
<td>M</td>
<td>Introduction to wetland and riparian ecological restoration; global wetlands</td>
<td>Misch Ch. 1-3</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3-Sep</td>
<td>Definition, Wetlands of World</td>
<td>W</td>
<td>Restoration principles; Plant adaptations; plant succession-restoration relationships; the Texas story -- choose Th or Fr for 2-hr lab.</td>
<td>Hobbs et al. 2011</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>8-Sep</td>
<td>Restoration Principles</td>
<td>M</td>
<td>Riparian restoration; terrestrial and aquatic linkages; geomorphology; regulations</td>
<td>Zedler, Misch Ch. 12</td>
<td>HW 1</td>
</tr>
<tr>
<td>2</td>
<td>10-Sep</td>
<td>Plant Adaptations &amp; Succession</td>
<td>W</td>
<td>Ecological hydrologic processes in flow systems; Dams and dam removal -- choose Th or Fr for 2-hr lab.</td>
<td>Misch Ch. 14</td>
<td>HW 2</td>
</tr>
<tr>
<td>2</td>
<td>Sep 11 or 12</td>
<td>LAB: Texas Water Videos</td>
<td>Th or Fr</td>
<td>TX Water Law</td>
<td>Lab 1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>15-Sep</td>
<td>Landscape Process</td>
<td>M</td>
<td>Role of disturbance: plant invasions, erosion, roads, fire, flood, gracing, etc.</td>
<td>Riparian Ch. 1-3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>17-Sep</td>
<td>Geomorphology 1 and 2</td>
<td>W</td>
<td>Restoration in Urban Environments</td>
<td>Swanson</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>22-Sep</td>
<td>Hydrology 1</td>
<td>M</td>
<td>Role of disturbance: plant invasions, erosion, roads, fire, flood, gracing, etc.</td>
<td>Hart and Poff 2002</td>
<td>Lab 2</td>
</tr>
<tr>
<td>4</td>
<td>24-Sep</td>
<td>Hydrology 2</td>
<td>W</td>
<td>Restoration in Urban Environments</td>
<td>Slaytor et al. 2005</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Sep 25 or 26</td>
<td>LAB: Darn Darns</td>
<td>Th or Fr</td>
<td>Common urban themes: Connection between BMP's and water quality</td>
<td>Palmer et al. 2005</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>29-Sep</td>
<td>Erosion, Floods</td>
<td>M</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1-Oct</td>
<td>Invasive Plants</td>
<td>W</td>
<td>Restoration Design</td>
<td>Misch Ch. 17</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6-Oct</td>
<td>Restoration in Urban Environments</td>
<td>M</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>8-Oct</td>
<td>BMP’s, Water Quality</td>
<td>W</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>13-Oct</td>
<td>Treatment Wetlands</td>
<td>M</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>15-Oct</td>
<td>Restoration Design</td>
<td>W</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>20-Oct</td>
<td>MIDTERM EXAM</td>
<td>M</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>22-Oct</td>
<td>Field Trip Overview</td>
<td>W</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>23, 24, &amp; 25</td>
<td>AUSTIN FIELD TRIP</td>
<td>Thurs-Sat</td>
<td>Remediation Design</td>
<td>Trip 1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>27-Oct</td>
<td>Global Cycles and Climate Change</td>
<td>M</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>29-Oct</td>
<td>Coastal Restoration</td>
<td>W</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>3-Nov</td>
<td>Riparian Assessment</td>
<td>M</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>5-Nov</td>
<td>Wetland Values</td>
<td>W</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>TBD</td>
<td>LAB: White Creek Tributary</td>
<td>TBD</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>10-Nov</td>
<td>Wetland Laws</td>
<td>M</td>
<td>Laws and regulations restorationists need to know: Graduate Student Case Studies</td>
<td>Misch Ch. 14</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>12-Nov</td>
<td>Case Study Presentations</td>
<td>W</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>17-Nov</td>
<td>Case Study Presentations</td>
<td>M</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>19-Nov</td>
<td>Case Study Presentations</td>
<td>W</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Nov 20 or 21</td>
<td>LAB: Brazos Co Streams</td>
<td>Th or Fr</td>
<td>No Class</td>
<td>Trip 3</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>24-Nov</td>
<td>Case Study Presentations</td>
<td>M</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>26-Nov</td>
<td>(Thanksgiving Holiday)</td>
<td>M</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>1-Dec</td>
<td>Case Study Presentations</td>
<td>M</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>3-Dec</td>
<td>Synthesis</td>
<td>W</td>
<td>Remediation Design</td>
<td>Misch Ch. 15</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>8-Dec</td>
<td>Redefined day. No class</td>
<td>No class</td>
<td>Remediation Design</td>
<td>No Class</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>10-Dec</td>
<td>Redefined day. No class</td>
<td>No class</td>
<td>Remediation Design</td>
<td>No Class</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>16-Dec</td>
<td>FINAL EXAM</td>
<td>T-8-10</td>
<td>Remediation Design</td>
<td>No Class</td>
<td></td>
</tr>
</tbody>
</table>

**Labs and Field Trip:** There are two labs and three field trips distributed throughout the semester (exact times TBA). October 23-25, there will be a three-day overnight field trip to Austin. The other two field trips are in town and last 2-4 hours. Participation in field trips is expected, includes assignments to be turned in, and accounts for 30% of the course grade.
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"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Course title and number
ESSM 430

Term
Spring 2014

Meeting times
MWF 1:50 – 2:40 PM
ANIN room 133*
*Select Friday classes meet in Library

Course Description and Prerequisites
Ecological Restoration is a relatively new, dynamic discipline that relies heavily on fundamentals of ecology; therefore, students in natural resources disciplines will practice translating and communicating key ecological concepts to advanced case studies in Ecological Restoration; such practice shall enhance these skills for professional applications.

Prerequisites: 1) ESSM 205 and 2) ESSM 320 or ESSM 420; or 3) by instructor approval

Instructor Information
Dr. Georgianne W. Moore, Associate Professor
Dept. Ecosystem Science and Management
329 Animal Industries Building
Phone: 845-3765; gwmoore@tamu.edu

Dr. William E. Rogers, Associate Professor
Dept. Ecosystem Science and Management
305 Animal Industries Building
Phone: 845-0317; wen@tamu.edu

Office Hours
MW 3:00-4:00pm
or by appt.

Office Hours
MW 10:00-11:00am
or by appt.

Learning Outcomes or Course Objectives
1. Describe the basic components of coupled socio-ecological systems and interpret processes at the organism, population, community, ecosystem, landscape and global levels.
   a. Define social vs. ecological tradeoffs
   b. Describe the dependence of humans on ecosystem services
   c. Relate the ecosystem components (abiotic/biotic) to current management practices and applications
   d. Apply principles of population dynamics and interactions between organisms, including competition, predation, mutualism, etc. to restoration design

2. Describe how geology, climate, and soils interact with the biota to influence energy flow, hydrology, biogeochemistry, and other key ecosystem functions.
   a. Relate the integration/interaction of plants, soil, and mycorrhizae to restoration concepts
   b. Relate trophic cascades and top-down influences on community structure and ecosystem processes to restoration concepts
   c. Relate the role of disturbance (eg. fire, drought, soil perturbation) on biotic and abiotic processes to restoration concepts
3. Apply basic statistics concepts and methods to develop sampling designs and collect, analyze, and interpret natural resources inventory and monitoring data.
   a. Interpret data to write and present a restoration prospectus
   b. Evaluate different types of data and assess variation in data quality
   c. Demonstrate the ability to read and interpret statistical information
   d. Appreciate the need for environmental monitoring and assessment

4. Design management strategies for restoring and sustaining ecosystem goods and services and adaptive management concepts.
   a. Analyze specific ecosystems and design practices that will enhance production of desired ecosystem goods or services
   b. Design a hypothetical restoration plan
   c. Describe principles of ecosystem resilience
   d. Develop an appreciation of ecological and engineering approaches to ecosystem restoration and stabilization
   e. Identify a problem situation and be able to design a plan to change the situation
   f. Apply ecological concepts to restoration and stabilization of ecological systems
   g. Discuss how ecological theory relates to a restoration project

5. Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge.
   a. Desire to continue education and knowledge in your field, and discuss current topics with your peers
   b. Read professional literature and apply information to the solution of real world problems
   c. Identify the major journals in basic and applied ecology
   d. Write review papers and maintain learning journal
   e. Translate and communicate scientific concepts to applications pertinent to restoration practitioners

Textbook and/or Resource Material

There is no required textbook that must be purchased for this course. We will assign required weekly readings from scholarly journals and other relevant publications. These will be made available on the eCampus course website. Other handouts will regularly be provided in class.

Grading Policies

<table>
<thead>
<tr>
<th>Student Evaluations:</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly Mini Papers</td>
<td>40</td>
</tr>
<tr>
<td>Restoration Prospectus</td>
<td>30</td>
</tr>
<tr>
<td>Worksheets</td>
<td>15</td>
</tr>
<tr>
<td>Classroom Engagement</td>
<td>10</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>100%</td>
</tr>
</tbody>
</table>

Grading Scale

Final grades will likely be based on a curve and your grade will partially reflect your ranking among fellow classmates and the distribution of mean point totals. As a result, it is impossible to determine what the cut-off will be for an "A", "B", etc., in advance, however, at the very least we will adhere to the traditional standard of A ≥ 90; B ≥ 80; C ≥ 70; D ≥ 60; F < 60. Consequently, the flexibility to grade on a curve is in your best interest because it will provide your instructors with an opportunity to elevate the final grades of many students.
Attendance Policy

Class attendance is required. The University views class attendance as being the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamus.edu/rule07. Class assignments missed as a result of unexcused absences are due the following class period after you return; however, past-due assignments are not eligible to receive full credit (except in cases of University excused absences), and will be accepted at the instructors’ discretion.

Active engagement in the classroom is an integral part of this course and should be viewed as important practice for your professional career. 10% of final grade is derived from active participation in class discussions and meaningful peer review. A set of worksheets are used to facilitate classroom activities (15% of final grade). Please read and understand the descriptions for how these activities are graded, and feel free to ask an instructor for clarification if you have questions. Instructors reserve the right to add accountability for reading via written quizzes or oral presentations, if necessary.

Typical Weekly Schedule (specific daily activities are subject to change)

**Monday:**
- Bring copy of assigned readings for class discussion
- Bring assigned worksheet containing discussion points for class discussion
- Turn in revised mini paper (P#r) from previous week (if applicable)
- Topic overview and student-led class discussion of assigned readings

**Wednesday:**
- Bring copy of assigned readings
- Instructor introduction of new restoration case study (occasional guest speaker)
- Small group discussion and worksheets for case study topics
- Whole class discussion

**Friday:**
- Turn in P# at beginning of class for peer review (PR)
- Mini-lecture on writing fundamentals
- Critique each other’s paper (PR) and provide constructive feedback via the PR worksheet
- Working on current writing assignments

Other Pertinent Course Information

**CODES AND DEFINITIONS**

Class discussion leaders. Read and prepare to discuss articles each **Monday**. Several times per semester you will each play a key role the discussion.

**Worksheets.** There are three types of worksheets: a) notes on assigned readings, b) notes on case study discussions, and c) peer review worksheets.

**P# - Weekly mini papers.** Brief 450-650 words; drafts due **Fridays**, weeks 2 – 13, to provide for peer review; edited papers are due the following **Monday**.

**PR – Peer review** skills are critical for professional development because you learn to distinguish good writing, and more importantly, you learn steps to improve your own writing.

**RP – Your Restoration Prospectus** will comprehensively apply course topics to a particular restoration case study, chosen by the individual students. A prospectus is a formal written plan for restoration that provides an ‘agent’ with the necessary information to make an informed
decision. Your prospectus will explain a proposed restoration recovery plan for a degraded system utilizing the scientific principles of Restoration Ecology we cover throughout the semester. Specific instructions and additional handouts will be provided later in the semester.

### Course Topics, Calendar of Activities, Major Assignment Dates

<table>
<thead>
<tr>
<th>Week</th>
<th>Monday</th>
<th>Wednesday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13-Jan Overview</td>
<td>15-Jan Discussion</td>
<td>17-Jan PR Workshop</td>
</tr>
<tr>
<td>2</td>
<td>20-Jan HOLIDAY</td>
<td>22-Jan Discussion</td>
<td>24-Jan</td>
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<tr>
<td>3</td>
<td>27-Jan Discussion</td>
<td>29-Jan Case Studies</td>
<td>31-Jan Studio/PR on P2</td>
</tr>
<tr>
<td></td>
<td>Turn in P1r</td>
<td></td>
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<tr>
<td>4</td>
<td>3-Feb Discussion</td>
<td>5-Feb Case Studies</td>
<td>7-Feb Studio/PR on P3</td>
</tr>
<tr>
<td></td>
<td>Turn in P2r</td>
<td></td>
<td>9-Feb Turn in RP Topic</td>
</tr>
<tr>
<td>5</td>
<td>10-Feb Discussion</td>
<td>12-Feb Case Studies</td>
<td>14-Feb Work on RP</td>
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<td></td>
<td>Turn in P3r</td>
<td></td>
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<td>6</td>
<td>17-Feb Discussion</td>
<td>19-Feb Case Studies</td>
<td>21-Feb</td>
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<tr>
<td></td>
<td>Turn in RP Draft 1</td>
<td></td>
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<tr>
<td>7</td>
<td>24-Feb Discussion</td>
<td>26-Feb Case Studies</td>
<td>28-Feb</td>
</tr>
<tr>
<td></td>
<td>Turn in P4r</td>
<td></td>
<td>Studio/PR on P5</td>
</tr>
<tr>
<td>8</td>
<td>3-Mar Discussion</td>
<td>5-Mar Case Studies</td>
<td>7-Mar</td>
</tr>
<tr>
<td></td>
<td>Turn in P5r</td>
<td></td>
<td>Studio/PR on P6</td>
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<tr>
<td>9</td>
<td>10-Mar</td>
<td>12-Mar</td>
<td>14-Mar</td>
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<td></td>
<td>Spring Break</td>
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<tr>
<td>10</td>
<td>17-Mar Discussion</td>
<td>19-Mar Citation Workshop</td>
<td>21-Mar Go to EIS</td>
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<td></td>
<td>Turn in P6r</td>
<td></td>
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<tr>
<td>11</td>
<td>24-Mar Discussion</td>
<td>26-Mar Case Studies</td>
<td>28-Mar</td>
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<tr>
<td></td>
<td>Turn in RP Draft 3</td>
<td></td>
<td>Studio/PR on P7</td>
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<tr>
<td>12</td>
<td>31-Mar Discussion</td>
<td>2-Apr Case Studies</td>
<td>4-Apr</td>
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<tr>
<td></td>
<td>Turn in P7r</td>
<td></td>
<td>Studio/PR on P8</td>
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<tr>
<td>13</td>
<td>7-Apr Discussion</td>
<td>9-Apr Case Studies</td>
<td>11-Apr</td>
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<tr>
<td></td>
<td>Turn in P8r</td>
<td></td>
<td>Studio/PR on RP</td>
</tr>
<tr>
<td>14</td>
<td>14-Apr Discussion</td>
<td>16-Apr Case Studies</td>
<td>18-Apr</td>
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<tr>
<td></td>
<td>Turn in P9r</td>
<td></td>
<td>No class</td>
</tr>
<tr>
<td>15</td>
<td>21-Apr Studio/PR on RP</td>
<td>23-Apr Discussion</td>
<td>25-Apr</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Turn in Final RP</td>
</tr>
</tbody>
</table>
Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

Academic Integrity

For additional information please visit: http://aggiehonor.tamu.edu

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
ESSM 440 / ESSM 628
Wetland Delineation

Dates: 30 April 2014, 3 -5 pm; 19-24 May 2014; Final Plant Collection Due - 6 June 2014

Instructors: Stephan L. Hatch  Robert W. Knight  Dale A. Kruse
Director  Associate Professor  Curator
S.M. Tracy Herbarium  Rangeland Ecology & Mgt.  S.M. Tracy Herbarium
2138 TAMU  2138 TAMU  2138 TAMU
Office: 979-845-4328  979-845-5557  979-458-4050
Cell: 979-777-8133  979-324-6980  979-229-6195
e-mail  s-hatch@tamu.edu  bob-knight@tamu.edu  dakruse@tamu.edu

Course Description: This course covers the application of the 1987 Wetland Delineation Manual in use by the Army Corps of Engineers (Corps) and Great Plains Supplement. Participants will learn the field indicators of hydrophytic vegetation, hydric soils, wetland hydrology, methods for making jurisdictional determinations in non-disturbed and disturbed areas, recognition of problem wetlands and technical guidelines for wetlands, and sight identification of wetlands plants.

Expectations: Students will be expected to attend all class sessions. Successful completion of the course will require students to be working on the plant collection and studying an additional 4-6 hours each day outside of the 7 am to 5 pm daily schedule. Total class and outside time will be about 80 hours from 8:00 am on the first day until 3:00 pm on day six. All personal appointments and business should be taken care of prior to the week of class. See student rule 7 for excused absence policies.

Required Text: Required readings and notes will be on sale at Copy Corner on Texas Ave across from Outback Steakhouse. The cost will be about $50 and there are five (5) packets. Copy Corner is open on Saturday and Sunday. The Aquatic and Wetland Plants of Southeastern United States: 2 volumes - Monocotyledons and Dicotyledons are the required texts (check set out from Knight, or purchased for about $130). The books for purchase will be at the MSC Bookstore.

Other required items: NO FLIP-FLOPS in the field!! If you show up in flip-flops you will not be allowed in the field. You will need rubber boots or old tennis shoes for going into water or muddy areas, long pants for walking through briars and poison ivy, sun screen, insect repellent, a water bottle for drinking and wetting soils for color and texture determinations, field notebook for keeping notes about the sites and collected plants, knife (old) for trimming soil profiles, backpack to put everything in, plant press with ~20 cardboards (plant presses, cardboards and straps are available from the Range Club for $35 - see Dr. Knight), plastic garbage bags to put plants in before they are pressed, pencils for field work, and 1 inch or larger - 3 ring binder for course notes.

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Academic Integrity Statement: "An Aggie does not lie, cheat, or steal or tolerate those who do." For more information, see the Honor Council Rules and Procedures on the web at: http://aggiehonor.tamu.edu/
ESSM 440 / ESSM 628 - Wetland Delineation

Dates:  
April 30, 3-5 pm (orientation at S. M. Tracy Herbarium)  
May 19-24 (class)  
June 6 (plant collection due)

Time:  
See course outline that follows

Locations:  
ANIN 317 (most lectures)  
ANIN 103A (mainly laboratory work but some lectures)  
S. M. Tracy Herbarium, University Services Building, Room 131  
Field locations to be announced - transportation provided from University Services Building each morning.

Grading:  
Field Determinations and Maps  
ESSM 440  ESSM 628  
60 points 60 points

Tuesday - 2 determination sheets and map (0 points)  
Wednesday - 2 determination sheets and map (10 points each)  
Friday - 2 determination sheets and map (10 points each)

Quizzes  
ESSM 440  ESSM 628  
80 points 80 points

4 @ 20 points each - see outline for times and dates

Homework  
ESSM 440  ESSM 628  
25 points 25 points

1 @ 25 points - see outline for date

Plant Collection (Due June 6, 2014)  
ESSM 440  ESSM 628  
90 points 135 points

A minimum of 2 samples of each species; collect from obligate (OBL) and facultative-wet (FACW) on the list provided (at Aggieland Bookstore next to the Copy Corner). Choose plants in consultation with instructors. You are allowed to collect plants together, but you should do your own identification, pressing, labels, and field books.

ESSM 440 - 20 species  
ESSM 628 - 35 species

Collection grading criteria:  
Identification  20  Identification  35
Quality of specimen  40  Quality of specimen  70
Labels  10  Labels  10
Field book  20  Field book  20
Total points  90  Total points  135

Sight Identification Tests (family and genus only, correct spelling – see outline for dates)  
(family - 0.5 pts ea., genus - 1.5 pts. ea.)  
ESSM 440  ESSM 628  
30 points 30 points

Sight ID Test #1 - 15 plants from list assigned at April meeting  
80 points 80 points

Sight ID Test #2 - 40 plants from cumulative list

Final Determinations and Map  
ESSM 440  ESSM 628  
120 points 120 points

Saturday morning - 3 determination sheets and a map (30 points each)

Final Written Exam  
ESSM 440  ESSM 628  
150 points 150 points

Saturday afternoon

TOTAL  
ESSM 440  ESSM 628  
635 points 680 points
SUMMER 2014
LECTURE AND LABORATORY SCHEDULE

30 APRIL 2014       WEDNESDAY
S.M. Tracy Herbarium 3:00 - 5:00 PM
Class meeting at the University Services Building (3380 University Drive East, Room 131) to discuss plant collecting, pressing, labels, field book, and sight ID expectations and procedures - Hatch, Knight, Kruse.

19 MAY 2014         MONDAY
ANIN 317
8:00 - 8:20  Introduction and course objectives - Hatch, Knight, Kruse
8:20 - 8:45  Safety briefing - Kruse (LSA Agreement - paper)
8:45 - 9:00  Wetland legislation - Kruse
9:00 - 9:30  1987 Federal manual, background, purpose, and scope - Kruse
9:30 - 10:00 Technical guidelines - Kruse
10:00 - 10:15 Break
10:15 - 11:00 Soil color - Knight
11:00 - 1:00  Lunch
1:00 - 3:00  Hydrophytic vegetation and Homework Assigned - Hatch
3:00 - 3:15  Fac-neutral test, preparation of determination sheets - Kruse
3:15 - 3:30  Break
3:30 - 5:30  Wetland hydrology - Knight
5:30 - 7:00  Dinner
ANIN 103A
7:00 - 10:00 Check out books - Knight
Cyperaceae and Juncaceae characteristics - Hatch

20 MAY 2014          TUESDAY
S. M. Tracy Herbarium parking lot, no later than 6:45 am
FIELD SITE - 1
7:00 – 8:00  Waters of the United States (handouts)
8:00 - 12:30  Field exercise - field indicators, delineation, plant collecting
12:30 - 2:30  Lunch and plant pressing
ANIN 317
2:30 - 2:45  Quiz #1
2:45 - 3:45  Hydric soils - Knight
3:45 - 4:00  Break
4:00 - 5:00  Routine and comprehensive methods - Kruse
5:00 - 7:00  Dinner
7:00 - 7:20  Sight ID Test #1
ANIN 103A
7:20 - 9:00  Work on plant collections, field books, and labels

21 MAY 2014         WEDNESDAY
S. M. Tracy Herbarium parking lot, no later than 6:45 am
FIELD SITE - 2
7:00 - 8:00  Wetland determinations and delineation (> 5 acres method)
8:00 - 12:30  Field exercise - wetland determinations (handouts)
12:30 - 2:30  Lunch
ANIN 317
3:00 - 3:10  Quiz #2
3:10 - 3:45  Federal regulatory jurisdiction - Knight
3:25 - 3:45  Break
3:45 - 5:30  Soil taxonomy - Knight
5:30 - 7:30  Dinner
7:30 - 9:00  Work on plant collections, field books, and labels
22 MAY 2014  THURSDAY

ANIN 317  8:00 - 4:00  Thursday is a designed to be a “catch-up” day. This time is provided to allow students to work on plant collections, study notes, review for quizzes and the final, etc. Instructors will generally be available from 8:00 am to 4:00 pm for any assistance that may be required during the day.

ANIN 317  4:00 - 5:00  Quiz #3 (Poaceae and Cyperaceae characters from lecture)
5:00 - 7:00  Dinner
7:00 - 9:00  Work on plant collections, field books, and labels

23 MAY 2014  FRIDAY  S. M. Tracy Herbarium parking lot, no later than 6:45 am

FIELD SITE - 3  7:00 - 11:00  Comprehensive field methods (handouts)
11:00 - 1:00  Lunch
1:00 - 1:30  Use of soil surveys - Knight
1:30 - 2:00  Difficult Wetland Situations - Kruse
ANIN 317  2:00 - 2:30  Quiz #4
2:30 - 4:30  Review for plant identification test
4:30 - 5:30  Sight ID Test #2
5:30 - 7:00  Dinner (pizza provided) and review for written final - instructors will be available for questions related to any of the material covered in the previous 5 days of the course. Students should arrive prepared to ask specific questions over the material.

24 MAY 2014  SATURDAY  S. M. Tracy Herbarium parking lot, no later than 6:45 am

FIELD SITE - 4  7:00 - 11:30  Final determination and delineation exam (handouts)
11:30 - 1:00  Lunch
ANIN 317  1:00 - 2:15  Final written exam
2:15 - 2:30  Professionalism and ethics - Knight and Hatch
2:30 - 2:45  Course evaluations
2:45 - 3:00  Certificates of completion
3:00  Adjourn

6 JUNE 2014  FRIDAY

S.M. Tracy Herbarium  4:00 pm  Plant collections due
Texas A&M University
Dept. of Ecosystem Science and Management

Course title: ESSM 444 and 655: Remote Sensing of the Environment
Course number: ESSM 655 & ESSM 444
Course date: Fall Semester 2014
Location: Lecture: KLCT 117; Lab: HFSB 124 (computer lab)
Meeting day(s): Monday, Wednesday
Meeting time(s): Lectures: MW: 12:40 - 1:30pm
Labs: W: 2:00 – 4:50pm

Course description

The main objective of this course is to introduce students to the principles and techniques necessary for applying remote sensing to diverse issues in natural resources. The course emphasizes a hands-on learning environment with theoretical and conceptual foundations in both aerial and satellite remote sensing. Primary focus will be placed on digital image interpretation, analysis, and processing for a broad range of applications. The course, through the class project, discussions, student presentations, and lab exercises, is based on inquiry-type activities, such as discovery, case studies, model-building, design, research, creating, and environmental problem-solving with remote sensing techniques.

Prerequisites: Good academic standing

Learning outcomes

Upon completion of the course, students are expected to:
1. Compare sensor characteristics and select appropriate sources of imagery and image characteristics for environmental analysis
2. Understand aerial photo scale, orthorectified imagery, image resolution, and derive direct and indirect measurements on aerial and satellite imagery
3. Perform aerial image interpretation, satellite image visual analysis, preprocessing and processing for identifying landscape features
4. Perform image classification by selecting appropriate classification algorithms
5. Generate maps from remote sensing imagery and report the accuracy assessment
6. Understand principles of lidar remote sensing and point clouds, display data, and process lidar data
7. Report in writing and orally present the remote sensing approach to problem solving
Instructor Information

Name Dr. Sorin C. Popescu, Associate Professor
Email & Phone s-popescu@tamu.edu; 862-2614
Office location Centeq B 221D
Online resource http://ecampus.tamu.edu/

Office hours Open door policy, though I recommend emailing or calling for appointments. Please put “655” or “444” in the subject of email messages regarding this class to receive prompt attention.

Teaching Assist Ryan Sheridan, PhD Candidate, ryan.sheridan@tamu.edu
TA Office hours: Fridays, 1:00-2:00pm; Centeq 214 or by appointment

Textbooks


Grading policy

10 point 90.0 – 100 = A  Excellent Lab assignments 25%
brake-out 80.0 - 89.9 = B  Good Quizzes 10%
system 70.0 – 79.9 = C  Satisfactory Project 20%
60.0 – 69.9 = D  Passing Midterm exam 20%
00.0 – 59.9 = F  Fail Final exam 25%

Lab assignments: All lab work is due at the beginning of the following lab period. All laboratory and homework assignments are to be completed in a neat, logical, and clear fashion.

Late assignments: A 10% reduction in grade, up to a maximum of 50%, will be assessed for each weekday an assignment is handed in late. Assignments will not be accepted if more than 5 weekdays late, unless documented excuse is presented as per University rules.

Important dates % of project grade
Midterm exam: Oct 8th, Wednesday (week 6), during lecture time 5%
Project proposals due (week 7): Oct 15 5%
Project progress report (week 10): Nov 5 5%
Project presentations (week 14): Dec 1 and Dec 3 20%
Project paper due (week 14): Dec 3 70%
Final exam: Dec 15, Monday, 10:30 AM-12:30 PM, in lecture room
### Tentative course outline

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<tr>
<th>Week</th>
<th>Topic</th>
<th>Reading</th>
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<tbody>
<tr>
<td>1</td>
<td>Syllabus; Definition of terms; History and future of remote sensing; electromagnetic spectrum</td>
<td>Chapter 1 and 2</td>
</tr>
<tr>
<td>2</td>
<td>The remote sensing process; RS sensors, aerial photographs, photogrammetry</td>
<td>Chapter 3 and 4</td>
</tr>
<tr>
<td>3</td>
<td>Image interpretation, statistics, image resolution, data visualization</td>
<td>Chapter 5 and 10</td>
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<tr>
<td>4</td>
<td>Land observation satellites, Active microwave (radar)</td>
<td>Chapter 6 and 7</td>
</tr>
<tr>
<td>5</td>
<td>Active sensors: LIDAR</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>6</td>
<td>Image preprocessing; Geometric and radiometric correction; Midterm exam</td>
<td>Chapter 11</td>
</tr>
<tr>
<td>7</td>
<td>Image classification</td>
<td>Chapter 12</td>
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<tr>
<td>8</td>
<td>Field Data, Accuracy assessment</td>
<td>Chapter 13, 14</td>
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<tr>
<td>9</td>
<td>Hyperspectral remote sensing; Digital change detection</td>
<td>Chapter 15, 16</td>
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<tr>
<td>10</td>
<td>Advanced image processing; GIS</td>
<td>Chapters 10</td>
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<tr>
<td>11</td>
<td>Hyperspectral remote sensing</td>
<td>Chapter 11</td>
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<td>12</td>
<td>Remote Sensing Applications</td>
<td>Part IV</td>
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<tr>
<td>13</td>
<td>Remote Sensing Applications</td>
<td>Part IV</td>
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<tr>
<td>14</td>
<td>Final exam review</td>
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### Tentative laboratory schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Introduction to Image Interpretation, Geometry of Aerial Photos, and Google Earth</td>
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<tr>
<td>2</td>
<td>Determining distance and heights on aerial photographs, measuring relief displacement and parallax, orthophotos, Web sources of remote sensing data.</td>
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<tr>
<td>3</td>
<td>Introduction to ENVI and use of orthophotos with ArcGIS. Multispectral remote sensing imagery. Image display; subsetting. GPS integration with digital imagery.</td>
</tr>
<tr>
<td>4</td>
<td>Image preprocessing; Initial statistics extraction; geometric correction; Radiometric correction</td>
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<tr>
<td>5</td>
<td>Band rationing, image filtering</td>
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<tr>
<td>6</td>
<td>Principal component analysis</td>
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<tr>
<td>7</td>
<td>Unsupervised classification; Project proposals due</td>
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<tr>
<td>8</td>
<td>Supervised classification</td>
</tr>
<tr>
<td>9</td>
<td>Accuracy assessment; Project work</td>
</tr>
<tr>
<td>10</td>
<td>Spectral change detection; Project progress reports due</td>
</tr>
<tr>
<td>11</td>
<td>Introduction to LIDAR, point cloud concepts and processing</td>
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<tr>
<td>12</td>
<td>Project work</td>
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<tr>
<td>13</td>
<td>Introduction to hyperspectral data analysis; Project work</td>
</tr>
<tr>
<td>14</td>
<td>Student project presentations</td>
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### Laboratory, Quiz, and Exam policy
The University policy on Scholastic Dishonesty will be enforced in this course. While you are encouraged to help each other understand concepts and techniques, all work submitted should
be your own. Exceptions to this policy will be explicitly noted by the instructor and should not be assumed by students. Make-up exams will not be offered. If you are going to miss an exam for a valid reason (per University rules), contact the instructor well in advance.

Save every lab session’s work on your home drive (U:) in the class folder (drive letter may change, depending on network administration for each semester). Organize the space on your home drive in a neatly manner. Keep your lab account password secure.

Laboratory reports - Format Guidelines
When specifically indicated, laboratory exercises must contain a brief report following the format guidelines given below (1-2 pages for section 500 and 3-4 pages for section 600; double-spaced using a 12-point proportionally-spaced font, with 1 inch margins all around.) Captions, references, footnotes, appendices, tables, etc. may be single-spaced. The report should be divided into Introduction (with background and objectives), Methods, Results, Discussions, and Conclusions sections, and should tie together and synthesize the lecture, readings, and practical exercises. A bullet-type format is accepted for students in section 500, but all the report sections mentioned above must be included. In the Methods section do not include a list of ENVI commands that you have used. Instead, give the big picture of your approach and the remote sensing/image processing methods that you have used. You are encouraged to explore and pursue methods beyond the lab handout procedures – do research! You may include an appendix of ENVI commands used, for future references. Figures and tables inserted in the text are encouraged. When appropriate, include snapshots of your imagery in the report, mainly in the Results section, but no larger than half a page. Each laboratory exercise will be due the following laboratory period, at the beginning of class, unless otherwise indicated. Instructor may give extra credit to students who further develop the lab exercise and use a solid list of references.

Each page following the first full page of text should have a page number. A title page may be supplied. In text citations and references should follow the guidelines for manuscripts submitted for publication to the American Society of Photogrammetry and Remote Sensing (http://www.asprs.org/publications.html), for Photogrammetric Engineering and Remote Sensing (PE&RS). Final projects must be printed using the same criteria. Students are required to keep electronic copies of all work submitted.

Projects
Students are required to design and implement a class project. The project must use digital image source data for an environmental application. Students must develop a specific output product useful to natural resource managers or researchers. When the instructor gives out project data, the data should not be used for any other purpose without instructor’s permission. The project is designed to (1) build upon and synthesize techniques or concepts demonstrated in class, and (2) let you explore your own data sets and research objectives using your developing remote sensing "toolkit." For graduate students in section 600, work that contributes to their thesis research or current employment is encouraged. All students, graduates and undergraduates, are required to team up in groups of 2 or 3 members and pursue group projects, with each student bringing a contribution to the final project. Single student projects are not accepted. All projects require instructor approval given on the project proposals.

A proposal (approximately 150-250 words) and outline describing the project and proposed methods must be turned in by the date indicate in the Important dates section. However, students are encouraged to turn in proposals as soon as is feasible. The proposal/outline should contain at least five preliminary references (section 600), peer-reviewed articles are preferred, or three preliminary references (section 500). The final report must be no more than twenty pages in length including figures and references, and the final report and summary/outline must follow
the format guidelines for papers and laboratory reports. Failure to follow these guidelines will result in the paper not being accepted. The final report must include an abstract of approximately 150 words that is succinct and informative without reference to the text. This should be followed by the Introduction (with a background subsection containing the literature review and objectives), Methods, Results, Discussions, and Conclusion. Keep in mind that these are semester projects. The expected content and effort that goes into the project should be generally equivalent to at least three laboratory topics that are connected and make sense in an operational or research context. Laboratory time may be provided for work on your project during the semester, but will be insufficient by itself. A 2-5 page project progress report is required at the start of class as indicated in the Important dates section. Well-chosen student projects may be suitable for subsequent publication in either conference proceedings or the peer-reviewed literature. Please keep this goal in mind as you develop and carry out your projects, and particularly as you prepare your final reports.

**Academic Integrity - Aggie Code of Honor**

Aggies do not lie, cheat, or steal, nor do they tolerate those who do.

The Aggie Code of Honor functions as a symbol to all Aggies, promoting understanding and loyalty to truth and confidence in each other.

For additional information please visit: [http://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor)

**Americans with Disabilities Act**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Office of Support Services for Students with Disabilities in Room 126 of the Student Services Building. The phone number is 845-1637.
Course title and number: ESSM 459 (2-3) 3 credits
Term: Spring 2014
Meeting times and location: TuTh 8:00-8:50; 11:10-12:25: HFSB 124

Course Description

Undergraduate Catalog: Computational tools for creating new data, sharing, integrating that data with other databases; conducting analyses and interpretation of information ranging from spreadsheets to advanced scientific workflow processing systems; tools to create higher quality, more useful data. Prerequisite: Junior or senior classification or approval of instructor.

Narrative: Scientific research, business, and management are increasingly dependent on databases and the automation of computational (not necessarily numeric) processing.

There was a time in the not-too-distant past when the abilities, (i) in the case of GIS, to digitize data, to overlay and intersect spatial data, and to demonstrate an appreciation for the difference between vector and raster data, and (ii) in the case of remote sensing, to demonstrate the ability to identify and measure objects on aerial photographs, the knowledge of the light-spectrum, and of the various platforms used to acquire remotely sense data, were sufficient for an undergraduate to secure a job as what we now would call a technician in the broad, and continually broadening, arena of the spatial sciences. Not so anymore.

Have you ever wondered why (have you even noticed that) the attribute files associated with "shapefiles" have the extension .dbf and that, by default, they open in Excel? The answer is that "dbf" literally stands for "database file" and that Excel "is flat". In the modern view of databases these "database files" are inferior in technology to what are called relational databases. It is one thing to ensure that numbers and text in one of these files are simply stored there, it is another thing to ensure that it is done efficiently. Modern, relational, databases strive to ensure that efficiency.

Have you ever, during the throes of completing a term project on time, been the victim of having to repeat the same task over, and over, and over, and over, and..., again? Your savior is the knowledge of just a bit of programming. You do not need to become "really geeky"—if you can think clearly, logically, then you can program. Hmm, you probably do not realize it, but you have been doing it, programming, behind the scenes for years.

Have you ever been given a data file for which you questioned either the positional or the attribute data was in question? I have—more often than I care to mention. I have been given provided with data for political boundaries that only approximately align, even at very coarse levels, for fires that supposedly occurred in the middle of the ocean, and for species that are far out of their ecological range. I have been provided with data for fires that were supposedly out before they started, and for which supposed trees are taller than the tallest of skyscrapers. There is reason to question the quality of data that is provided to you. Is it all bad? Absolutely not!! But there are data quality issues, and we will touch upon some of those.

This is cool stuff—really! Moreover, it is stuff that might very-well land you that better job!!
Prerequisites:

Junior or senior classification or approval of the instructor.

Learning Outcomes or Course Objectives

Course Objectives
1. Develop an appreciation of the programming process.
2. Further develop your ability to think logically.
3. Acquisition of spatial data from existing environmental databases.

Learning Outcomes
1. Explain, develop, and use the concepts and applications of ecoinformatics including non-spatial and spatial database management systems (DBMS), search and query language (SQL), and scientific workflow programming.
   a. Acquire environmental data from various sources and design databases using proprietary and open source software tools.
   b. Identify existing data repositories and databases and use Open Database Connectivity (ODBC) and/or search and query languages (SQL) across standalone to grid or cloud computing platforms to access data.
   c. Demonstrate the ability to identify different metadata specifications and editors.
2. Within the context of scientific workflows,
   a. Identify different types of data and assess variation in data quality.
   b. Demonstrate the ability to use proprietary and open source software tools, e.g., Python, Microsoft Excel effectively.
   c. Explain the difference between different types of workspaces and, briefly, their advantages and disadvantages.
3. Use general system thinking/logic to automate workflow,
   a. Demonstrate the ability to write simple scripts to automate tasks in Excel and ArcMap.
   b. Demonstrate the ability to write and use functions.
4. Illustrate critical thinking and demonstrate problem solving skills.
   a. Identify the critical variables in a given problem.
   b. Compare and contrast conceptual or workflow maps for environmental problem solving (e.g., steps to problem-solving—informal flowcharting)

Instructor Information

Name: Dr. Marian Eriksson
Number: 979/224-2648
Email: m-eriksson@tamu.edu
Off hours: Friday 2:00—4:00, 214 Centeq
Office: 320 HFSB; 232 Centeq
Textbook and/or Resource Material

Required Texts:

Other Readings: TBA

Grading Policies

COURSE REQUIREMENTS AND GRADING

- Zandbergen Regular Exercises (14%)
- Regular homework assignments (36%)
- Quizzes (3 make be take home, 18%)
- Participation I (%20)
- Participation II (submission of in-class work, 12%)
- Grade Scale: 100 – 90 (A), 89 – 80 (B), 79 – 70 (C), 69 – 60 (D), and < 60 (F)

There will be approximately 12 in-class and homework assignments, each, for a combine 48%. They will be related and may be given a combined. The course is very interactive and I do not make a formal distinction between lab time and lecture time.

Professionalism (Class Attendance and Attention)

"The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at [http://student-rules.tamu.edu/rule07](http://student-rules.tamu.edu/rule07)." There is a grade for active participation. You must be in class the majority of the class period for credit. I know who comes and when. If attendance slacks off I will resort to attendance-sheets whereby students must sign the attendance sheet that will be made available at the start of the class. Students are expected to be professionals by paying attention, participating during class, and moving to the front of the class to facilitate interaction. Sleeping, reading of newspapers, computing IM/texting and surfing, and cell phone use (turn them off) will not be tolerated. Everybody in the class will receive individual attention. That means that there will sometimes be down time for others. The best exhibition of participation will be for you to help your neighbors when you "got it" and they did not. Participation also goes the other way around in the act of asking for help. I will pay attention to this.

Make-up Assignments and Quizzes, Tests and Exams

It is the responsibility of the student to obtain notes or other material and perform exercises for missed classes. Only University Excused Absences (Rule 7) will be accepted for scheduling make-up quizzes, tests or exams. If you are absent from a quiz, test, or exam, you will only be allowed to make it up (in a timely fashion) upon presentation of written documentation of reason for absence (e.g., doctor statement, official school activity, etc.) or by prior consent of the Instructor. If you are going to be absent from a quiz for an official school activity, you must present a written note, signed by proper authority, prior to the date of absence, if possible.
<table>
<thead>
<tr>
<th>Week</th>
<th>Class/Laboratory Topics (tent.)</th>
<th>Required Reading (tent.)</th>
<th>PAZ Due (tent.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Housekeeping: The GUIs; Assignment statements (VB, Py); Variables; Working with strings (VB); Help (VB); Comments Workspaces; Branching (VB and Py); Looping (VB); Font, Interior, Object basics (VB); For Each (VB); More examples of material to date.</td>
<td>Syllabus; PAZ Ch. 1 &amp; 3</td>
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<tr>
<td>2</td>
<td></td>
<td>PAZ 4.1-4.7</td>
<td>Ch. 1 &amp; 3</td>
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<tr>
<td>3</td>
<td></td>
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<td>4</td>
<td>Arrays (VB), Lists and Tuples (Py); Looping Select (SQL); VB and Py in Selections, Definition Queries, Labels, etc. More work with array-like things; Possibly dictionaries (Py). Quiz 1 through branching and looping.</td>
<td>PAZ Ch. 2</td>
<td>Ch. 4-I</td>
</tr>
<tr>
<td>5</td>
<td>Functions (VB and Py); Modules (Py); Update, Delete, Select Into; (SQL); Misc App VB and Py; On Error in VB; Try Except Finally in Py Classes in Py; Misc App VB and Py; Left &amp; Inner Joins (SQL) compare ArcMap.</td>
<td>PAZ Ch. 6</td>
<td>Ch. 2</td>
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<td>6</td>
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<tr>
<td>7</td>
<td></td>
<td>PAZ Ch. 5 &amp; 12</td>
<td>Ch. 6</td>
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<tr>
<td>8</td>
<td>File System Object; Files in VB and Py. Listing with ArcPy Cusors in ArcPy; ArcPy for geometries. Recursive Functions (?) Quiz 2 through week 7, mostly arrays, lists, tuples, and functions (VB and Py), and very simple SQL statements and use in ArcMap.</td>
<td>PAZ Ch. 7</td>
<td>Ch. 5 &amp; 12</td>
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<td>9</td>
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<tr>
<td>10</td>
<td>ArcPy mapping</td>
<td>PAZ Ch. 10</td>
<td>Ch. 8</td>
</tr>
<tr>
<td>11</td>
<td>ArcPy for raster manipulation</td>
<td>PAZ Ch. 9</td>
<td>Ch. 10</td>
</tr>
<tr>
<td>12</td>
<td>ArcPy tools</td>
<td>PAZ Ch. 13 &amp; 14</td>
<td>Ch. 9</td>
</tr>
<tr>
<td>13</td>
<td>ArcPy apps; Possibly data discovery and acquisition, intro database connections, Current Project, ODBC.</td>
<td>PAZ Ch. 11</td>
<td>Ch. 13 &amp; 14</td>
</tr>
<tr>
<td>14</td>
<td>Cont. wk 13. Quiz through wk 13. Due day of final exam.</td>
<td></td>
<td>Ch. 11</td>
</tr>
</tbody>
</table>
Handouts
Any handouts or web-based material used in this course are copyrighted. Handouts and web-based materials include but are not limited to syllabi, quizzes, exams, in-class materials, review sheets, and problem sets. Because these materials are copyrighted, you may only use them for your own studies and may not lend them to or share with any other student.

Plagiarism
Plagiarism consists of passing off as one’s own the ideas, words, writings, etc., which belong to another. You are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Evidence of plagiarism will result in an automatic null mark for the assignment or test. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section “Scholastic Dishonesty.”

Americans with Disabilities Act (ADA)
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Academic Integrity
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ESSM/GEOG 462 ADVANCED GIS FOR NATURAL RESOURCE MANAGEMENT [Schedule and Materials]
FALL 2014

Course Instructor

Dr. Michelle Lawing, Department of Ecosystem Science and Management
Office: 223 Centeq Building B (Research Park)
Office Hours: TR 9:00am – 10:00am or by appointment
Office Phone: 979-845-2748
Email: alawing@tamu.edu

Meeting Times and Place

Lecture: TR 8:00a -8:50a Room 214, Centeq (Research Park)
Lab: M 8:00a – 10:50a Room 214, Centeq (Research Park)

Course Description

Advanced topics in Geographic Information Systems (GIS) to solve natural resource problems; manipulation of raster data types; three-dimensional modeling; emphasis on geoprocessing as it relates to applied projects, particularly with habitat suitability models; field and lab use of Global Positioning Systems (GPS); internet-based GIS modeling. Prerequisites: ESSM 351, AGSM 461, some other equivalent or approval from instructor, junior or senior classification. Cross-listed with GEOG 462. Prerequisites: ESSM 351 or equivalent course or instructor’s approval.

Course Grading and Composition

Grading (A: 90-100%, B: 80-89%, C: 70-79%, D: 60-69%, F: <60%)

You will earn points toward your grade. The points allotted to each focus area are listed below. In some cases, there are more points possible than the total number of points allotted to that area. This would be considered extra credit if one were to participate fully and extra credit can “spill” into other focus areas.

Labs – 20
Data project – 15
Project proposal – 15
Participation and peer review – 20
Final project and presentation – 30

Note: The data project, project proposal and final project papers are graded on writing quality, as well as the written peer reviews for each. You will get the chance to improve your quality of writing through regular feedback from the instructor and your peer-review writing group on content, style, mechanics, format, organization, and presentation of writing. The grade for each of the writing sections will be based on the final instructor and peer-reviewed product.

The Labs point breakdown - 2 pts per lab, 11 labs total.
The Participation and peer review point breakdown - 1 pt per paper or group discussion participation, role leaders
earn 1pt. 11 participations total, 2 pts for peer review data project, 3 pts peer review project proposal, 4 pts peer review final project.

The Final project and presentation point breakdown - 20 pts for paper, 8 pts for presentation, 2 pts for asking questions in peer presentations.

Course Learning Objectives

1. Explain and use the concepts and applications of geographic information systems and remote sensing (Program Learning Outcome, PLO, 1d).
   1. Define important spatial concepts such as spatial autocorrelation, spatial heterogeneity, and scale dependency.
   2. Create and manipulate point, polygon, and raster data types.
   3. Develop geoprocessing workflows for research, manager, or client.
   4. Discuss primary literature to reinforce spatial concepts and demonstrate spatial thinking.

2. Apply basic statistics concepts and methods to develop sampling designs and collect, analyze, and interpret nature resources inventory and monitoring data (PLO 1e).
   1. Demonstrate competence in spatial analyst for data manipulation and calculations.
   2. Demonstrate competence in utilizing spatial statistical tools for spatial analysis.
   3. Design, collect, and analyze data for a final project.

3. Evaluate conceptual, statistical, and quantitative ecological models and systems thinking (PLO 1f).
   1. Demonstrate the ability to read, interpret, and explain conceptual, statistical, and quantitative ecological models through discussion of primary literature.

4. Illustrate critical thinking and demonstrate problem-solving skills (PLO 5).
   1. Write a research proposal based on a problem in ecosystem science or management.
   2. Write a final project paper that requires critical thinking in development of the project, analysis, interpretation of the results, and their implications.
   3. Interpret spatial analysis and utilize spatial statistics in decision-making.

5. Demonstrate an ability to acquire, interpret, and present conclusions orally and in writing (PLO 6).
   1. Write a data project paper that demonstrates the acquisition, quality assessment, and retention of metadata specifications with data acquisition.
   2. Write a research proposal based on a problem in ecosystem science or management.
   3. Write a final project paper that requires critical thinking in development of the project, analysis, interpretation of the results, and their implications.
   4. Present the final project with visual aid in the form of a fifteen-minute conference style talk.

6. Demonstrate the ability to work collaboratively in teams and exercise leadership skills on projects (PLO 7).
   1. Work collaboratively to discover, download, and manipulate data from online.
   2. Collaboratively discuss primary literature and demonstrate leadership skills through directing an assigned aspect of the discussion.

7. Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge (PLO 9).
   1. Demonstrate the ability to discover, download, and utilize online data sources.
   2. Discuss current research topics in spatial ecosystem science and management and identify the relevant journals publishing this literature.

Class Project

The class project will be developed in three parts and it is an individual-based project. The class project should utilize GIS and spatial data in conjunction with an analysis to address a relevant science or management question. The first part of the project is the "data project" where you will discover data that are relevant and necessary to address the question at hand. The data project is due October 2, 2014. The second part of the project is the project proposal; this serves the purpose of an introduction to the project and methods to be used to address the project. A project proposal will be submitted to the instructor on or before October 20, 2014. The third part of the class project is the final project. In this part you will analyze your data, report results and discuss your findings. You will prepare your final project paper in accordance with the guidelines for publication of an identified journal. The final paper is due on or before December 9, 2014. Project results will be delivered to the class in the form of a presentation during the week of December 1-5, 2014. Presentations and results should be of high quality. It is hoped that the project results will be formally published. Citations are expected in all three parts of the class project. In addition, peer review will be an important part of project feedback and you are expected to become a competent reviewer and produce a formal peer review of a fellow student's final project, due on or before December 15, 2014.

Attendance Policy

Attendance is required for all labs, lectures and discussions. If the student must miss a class due to a university excused absence, then the student will be allowed to make up the work. The student must discuss this excused absence with the instructor determine a make up plan.
Notice

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Office of Support Services for Students with Disabilities in Room 126 of the Student Services Building. The phone number is 845-1837.

Honor Code

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Tentative Class Schedule

Online Class Schedule
Course title and number  ESSM 481 Senior Seminar (1-0) Credit 1
Term            Fall 2014
Meeting times and location  Lecture: Monday 8:00-8:50 AM; KLCT 127

Course Description and Prerequisites
Students will complete a professional e-portfolio, resume and job application; explore job search, application, and interview; write reflections describing their competency in ESSM PLOS; evaluate their degree program and faculty.

Prerequisites: Senior classification in ESSM degree program; Recommended- ESSM 201

Learning Outcomes or Course Objectives
PLO 11. Demonstrate an ability to acquire, interpret, and present conclusions orally and in writing.
- Demonstrate the ability to communicate effectively through writing, oral, and visual media.
PLO 14. Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge
- Demonstrate skills to acquire, organize and reorganize new knowledge in ePortfolio

Instructor Information
Name  M. M. Kothmann
Telephone number  Office: 979-845-5575 Cell: 979-229-7410
Email address  m-kothmann@tamu.edu
Office hours  By appointment
Office location  KLCT 119

Textbook and/or Resource Material
TEXT: There is no required text; Selected Readings will be posted on eCampus course page

GRADING                  Percent
Class attendance **       20
Portfolio                30
Resume & Cover Letter    15
PLO Reflections          25
Stewardship paper        5
Total                    100

**(Absences: 1=15, 2=10, 3=5 attendance points; ≥4 unexcused absences = course grade of F)

A = 90-100; B = 80-89; C = 70-79; D = 60-69; F < 60
COURSE POLICIES:
1. "The University views class attendance as the responsibility of an individual student. Attendance is essential to complete this course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07."
2. Assignments shall be submitted on or before the date due. Work not received by the due date is considered late. Work missed because of unexcused absences may receive a grade of zero.
3. Any student having 4 or more unexcused absences will fail. (Course grade = F) Class attendance will be determined by checking roll at the beginning of class (8:00 AM)
4. Students with excused absences must contact the instructor immediately after returning to class and schedule a date for submission of missed work or it is considered late. It is the student's responsibility to make arrangements with the instructor to make up work missed because of excused absences.

AMERICANS WITH DISABILITIES ACT (ADA)
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ACADEMIC INTEGRITY
As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section "Scholastic Dishonesty." You may also contact the Texas A&M Writing Center's website for guidance on how to avoid plagiarism: http://uwc.tamu.edu/. Allowing someone to copy your work is a violation of the Aggie Honor Code. Refer to the new office Aggie Honor System website and learn the "definitions of academic misconduct": http://aggiehonor.tamu.edu/RulesAndProcedures/HonorSystemRules.aspx#definitions
"An Aggie does not lie, cheat, or steal, or tolerate those who do."
For additional information please visit: http://aggiehonor.tamu.edu

ADDITIONAL COURSE INFORMATION
In this course you will reflect on your courses and other learning experiences and learn to identify and communicate the competencies (KSA) you have achieved. You will do this by developing both an ePortfolio and your resume. You will need to write 'reflections' to demonstrate your knowledge, skills, and abilities and to include 'artifacts' from your courses that demonstrate your KSA. These artifacts should be based on learning experiences in courses, internships, jobs, and other activities. You should identify: "What do I know?", "What can I do?", and "What personal attributes and abilities do I possess?". You will be required to write a "Stewardship" paper that will present your perspective and philosophy with respect to natural resource management and your chosen profession. All of these items should be incorporated into your ePortfolio to create a professional presentation of your KSA. We will utilize both peer review and review by instructor in the development of the components in your ePortfolio and of the ePortfolio.

Your regular participation in this course is important. Both class attendance and completion of assignments on time are important. Failure to attend class and not being prepared with assigned papers will negatively affect your grade. A primary objective for this course is to help you develop and practice important professional skills and attributes.
## LECTURE SCHEDULE

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>TOPIC</th>
<th>ASSIGNMENT</th>
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<tbody>
<tr>
<td>9/01</td>
<td>Course introduction, policies, overview, and assignments</td>
<td>Kothmann</td>
</tr>
<tr>
<td>9/08</td>
<td>Developing your ePortfolio, (Meet in SCC)</td>
<td>Kothmann</td>
</tr>
<tr>
<td>9/15</td>
<td>Writing reflections of learning experiences: Critical</td>
<td>Kothmann</td>
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<td></td>
<td>Thinking</td>
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<tr>
<td>9/22</td>
<td>Cover Letter, Resume, and job application</td>
<td>Jennifer Ann Smith</td>
</tr>
<tr>
<td>9/29</td>
<td>Review and critique of cover letter and resume</td>
<td>Paul Pausky</td>
</tr>
<tr>
<td>10/6</td>
<td>Assignment &amp; discussion of stewardship paper</td>
<td>Kothmann</td>
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<tr>
<td>10/13</td>
<td>Peer review of stewardship paper</td>
<td>Kothmann</td>
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<tr>
<td>10/20</td>
<td>Peer review of ePortfolio (meet in SCC)</td>
<td>Kothmann</td>
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<tr>
<td>10/27</td>
<td>Communication Skills (Writing, Speaking, Listening)</td>
<td>Kothmann</td>
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<tr>
<td>11/03</td>
<td>Networking and identifying options</td>
<td>Paul Pausky</td>
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<tr>
<td>11/10</td>
<td>Lifelong Learning (Sharpening the Saw)</td>
<td>Kothmann</td>
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<tr>
<td>11/17</td>
<td>Presentation of ePortfolios</td>
<td>Student presentations</td>
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<td>11/24</td>
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<td>12/01</td>
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<tr>
<td>12/08</td>
<td>Presentation of ePortfolios</td>
<td>Student presentations</td>
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## ASSIGNMENT

<table>
<thead>
<tr>
<th>ASSIGNMENT</th>
<th>Due Date</th>
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<tbody>
<tr>
<td>Submit link to ePortfolio</td>
<td>9/08</td>
</tr>
<tr>
<td>Review of Cover Letter, Resume, and job application</td>
<td>9/29</td>
</tr>
<tr>
<td>ePortfolio (for mid-semester grade)</td>
<td>10/06</td>
</tr>
<tr>
<td>Peer review of draft of stewardship paper (in class)</td>
<td>10/20</td>
</tr>
<tr>
<td>Final Stewardship paper</td>
<td>11/17</td>
</tr>
<tr>
<td>Presentation of ePortfolios</td>
<td>11/17-12/08</td>
</tr>
<tr>
<td>Final ePortfolio submission</td>
<td>12/10</td>
</tr>
</tbody>
</table>
Course title and number  ESSM 481 Senior Seminar (1-0) Credit 1
Term  Spring 2014
Meeting times and location  Lecture: Monday 8:00-9:00 AM; ANIN 317

Course Description and Prerequisites
Students will complete a professional e-portfolio, resume and job application; explore job search, application, and interview; write reflections describing their competency in ESSM PLO; evaluate their degree program and faculty.

Prerequisites: Senior classification in ESSM degree program; Recommended-ESSM 201

Learning Outcomes or Course Objectives
PLO 11. Demonstrate an ability to acquire, interpret, and present conclusions orally and in writing.
- Develop and write reflections on learning experiences
- Write a stewardship paper
PLO 14. Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge
- Explore career opportunities and required competencies
- Develop ePortfolio, Cover Letter, and Resume

Instructor Information
Name  M. M. Kothmann
Telephone number  Office: 979-845-5575 Cell: 979-229-7410
Email address  m-kothmann@tamu.edu
Office hours  By appointment
Office location  ANIN 206

Textbook and/or Resource Material
TEXT: There is no required text; Selected Readings will be posted on eCampus course page

<table>
<thead>
<tr>
<th>GRADING</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class attendance**</td>
<td>20</td>
</tr>
<tr>
<td>Portfolio</td>
<td>30</td>
</tr>
<tr>
<td>Presentation of Portfolio</td>
<td>5</td>
</tr>
<tr>
<td>Resume &amp; Cover Letter</td>
<td>15</td>
</tr>
<tr>
<td>PLO Reflections</td>
<td>25</td>
</tr>
<tr>
<td>Stewardship paper</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

** (>2 absences = 0 attendance points; ≥4 unexcused absences, course grade = F)

A = 90-100; B = 80-89; C = 70-79; D = 60-69; F < 60
COURSE POLICIES:
1. “The University views class attendance as the responsibility of an individual student. Attendance is essential to complete this course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07.”
2. Assignments shall be submitted on the date due. Work not received by the end of class on the due date is considered late. Work missed because of unexcused absences will receive a grade of zero.
3. Any student having 4 or more unexcused absences will fail. (Course grade = F) Class attendance will be determined by checking in at the beginning of class (8:00 AM)
4. Students with excused absences must contact the instructor within 1 week after returning to class and schedule a date for submission of missed work or it is considered late. It is the student’s responsibility to make arrangements with the instructor to make up work missed because of excused absences.

AMERICANS WITH DISABILITIES ACT (ADA)
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

ACADEMIC INTEGRITY
As commonly defined, plagiarism consists of passing off as one’s own the ideas, words, writings, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section “Scholastic Dishonesty.” You may also contact the Texas A&M Writing Center’s website for guidance on how to avoid plagiarism: http://uwc.tamu.edu/. Allowing someone to copy your work is a violation of the Aggie Honor Code. Refer to the new office Aggie Honor System website and learn the "definitions of academic misconduct": http://aggiehonor.tamu.edu/RulesAndProcedures/HonorSystemRules.aspx#definitions
"An Aggie does not lie, cheat, or steal, or tolerate those who do."
For additional information please visit: http://aggiehonor.tamu.edu

ADDITIONAL COURSE INFORMATION
In this course you will reflect on your courses and other learning experiences and learn to identify and communicate the competencies (KSA) you have achieved. You will do this by developing both an ePortfolio and your resume. You will need to write ‘reflections’ to demonstrate your knowledge, skills, and abilities. These will be based on learning experiences in courses, internships, jobs, and other activities and should identify what you know, what you can do, and the strengths of your personal attributes. You will also write a “Stewardship” paper that will present your perspective and philosophy with respect to natural resource management and your chosen profession. All of these items will be incorporated into your resume and ePortfolio for a professional presentation of your KSA. We will utilize peer review and review by instructor in the development of your materials.

Your regular participation in this course is important. Both class attendance and completion of assignments on time as scheduled are important. Failure to attend class and not being prepared with assigned papers will negatively affect your grade. A primary objective for this course is to help you develop and practice important professional skills and attributes.
### LECTURE SCHEDULE

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>TOPIC</th>
<th>ASSIGNMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/13</td>
<td>Course introduction, policies, overview, and assignments</td>
<td>Kothmann</td>
</tr>
<tr>
<td>1/20</td>
<td>MLK holiday- no class</td>
<td></td>
</tr>
<tr>
<td>1/27</td>
<td>Developing your ePortfolio</td>
<td>Kothmann (Meet in SCC)</td>
</tr>
<tr>
<td>2/3</td>
<td>Cover Letter, Resume, and job application</td>
<td>Kothmann</td>
</tr>
<tr>
<td>2/10</td>
<td>Review and critique of cover letter and resume</td>
<td>Jennifer Ann Smith</td>
</tr>
<tr>
<td>2/17</td>
<td>Networking and identifying options</td>
<td>Paul Pausky</td>
</tr>
<tr>
<td>2/24</td>
<td>Assignment &amp; discussion of stewardship paper</td>
<td>Kothmann</td>
</tr>
<tr>
<td>3/3</td>
<td>Writing reflections of learning experiences: Critical Thinking</td>
<td>Kothmann</td>
</tr>
<tr>
<td>3/10</td>
<td>Spring Break</td>
<td></td>
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<tr>
<td>3/17</td>
<td>Peer review of stewardship paper</td>
<td>Kothmann</td>
</tr>
<tr>
<td>3/24</td>
<td>Communication Skills (Writing, Speaking, Listening)</td>
<td>Kothmann</td>
</tr>
<tr>
<td>3/31</td>
<td>Lifelong Learning (Sharpening the Saw)</td>
<td>Paul Pausky</td>
</tr>
<tr>
<td>4/7</td>
<td>Presentation of ePortfolios</td>
<td>Student presentations</td>
</tr>
<tr>
<td>4/14</td>
<td>Presentation of ePortfolios</td>
<td>Student presentations</td>
</tr>
<tr>
<td>4/21</td>
<td>Presentation of ePortfolios</td>
<td>Student presentations</td>
</tr>
<tr>
<td>4/28</td>
<td>Class discussion of courses and critique</td>
<td>Kothmann</td>
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### ASSIGNMENT

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<thead>
<tr>
<th>ASSIGNMENT</th>
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</thead>
<tbody>
<tr>
<td>Submit link to ePortfolio</td>
<td>2/3</td>
</tr>
<tr>
<td>Draft ePortfolio (for mid-semester grade)</td>
<td>3/3</td>
</tr>
<tr>
<td>Presentation of ePortfolios</td>
<td>4/7, 14, 21</td>
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<tr>
<td>Final ePortfolio submission</td>
<td>Final ePortfolio due 4/27</td>
</tr>
<tr>
<td>Cover Letter, Resume, and job application</td>
<td>Draft due 2/10 Final submission 3/17</td>
</tr>
<tr>
<td>Peer Review and Workshop on Cover Letter and Resume</td>
<td>2/10</td>
</tr>
<tr>
<td>Draft of stewardship paper for peer review</td>
<td>3/17</td>
</tr>
<tr>
<td>Reflections for ESSM PLO 1-15</td>
<td>3/31</td>
</tr>
<tr>
<td>Final Stewardship paper</td>
<td>4/7</td>
</tr>
</tbody>
</table>
Course: ESSM 485 Directed Studies Honors (1-0) Credit 1
Term: Fall 2014
Meeting time: Lecture: T 12:45-2 PM
Location: Kleberg 26 Conference Room

Course Description and Prerequisites
Explore and understand the knowledge, skills and abilities required for varied careers within ecosystem science and management through the faculty presenters who will be joining us each week for a brief description of their research and for questions.

Learning Outcomes or Course Objectives
PLO 11: Demonstrate an ability to acquire, interpret, and present conclusions orally and in writing.
PLO 13: Demonstrate environmental stewardship and professional and ethical behavior.
PLO 14: Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge

Instructor Information
Name: Heather Janke
Telephone number: 979-862-8993 (Cell: 832-969-5958; I receive text messages)
Email address: hjanke@tamu.edu
Office hours: By appointment (send me an email)
Office location: ANIN 322A

Textbook and/or Resource Material
TEXT: Class notes available: Note presenters bring to their presentation

GRADING: Percent
Assignments: 50
Class attendance: 50 (>2 unexcused absences = 0 points)
Total: 100
ANY STUDENT RECEIVING >2 UNEXCUSED ABSENCES WILL FAIL (F)
A = 90-100; B = 80-89; C = 70-79; D = 60-69; F < 60

ATTENDANCE POLICY
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3. Students with excused absences must contact the instructor within 1 week after returning to class and schedule a date for submission of missed work or it is considered late. It is the student's responsibility to make arrangements with the instructor to make up work missed because of excused absences. Do not procrastinate!

AMERICANS WITH DISABILITIES ACT (ADA)
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Refer to the new Aggie Honor System website and learn the “definitions of academic misconduct”

“As an Aggie does not lie, cheat, or steal, or tolerate those who do.”

For additional information visit: http://aggiehonor.tamu.edu

<table>
<thead>
<tr>
<th>LECTURE</th>
<th>TOPIC</th>
<th>Info</th>
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<tbody>
<tr>
<td>1</td>
<td>9/02 Introduction</td>
<td>Heather Janke</td>
</tr>
<tr>
<td>2</td>
<td>9/9 Blue &amp; Green Water Assessment at the Continental Scale Under Current &amp; Climate Change Scenarios</td>
<td>Dr. Raghavan Srinivasan</td>
</tr>
<tr>
<td>3</td>
<td>9/16 Military Lands Management, Agrostology, and Biogeography</td>
<td>Dr. Robert Shaw</td>
</tr>
<tr>
<td>4</td>
<td>9/23 Ecosystem Ecology In An Era of Change</td>
<td>Dr. Sorin Popescu</td>
</tr>
<tr>
<td>5</td>
<td>9/30 Human Dimensions of Ecosystem Management on Private and Communal Lands</td>
<td>Dr. Jason West</td>
</tr>
<tr>
<td>6</td>
<td>10/07</td>
<td>Dr. Urs Kreuter</td>
</tr>
<tr>
<td>7</td>
<td>10/14 My Year in South America</td>
<td>Dr. Brad Wilcox</td>
</tr>
<tr>
<td>8</td>
<td>10/21 Natural Resources and International Development</td>
<td>Dr. Steve Whitenant</td>
</tr>
<tr>
<td>9</td>
<td>10/28 Hercules and the Hydra: Is rangeland restoration more effective when traditional management treatments are combined with fire?</td>
<td>Dr. William Rogers</td>
</tr>
<tr>
<td>10</td>
<td>11/04 The Fate of Aspen Woodlands in a World with Diminishing Snow Packs</td>
<td>Dr. Katy Kavanaugh</td>
</tr>
<tr>
<td>11</td>
<td>11/11 Biogeochemistry of Rangelands and Forestlands</td>
<td>Dr. Tom Bouton</td>
</tr>
<tr>
<td>12</td>
<td>11/18 Coupled Human-Ecological Systems</td>
<td>Dr. David Briske</td>
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<td>13</td>
<td>11/25 Thanksgiving Week</td>
<td>NA</td>
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<tr>
<td>14</td>
<td>12/02 Wrap Up</td>
<td>Heather Janke</td>
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ASSIGNMENTS

<table>
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<tbody>
<tr>
<td>Reflection on 9-9 lecture</td>
<td>9/16</td>
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<tr>
<td>Reflection on 9-16 lecture</td>
<td>9/23</td>
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<td>Reflection on 9-23 lecture</td>
<td>9/30</td>
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<tr>
<td>Reflection on 9-30 lecture</td>
<td>10/07</td>
</tr>
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<td>Reflection on 10-7 lecture</td>
<td>10/14</td>
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<tr>
<td>Reflection on 10-14 lecture</td>
<td>10/21</td>
</tr>
<tr>
<td>Reflection on 10-21 lecture</td>
<td>11/04</td>
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<td>Reflection on 11-4 lecture</td>
<td>11/11</td>
</tr>
<tr>
<td>Reflection on 11-11 lecture</td>
<td>11/18</td>
</tr>
<tr>
<td>Walk</td>
<td>11/25</td>
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<tr>
<td>Reflection on 11-18 lecture</td>
<td>12/02</td>
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</table>
Course: ESSM 485 Directed Studies Honors (1-0) Credit 1
Term: Fall 2014
Meeting time: Lecture: T 12:45-2 PM
Location: ANIN 229 Conference Room

Print your name
Initial each item below

I understand that my grade will be based on the following grading scheme.

A = 90-100; B = 80-89; C = 70-79; D = 60-69; F < 60

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Assignments</td>
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<tr>
<td>Class attendance</td>
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<tr>
<td>Total</td>
<td>100</td>
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</tbody>
</table>

I understand that attendance will be based on each student’s signature on the attendance roll sheet. It is your responsibility to be sure you sign the roll sheet before class. Arriving after 12:45PM will result in a reduction in my attendance grade.

I understand that Attendance grade will be calculated as described below.

<table>
<thead>
<tr>
<th>Unexcused Absences</th>
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<tbody>
<tr>
<td>0</td>
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<tr>
<td>1</td>
<td>95</td>
</tr>
<tr>
<td>2</td>
<td>90</td>
</tr>
<tr>
<td>3 or 4</td>
<td>0</td>
</tr>
<tr>
<td>&gt;4</td>
<td>F Failure for the course</td>
</tr>
</tbody>
</table>

**Late attendance (after 12:45 PM) will deduct 5 points for each ‘tardy’.]
Changing Natural Resource Policy

Course title and number: ESSM489/689 SPTP- Changing Natural Resource Policy (3-0). Credit 3
Term: Fall 2014
Meeting times and Location: Lecture T&R 3:55pm-5:10pm ANIN317

Course Description and Prerequisites

Students will study the process through which environmental policies are changed; study theories of social and political change; teams use those theories along with their original research on environmental policy problems to create and implement plans for changing environmental policies in their own communities.

Prerequisites: Junior or senior classification or approval of instructor.

Learning Outcomes or Course Objectives

PLO 7: Design management strategies for restoring and sustaining ecosystem goods and services and adaptive management concepts.
PLO 8: Interpret socio-economic and business environments relevant to ecosystem management.
PLO 9: Assess past, present, and future policy options relevant to ecosystems.
PLO 10: Illustrate critical thinking and demonstrate problem solving skills.
PLO 11: Demonstrate an ability to acquire, interpret, and present conclusions orally and in writing.
PLO 12: Demonstrate the ability to work collaboratively in teams and exercise leadership skills on projects.
PLO 13: Demonstrate environmental stewardship and professional and ethical behavior.
PLO 14: Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge.
PLO 15: Demonstrate civic responsibility and global citizenship

Instructor Information

Name: Dr. Forrest Fleishman
Telephone number: 979-862-1071 Office (please note that email is preferred)
Email address: Forrestf@tamu.edu
Office hours: Wednesday & Thursday, 1:30-3:30 pm or by Appointment
Office location: 310 HFSB
Assessment, Grading & Course Structure

During the first week of the class, students will participate in a facilitated brainstorming exercise, in which they will self-select into teams of 4-6 students who will work together for the remainder of the semester to develop and implement a plan to change an environmental policy of their choosing. Students will be guided towards focusing on problems which are tractable within the limits of a semester: Solving global warming is probably not tractable in a semester, but changing the way energy is used on campus may be.

Assessment for undergraduates will be divided up into individually-based assessment and team-based assessment. Individual assessment will focus on weekly reading responses and/or reflections on the learning process, due 3 hours before the week’s first class (12 in total, plus one final reflection for 13). Team assessments will assess the quality of team-produced outputs including (a) a problem statement (b) an action plan, and (c) a report on the action taken. All three of these will require both written & oral presentation. Students will have an opportunity to grade their peers, and this will be used to adjust individual grades (i.e. a portion of the grade for each team assignment will be assigned by peers).

Grading Policies

The points in the course will be assigned as follows for undergraduates

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Number of Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly reading responses/reflections (12 worth 25 points each)</td>
<td>300</td>
</tr>
<tr>
<td>Written Problem statement</td>
<td>125</td>
</tr>
<tr>
<td>Problem statement presentation</td>
<td>50</td>
</tr>
<tr>
<td>Written Action Plan</td>
<td>175</td>
</tr>
<tr>
<td>Action plan presentation</td>
<td>50</td>
</tr>
<tr>
<td>Written report on action taken</td>
<td>225</td>
</tr>
<tr>
<td>Action taken presentation</td>
<td>50</td>
</tr>
<tr>
<td>Final Reflection</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1025</strong></td>
</tr>
</tbody>
</table>

Grading Scale:
- 900-1025 = A
- 800-899 = B
- 700-799 = C
- 600-699 = D
- Below 599 = F

Note that there are 25 “extra points” in this grading scale, effectively allowing students to drop one reading response, should they feel confident in gaining the other points in the class. In the unusual case that a student has a grade between the 99 and the 00 (eg. 899.4), conventional rounding rules will be followed (i.e. 899.4 is rounded down to 899, a B, 899.5 will be rounded up to 900, an A)

Graduate students have an additional assignment to conduct a background research paper on their group topic examining the political background of the issue. This will be worth an additional 400 points, and final grades will be calculated on a percentage basis, i.e. above 90% is an A, above 80% is a B, above 70% is a C, above 60% is a D. Further details of this research-based assignment will be distributed during the first week of class.
Attendance and Late Work Policy

Students are expected to attend class regularly, participate actively in in-class activities, including both full-class discussions and small-group project work, and submit assignments on time. Students who do not attend class regularly, or who attend but do not actively participate, will be through limited participation in group projects & discussions that will contribute to group and individual grades. Prompt completion of work in this class is important. Students who hand in assignments after the time it is due will receive 50% credit for the assignment if completed and handed in within 24 hours of the due date, after which it will receive a zero. I will grant extensions only in extenuating circumstances, and only if you contact me before the due date for the assignment. Please note that the grading rubric contains 25 “extra points”, effectively allowing students to drop one reading response for the term without penalty. Late work will be accepted in the case of a University Excused Absence with no penalty. There will be no makeup for missed exams, except in the case of an University Excused Absence. The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at http://student-rules.tamu.edu/rule07.

Textbook and/or Resource/Reading Material

All readings apart from the course textbooks will be posted on eCampus. One textbook is required for all students: Graham, B. H. C. (2010). America, the owner's manual: making government work for you. Washington, D.C.: CQ Press. Please note that you may be able to find very inexpensive used copies of this book online.

Graduate Students (those enrolled in ESSM 689), are recommended to obtain Theories of the Policy Process. A new 3rd edition, edited by Paul Sabatier & Chris Weibe, came out this summer, and I have not been able to obtain a copy yet, so I am not requiring this text, but I do suggest that it would be very useful for your research papers.

Other Pertinent Course Information

You are allowed to use electronic devices during class time for appropriate purposes (i.e. writing, working with students). Inappropriate use of electronic devices (i.e. for purposes not related to the class) is disrespectful and disruptive. If inappropriate use is frequent, this privilege will be suspended.

Americans with Disabilities Act (ADA)

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Academic Integrity

You are expected to follow the Aggie Honor code. For additional information please visit:
http://aggiehonor.tamu.edu “An Aggie does not lie, cheat, or steal, or tolerate those who do.”
Course Outline

Week 1 (Sept 1-7): Course Introduction, topic brainstorm

Week 2 (Sept 8-14): Overview of approaches to policy change (part 1)

Week 3 (Sept 15-21): Overview of approaches (part 2)


Week 6 (Oct. 6-12): Communication & its limits. 1st draft of graduate student background papers due October 7th.
*Professor Fleischman will likely be out of town at a conference this week. If so, students should use class time to prepare

Week 7 (Oct 13-19): Political Strategies. Strategy presentations in class


Week 9 (Oct 27-Nov 2): Environmental social movements.

Week 10 (Nov 3-9): Grassroots social organizing
• Possible guest lecture by Thomas Heberlein on Nov. 4th

Week 11 (Nov 10-16): Nonviolent direct action (1)
• Thoreau, H.D. *Civil Disobedience*

Week 12 (Nov 17-22): Nonviolent Direct Action (2)

Week 13: (Nov 24-30): Thanksgiving break: No class

Week 14: (Dec 1-7): Presentations of action

Week 15: LAST DAY OF CLASS: DEC. 9 Action write-ups due. Final reflections due. Final papers due for graduate students on last day of classes at midnight.
ESSM 600

PRINCIPLES OF ECOSYSTEM SCIENCE AND MANAGEMENT

M-W-F 9:10-10:00 AM

INSTRUCTOR:  Dr. Thomas W. Boutton
Department of Ecosystem Science & Management

OFFICE:  ANIN Room 419 (Office Hours M-W-F 10 AM -12 noon)

PHONE:  845-8027

E-MAIL:  boutton@tamu.edu

HOME PAGE:  http://agrilife.org/boutton/

COURSE DESCRIPTION:

This course reviews the principles of ecology that are fundamental to the development of sustainable land use systems, and examines contemporary land use practices and their ecological significance in the major ecosystems of the world. First, the importance of ecosystems and the services they provide to human society will be identified and discussed. Then, basic ecological principles critical to man's sustainable use of ecosystems will be reviewed. Emphasis is placed on ecosystem processes that also have significance at landscape, regional, and global scales. Finally, current land use practices and issues in forests, rangelands, croplands, and wetlands will be covered.

LEARNING OUTCOMES AND OBJECTIVES:

1) Be able to define the ecosystem concept and understand where ecosystems fit into ecological hierarchy.

2) Develop an in-depth knowledge of some of the most fundamental aspects of ecosystem science (energy flow, biogeochemistry, succession, and the role of disturbance).
3) Be able to describe how ecosystem processes are linked to other portions of the ecological hierarchy and other spatial and temporal scales.

4) Be able to document how land cover/land use changes alter and interact with ecosystem structure and function in grassland, forest, agricultural, wetland, and urban ecosystems.

5) Develop an understanding of some of the key environmental problems associated with land uses in grassland, forest, agricultural, wetland, and urban ecosystems.

6) Develop an awareness of ecosystem management practices that can mitigate and restore systems that have been affected adversely by human activity.

EVALUATION PROCEDURES:

(1) 2 exams worth 100 points each
(2) participation in class discussions
(3) presentation of an independent research project, 150 points

COURSE MATERIALS:

Assigned readings and class notes are available on e-Campus: http://ecampus.tamu.edu/

AMERICANS WITH DISABILITIES ACT (ADA) POLICY STATEMENT:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

ACADEMIC INTEGRITY STATEMENT:

"An Aggie does not lie, cheat, or steal or tolerate those who do."

For more information see the Honor Council Rules and Procedures on the web at: http://www.tamu.edu/aggiehonor
I. ECOLOGY AND LAND USES

A) The contemporary context

1) ecosystems and the services they provide
2) human appropriation of ecosystem services via land uses
3) consequences of human land use from ecosystem to global scales
4) the need for sustainability of land uses

II. THE SCIENCE OF ECOLOGY: KEY CONCEPTS FOR LAND USERS

A) Introduction

1) what is ecology?
2) significance of space and time (scaling)
3) ecology in relation to land use
4) ecology and natural resources

B) The ecosystem concept

C) Ecological energetics

1) laws of thermodynamics
2) qualities of solar energy
3) energy budget of earth-atmosphere system
4) productivity/decomposition
5) food chains and food webs
6) human modification of biological and physical aspects of energy flow

D) Biogeochemistry and nutrient cycling

1) nutrients essential for life
2) general characteristics of nutrient cycles
3) hydrologic cycle
4) carbon cycle
5) nitrogen cycle
6) nutrient cycles, climate, and global change

E) Succession

1) development of succession concept
2) primary and secondary succession
3) changes in ecosystem function during succession
4) past and present thoughts on the climax concept
5) contemporary models of mechanisms of succession
6) significance of succession to land use systems

F) Disturbance as an Ecosystem Characteristic

1) properties of disturbances - frequency, intensity, scale
2) influence on ecosystem structure and function
3) impact on biodiversity
4) role of disturbance in land management

G) Soils and their properties

1) components of the soil
2) soil formation
3) soil texture
4) soil profiles
5) major soil types
6) soil erosion and soil conservation

H) Landscape ecology

1) structure, function, and dynamics of landscapes
2) landscape elements and their interactions
3) role of geomorphology in landscape ecology
4) landscape ecology and land management

I) Principle biomes of the world

1) geographic distribution of biomes
2) characteristics - plants, animals, soils
3) slide show of major biomes

III) LAND USES IN DIFFERENT ECOSYSTEM TYPES

A) Land uses in forestlands

1) geographic distribution
2) forest types and major species
3) types of land use on forestland
4) forest management
   a) site quality and site indices
   b) rotation
   c) methods of harvest
   d) effects of harvesting on nutrient cycling and hydrology
B) Land uses in rangelands

1) geographic distribution
2) rangeland types
3) types of land use on rangelands
4) management of rangelands
   a) range site concept
   b) range condition concept
   c) controversy surrounding range condition
   d) range trend
   e) grazing systems

C) Land uses in agricultural ecosystems

1) concept of sustainable agriculture
2) significance of tillage systems
3) impacts on watersheds

D) Land use in wetlands

1) varieties of wetlands and their occurrence
2) ecological significance of wetlands
3) current land use practices in wetlands

E) Land uses in urban ecosystems

1) comparison of natural vs. urban ecosystems
2) physical and biotic characteristics of the city
3) ecosystem processes in the city
4) urban ecology as a planning approach
5) social ecology

F) Restoration ecology

1) the degraded system as an alternative state
2) feedbacks that increase resilience in degraded systems
3) overcoming constraints to restoration
4) goals, trajectories, evaluation criteria
Objectives:
Complex and unprecedented changes within the earth system require that novel conceptual frameworks for sustainable development, alternative approaches of knowledge production, and innovative social institutions be developed and implemented to support effective stewardship. This course explores these emerging frameworks and their application within the context of resilience and social ecological systems. Adaptive management, social learning and flexible, decentralized institutions will be emphasized as key elements of effective stewardship. Post-normal science will be explored as a means of knowledge production to contend with conditions of high uncertainty, incomplete knowledge, and urgent, high-stakes decisions. The implementation and value of resilience-based stewardship will be investigated in diverse ecosystems including forests, rangelands, agro-ecosystems, oceans, and built environments.

Learning Outcomes:
Course completion will contribute to the following learning outcomes:
- Greater insight into the meaning and value of resilience, sustainability, and vulnerability frameworks.
- Describe the importance of social-ecological systems to continued provisioning of ecosystem services and human well-being.
- Appreciate the need for novel approaches and methodologies to contend with unprecedented changes in the Earth system.
- Understand the critical contributions of social institutions and governance systems to navigate change and promote stewardship.
- Learn how to apply and interpret resilience-based management in diverse ecological and social systems.
- Identify the skill sets and perspectives that are needed for successful application of ‘resilience thinking’.

Instructor:
Dr. David D. Briske
Ecosystem Science and Management
Animal Industries Building (ANIN), Room 328
Phone: 979-845-5581
Email: dbriske@tamu.edu

Meeting Time and Location:
Wednesday 1:50 – 3:40 pm; Animal Industries Building, Room 133

Text and Reading Assignments:

Prerequisites:
RENR 205 – Fundamentals of Ecology - or an equivalent ecological background.
Educational Approach:
The course is founded on collaborative learning emphasizing discussion of the text and assigned readings. Each section will begin with a brief overview, followed by group discussion, and will conclude with a summary of major take home messages. Students will be required to provide discussion questions for assigned readings prior to class and to conduct in-depth discussions of them. The instructor will post 2-4 synthesis questions to guide on-line discussion of the major taken home messages of the assigned readings at the end of each week. Students will be expected to post one direct response, and one response a subsequent student posting. Class discussions will be student led in the second half of the course to address section VIII – Case Studies and Applications.

Learning through Discussion:¹
Discussion is the prototypic teaching method for active learning. Research has established that memory is affected by how deeply we process new knowledge. Elaboration of knowledge by explaining, questioning, and summarizing contributes to greater cognitive learning and critical thinking skills. Students have been shown to be more attentive and think more deeply in a discussion than in a more passive learning format.

Benefits of learning through discussion:
- Practice critical thinking
- Evaluate logic and evidence
- Engage in collaborative learning
- Receive immediate feedback from peers
¹Excerpt from ‘McKeachies’s Teaching Tips. 2011, 13th Ed., Wadsworth’.

Evaluation Procedures:
Evaluation will be based on a combination of in-class exams, take-home assignments, and class participation. Exams will consist of definition, short-answer, and essay questions. Take-home assignments will emphasize interpretation, synthesis and application of course content to specific social-ecological systems of interest. Class participation requires that students read assigned material before each class period and actively participate in class discussions. A reflective essay will enable students to interpret and present their class experience at the end of the course.

<table>
<thead>
<tr>
<th></th>
<th>Points</th>
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<tbody>
<tr>
<td>Mid-term Exam</td>
<td>100 points</td>
</tr>
<tr>
<td>Final Exam</td>
<td>100 points</td>
</tr>
<tr>
<td>Take-home Assignments (2)</td>
<td>200 points</td>
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<tr>
<td>Reflective Essay</td>
<td>50 points</td>
</tr>
<tr>
<td>Class Presentation</td>
<td>50 points</td>
</tr>
<tr>
<td>Class Participation</td>
<td>50 points</td>
</tr>
<tr>
<td>Total Points</td>
<td>550 points</td>
</tr>
</tbody>
</table>

Grade Distribution:
- A=90%
- B=80-89%
- C=70-79%
- D=60-69%
- F=0-59%
Participation Rubric:
Written questions submitted for class discussion and verbal responses in-class are intended to address the central themes of the reading, stimulate group discussion, and promote greater understanding of the content. On-line discussions are to clarify uncertainty, provide insightful analysis or synthesis, and reinforce take home messages.

Questions and responses will be evaluated as follows:
1. No contribution; minimal knowledge of content or concept
2. Minimal contribution; aware of topic and content
3. Substantial contribution; contributes to engagement and learning
4. Major contribution; motivates class and promotes understanding

Make-Up Examinations and Late Assignments:
Make-up examinations and late assignments will be accepted only when students present a documented University-excused absence within 1 week of the scheduled exam or assignment (see TAMU Regulations).

Attendance:
Regular class attendance is expected and will be evaluated as a component of class participation. Students who consistently attend class attain the highest performance.

Americans with Disabilities Act
The Americans with Disabilities Act (ADA) provides comprehensive civil rights protection for persons with disabilities. Contact the Department of Student Life in Room B118 in Cain Hall (845-1637) for information.

Academic Integrity Statement
Upon admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code and the rules of the Honor System.
I. Challenges to the Earth System (Chapter 14)
   1. Human population growth
   2. Industrialization and global change
   3. Human cognition and governance
   4. The Anthropocene

II. Resilience & Social-ecological Systems (Chapter 1)
   1. Resilience, sustainability and vulnerability
   2. Resource management models
   3. Thresholds and alternative states
   4. Linking social and ecological processes
   5. Adaptive cycles and panarchy

III. Ecosystem Services (Chapter 2)
   1. Broad categories
   2. Valuation methods
   3. Managing tradeoffs

IV. Adaptive Co-management (Chapter 4)
   1. Adaptive governance
   2. Knowledge sources
   3. Adaptive and social learning
   4. Adaptive management

V. Navigating System Change (Chapters 5)
   1. Vulnerability
   2. Adaptability
   3. Resilience
   4. Transformability

VI. Policy-relevant Science (Chapter None)
   1. Low uptake of scientific knowledge
   2. Creating usable science
   3. Post-normal science

VII. Case Studies and Applications
   1. Forests (Chapter 7)
   2. Rangeland/Drylands (Chapter 8)
   3. Oceans (Chapter 10)
   4. Agro-ecosystems (Chapter 12)
   5. Urban environments (Chapter 13)

VIII. Application of Resilience-based Stewardship (Chapter 15)
   1. Resilience thinking
   2. Necessary skill sets
   3. Social capital and learning are vital
The Research Process (ESSM 605)
Fall 2013

Instructor:
Jianbang Gan
311 Horticulture/Forest Science Bldg.
Phone: 862-4392
Email: j-gan@tamu.edu

Schedule:
Class: 10:20-11:10 a.m. MW, HFSB 303
Office: 1:00-4:00 p.m. MW or by appointment

Prerequisite:
None

Course Description:
Nature and objectives of graduate work, the scientific method and basic and applied research. Introduction to design of experiments and analysis of data; principles of organization of project proposals, theses and scientific reports.

Course Objectives:
(1) To introduce students to the philosophy of science and the research process; and
(2) To provide students with hands-on experience in developing research ideas and proposals.

Learning Outcomes:
(1) Discuss the philosophy of science, critical thinking, and research ethics;
(2) Describe the research process and its applications;
(3) Develop a research proposal; and
(4) Demonstrate the ability to critically review research proposals, to discuss/communicate assessments of research ideas and findings, and to write theses and scientific papers.

Textbook:

Topics and Assignments:
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Reading Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction and overview</td>
<td>Selected readings</td>
</tr>
<tr>
<td>2</td>
<td>Science and scientific discovery</td>
<td>Selected readings</td>
</tr>
</tbody>
</table>

Philosophy of science
*** Identify and discuss TWO most important scientific discoveries or technological advances (in your opinion) in your or related field (what, who, when, how, and why) ***

### Critical thinking

<table>
<thead>
<tr>
<th>3</th>
<th>Critical/scientific thinking</th>
<th>Creative thinking</th>
<th>Selected readings</th>
</tr>
</thead>
</table>

### Research proposals

<table>
<thead>
<tr>
<th>4</th>
<th>Research proposal development</th>
<th>Funding sources</th>
<th>Selected readings</th>
</tr>
</thead>
</table>

*** Write a research proposal summary ***

<table>
<thead>
<tr>
<th>5</th>
<th>Library skills (guest lecture by librarian)</th>
<th>Selected readings</th>
</tr>
</thead>
</table>

*** Research proposal summaries due ***

<table>
<thead>
<tr>
<th>6</th>
<th>Presentation, review, and revision of proposal summaries</th>
<th>*** Start to develop a full research proposal based on the approved summary ***</th>
</tr>
</thead>
</table>

### Research process

<table>
<thead>
<tr>
<th>7</th>
<th>Research as a way of knowing</th>
<th>Ch. 1-2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Research tools</td>
<td>Selected readings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8</th>
<th>Research problems and variables</th>
<th>Ch. 3-5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Defining a research problem</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Selecting variables and variable’s measurements</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9</th>
<th>Research design</th>
<th>Ch. 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Types of research designs and how to choose</td>
<td>Selected readings</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10</th>
<th>Data collection</th>
<th>Ch. 7-8</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Data gathering methods</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Problems of measurements</td>
<td></td>
</tr>
</tbody>
</table>

*** Research proposals due ***

*** Assignment of proposal reviews to students ***
11 Analysis, interpretation, and presentation  
   Data analysis  
   Drawing conclusions  
   Writing theses/dissertations and research papers  

12 Ethics in science (Case studies)  

*** Individual proposal reviews due ***  

13-14 Simulations of proposal review panel meeting/discussion  
(Each student will lead the discussion of one proposal and the development of its pane review summary)  

*** Panel review summaries due ***  

15 Proposal revision  

*** Final/Revised research proposals due ***  

**Grading:**  
Students in this course are required to: 1) develop a research proposal, 2) present the research proposal in the class at the end of the semester, and 3) review research proposals developed by classmates. Grades will be determined using the following weights and grading scale:  

**Weights:**  
- Summary of research proposal: 20%  
- Research proposal: 50%  
- Class participation/discussion and proposal review: 30%  

**Grading Scale:**  
- A: 90-100%  
- B: 80-89%  
- C: 70-79%  
- D: 60-69%  
- F: < 60%  

All assignments should be turned in at the time specified by the instructor. Late submissions will be discounted at a 25% daily rate. Proposal summaries, full proposals, and student presentation will be evaluated by both students and the instructor. Proposals will be evaluated based on scientific merits and quality of writing. The evaluation forms will be provided.  

Attendance at each session including lectures, class discussion, and student presentation is expected. The official regulations concerning incompletes are: “The instructor shall give this grade only when the deficiency is due to an authorized absence or other cause beyond the control
of the student.” For more information on the Student Rules regarding Academics visit http://student-rules.tamu.edu.

Guidelines for Research Proposals:
Research proposals should follow the USDA NRICGP, NSF, or NIH format. The proposal should include a title, a project summary/abstract, and narrative descriptions (background and signification, previous experience/preliminary data, applicant credentials, objectives, hypotheses, specific arms/activities, methodology, expected results, pitfalls and remedies, and completion schedule). Budgets and collaboration arrangements are not required, but welcome. The proposal should be typed and printed on 8.5x11” white paper with 1” margins and appropriate line spacing. Choose a readable type style, preferably 12 point Times Roman. All pages, except the cover, should be numbered consecutively. The description part of the proposal should not exceed 15 pages.

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Academic Integrity Statement and Policy
ESSM 610
RANGELAND RESOURCE MANAGEMENT
Spring 2014

Instructors:
Wayne Hamilton, Room 213D, Animal Industries Building
Phone: Office 979-845-5589, Fax 979-845-6430, Cell 979-229-8418 and email:
wt-hamilton@tamu.edu

Dr. Doug Tolleson, University of Arizona, V – V Ranch, Cottonwood, AZ.
Phone: Office 928-554-8990, Fax 928-554-8996, Cell 928-821-3222 and email:
dougt@cals.arizona.edu

The class is offered as a distance education class only. All registered students will take the
course via the internet (ecampus).

Textbook and Class Materials:
Grazing Management: An Ecological Perspective
R. Heitschmidt and J. W. Stuth (Editors)
For hard copy: Timber Press, 9999 S.W. Wilshire, Portland, Oregon 97225

Range Management: Principles and Practices
J.L. Holechek, Rex D. Pieper and Carlton H. Herbel, 3rd Edition or latest
Prentice Hall, Inc

Additional reading materials may be provided and/or assigned.

Catalog Description:

Basic concepts and theories of rangeland management. Techniques in range classification,
grazing management and improvement practices. Prerequisites: Graduate classification in
agriculture or related subject matter areas.

Course Objectives:

1. Develop a basic understanding of the history and major principles of range management.
2. Develop an understanding of the application of the most important field methods used in
range inventory and analysis and to familiarize students with range improvement
practices for multiple objectives.
4. Stimulate interest in the art and science of rangeland management and future trends of
human impact on rangelands worldwide.

Course Grading:

There will be 2 exams (mid-semester and final) that count 40% each, or 80% of the total course
grade. Other quizzes, assigned projects/papers/exercises will comprise 20% of the course grade.
ESSM 610
Lecture Schedule Spring 2013

(This is a distance education course. You will need to access the weekly lecture and other assignments on the internet. Mrs. Maria Martinez (mamartinez@ag.tamu.edu) will assist you if you have problems accessing any of the materials during the semester)

<table>
<thead>
<tr>
<th>Week of:</th>
<th>Date</th>
<th>Topic</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>13</td>
<td>Introduction and Orientation/Rangelands Defined</td>
<td>Hamilton</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>Range Plant Physiology/Morphology</td>
<td>Hamilton</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>Ecological Principles/ Ecological Sites</td>
<td>Hamilton</td>
</tr>
<tr>
<td>February</td>
<td>3</td>
<td>Nutritional Ecology of Rangeland Herbivores</td>
<td>Tolleson</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Nutritional Monitoring of Rangeland Herbivores</td>
<td>Tolleson</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Rangeland Forage Inventory</td>
<td>Hamilton</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Forage Management/Stocking Rates</td>
<td>Hamilton</td>
</tr>
<tr>
<td>March</td>
<td>3</td>
<td>Mid-term Exam</td>
<td>Hamilton/Tolleson</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Spring Break (no new lecture material introduced)</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>Vegetation Manipulation/PestMan DSS</td>
<td>Hamilton</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>Rangeland Grazing Systems</td>
<td>Tolleson</td>
</tr>
<tr>
<td></td>
<td>31</td>
<td>Rangeland Management on Public Lands</td>
<td>Tolleson</td>
</tr>
<tr>
<td>April</td>
<td>7</td>
<td>Rangeland Management during drought</td>
<td>Hamilton</td>
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<tr>
<td></td>
<td>14</td>
<td>Rangeland Watersheds – Dynamics and Significance</td>
<td>Wilcox</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Wildlife considerations in rangeland management</td>
<td>Hamilton</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>No new lecture material introduced</td>
<td>NA</td>
</tr>
<tr>
<td>May</td>
<td>5</td>
<td>Final Exam will be posted on May 1 and will be due back to instructors by email NLT 5:00pm May 6. Assignments not previously submitted are also due.</td>
<td>Hamilton/Tolleson</td>
</tr>
</tbody>
</table>

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Academic Integrity Statement and Policy

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COURSE SYLLABUS – Spring 2014
ESSM 611—GRAZING MANAGEMENT AND RANGE ANIMAL NUTRITION

M. M. Koithmann, Office 845-5575, Cell 229-7410, m-koithmann@tamu.edu
Office: Animal Industries 206, Office hours by appointment or any time I am present. You are welcome to ‘drop-in’ or email me to schedule an appointment.

Prerequisite: Graduate classification

Outline of Course Topics
- Management of the interactions of rangeland plants and animals.
  - Principles of plant growth.
  - Principles of plant succession and community function.
- Principles and concepts for grazing management.
  - Manipulation of season, frequency, and intensity of grazing.
  - Use of fire to manage plant communities.
- Linking grazing methods to vegetation management and animal nutrition.
- The carrying capacity concept and management of stocking rates.
- Plant characteristics that determine forage quality.
- Forage preferences/diet selection of different kinds and classes of herbivores.
- Concepts for nutritional ecology of herbivores:
  - Anatomical, physiological, and metabolic characteristics of herbivores,
  - Diet selection, intake, digestion, metabolism, and assimilation of nutrients from grazed forages and supplements.
- Principles of nutritional management:
  - Supplementation of grazing animals for maintenance, growth, lactation, and reproduction.

Learning Outcomes
At the completion of this course, you should be able to:
1. Describe key morphological and physiological processes of plant growth and development that are important to grazing management. Understand the interactions of grazing and environmental conditions on plant growth.
2. Describe plant community responses to grazing and fire on range and pasture lands.
3. Describe concepts and principles for different grazing management methods.
4. Describe the concept of carrying capacity and explain how it relates to animal production and the management of stocking rates and grazing systems on range and pasture lands.
5. Identify and describe the concepts and variables incorporated into The Grazing Manager and how TGM is used to plan and monitor grazing management.
6. Describe chemical and morphological factors that affect forage quality and anti-quality.
7. Describe anatomical characteristics of animals that affect diet selection, digestion and intake.
8. Describe the principles of nutritional ecology (diet selection, digestion and passage through the GI tract) in relation to forage intake.
9. Understand concepts and principles for effective supplementation of grazing animals.
10. Analyze, evaluate, and recommend alternative grazing management methods with respect to the expected vegetation and animal responses.
11. Recommend supplementation practices with respect to the expected animal responses.

Learning Approach
You will utilize independent reading and on-line class discussions to develop individual synthesis reports, which you will submit on-line each week. You are expected to read the assigned papers, participate each week in on-line discussions, and submit the weekly assignments on time. There will be no exams. Assignments will be submitted on-line in Vista. Grading will be based on accuracy, completeness, and evidence of critical thinking. Your grade in this course will depend upon regular participation in on-line discussions and completing weekly assignments on-time.

Page 1
Text: Selected readings posted on eCampus course page

Grading: A 90-100%; B 80-89%; C 70-79%; D 60-69%; F <60%
- 30% Discussion
- 70% Synthesis Papers

Penalty for Late Submission of Papers
Assignments not submitted by the ‘Due Date’ listed, without prior approval of the instructor, will be subject to a 10% late penalty.

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As a student at Texas A&M University, it is your duty to know and live by the Aggie Honor Code. For details, please refer to the Honor Council Rules and Procedures on the web at www.tamu.edu/aggiehonors

Plagiarism
Plagiarism consists of passing off as one’s own the ideas, words, writings, etc., which belong to another. You are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Evidence of plagiarism will result in an automatic null mark (ZERO) for the assignment or test. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section “Scholastic Dishonesty.”

Additional Information
Course materials will be delivered through eCampus. Papers will be organized into 13 weekly modules that correspond to the course schedule. Reference papers and other instructional materials will be posted in modules for each of the 13 weeks. A discussion thread will be started by the instructor each week. Each student will be expected to contribute to each discussion thread and contributions will be evaluated. Postings should focus on questions and comments related to the reference papers for that week. Each student will submit a synthesis paper at the end of each week based on questions posted by the instructor. The synthesis paper will summarize the key concepts and principles for the weekly topic. The course grade will be based on the weekly student submissions to the online discussions and the synthesis papers. There will be 13 grades for weekly discussion and 13 grades for the synthesis papers.
## ESSM 611 COURSE SCHEDULE

Dr. M. M. Kothmann; m-kothmann@tamu.edu; 979-229-7410; ANIN 206

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Due Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/13</td>
<td>Course introduction; methods, materials, and procedures</td>
<td>1/19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Forage class, species, plant part</td>
<td>1/20</td>
</tr>
<tr>
<td>2</td>
<td>1/20</td>
<td>Plant Growth and Development</td>
<td>1/26</td>
</tr>
<tr>
<td>3</td>
<td>1/27</td>
<td>Plant Community Dynamics</td>
<td>2/2</td>
</tr>
<tr>
<td>4</td>
<td>2/3</td>
<td>Grazing methods</td>
<td>2/9</td>
</tr>
<tr>
<td>5</td>
<td>2/10</td>
<td>Carrying capacity and stocking rates</td>
<td>2/16</td>
</tr>
<tr>
<td>6</td>
<td>2/17</td>
<td>The Grazing Manager</td>
<td>2/23</td>
</tr>
<tr>
<td>7</td>
<td>2/24</td>
<td>Analysis of Grazing Plans</td>
<td>2/24</td>
</tr>
<tr>
<td>8</td>
<td>3/3</td>
<td>Forage characterization: Anti-quality factors, Chemical composition</td>
<td>3/2</td>
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<tr>
<td>9</td>
<td>3/17</td>
<td>Anatomy of the gastro-intestinal tract of large ungulates;</td>
<td>3/16</td>
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<td></td>
<td></td>
<td>Foraging strategies</td>
<td>3/17</td>
</tr>
<tr>
<td>10</td>
<td>3/24</td>
<td>Diet selection (palatability, preference, selection)</td>
<td>3/30</td>
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<tr>
<td>11</td>
<td>3/31</td>
<td>Forage &amp; nutrient intake</td>
<td>3/31</td>
</tr>
<tr>
<td>12</td>
<td>4/7</td>
<td>Nutritional management: Supplementation and Grazing management</td>
<td>4/6</td>
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<tr>
<td>13</td>
<td>4/14</td>
<td>Analyze and evaluate scenarios for grazing management and supplementation with respect to vegetation and animal responses.</td>
<td>4/20</td>
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<td>4/21</td>
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ESSM 612
RANGELAND VEGETATION MANAGEMENT
An Elearning Class

INSTRUCTOR: Wayne Hamilton: (979) 845-5589
Room 130E, Suite 130 Centeq building B
Email: wt-hamilton@tamu.edu
Secretary: (979) 845-7331
Email: aja8785@tamu.edu

Course Objectives:

1. Develop students' technical background relative to selection and application of range improvement practices involving manipulation of vegetation for multiple land uses and management goals.

2. Develop students' ability to project vegetation and animal responses from grazing and brush and weed management, integrate brush management with resource use objectives, and analyze economic feasibility.

3. Familiarize students with computer-based decision aids for strategic and tactical planning of vegetation manipulation and management systems.

4. Acquaint students with selected current field research in grazing and brush and weed management methods and management systems. Familiarize students with the most prevalent problem woody plant species in Texas and field methods for measuring woody plants and estimating their influence on forage production.

5. Require students to demonstrate the capability to utilize and incorporate the above course materials into problem solving via an assigned term project and paper.

Topical Outline:

I. Course Outline and course orientation. Background and sources of problems associated with vegetation changes on western rangelands.

II. Alternative methods for management of problem range vegetation, plant and animal responses and research application.
   A. Mechanical
   B. Chemical
   C. Biological
   D. Burning
III. Integrated brush management systems - concepts, development, implementation and monitoring.

IV. Brush management and multiple resource uses, including livestock grazing, watershed, wildlife, recreation, and nature-based tourism.

V. Techniques and considerations for economic analysis of brush management.

VI. Computer software to facilitate selection of brush management technology.

VII. Problem assignments.

Course Grading:

A midterm exam will be administered and there will be a final exam. A term paper is required. Subject matter for term projects/papers will be assigned by the instructor.

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm exam</td>
<td>40%</td>
</tr>
<tr>
<td>Term project/paper</td>
<td>20%</td>
</tr>
<tr>
<td>Final exam</td>
<td>40%</td>
</tr>
</tbody>
</table>

100%

The following texts will be used as references in the course:


The above listed are available at the Texas A&M University Press at a discount price. Additional readings and/or notes will be provided in class or made available at a copy center for purchase.

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit [http://disability.tamu.edu](http://disability.tamu.edu)

Academic Integrity

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PLANT AND RANGE ECOLOGY

Ecosystem Science and Management 620

Syllabus/Course Outline

The Space/Time Continuum in Ecological Systems and Their Interactions.

ASSEMBLED BY:

Dr. Fred E. Smeins
Department of Ecosystem Science and Management
Texas A&M University
College Station, Texas 77843
(Fall 2014)
PLANT AND RANGE ECOLOGY
Ecosystem Science and Management 620
(Fall 2014)
(T, TH 12:45-2:00; Room 133 ANIN)

INSTRUCTOR: Dr. Fred E. Smeins
Department of Ecosystem Science and Management
Room 130D, Centeq Building
845-5573
f-smeins@tamu.edu

COURSE DESCRIPTION:
Investigation of community/ ecosystem/ landscape distribution patterns, structure, spatial/temporal organization and function, paleoecology, ecological succession, disturbance regimes, ecological diversity and classification schemes. North America rangeland (grasslands, shrublands, deserts, wetlands, etc.) stressed but world ecosystems reviewed.

PREREQUISITES:
RENR 205; RENR 215 or equivalent; graduate classification.

LEARNING OUTCOMES
- Able to locate and characterize the ecological features of major rangeland regions of North America and the world.
- Capability to assess climate/weather, soil/ geology, topography and land use as they interact to influence the structure, composition, biodiversity and productivity of rangeland ecosystems.
- Familiarity with various approaches to describe and classify the ecological condition of rangeland ecosystems.
- Able to assess the mechanisms and processes that drive ecological succession in rangeland ecosystems and the tools to drive successional trajectories.
- Ability to characterize the geological/historical origin and evolution of rangeland ecosystems.
- Have an awareness of the impact of potential global climate change, invasive exotic species, habitat fragmentation, nutrient enrichment and land use changes on the character and dynamics of rangeland ecosystems.

TEXTBOOK AND READING MATERIALS:
All materials are available to be downloaded from eCampus. Make sure that you have set-up your Neo account. Your Net ID and password will be the same for eCampus. You can login to eCampus through the following link:

http://ecampus.tamu.edu
COURSE OUTLINE:

I. Ecological Definitions and Concepts
   A. Hierarchy Theory
   B. Levels of Organization
   C. Scale
   D. Ecosystem Structure and Function
   E. Landscape Structure and Function
   F. Ecosystem Services

II. Rangeland definition, distribution, extent and general features

III. Rangeland Regions
   A. Tropical/Subtropical Grassland, Savannah/ Shrubland/Woodland
   B. Desert (Subtropical and Temperate)
   C. Temperate Grassland
   D. Temperate Savannah and Shrubland
   E. Broad Sclerophyll Shrublands and Woodlands
   F. Tundra (Alpine and Arctic)
   G. Other (Wetlands, Forest Range, etc.)

IV. Climate/Weather
   A. Global Climate Patterns
   B. Climate Modes
   C. Climate Variation
   D. Climate Classifications
   E. Climate/Vegetation Relationships
   F. Climate/Soil/Vegetation Interactions
   G. Climate/Fire/Vegetation Interactions

V. Community/Ecosystem Characteristics/Attributes
   A. Growth Form and Physiognomy
   B. Stratification/Spatial Organization
      i. Vertical
      ii. Horizontal
   C. Species Composition
   D. Dominance
   E. Community Theory
   F. Functional Groups, Plant Strategies, Guilds, etc
   G. Keystone Species
   H. Ecological Diversity (Biodiversity)
      i. Genetic
      ii. Species
Communities
iv. Landscapes
v. Regions
vi. Structure, Composition, Pattern, Process, Function
I. Temporal Variation
J. Disturbance Regimes/Succession

VI. Classifications

A. UNESCO
B. Ecoregions-Bailey
C. U.S. National Vegetation Classification (USNVC)
D. USDA Soil Classification
E. EPA Land Unit Classification
F. Major Land Resource Areas/Regions - USDA, NRCS
   Ecological Sites
   State and Transition Models (later in VII, B, 3)
G. Other - Land Cover, Wetlands, etc.

VII. Temporal Patterns/Dynamics

Consider the origin, evolution, and kinds of causative factors that affect the
distribution and characteristics of ecosystems of the world with emphasis on
North America.

A. Non-directional
   1. Diurnal (daily)
   2. Phenological (seasonal, annual)
   3. Replacement (ontogenetic, regeneration) (annual to decades)
   4. Cyclic Change (years to decades)
   5. Fluctuation (years to decades)

B. Directional Change
   1. Biotic History (phylogenetic and ecological variation under
      longterm changing environmental conditions - Geological Time)
      a. Pre-Pleistocene
      b. Pleistocene
      c. Holocene
      d. Historical
   2. Succession (variation during relatively constant environmental
      conditions - Ecological Time)
      a. Primary
      b. Secondary
      c. Models
         i. facilitation
         ii. tolerance
         iii. inhibition
iv. exclusion
v. population/life history
  Grime-Plant Strategies
  Tilman-Resource Ratios
  Noble and Slatyer – Vital Attributes
d. Successional Processes/Mechanisms (Clements, Pickett)
i. […]
ii. migration (agents, mechanisms)
iii. ecesis (colonization)
iv. biotic interactions (competition, herbivory, predation, etc.)
v. reaction (plant and animal influences)
vi. stabilization: stability-resistance, resilience
e. Equilibrium vs. Non-equilibrium Systems

3. Application to Rangeland Assessment and Condition
   a. Range Condition
   b. State and Transition Models
   c. Rangeland Health

VIII. Field Trip

One-half day local field trip (TBA)

IX. Grade Determinations

   a. Examinations
      i. Mid-term examination
      ii. Final examination (December 17, 8:00-10:00)
   b. Group Project
   c. Exercises (to include questions submitted for student presentations) @ 10 to 50 points each

      TOTAL 500 pts (100%)

Late Work/Make-up Policy

If you miss a regularly scheduled examination, only written excused absences will be accepted as a pass to take a make-up examination. An excused absence means that illness or some other problems beyond your control prevented you from preparing for, or being present at, a scheduled exam. You must register your excused absence within 7 days of the missed exam. Exercises and reports shall be submitted on the due date; if late they will only be accepted with a written excuse.

Attendance Policy

Attendance will only be taken the first few class periods until drops, adds and other variables that may affect the final enrollment are addressed. Thereafter attendance will not be taken. If you are absent for an extended period you should notify the instructor of the nature of your
absence.

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Aggie Honor Code

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On all course work, assignments, and examinations at Texas A&M University, the following Honor Pledge shall be preprinted and signed by the student:

"On my honor, as an Aggie, I have neither given nor received unauthorized aid on this academic work."
Student Paper Reviews and Presentations

Groups of two to four students will select a topic from a suggested list. The group will review assigned papers as well as their own literature reviews and 1) prepare a written (ca. two page) summary and critique including pertinent literature citations to be reviewed by the instructor prior to the class presentation and then to be distributed to the class one period prior to the presentation and 2) make a 40-45 minute presentation on the topic. Grading will be as follows:

- Written summary/Outline: 90 points
- Integration of speakers and papers: 20 points
- Oral Presentation/Response: 40 points
- Total: 150 points

Once topics are selected, schedule a visit with the instructor 1) to obtain additional material to be covered in the presentation and 2) to discuss areas to emphasize and general approach. The presentation can take any format you choose, i.e., transparencies, powerpoint, etc.

All members of the group will receive the same grade. However, each member of the group will assign a numerical grade (0-100) to all other group members based on their contribution and participation. The average of those grades will become the grade for each individual. That is, if the group receives 100 points, and an individual's average is 75, that individual would receive a grade of 75 (0.75 x 100).

For each presentation each member of the class (not including the presenters) will submit at least three questions that relate to the topic. These will be submitted at the beginning of the class period on the day of the presentation and each will be worth 5 points, for a maximum of 15 points toward the Exercise grades.
OBJECTIVES:
Investigation of physiological mechanisms influencing ecological patterns and processes, including plant acclimation and adaptation in contrasting habitats, abiotic controls on species productivity and distribution, relevant conceptual and experimental approaches, and integration across ecological scales. Each subject matter section begins with an introduction of the relevant physiological processes and develops toward an ecological synthesis of these processes at community or ecosystem scales and highlights areas of active, current research.

LEARNING OUTCOMES:
As a result of taking this course, students will be able to accomplish the following:
- Identify the importance of major physiological processes to ecosystem function
- Describe plant-environment interactions and how they shape plant adaptation and distribution
- Decompose complex ecological patterns into their component physiological processes
- Independently interpret physiological plant ecology literature for multiple applications

INSTRUCTOR:
Dr. Jason B. West
Assistant Professor
Department of Ecosystem Science and Management
Office: Animal Industries Building, Room 413
Telephone: 845-3772
email: jbwest@tamu.edu

MEETING TIME AND LOCATION:
Monday, Wednesday and Friday, 9:10 - 10:00 am.
Animal Industries Building, Room 229.
Office hours by appointment

READING ASSIGNMENTS:
Recommended textbooks:


Material from other textbooks and peer-reviewed papers will also be assigned for each subject matter section. Additional material will be made available in electronic form on the course eLearning page where possible or in print in class.
EVALUATION PROCEDURES:
Exams will consist of definition and short-answer questions. Problem sets will require synthesis and application of information addressed in lectures, the text, assigned readings, and class discussions to an actual or hypothetical ecological scenario. Problems sets will be made available on the course home page.

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<thead>
<tr>
<th>Problem sets (5; 20 points each)</th>
<th>100 points</th>
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<tbody>
<tr>
<td>Participation and discussion</td>
<td>50 points</td>
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<tr>
<td>Final proposal and presentation</td>
<td>50 points</td>
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<tr>
<td>Exam I</td>
<td>100 points</td>
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<tr>
<td>Exam II</td>
<td>100 points</td>
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<tr>
<td>Exam III</td>
<td>100 points</td>
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<tr>
<td>TOTAL</td>
<td>500 points</td>
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</table>

GRADE DISTRIBUTION:
- A=90%
- B=80-89%
- C=70-79%
- D=60-69%
- F=0-59%

MAKE-UP EXAMINATIONS AND LATE ASSIGNMENTS:
Make-up examinations will be given provided that students present a documented University-excused absence within 1 week of the scheduled exam (see TAMU Regulations).

ATTENDANCE:
The University views class attendance as an individual student responsibility and regular class attendance is expected. Experience indicates that those students who attend class consistently attain the highest performance.

AMERICANS WITH DISABILITIES ACT
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<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Assignments</th>
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<tbody>
<tr>
<td>8/26</td>
<td>Intro to PPE</td>
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<tr>
<td>8/28</td>
<td>Plant environments</td>
<td></td>
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<tr>
<td>8/30</td>
<td>Energy budgets</td>
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</tr>
<tr>
<td>9/2</td>
<td>Energy budgets</td>
<td>Problem Set 1</td>
</tr>
<tr>
<td>9/4</td>
<td>Temperature</td>
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<tr>
<td>9/6</td>
<td>Photosynthesis</td>
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<td>Photosynthesis</td>
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<td>Photosynthesis</td>
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<td>9/13</td>
<td>D1 - Energy budgets</td>
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<tr>
<td>9/16</td>
<td>Respiration</td>
<td>Problem Set 2</td>
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<tr>
<td>9/18</td>
<td>Respiration</td>
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<tr>
<td>9/20</td>
<td>D2 - Plant carbon relations</td>
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<tr>
<td>9/23</td>
<td>Phloem transport</td>
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<td>9/25</td>
<td>Scaling carbon fluxes</td>
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<td>9/29</td>
<td>D3 - Plant carbon relations</td>
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<td><strong>Exam 1</strong></td>
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<tr>
<td>10/2</td>
<td>Plant water relations</td>
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<td>10/4</td>
<td>Plant water relations</td>
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<td>10/7</td>
<td>Plant water relations</td>
<td>Problem Set 3</td>
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<td>Plant water relations</td>
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<td>10/11</td>
<td>D4 - Plant water relations</td>
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<td>10/18</td>
<td>D5 - Plant water relations</td>
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<tr>
<td>10/21</td>
<td>Plant nutrient relations</td>
<td>Problem Set 4</td>
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<tr>
<td>10/25</td>
<td>Possible guest lecture</td>
<td>1st draft proposal due</td>
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<td>Plant nutrient relations</td>
<td>Problem Set 4 due</td>
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<tr>
<td>11/1</td>
<td>D6 - Plant nutrient relations</td>
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<tr>
<td>11/4</td>
<td><strong>Exam 2</strong></td>
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<tr>
<td>11/6</td>
<td>Whole plant growth</td>
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<tr>
<td>Date</td>
<td>Topic</td>
<td>Assignments</td>
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<tr>
<td>11/8</td>
<td>Whole plant growth</td>
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<td>11/11</td>
<td>Whole plant growth</td>
<td>Problem Set 5</td>
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<tr>
<td>11/13</td>
<td>Whole plant growth</td>
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<td>11/15</td>
<td><em>D7 - Whole plant growth</em></td>
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<tr>
<td>11/18</td>
<td>Plant stress</td>
<td>Problem Set 5 due</td>
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<tr>
<td>11/20</td>
<td>Biotic interactions</td>
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<td>11/22</td>
<td>Ecophysiology and ecosystems</td>
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<tr>
<td>11/25</td>
<td><em>D8 – Ecophysiology and ecosystems</em></td>
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<tr>
<td>11/27</td>
<td>Exam 3</td>
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<td>11/29</td>
<td>Thanksgiving Holiday – NO CLASS</td>
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<td></td>
<td><strong>Proposal presentations - may change time/date to accommodate all presentations</strong></td>
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<tr>
<td>12/2</td>
<td></td>
<td>Submit final proposal draft</td>
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<tr>
<td>12/9</td>
<td>8-10; scheduled final time (NO FINAL)</td>
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ESSM 622

BIOGEOCHEMISTRY OF TERRESTRIAL ECOSYSTEMS

SPRING SEMESTER
T-TH 8:00-9:15 AM

INSTRUCTOR:

Dr. Thomas W. Boutton
Department of Ecosystem Science and Management

Office: Animal Industry Bldg., Room 419
Phone: 845-8027
Fax: 845-6430
E-mail: boutton@tamu.edu
Home Page: http://agrilife.org/boutton/

BACKGROUND AND PURPOSE:

The biogeochemical cycles of carbon, nitrogen, sulfur, and phosphorus have tremendous contemporary significance due to their critical roles in determining the structure and function of ecosystems, and their influence on atmospheric chemistry and the climate system. Human impacts on these nutrient cycles are now responsible for a multitude of global changes that threaten the sustainability of ecosystem services essential to mankind.

This course provides a framework for understanding biogeochemical cycles, their significance at both global and ecosystem levels of organization, and their contemporary relevance to ecosystem science and management. The cycles of carbon, nitrogen, sulfur, and phosphorus are emphasized due to their significance in the earth-atmosphere-biosphere system. Ecosystem-level processes are studied in forest, grassland, and agricultural ecosystems. Because many of our current environmental problems are manifestations of disturbed biogeochemical cycles, this course is fundamental to understanding environmental issues such as global climate change, changes in atmospheric composition, land cover/land use changes, carbon sequestration, nitrogen saturation, acid precipitation, nonpoint-source pollution, and water quality.

This course is of interest to graduate students in ecology, soil science, geosciences, hydrology, atmospheric sciences, agricultural sciences, and environmental engineering. There are no prerequisites other than graduate standing in one of these disciplines.
LEARNING OUTCOMES AND OBJECTIVES:

1) Be able to define the fundamental characteristics and properties shared by all biogeochemical cycles, and establish the relevance of energy flow and the hydrologic cycle to all other nutrient cycles.

2) Be able to document the major properties and processes that characterize the biogeochemical cycles of carbon, nitrogen, sulfur, and phosphorus at ecosystem to global scales.

3) Develop an in-depth knowledge of the key biogeochemical processes that occur at the ecosystem level of organization, and be able to evaluate the role of soil structure, soil biology, and soil biochemistry in those processes.

4) Be able to document how land cover/land use changes in grassland, forest, agricultural, and urban ecosystems alter and interact with major biogeochemical processes.

5) Develop an understanding of the strong interactions between biogeochemical cycles and global changes.

EVALUATION PROCEDURES:

Two exams (100 points each) will be given during the course of the semester. In addition, each student will give approximately 7-10 brief (10-15 min) oral presentations (50 points each) that summarize and interpret an assigned reading. Class participation in discussions of the assigned readings is expected of all students throughout the semester.

COURSE MATERIALS:

Assigned reading: available on e-Campus (http://ecampus.tamu.edu/)
Class notes: available on e-Campus (http://ecampus.tamu.edu/)

AMERICANS WITH DISABILITIES ACT (ADA) POLICY STATEMENT:

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

ACADEMIC INTEGRITY STATEMENT:

"An Aggie does not lie, cheat, or steal or tolerate those who do."

For more information see the Honor Council Rules and Procedures on the web at: http://www.tamu.edu/aggiehonor
Course Description
Restoration Ecology (ESSM 630) is a Web-based, graduate-level course offered for academic credit by Texas A&M University. This course explores restoration ecology and ecological restoration through an examination of restoration strategies, current literature, case studies and problems, with the goal of understanding the limitation, socioeconomic considerations, and ecological potentials of this discipline.

The course will be delivered using course website, eLearning, eLearning discussion boards and email.

Instructor
Steve Whisenant, Professor
Department of Ecosystem Science and Management
Texas A&M University
s-whisenant@tamu.edu

Current Assignment
Chief of Party
Bor, South Sudan
The Borlaug Institute for International Agriculture
Texas A&M University

Course Moderator
Sasathorn “Sasa” Tpaneeyakul
Department of Ecosystem Science and Management
Texas A&M University
Centeq 253
Phone: (979) 845-1551
sasatap@tamu.edu

Prerequisites
Graduate standing

Learning Outcomes
1-Recognize causes and symptoms of ecosystem degradation
2-Develop restoration strategies that address the causes of degradation
3-Develop restoration strategies that repair natural recovery processes

Grade Distribution
(100-90 = A, 80-89 = B, 70-79 = C, 60-69 = D, below 60 = F)

Late Work Policy
Assignments due on assigned date and time unless special arrangements have been made for later date.

Textbook

The textbook is available to students online at no cost. This may be of use to those of you who have not received your textbook. You will need your NetID and Password to access the electronic book. Please note that the electronic book will only allow you to view one page of the textbook at a time. However, you can search the textbook, and a table of contents is available so that you may visit any chapter you like.
The easiest way to get to the book is to follow the steps below:

1. Visit https://library.tamu.edu/
2. Type in “Steven Whisenant” in the search box. Make sure that LibCat is the catalog option selected. Click Search.
3. Click on the search result #1 – “Repairing damaged wildlands [electronic resource]: a process-oriented, landscape-scale approach / Steven G. Whisenant”
4. Under Internet Access, click “Connect to the full text of this electronic book”

Course Website and eLearning
Materials for this course, including articles, can be accessed at http://essmonline.tamu.edu/essm630/.
The eLearning portion of this course (refer to the course website for details) will be used to conduct class discussions, submit assignments, and to check grades. The course Schedule & Assignments and the Week at a Glance pages will guide you through the assignments for each week. To access the eLearning portion of ESSM 630:

1. Go to http://elearning.tamu.edu
2. Click “TAMU (NetID).” Use your NetID and Password that you created for your Neo e-mail account to access the class.
3. Once you are in eLearning, select ESSM 630 to enter the course. The first page you see will list the assignments for the current week.

For questions regarding course content, please contact Dr. Whisenant at s-whisenant@tamu.edu or Sasa at sasatap@tamu.edu.

Course Objectives
Review and discuss fundamental concepts, current literature, and contemporary topics relating to ecological restoration in natural ecosystems. This includes the theoretical development of restoration ecology and its application – ecological restoration. The relationship with conservation biology will be explored. The goal is to inform, exchange views, and develop critical thinking skills. Case studies will be developed and examined as a means of exploring alternative objectives, problems, limitations, ecological potentials, and restoration strategies.

Course Approach
The textbook will provide the framework and structure to the study of restoration ecology and its application – ecological restoration. The additional readings, associated with each chapter, provide alternative approaches, updated information, and insights into other ecosystems. The PowerPoint presentations and additional readings are available on the course website under the Schedule & Assignments and Week at a Glance pages. Access to some of the assigned reading is made possible by the Texas A&M University Libraries EZ Proxy feature. You will need to logon with your NetID and Password to view these articles from the links on the course website. The PowerPoint presentations and additional readings in PDF format are also available on eLearning under Reading Assignments.
Interactive discussions about the readings are designed to provide a forum for interactions among students.

All assignments are due each Monday morning (10 am CDT).
1. Each week, you are expected to post a 1-page (approx. 300 word) analysis of the previous week’s reading assignments (one chapter, plus articles). Your synopsis will be posted within the eLearning “Topic Synopsis” discussion forum. This synopsis will discuss:
   a. The main points addressed in the chapter and readings;
   b. Your view of the most important ecological concepts presented; and
   c. The practical implications. Be concise and focus on major concepts and applications.

2. Each week, two or three individuals will be specifically assigned the task of providing a 500-word synopsis on a scholarly article that relates to the current topic. Procedures for this assignment are:
   a. Review the articles listed below and select three for your scholarly article synopsis. The course moderator, Sasa, will contact you via email prior to the beginning of the semester to request your list of topic choices. Send your choices, listed in order of preference, to sasatap@tamu.edu by 10 am (CDT) June 10, 2013. Topics will be assigned on a first come, first serve basis. If one of your choices is already assigned to another classmate you will be assigned your second or third choice based on topic availability. Topic assignments and due dates will be posted on the course website and eLearning by June 12, 2013.


   X. Opposite Paths to Success. Chapter 9 from Collapse: how societies choose to fail


b. Concisely describe the important ecological concepts and practical applications of the article. How does it relate to the current chapter and other readings? Your analysis will provide a brief synopsis, discussion of main points, comparison with book chapter and other articles, discussion of most important ecological finding and most important practical finding. Not every article will address all of those topics.

c. Post your synopsis to the “Individual Synopsis Submission” discussion forum in eLearning.

3. Each week, you are expected to participate in the “Topic Discussion” in eLearning. See the Course Schedule for details. Since this class has students with many different backgrounds, I expect some comments will address relatively basic ideas while others may address specific items. Both are desirable and encouraged.

Grading
No tests! Your grades will be determined from weekly assignments (80%) and your participation in discussions of other articles (20%). Individuals that routinely fail to contribute to the group projects will receive an appropriate grade.

American Disability Act (ADA) Policy Statement
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu.

Academic Integrity Statement
“An Aggie does not lie, cheat, or steal, or tolerate those who do.” For more information, read the Honor Council Rules and Procedures at [http://aggiehonor.tamu.edu/](http://aggiehonor.tamu.edu/).

### Schedule and Assignments

<table>
<thead>
<tr>
<th>WEEK</th>
<th>TOPIC AND ASSIGNMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td><strong>June 3 - 9</strong></td>
</tr>
<tr>
<td><strong>Introduction to Restoration Ecology</strong></td>
<td>Read Wk 1 PowerPoint</td>
</tr>
<tr>
<td></td>
<td>Read Chapter 1 in Textbook (Wildland Degradation and Repair)</td>
</tr>
<tr>
<td></td>
<td>Add your synopsis to discussion board by <strong>June 10</strong></td>
</tr>
<tr>
<td></td>
<td>June 10-12:</td>
</tr>
<tr>
<td></td>
<td>Read discussion board synopses from previous week and add your comments</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td><strong>June 10 - 16</strong></td>
</tr>
<tr>
<td><strong>Ecosystem Services</strong></td>
<td>June 13-16:</td>
</tr>
<tr>
<td></td>
<td>Read Wk 2 PowerPoint</td>
</tr>
<tr>
<td></td>
<td>Add your synopses to discussion board by <strong>June 17</strong></td>
</tr>
<tr>
<td></td>
<td>June 17-19:</td>
</tr>
<tr>
<td></td>
<td>Read discussion board synopses from previous week and add your comments</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td><strong>June 17 - 23</strong></td>
</tr>
<tr>
<td><strong>Assessing Damage to Primary Processes</strong></td>
<td>June 20-23:</td>
</tr>
<tr>
<td></td>
<td>Read Wk 3 PowerPoint</td>
</tr>
<tr>
<td></td>
<td>Read Chapter 2 in Textbook</td>
</tr>
<tr>
<td></td>
<td>Add your synopses to discussion board by <strong>June 24</strong></td>
</tr>
<tr>
<td></td>
<td>June 24-26:</td>
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<tr>
<td></td>
<td>Read discussion board synopses from previous week and add your comments</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td><strong>June 24 - 30</strong></td>
</tr>
<tr>
<td><strong>Repairing Damaged Primary Processes</strong></td>
<td>June 27-30:</td>
</tr>
<tr>
<td></td>
<td>Read Wk 4 PowerPoint</td>
</tr>
<tr>
<td></td>
<td>Read Chapter 3 in Textbook</td>
</tr>
<tr>
<td></td>
<td>Add your synopses to discussion board by <strong>July 1</strong></td>
</tr>
<tr>
<td></td>
<td>July 1-3:</td>
</tr>
<tr>
<td></td>
<td>Read discussion board synopses from previous week and add your comments</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td><strong>July 1 - 7</strong></td>
</tr>
<tr>
<td><strong>Directing Vegetation Change</strong></td>
<td>July 4-7:</td>
</tr>
<tr>
<td></td>
<td>Read Wk 5 PowerPoint</td>
</tr>
<tr>
<td></td>
<td>Read Chapter 4 in Textbook</td>
</tr>
<tr>
<td></td>
<td>Add your synopsis to discussion board by <strong>July 8</strong></td>
</tr>
<tr>
<td>Week</td>
<td>Dates</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| 6    | July 8-14   | July 8-10: Read discussion board synopses from previous week and add your comments  
Selecting Plant Materials  
July 11-14: Read Wk 6 PowerPoint  
Read Chapter 5 in Textbook  
Add your synopsis to discussion board by July 15  
July 15-17: Read discussion board synopses from previous week and add your comments  
Site Preparation and Seedbed Preparation  
July 18-21: Review Wk 6 PowerPoint  
Read Chapter 6 in Textbook  
Add your synopsis to discussion board by July 22 |
| 7    | July 15-21  | July 22-24: Read discussion board synopses from previous week and add your comments  
Planting  
July 25-28: Read Wk 8 PowerPoint  
Read Chapter 7 in Textbook  
Add your synopsis to discussion board by July 29  
July 29-31: Read discussion board synopses from previous week and add your comments  
Planning Restoration Programs  
August 1-4: Review SER Primer PowerPoint  
Read Chapter 8 in Textbook  
Read SER Primer PDF  
Add your synopses to discussion board by August 5  |
| 10   | August 5-11 | August 5-9: Read discussion board synopses from previous week and add your comments  
Relax |
Course title and number: ESSM 631
Term (e.g., Fall 200X): Fall 2014
Meeting times and location: ANIN 317 at 10:20-11:10 MW, Lab TBA

Course Description and Prerequisites

How wetland and riparian areas link terrestrial and aquatic systems and function hydrologically and ecologically within watersheds; integrated approaches for restoration of degraded wetland and riparian systems; improving water resources through vegetation management and restoration.

Prerequisites: At least one ecology course or instructor approval.

Instructor Information

Name: Dr. Georgianne W. Moore
Telephone number: 979-845-3765
Email address: gwmoores@tamu.edu
Office hours: M 11:10-noon, or by appointment
Office location: ANIN 329

Textbook and/or Resource Material

*Wetlands* 4th Ed. Mitsch and Gosselink (2007) and selected readings posted on WebCT

Grading Policies

<table>
<thead>
<tr>
<th>Student Assessment</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Trips</td>
<td>22</td>
</tr>
<tr>
<td>Homework and Labs</td>
<td>18</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>15</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20</td>
</tr>
<tr>
<td>Case Study Presentation</td>
<td>15</td>
</tr>
<tr>
<td>Participation &amp; Reading Quizzes</td>
<td>10</td>
</tr>
<tr>
<td>TOTAL:</td>
<td>100%</td>
</tr>
</tbody>
</table>

Grade Distribution: 90-100% = A; 80-89% = B; 70-79% = C; 60-69% = D; <59% = F
Course Topics, Calendar of Activities, Major Assignment Dates

<table>
<thead>
<tr>
<th>Wk</th>
<th>Date</th>
<th>Topic</th>
<th>Meets</th>
<th>Subject</th>
<th>Readings</th>
<th>Assnmts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-Sep</td>
<td>Introduction</td>
<td>M</td>
<td>Introduction to wetland and riparian</td>
<td>Mitsch Ch 1-3</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3-Sep</td>
<td>Delineation, Wetlands of World</td>
<td>W</td>
<td>ecological restoration; global wetlands</td>
<td>Hobbs et al 2011</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>6-Sep</td>
<td>Restoration Principles</td>
<td>M</td>
<td>Restoration principles; Plant adaptations;</td>
<td>Zedler, Mitsch Ch 12</td>
<td>HW 1</td>
</tr>
<tr>
<td>2</td>
<td>10-Sep</td>
<td>Plant Adaptations &amp; Succession</td>
<td>W</td>
<td>plant succession; restoration relationships;</td>
<td>Mitsch Ch 6</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Sep 11 or 12</td>
<td>LAB: Texas Water Videos</td>
<td>Th or Fr</td>
<td>The Texas story -- choose Th or Fr for 2-hr lab.</td>
<td>TX Water Law</td>
<td>Lab 1</td>
</tr>
<tr>
<td>3</td>
<td>15-Sep</td>
<td>Landscape Process</td>
<td>M</td>
<td>Riparian restoration; terrestrial and aquatic</td>
<td>Ripparia Ch 1-3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>17-Sep</td>
<td>Geomorphology 1 and 2</td>
<td>W</td>
<td>linkages; geomorphology; regulations</td>
<td>Swanson</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>22-Sep</td>
<td>Hydrology 1</td>
<td>M</td>
<td>Restoring the hydrologic cycle;</td>
<td>Mitsch Ch 4</td>
<td>HW 2</td>
</tr>
<tr>
<td>4</td>
<td>24-Sep</td>
<td>Hydrology 2</td>
<td>W</td>
<td>ecohydrologic processes in flooding systems;</td>
<td>Hart and Poff 1999 +1</td>
<td>Lab 2</td>
</tr>
<tr>
<td>4</td>
<td>Sep 25 or 26</td>
<td>LAB: Dam Operation</td>
<td>Th or Fr</td>
<td>Dams and dam removal -- choose Th or Fr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>29-Sep</td>
<td>Erosion, Roads</td>
<td>M</td>
<td>for 2-hr lab.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>1-Oct</td>
<td>Invasive Plants</td>
<td>W</td>
<td>Role of disturbance; plant invasions, erosion,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6-Oct</td>
<td>Restoration in Urban Environments</td>
<td>M</td>
<td>roads, fire, flood, grazing, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>8-Oct</td>
<td>BMPs, Water Quality</td>
<td>W</td>
<td>Common urban themes; Connection between</td>
<td>Palmer 2005, Mitsch Ch 9</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>13-Oct</td>
<td>Treatment Wetlands</td>
<td>M</td>
<td>EMPs and water quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>15-Oct</td>
<td>Restoration Design</td>
<td>W</td>
<td>Remediation; Restoration design</td>
<td>Mitsch Ch 5 (p. 196-206)</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>20-Oct</td>
<td>MIDTERM EXAM</td>
<td>M</td>
<td>MIDTERM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>22-Oct</td>
<td>Field Trip Overview</td>
<td>W</td>
<td>Austin/Bastrop Restoration Trip</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>23, 24, &amp; 25</td>
<td>AUSTIN FIELD TRIP</td>
<td>Thurs-Sat</td>
<td>Thursday PM, Friday and Saturday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>27-Oct</td>
<td>Global Cycles and Climate Change</td>
<td>M</td>
<td>Global role of wetlands in climate; Coastal processes and function</td>
<td>Mitsch Ch 10, Seyw et al 2009</td>
<td>Trip 1</td>
</tr>
<tr>
<td>9</td>
<td>28-Oct</td>
<td>Coastal Restoration</td>
<td>W</td>
<td></td>
<td>Mitsch Ch 13, Four videos</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>3-Nov</td>
<td>Riparian Assessment</td>
<td>M</td>
<td>How to assess health? Putting a price on</td>
<td>Texas Field Guide</td>
<td>Trip 2</td>
</tr>
<tr>
<td>10</td>
<td>5-Nov</td>
<td>Wetland Values</td>
<td>W</td>
<td>restoration. Lab takes ~2hrs on your own</td>
<td>Mitsch Ch 11, Bernhardt</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>TBD</td>
<td>LAB: White Creek Tributary</td>
<td>TBD</td>
<td>schedule.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>10-Nov</td>
<td>Wetland Laws</td>
<td>M</td>
<td>Laws and regulations restorationists need to</td>
<td>Mitsch Ch 14</td>
<td></td>
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<tr>
<td>11</td>
<td>12-Nov</td>
<td>Case Study Presentations</td>
<td>W</td>
<td>know, Graduate Student Case Studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>17-Nov</td>
<td>Case Study Presentations</td>
<td>M</td>
<td>Graduate Student Case Studies; Assessment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>19-Nov</td>
<td>Case Study Presentations</td>
<td>W</td>
<td>Tools. Lab takes ~4hrs driving to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Nov 20 or 21</td>
<td>LAB: Brazos Co Streams</td>
<td>Th or Fr</td>
<td>local streams as a split class.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>24-Nov</td>
<td>Case Study Presentations</td>
<td>M</td>
<td>Assessment tools; Graduate Student</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>28-Nov</td>
<td>((Thanksgiving Holiday))</td>
<td>M</td>
<td>Presentations; No Wed Class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>1-Dec</td>
<td>Case Study Presentations</td>
<td>M</td>
<td>Graduate Student Presentations</td>
<td></td>
<td>No Class</td>
</tr>
<tr>
<td>14</td>
<td>3-Dec</td>
<td>Synthesis</td>
<td>W</td>
<td>Course Synthesis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>6-Dec</td>
<td>Redefined day, No class</td>
<td>M</td>
<td>No class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>10-Dec</td>
<td>Redefined day, No class</td>
<td>M</td>
<td>No class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>15-Dec</td>
<td>FINAL EXAM</td>
<td>T 8-10</td>
<td>Final Exam</td>
<td></td>
<td>FINAL</td>
</tr>
</tbody>
</table>

**Labs and Field Trip:** There are two labs and three field trips distributed throughout the semester (exact times TBA). October 23-25, there will be a three-day overnight field trip to Austin. The other two field trips are local and last 2-4 hours. Participation in field trips is expected, includes assignments to be turned in, and accounts for 22% of the course grade.

**Attendance Policy**

"The University views class attendance as the responsibility of an individual student. Attendance is essential to complete the course successfully. University rules related to excused and unexcused absences are located on-line at [http://student-rules.tamu.edu/rule67](http://student-rules.tamu.edu/rule67)." For illnesses, please turn in an Explanatory Statement and/or Physician confirmation note (section 7.1.6.2) on the date you return to class. Field trips are a very important component of this course. Thus, attendance is **required** for all three field trips. See the teaching schedule for dates of each field trip and make arrangements in advance
to be there! Only University Excused Absences will be accepted as reasons for non-attendance. Students who miss a field trip will be required to complete an additional report on a topic assigned by the instructor.

Missed or Late Assignments: In cases of excused absence, missed assignments (exams, homework, etc.) can be made up in a timely manner (See Student Rules #7). You are responsible for notifying the instructor immediately to make arrangements. Substitute make-up work may be necessary at the instructor's discretion.

Regarding unexcused absences or late assignments, you are responsible for notifying the instructor immediately to make arrangements. In most cases a penalty of 10% will be incurred each class meeting day items are late, beginning after class on the due date. If unexcused, the instructor retains the right to refuse late work and assign zero for the grade. No assignment will be accepted 2 weeks past due or after the final class meeting.

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu

Academic Integrity

For additional information please visit: http://aggiehonor.tamu.edu

"An Aggie does not lie, cheat, or steal, or tolerate those who do."
Ecohydrology  
ESSM 635—Fall 2014

TIME In class Mondays 4:00-7:00 pm ANIN 317

COURSE DESCRIPTION
The course will focus on providing an in-depth coverage of the interaction of water and vegetation at multiple scales. In other words, we will be examining how vegetation affects water and visa versa. In the process, students will also gain an in depth knowledge of basic hydrological processes. Case studies will be utilized throughout the semester with an emphasis on student lead syntheses and participation. Critical thinking and analysis will be emphasized.

COURSE GOAL
By the end of the course, students will have an understanding of landscape hydrology and how changing land cover and biota will affect hydrologic processes.

INSTRUCTOR
Dr. Bradford Wilcox  Ecosystem Science and Management
Office: 319 Forestry  Phone: 458-  Email: bwilcox@tamu.edu
                 1899

READINGS
Selected Readings—provided thru eCampus

GRADING 600 Section

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synthesis Assignments</td>
<td>70%</td>
</tr>
<tr>
<td>Oral Presentation</td>
<td>20%</td>
</tr>
<tr>
<td>Participation and Discussion</td>
<td>10%</td>
</tr>
</tbody>
</table>

Synthesis Writing Assignment
A large part of the course will be based the student ability to synthesize material and distill the most critical ideas. There are a total of 13 assignments and where students are asked to provide a 1-2 page syntheses of the weekly readings. Assignments are due on the Sunday evening before Monday class. The major objectives of the exercises are that of mastering the material and also better developing critical thinking and assessment skills. Late assignments will not be accepted.

Oral presentation
A core philosophy of this class is that we will be teaching each other. Accordingly each student will have the opportunity to develop and present a lecture that summarizes that weekly papers. The lecture will be of professional quality and about 40 minutes in length
Class participation
The core learning principle for this course is that we are a learning community and are learning from each other. This obviously cannot occur if students do not attend class. Participation in each class is expected. The penalty for unexcused absences is loss of 10 points per class missed for the weekly writing assignment.

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Academic Integrity Statement
"An aggie does not lie, cheat, or steal or tolerate those who do". More information on the Honor Council Rules and Procedures can be found at www.tamu.edu/aggiehonor.
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
<th>Writing Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1$</td>
<td>16Sep</td>
<td>Introduction</td>
<td>Asbjornsen et al. (2011); Odorico et al.</td>
<td>Syntheses 1: Ecohydrology</td>
</tr>
<tr>
<td>2$</td>
<td>8Sep</td>
<td>Ecohydrology Overview</td>
<td>Newman et al. (2006); Harte (2002)</td>
<td>Syntheses 2: Dryland Ecohydrology</td>
</tr>
<tr>
<td>3$</td>
<td>15Sep</td>
<td>Dryland Ecohydrology</td>
<td>Steffen et al. (2007); Wilcox et al. (2011)</td>
<td>Syntheses 3: Anthropocene</td>
</tr>
<tr>
<td>4$</td>
<td>22Sep</td>
<td>Anthropocene</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5$</td>
<td>29Sep</td>
<td>Free Week</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7$</td>
<td>13Oct</td>
<td>Water and Agriculture</td>
<td>Rockstrom et al. (2010); Gordon et al. (2010)</td>
<td>Syntheses 5: Water and Agriculture</td>
</tr>
<tr>
<td>8$</td>
<td>20Oct</td>
<td>Water and Energy Budgets</td>
<td>Bonan (2010); Anderson (2011)</td>
<td>Syntheses 6: Water and Energy Budgets</td>
</tr>
<tr>
<td>9$</td>
<td>27Oct</td>
<td>Evapotranspiration</td>
<td>Dugas et al. (1998); Heiman et al. (2010)</td>
<td>Syntheses 7: Evapotranspiration</td>
</tr>
<tr>
<td>10$</td>
<td>3Nov</td>
<td>Recharge</td>
<td>Stanton et al. (2005); Seyfried and Wilcox (2006)</td>
<td>Syntheses 8: Recharge</td>
</tr>
<tr>
<td>11$</td>
<td>10Nov</td>
<td>Runoff</td>
<td>Wilcox et al. (2003); Ludwig et al. (2005)</td>
<td>Syntheses 9: Runoff</td>
</tr>
<tr>
<td>12$</td>
<td>17Nov</td>
<td>Land Cover Change</td>
<td>Foley et al. (2003); LeBlanc et al. (2008)</td>
<td>Syntheses 10: Desertification</td>
</tr>
<tr>
<td>13$</td>
<td>24Nov</td>
<td>Woody Plants</td>
<td>Wilcox et al. (2006); Huxman et al. (2005)</td>
<td>Syntheses 11: Woody Plants</td>
</tr>
<tr>
<td>14$</td>
<td>1Dec</td>
<td>Woody Plants</td>
<td>Wilcox and Huang (2010); Wilcox et al. (2008)</td>
<td>Syntheses 12: Woody Plants</td>
</tr>
<tr>
<td>15$</td>
<td>8Dec</td>
<td>Plantations</td>
<td>Dyer and Versfeld (2007); Jackson et al. (2005); Mark et al. (2008)</td>
<td>Syntheses 13: Plantations</td>
</tr>
</tbody>
</table>
Description

Management of range and forest watersheds; influence of range and forest practices on runoff, interception, infiltration, erosion and water quality; current literature and research advances.

Learning Outcomes:

1. To be able to describe the hydrologic cycle and its components with special emphasis on the role of vegetation
2. To be able to describe the impacts of range and forest practices on water quality and quantity basis for land use decisions.

Instructor:

Robert W. Knight
Ecosystem Science and Management
Animal Industries 322E
Phone 979-845-5557
Cell 979-324-6980 Before 10:00 p.m.
E-mail: bob-knight@tamu.edu

Grades:

Two exams: 50%
Term paper: 20%
Class discussion: 18%
Homework: 12%

Grading policy: Missed tests and late work will be handled according to University Rule 7. Late work for unexcused absences will be penalized 10% of the total points per day late. There will be no makeup exams for unexcused absences. Grades will follow A=100%-90%, B=89.5%-80%, C=79.5%-70%, F=<69.5% (http://student-rules.tamu.edu/rule7.htm)

Text:
No assigned text. Required readings will be posted on eCampus.
Topic Outline

I. Introduction
   a) Definitions (Week 1)
   b) Historical Development (Week 1)
   c) Importance, Distribution and Problems (Readings) (Week 1)
   d) Water Law (Readings) (Week 2)

II. Hydrologic Cycle – Overview of Processes, Measurement and Analysis of:
   a) Hydrologic Cycle (Week 2)
   b) Precipitation (Week 2)
   c) Interception (Readings) (Week 2)
   d) Evapotranspiration (Readings) (Week 3)
   e) Infiltration (Readings) (Week 3)
   f) Runoff (Week 3)
   g) Groundwater (Week 4)

III. Erosion – Overview of Processes, Measurement and Analysis of:
   a) Surface (Readings) (Week 5)
   b) Mass Movement (Week 5)
   c) Channel (Week 5)

Test 1 (Week 6)

IV. Hydrologic Models (Readings) (Week 7)

V. Influence of Vegetation Manipulation on Water Yield
   a) Forestland (Readings) (Week 7)
   b) Rangeland (Readings) (Week 7)

VI. Water Quality Criteria
   a) Physical Parameters (Week 8)
   b) Chemical Parameters (Week 8)
   c) Biological (Week 8)

VII. Impacts of Land Management Practices on Water Quality
   a) Forest – Roads, Logging, Planting (Readings) (Week 9)
   b) Range – Grazing, Improvement Practices (Readings) (Week 9)
   c) Recreation and Urbanization (Week 9)

Term Paper Due (Week 10)

Test 2 (Finals Week)
ESSM 636 Due Dates

Exam Dates:

Exam 1  July 11, Friday

Exam 2  August 11, Monday

Term Paper:

June 30 – Proposed paper title, one paragraph description of paper and 10 references

August 4 – Final paper due by 5:00 p.m.

Homework:

Transpiration study results due  June 16

Infiltration study results due  July 7

Raindrop splash erosion results due  July 7

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Academic Integrity:

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“An Aggie does not lie, cheat, or steal, or tolerate those who do.”

Helpful Websites

Academic Calendar  http://admissions.tamu.edu/Registrar/General/Calendar.aspx
On-line Catalog  http://www.tamu.edu/admissions/catalogs/
Student Rules  http://student-rules.tamu.edu/
ESSM 648
Wetland Plant Taxonomy
(3 credits) (1-4)

INSTRUCTOR: Stephan L. Hatch (s-hatch@tamu.edu) 845-4328

OFFICE: Room 131B, University Services Building


OBJECTIVES:
1. To learn variation in the morphology of wetland plants.
2. To become proficient in using diagnostic key for identification (followed by verification).
3. To learn how to collect wetland plant specimens.
4. Learn to recognize important wetland plant genera by sight.

GRADING:
1. Lecture exams (2) .......................................................... 200
2. Keying exams (5 @ 30 points each) .................................. 150
3. Sight Identification (3 @ 50 points each) ......................... 150
   a. Herbs, shrubs, trees, floating submergents, and fern allies (Family, Genus)
   b. Cumulative, plus grass-likes (Family, Genus)
   c. Cumulative, plus grasses (Tribe, Genus)
4. Collection of wetland plants, fieldbook, disk, and labels of 50 species ........ 100

TOTAL 600

A=100-90%
B=89-80%
C=79-70%
D=69-60%
F=59-0%

COLLECTION & LAB SUPPLIES
1. Plant press
2. Collection notebook (fieldbook)
3. Dissecting needles
4. Single edge razor blade
5. Forceps (needle nose or watchmaker)
6. One 6 in (15 cm) ruler
7. 10 X hand lens
8. Double-stick tape

Academic Integrity Statement
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Outline of lectures by major topics

<table>
<thead>
<tr>
<th>I. Introduction</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Orientation, course objectives, grading, texts, and supplies</td>
<td>1</td>
</tr>
<tr>
<td>B. Importance of taxonomy to wetland delineation</td>
<td></td>
</tr>
<tr>
<td>C. Classification systems for wetland plants</td>
<td></td>
</tr>
</tbody>
</table>

| II. History of wetland plant taxonomy and important literature |       |

<table>
<thead>
<tr>
<th>III. Nomenclature</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Practical problems of nomenclature that affect wetland plant taxonomy</td>
<td></td>
</tr>
<tr>
<td>B. Rules governing changes of scientific names</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IV. Vegetative and floral characteristics of wetland plants</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Identification process</td>
<td>10</td>
</tr>
<tr>
<td>B. Using diagnostic keys for identification using floral and vegetative characters</td>
<td></td>
</tr>
<tr>
<td>C. Important family characteristics of wetland plants</td>
<td></td>
</tr>
</tbody>
</table>

| V. Importance of habitat to plant community stability |       |

| VI. Summary |       |

Laboratory:

Study of important wetland plant families with emphasis on the use of diagnostic keys for identification. Numerous families and genera will be learned for sight recognition. A plant collection is required. Field trips will be important to visualize and summarize material studied.
The Wetland Plant Taxonomy web site is designed to give students another aid to help with ESSM 648.

This site has the following features:

- Class schedule
- Lab schedule
- Texas Wetland Plants
  - Images for sight identification. Click on names for images.
  - Checklists of grass, and grass-like plants, their Texas distribution, and wetland indicator classification.
    * Cyperaceae (sedges)
    * Juncaceae (rushes)
    * Poaceae (grasses)
- Links - List of related sites like the Tracy Herbarium specimen browser and the Tracy Herbarium web site.
- Contacts

Texas Grasses
http://www.cslr.tamu.edu/FLORA/taes/610

Texas Rushes
http://www.csde.tamu.edu/FLORA/taes/tracy/rushes

Texas Sedges
http://www.csde.tamu.edu/FLORA/taes/tracy/sedges
<table>
<thead>
<tr>
<th>Date</th>
<th>Lab</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/1</td>
<td>1.</td>
<td>Introduction; collecting, pressing, and mounting of wetland plants. Collection data, labels, and field book. Key representatives of the Fabaceae.</td>
</tr>
<tr>
<td>9/3</td>
<td>2.</td>
<td>Floral variation and keying representatives of Fabaceae, Ruppiaceae, and Asteraceae.</td>
</tr>
<tr>
<td>9/8</td>
<td>3.</td>
<td>Floral variation and keying representatives of Cymodoceaceae, Apiaceae and Asteraceae.</td>
</tr>
<tr>
<td>9/10</td>
<td>4.</td>
<td>Floral variation and keying representatives of Alismataceae, Lemnaceae, and Polygonaceae.</td>
</tr>
<tr>
<td>9/15</td>
<td>5.</td>
<td><strong>Keying Test.</strong></td>
</tr>
<tr>
<td>9/22</td>
<td>7.</td>
<td>Vegetative and floral parts of the Cyperaceae.</td>
</tr>
<tr>
<td>9/24</td>
<td>8.</td>
<td>Key Cyperaceae to genus.</td>
</tr>
<tr>
<td>10/1</td>
<td>11.</td>
<td>Key Cyperaceae to species.</td>
</tr>
<tr>
<td>10/6</td>
<td>12.</td>
<td><strong>Keying Test</strong> (CYPERACEAE)</td>
</tr>
<tr>
<td>10/8</td>
<td>10.</td>
<td><strong>Sight I.D.</strong> Test over herbs, shrubs, trees, floating submergent and fern ally.</td>
</tr>
<tr>
<td>10/13</td>
<td>13.</td>
<td>Key Cyperaceae to species.</td>
</tr>
<tr>
<td>10/15</td>
<td>14.</td>
<td>Key Cyperaceae to species.</td>
</tr>
<tr>
<td>10/20</td>
<td>15.</td>
<td>Floral variation and keying representatives of Juncaceae and Typhaceae.</td>
</tr>
<tr>
<td>10/22</td>
<td>16.</td>
<td><strong>Keying Test.</strong> (CYPERACEAE, JUNCACEAE, TYPHACEAE)</td>
</tr>
<tr>
<td>10/27</td>
<td>17.</td>
<td>Vegetative and spikelet parts of grasses.</td>
</tr>
<tr>
<td>10/29</td>
<td>18.</td>
<td>Spikelet variation and inflorescences.</td>
</tr>
<tr>
<td>11/5</td>
<td>20.</td>
<td><strong>Keying Test</strong> (POACEAE)</td>
</tr>
<tr>
<td>11/10</td>
<td>21.</td>
<td>Spikelet variation and keying representatives of Pappophoreae, Paniceae, and Andropogoneae.</td>
</tr>
<tr>
<td>11/12</td>
<td>22.</td>
<td><strong>Sight I.D.</strong> Test over herbs, shrubs, trees, floating submergent, fern ally and grass likes.</td>
</tr>
<tr>
<td>11/19</td>
<td>24.</td>
<td>Key your own collections.</td>
</tr>
<tr>
<td>11/24</td>
<td>25.</td>
<td>Key your own collections</td>
</tr>
<tr>
<td>12/1</td>
<td>27.</td>
<td><strong>Keying Test.</strong> (POACEAE)</td>
</tr>
<tr>
<td>12/3</td>
<td>28.</td>
<td><strong>Sight I.D.</strong> Test cumulative to include grasses. Key your own collection.</td>
</tr>
<tr>
<td>12/8</td>
<td></td>
<td>Collections are due December 2, 2014 at 5:00 p.m. in the S.M. Tracy Herbarium.</td>
</tr>
</tbody>
</table>

**Tests:**  
Midterm: October 15  
Final: December 16  3:30-5:30 p.m.
ESSM/BAEN 652 Syllabus
Advanced Topics in Geographic Information Systems
Spring Semester 2014

Course Instructor: Dr. R. Srinivasan (Srini)
979-845-5069
r-srinivasan@tamu.edu
Centex Bldg 221E

TA: Christopher Garza (cgarza7@tamu.edu)

Office Hours Instructor: By appointment only. Please contact through e-mail.
Office Hours TA: MF — 1-4PM, Centeq Room 214 (Research Park)

Lecture: All Sections— W 8:00a - 8:50a Room Room 214, Centeq (Research Park)
Labs: All Sections— M 8:00a — 10:50a Room 214, Centeq (Research Park)

Lab Instructor: Srini

Composition:
Homework/Quizzes 12%
Mini Class projects 48%
Final Project 40%

Prerequisites: ESSM 351/651 or equivalent course or instructor’s approval

Course Objective: The objective of this course is to give students a greater understanding of
advanced GIS topics. Knowledge gained in this course will give students the
tools required to solve complex natural resource issues. This will be
accomplished by providing experience in spatial analysis, environmental
modeling, and geostatistical analysis. Students will also be exposed to internet
based mapping—a technology used to disseminate spatial data.

Class Projects: Class Projects will be developed by individuals. These projects should utilize
GIS and use raster data in conjunction with any type of analysis covered in this
course. Project results will be delivered to the class in the form of a
presentation and poster. Presentations and results should be of publishable
quality. It is hoped that class project results will be formally published.

Class Abstract: An abstract of the proposed project will be submitted to the instructor on or
before March 8, 2013. The abstract will be no more than 2 pages, double-
spaced. It should provide a description of the project with detailed information
regarding its purpose. Include learning objectives, methodology and a list of
data used in the project and its availability. It should basically answer—what am
I going to do, how did I get this idea, and what am I going to learn from doing it.
Please include citations if applicable.

Optional Textbook: ArcGIS Extension Guides Bundle ($60.00 from esri.com)
Course Webpage: www-ssl.tamu.edu/frsc652
Topic
Course Introduction, Review of ArcView 10.x, Establishing Log-ins, Understanding Map Projections

Week 1

The Geodatabase
GIS Analysis

Week 2

Spatial Analyst Lab I
Surface Analysis—Getting to Know Surface Types (DEMs, TINs, etc.)

Week 3

Spatial Analyst Lab II
Raster Modeling

Week 4

Spatial Analyst Lab III
Distance, Density and Statistical functions

Week 5

Miniproject – 1 discussion
3-D Analyst

Week 6

3-D Analyst—Line of Sight Analysis and Viewsheds
Map Design and Cartography

Week 7

Holiday—Spring Break

Week 8

Global Positioning Systems
Basics of Geostatistical Analysis—Interpolation

Week 9

Geostatistical Analyst Lab I
Deterministic Methods, Kriging, Semivariograms, Covariance

Week 10

Geostatistical Analyst Lab II
Creating AXL Files and Setting up Map Services

Week 11

ArcIMS Lab I
Customizing with Designer

Week 12

ArcIMS Lab II
Applications

Week 13

Project Work Day
Guest Lecture

Week 14

Project Presentations

Week 15

Note:
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Texas A&M University
Dept. of Ecosystem Science and Management

Course title: Advanced Remote Sensing
Course number: ESSM 656
Course date: Spring Semester 2014
Location: Monday: HFSB 104; Wednesday, lecture and lab: Centeq B 214
Meeting time(s): Lectures: Monday, Wednesday: 12:40 to 1:30
Lab: Wed 1:40 to 3:40 (Centeq building), lab room B 214

Course description

The goal of this course is twofold: to introduce students with a basic knowledge of remote sensing to advanced topics in digital remote sensing applications and to instill enthusiasm in this subject area to encourage future specialists. The course emphasizes a hands-on learning environment, with in depth insights into theoretical and conceptual foundations in both aerial and satellite remote sensing. Primary focus will be placed on advanced active (lidar) and digital image analysis techniques, such as object oriented image classification. The class emphasis is on image data processing for a broad range of sensors and applications. Ultimately, the course will empower students to delve more deeply into advanced issues in remote sensing and to customize and develop image processing tools for their particular area of interest.

Prerequisites: Approval of instructor or one of the following: FRSC 608 (ESSM 655), RENR 444, GEOG 651, GEOG 661.

Learning outcomes

Upon completion of the course, students are expected to:
1. Compare remote sensing systems characteristics and select appropriate imagery for environmental applications
2. Perform pixel-based and object-oriented image classification; compare results of various classification techniques and select the most accurate classifier
3. Select appropriate segmentation parameters when using object-oriented classification
4. Understand principles of active sensors data, such as lidar data, including discrete return and full waveform data
5. Process lidar and optical remote sensing data and understand data fusion
6. Report in writing and orally present the remote sensing approach to problem solving
**Instructor information**

Name: Sorin Popescu  
Email: s-popescu@tamu.edu  
Office location: Centeq B221D  
Phone: 862-2614  
Elearning: http://ecampus.tamu.edu  

Office hours: Open door policy, though I recommend emailing or calling for appointments. Please put “656” in the subject of email messages regarding this class to receive prompt attention. Please avoid “drop-ins” just before class time; you are welcome any other time.

Laboratory: Ryan Sheridan, ryan.sheridan@tamu.edu; Office: Centeq B 217.

**Textbook**


Lecture materials and references posted on Elearning/Vista

**Grading**

10 point break-out system  
90.0 - 100 = A Excellent  
80.0 - 89.9 = B Good  
70.0 - 79.9 = C Satisfactory  
60.0 - 69.9 = D Passing  
00.0 - 59.9 = F Fail

Lab assignments: 25% (due at the beginning of the following lab period)  
Project: 25%  
Paper presentation: 12% (includes asking questions and answers to questions)  
Visualization: 13%  
Final exam: 25%

**Lab assignments**: All lab work is due at the beginning of the following lab period. All laboratory and homework assignments are to be completed in a neat, logical, and clear fashion.

**Late assignments**: A 10% reduction in grade, up to a maximum of 50%, will be assessed for each weekday an assignment is handed in late. Assignments will not be accepted if more than 5 weekdays late, unless documented excuse is presented as per Texas A&M University rules.
Important dates

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>% of project grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project proposal and presentations</td>
<td>Feb 26</td>
<td>5%</td>
</tr>
<tr>
<td>Project progress report</td>
<td>March 19</td>
<td>10%</td>
</tr>
<tr>
<td>Visualization</td>
<td>April 2</td>
<td></td>
</tr>
<tr>
<td>Project presentations</td>
<td>April 16</td>
<td>15%</td>
</tr>
<tr>
<td>Project paper due</td>
<td>April 23</td>
<td>70%</td>
</tr>
<tr>
<td>Final exam</td>
<td>May 5, Monday, 10:30 a.m.-12:30 p.m., in the lab</td>
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</tr>
</tbody>
</table>

Student paper presentation dates: Every Wed, starting Jan 29 (check schedule on eCampus)

Tentative course and laboratory outline

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Definition of terms; Visualization of remote sensing data; Electromagnetic spectrum and radiation laws as they relate to remote sensing. Review of ENVI image processing.</td>
</tr>
<tr>
<td>3</td>
<td>Image processing considerations and processing techniques. SVM classifiers.</td>
</tr>
<tr>
<td>4</td>
<td>Advanced image processing, Review of basic concepts and methods of image classification. Hybrid classifiers. Object-oriented image classification (1).</td>
</tr>
<tr>
<td>5</td>
<td>High resolution imaging satellites and applications. High-resolution digital airborne imagery. Image analysis and processing issues. Object-oriented image classification (2).</td>
</tr>
<tr>
<td>8</td>
<td>Lidar-derived elevation: bare Earth DEMs and applications in urban areas, topographic mapping, forestry. Lidar forest measurements.</td>
</tr>
<tr>
<td>9</td>
<td>Lidar image geometry. 3D feature extraction. FUSION – lidar data processing.</td>
</tr>
<tr>
<td>10</td>
<td>Planning a lidar acquisition; deciding upon data collection characteristics. Fusion with multispectral data. Lidar data visualization.</td>
</tr>
<tr>
<td>11</td>
<td>Large resolution remote sensing sensors (MODIS) and applications.</td>
</tr>
<tr>
<td>12</td>
<td>Hyperspectral remote sensing. Current sensors and applications in natural resources.</td>
</tr>
<tr>
<td>13</td>
<td>Hyperspectral information extraction. Advanced processing techniques.</td>
</tr>
<tr>
<td>14</td>
<td>The digital revolution in remote sensing: What’s next? Final exam review</td>
</tr>
</tbody>
</table>

Laboratory, Homework, and Exam policy

The University policy on Scholastic Dishonesty will be enforced in this course. While you are encouraged to help each other understand concepts and techniques, all work submitted should be your own. Exceptions to this policy will be explicitly noted by the instructor and should not be assumed by students. Make-up exams will not be offered. If you are going to
miss an exam for a valid reason (documented per University rules), contact the instructor well in advance.

All laboratory assignments are to be completed in a neat, logical, and clear fashion. A 10% reduction in grade, up to a maximum of 50%, will be assessed for each weekday an assignment is handed in late. Assignments will not be accepted if more than 5 weekdays late, unless documented excuse is presented as per TAMU guidelines.

Note: your lab teaching account is deleted at the end of the semester. Please save all class data before semester ends.

Laboratory reports
Unless otherwise indicated, all laboratory exercises must contain a brief report following the format guidelines given below. The report should be divided into Introduction, Methods, Results and Discussion, and Conclusions sections, and should tie together and synthesize the lecture, readings, and practical exercises. In the Methods section do not include a list of ENVI/eCognition or other software commands that you have used. Give instead the big picture of your approach and the remote sensing/image processing methods that you have used. You may include an appendix of software menus/commands used, for future references. Figures and tables inserted in the text are encouraged. When appropriate, include snapshots of your imagery in the report, mainly in the Results section, but no larger than half a page. Each laboratory exercise will be due the following laboratory period, at the beginning of class, unless otherwise indicated. Instructor may give extra credit to students that engage in developing the assignment beyond the required tasks, e.g., extra programming developments, extended literature search and citations on the topic, etc.

Projects
Each student is required to design and implement a class project as a group project, ideally 2 students in a group. The project must use digital image source data and the student must develop a specific output product useful in his own field of interest for applying remote sensing. The project is designed to (1) build upon and synthesize techniques or concepts demonstrated in class, and (2) let you explore your own data sets and research objectives using your developing remote sensing "toolkit." Work that contributes to your thesis research or current employment is encouraged. All projects require instructor approval.

A proposal (150-word maximum) and outline describing the project and proposed methods must be turned in by the date indicate in the Important dates section. However, students are encouraged to turn in proposals as soon as is feasible. The proposal/outline should contain at least five preliminary references. The final report must be no more than twenty pages in length including figures and references, and the final report and summary/outline must follow the format guidelines for papers and laboratory reports. Failure to follow these guidelines will result in the paper not being accepted. The final report must include an abstract of no more than 150 words that is succinct and informative without reference to the text. This should be followed by the Introduction (including a thorough literature review, with Background and Objectives), Methods, Results, and Discussion/Conclusions.

Keep in mind that these are semester projects. Laboratory time will be provided for work on your project during the semester, but will be insufficient by itself. A 2-5 page project progress report is required at the start of class as indicated in the Important dates section. Well-chosen student projects may be suitable for subsequent publication in either conference proceedings or the peer-reviewed literature. Please keep this goal in mind as you develop and carry out your projects, and particularly as you prepare your final reports.
Format Guidelines for Papers and Laboratory Reports
Papers and lab reports must be double-spaced (using a 12-point proportionally-spaced font) with 1 inch margins all around. Captions, references, footnotes, appendices, tables, etc. may be single-spaced. Figures and tables are encouraged when they serve to illustrate or clarify a point and they should be inserted in the text. Each page following the first full page of text should have a page number in the upper right corner or bottom center. A title page may be supplied; however, reports in special binders of any kind will generally not be accepted. In text citations and references should follow the guidelines for manuscripts submitted for publication to the American Society of Photogrammetry and Remote Sensing (http://www.asprs.org/publications.html), for Photogrammetric Engineering and Remote Sensing (PE&RS). Lab reports should be emailed to the TA and placed in the class drop-box (TA will provide additional instructions). Final projects must be prepared using the same criteria. Students are required to keep electronic copies of all work submitted.

Student paper presentations
Each student will present at least one scientific paper published in a remote sensing refereed journal throughout the course (approx. 20 min, including questions (15+5)). Students should consult the presentation dates in the “Important dates” section and decide by the second week of classes when they intend to present. Instructors may assign presentation dates, as well. Each student is expected to find three research papers published in remote sensing journals that fit the topic of interest for his/her research and ideally match lecture topics covered during the week of the presentation. At least one week before the scheduled presentation date, the student should make the three papers available to the instructor and consult to decide on one of the three papers to be presented in class. Students will make the chosen paper available as pdf to the instructor, to be posted on eCampus a week in advance of the presentation date. Each student is required to prepare at least one question for the presenter and email it in advance of the presentation date. Questions should indicate depth of thought and familiarity with the topic covered in the paper. Presentations should clearly present research objectives, methods, results, conclusions, and implications for his/her own research. It is expected that the presenter will critically evaluate the work presented in the paper. The presenter should best address questions from classmates on the last few slides of the presentation. Grades reflect on both the presentations and the questions asked throughout the semester. Recommended journals: Remote Sensing of Environment, Photogrammetric Engineering & Remote Sensing, Canadian Journal of Remote Sensing, etc.

Aggie Code of Honor
Aggies do not lie, cheat, or steal, nor do they tolerate those who do.
The Aggie Code of Honor functions as a symbol to all Aggies, promoting understanding and loyalty to truth and confidence in each other. http://www.tamu.edu/aggiehonor

Americans with Disabilities Act
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Office of Support Services for Students with Disabilities in Room 126 of the Student Services Building. The phone number is 845-1637.
ESSM 660-600
LANDSCAPE ANALYSIS AND MODELING
– Spatial Methods and Ecological Inquiry
3 Credit Hours
Spring 2014

Instructor:
X. Ben Wu, Department of Ecosystem Science and Management
Office: 209D AnIn; Phone: 979-845-7334; E-mail: xbw@tamu.edu
Office hours: Thursdays 2:30-3:30 pm (209D AnIn or online), or by appointment

Teaching Assistant:
Chris Garza, Department of Ecosystem Science and Management
Office: 103G AnIn-Anex; E-mail: cgarza7@neo.tamu.edu
Office hours: Tuesdays 4:00-6:00 pm (103G AnIn-Anex or online), or by appointment.

Learning Outcomes:
Students will be able to:
- explain the concepts and methods of related spatial analysis;
- perform spatial analyses using associated software;
- formulate research hypotheses for spatial issues in related fields, select appropriate quantitative methods to test the hypotheses, and interpret the findings; and
- develop reports in the form of journal manuscripts, conduct constructive reviews of journal manuscripts, and revise manuscript according to reviews and write response to review comments.

Prerequisites:
Course work in ecology/landscape ecology, introductory statistics, and introductory GIS (ArcGIS); or approval of instructor.

eCampus:
An eCampus course is available (access through http://ecampus.tamu.edu/) that includes syllabus, lectures, readings, exercises, quizzes, discussion forum, email tool, grades and student progress, web resources, and project reports and presentations.

Class/Discussion Session:
Thursdays 4:00-5:00 pm, in 229 AnIn.

WebMeeting:
We will use TTvn WebMeeting for online office hours. We may need to conduct one of our class/discussion sessions online as well. Please register at http://ttvnwebmeeting.tamu.edu/ and email me your WebMeeting login user name so I can add you to the class.
Course description:

Introduction to concepts and quantitative methods of spatial analysis and their applications, with an emphasis on natural resource studies.

Concepts and Methodology

Readings and lectures on quantification of spatial pattern and spatial statistics (patch-based metrics, contagion and lacunarity analysis, quadrat variance methods, spatial autocorrelation, Mantel tests, geostatistics, and point pattern analysis, etc.), supported by on-line discussions, in-class discussion sessions, and office hours.

On-line quizzes

Open-book timed quizzes over lecture and reading materials will be given in eCampus. Three attempts are allowed for each quiz, with some alternative questions. The highest of the 3 scores will be recorded.

Paper Discussions

On-line discussions of recent literature will be conducted on applications of the methods. Each student needs to submit a synopsis (~500 words) of the paper and participate in online discussions (one or more questions/comments). One group will be assigned for each paper to facilitate the discussions on-line and during the Discussion session.

Exercises

Hands-on exercises on spatial analysis using Excel, GIS and specialty software will be given. One group will be assigned to review and provide feedback for each exercise during the Discussion session.

Group Assignments

Each group will work collaboratively to (1) review student submissions and provide feedback for assigned exercises during the Discussion sessions, (2) facilitate on-line and in-class discussions of assigned papers, (3) make an oral presentation of group project, and (4) develop a formal review of another group’s manuscript.

Group Project

Each group of students will conduct a research project and develop a manuscript in the style for Landscape Ecology, participate in a mock journal peer review process, and revise the manuscript based on the reviews and develop response to review comments.

1. Project proposal (1-2 pages, due March 4)
   A proposed research project should be in a student’s own area of research and has sufficient spatial data ready for analysis. The proposal needs to include a brief rationale for the study, the research hypotheses, description of data, proposed methods of spatial analyses, and expected outcome.

2. Manuscript and submittal letter (due April 15)

3. Oral presentation (15’ plus 5’ Q&A) of group project (on April 17)

4. Peer review of the manuscripts (due April 22)
   Each group member will submit a review of another group’s manuscript. Each group will then develop a summary of the individual reviews.
5. Revised manuscripts and response to (summary and individual) review comments (due April 29)

**Grading** (A: 90-100%, B: 80-89%, C: 70-79%, D: 60-69%, F: <60%):
- On-line quizzes over lecture and reading materials, 20%.
- Exercises, 10%.
- Paper discussions and synopsis, 15% (synopsis-5%, participation in discussion and quality of contributions-10%).
- Group Assignments, 15% (peer evaluation of group performance-5%, peer evaluation of individual group member performance-5%, quality of manuscript review-5%).
- Group Project, 40% (manuscript-25%, response to review comments-5%, project presentation-10%).

**Reference materials:**
Readings are available in eCampus.

**Notes:**
- Each student please schedule an individual meeting (~15’) with me at the beginning of the semester, during office hours, right after class, or another time by appointment. I would like to get to know you a little and hear your plan for the semester.
- We will form the groups during the first week. Each group needs to have sufficiently strong expertise in ecology and GIS and is ideally composed of students from diverse academic backgrounds. Please make sure to provide opportunities for each group member to contribute and build collaborative and productive groups. There will be an end-of-term peer evaluation of individual group members based on their preparedness for tasks, their contribution to group work, and how well they collaborate with group members.
- Unless specified otherwise, assignments and assessments are due Tuesday nights (you have until 5:00 AM Wednesday). The due dates will be specified in individual assessments/assignments and in the course calendar in eCampus. The eCampus calendar will show Wednesday as the due date, but it’s “really” Tuesday night.

*The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cawley Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu*

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# TENTATIVE SCHEDULE

<table>
<thead>
<tr>
<th>Week of</th>
<th>Topic (lecture video)</th>
<th>Reference Materials</th>
<th>Quiz due</th>
<th>Exercise due</th>
<th>Paper synopsis and discussion</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 13</td>
<td>Organizational meeting (Jan 18)</td>
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<tr>
<td>Jan 20</td>
<td>Landscape Ecology</td>
<td>McFarland 2013 (Background section)</td>
<td></td>
<td></td>
<td>Post a synopsis of a landscape ecological paper</td>
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</tr>
<tr>
<td>Jan 27</td>
<td>Patch-based metrics</td>
<td>McFarland 2013 (Fragstats Metrics: area and edge, shape, core area, and contrast); Wu et al. 2000</td>
<td>Q-Landscape metrics</td>
<td>E-Metrics</td>
<td>Wu 2013; respond to 3 synopses of papers posted by other students</td>
<td>Group 1</td>
</tr>
<tr>
<td>Feb 3</td>
<td>Diversity and Contagion</td>
<td>McFarland 2013 (Fragstats Metrics: aggregation and diversity); Li &amp; Reynolds 1993</td>
<td>Q-Contagion</td>
<td>E-Contagion</td>
<td>Perotto-Baldovi et al. 2011</td>
<td>Group 2</td>
</tr>
<tr>
<td>Feb 17</td>
<td>Autocorrelation, Mantel tests</td>
<td>Fortin &amp; Gurevich 1993; Wu and Misch 1998</td>
<td>Q-Autocor, Mantel tests</td>
<td>E-Mantel tests-PASSAGE</td>
<td>Middleton &amp; Wu 2008</td>
<td>Group 1</td>
</tr>
<tr>
<td>Feb 24</td>
<td>Point pattern analysis</td>
<td>Haase et al. 1996; Feegin and Wu 2007</td>
<td>Q-Point pattern</td>
<td>E-Point pattern/ RIPPER</td>
<td>Martinez et al. 2010</td>
<td>Group 2</td>
</tr>
<tr>
<td>Mar 10</td>
<td>Spring Break (no class)</td>
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<tr>
<td>Mar 17</td>
<td>Kriging</td>
<td>Isaaks &amp; Srivastava 1989 (Chpt 11, 12, 13, 15)</td>
<td>Q-Estimation</td>
<td>E-Geostatistical Analyst</td>
<td>Bai et al. 2009</td>
<td>Group 1</td>
</tr>
<tr>
<td>Mar 24</td>
<td>Quadrat variance methods</td>
<td>Dale 2000 (Chpt 3)</td>
<td>Q-Quadrat variance</td>
<td>E-Quadrat variance-PASSAGE</td>
<td>Liu et al. 2010</td>
<td>Group 2</td>
</tr>
<tr>
<td>Mar 31</td>
<td>Working on group projects; paper presentation/discussion (TBA)</td>
<td>by Group 3</td>
<td></td>
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<tr>
<td>Apr 7</td>
<td>Working on group projects; paper presentation/discussion (TBA)</td>
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<tr>
<td>Apr 14</td>
<td>Working on group projects (manuscript due Apr 15); presentations of group projects (on Apr 17)</td>
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<tr>
<td>Apr 21</td>
<td>Peer review of manuscripts (due Apr 22); course review and feedback</td>
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<tr>
<td>Apr 28</td>
<td>Revised manuscripts and responses to review comments (due April 29); group and individual peer evaluations (due April 29)</td>
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ESSM 671/AGEC 659: ECOLOGICAL ECONOMICS FALL 2014
COURSE SYLLABUS

Instructors
ESSM 671/RENR 659: Urs P. Kreuter, Dept. ESSM, 845-5583, urs@tamu.edu
AGEC 659: J. Richard Conner, Dept. AGEC, 845-7456, jrc@tamu.edu

Venue and Time: ANIN 133 – Tuesday/Thursday 9:35-10:50am

Prerequisites: None

Introduction
Ecological Economics is defined as the study of the relationships between ecosystems and economic systems. In addition, Ecological Economics integrates environmental economics and ecological impact assessment and encourages innovative ways of thinking about the linkages between ecological and economic systems. This trans-disciplinary approach "recognizes the need to make economies more cognizant of ecological impacts and dependencies; to make ecology more sensitive to economic forces, incentives and constraints; and to treat integrated economic-ecological systems with a common set of conceptual and analytical tools" (Robert Costanza, 1989. Ecological Economics, 1:1-7).

The format for the course will be primarily facilitated discussion based on assigned readings, with course instructors or assigned students leading the discussion of each topic. Students must complete assigned readings prior to the class meeting and be prepared to discuss the topic with their peers. Level of class participation will affect the final grade. Students are expected to exhibit professionalism and respect for their peers, be self-motivated and disciplined, think critically, and assimilate, assess and synthesize material covered in class.

The main product for each student in the course will be a 4000-5000 word term paper that is potentially publishable in a peer-reviewed journal. The paper can be either a review or research paper that integrates ecological and economic concepts or issues. The topic of the paper must be approved by the course instructors. Students are encouraged to link their topic to their own graduate research. Each term paper will be reviewed by two other students after which the author must address the reviewer comments and revise their term paper accordingly.

Course Structure
The course is divided into three sections.

Section I: This 7-week section consists of readings-based discussions led by the course instructors to cover basic concepts in Ecological Economics. Students must prepare to discuss the assigned readings during class. By the end of this section, students must submit the topic for their term paper for approval.

Section II: This 3-week section consists of student led discussions of two current issues in the context of Ecological Economics thinking. Small groups of students will be responsible for directing the discussions while all others must participate actively in the discussion. By the end of this section (week 10), students must complete the first draft of their term paper for peer review.

Section III: This 3-week section consists of mini-seminars during which students will present a 15-20 minute summary of their term paper, followed by a 10-minute discussion/critique by the other students. Students will also be required to anonymously review two term papers. By the end of this section, students must revise their term paper and respond to the reviewer comments in writing.
Course Learning Objectives

- **Section I**: Gain knowledge and comprehension about key concepts and principles pertaining to Ecological Economics and about approaches to evaluating ecosystem services.

- **Section II**: Effectively apply this knowledge by examining and analyzing two case studies that focus on interactions between human economic activities and the delivery of ecosystem services and that focus on promoting sustainable development.

- **Section III**: Synthesize the knowledge and analytical skills in an oral seminar presentation a potentially publishable review/research paper, preferably related to the students’ graduate research, which examines the interaction between economic activity and ecosystem function.

Course Learning Outcomes

<table>
<thead>
<tr>
<th>Competence</th>
<th>Skills</th>
<th>Assessment Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section I</strong> Knowledge and Comprehension</td>
<td>Knowledge and recall of major concepts</td>
<td>Class test&lt;br&gt;Question cues: List, define, describe, etc.</td>
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<tr>
<td></td>
<td>Understand, <em>interpret</em>, compare and contrast information</td>
<td>Class test; participation in class discussion&lt;br&gt;Question cues: Summarize, describe, interpret, contrast, distinguish, differentiate, etc.</td>
</tr>
<tr>
<td><strong>Section II</strong> Application and Analysis</td>
<td>Apply information, methods and concepts in new situations</td>
<td>Group led discussions on key topics/case studies&lt;br&gt;Question cues: Examine, demonstrate, illustrate, show, compare, relate, etc.</td>
</tr>
<tr>
<td></td>
<td>Analyze information by identifying components, patterns &amp; differences</td>
<td>Group led discussions on key topics/case studies&lt;br&gt;Question cues: Analyze, classify, connect, separate, arrange, compare, infer, etc.</td>
</tr>
<tr>
<td><strong>Section III</strong> Synthesis and Evaluation</td>
<td>Synthesize concepts by applying knowledge &amp; skills to a new topic</td>
<td>Preparation of draft of term-paper and a short oral presentation of term-paper topic&lt;br&gt;Question cues: plan, design, integrate, modify, prepare, present, etc.</td>
</tr>
<tr>
<td></td>
<td>Evaluate application of key concepts/methods</td>
<td>Review of other students’ term papers and revised personal term paper after peer review&lt;br&gt;Question cues: Assess, rank, grade, recommend, judge, revise, convince, etc</td>
</tr>
</tbody>
</table>

Text Books and Resource Materials

- **REQUIRED**: Web-based assigned readings for Sections I and II
### Grading

<table>
<thead>
<tr>
<th>Section</th>
<th>Topic</th>
<th>Points</th>
</tr>
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<tbody>
<tr>
<td>Section I</td>
<td>Class test covering key concepts covered in first section</td>
<td>300</td>
</tr>
<tr>
<td>Section II</td>
<td>Comprehension and leadership of class discussion on assigned topic</td>
<td>100</td>
</tr>
<tr>
<td>Section III</td>
<td>Content and quality of oral presentation of term paper topic</td>
<td>100</td>
</tr>
<tr>
<td>Section III</td>
<td>Quality of Peer review of other students’ term paper</td>
<td>100</td>
</tr>
<tr>
<td>Section III</td>
<td>Content and quality of final term paper &amp; response to peer comment</td>
<td>300</td>
</tr>
<tr>
<td>All sections</td>
<td>Consistency of participation in class discussion</td>
<td>100</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>1000</strong></td>
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</tbody>
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Grade Allocation:  
A = 1000-900;  B = 899-800;  C = 799-700;  D = 699-600;  F = <599

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### Course and University Policy Statements

**Make-up Test:** Make-up exams will only be given for University Excused Absences (Rule 7).

**Handouts:** Handouts, including reading material and class test, may not be copied without prior permission of the instructor.

**Academic Integrity Statement:** *Aggie Honor Code: “An Aggie does not lie, cheat, or steal or tolerate those who do.”* As a student at Texas A&M University, it is your duty to know and live by the Aggie Honor Code. Ignorance of the rules does not exclude any member of the Texas A&M University community from the requirements or the processes of the Honor System. For additional information visit [www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor).

**Plagiarism:** Plagiarism consists of passing off as one’s own ideas, words, writings, etc., which belong to another. You are committing plagiarism if you copy the work of another person and turn it in as your own, even if you have the permission of that person. Evidence of plagiarism will result in an automatic null mark for the assignment or test, and possible further disciplinary action including expulsion from the course or Texas A&M University. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section “Scholastic Dishonesty.”

**Americans with Disabilities Act (ADA) Policy Statement:** The following ADA Policy Statement (part of the Policy on Individual Disabling Conditions) was submitted to the University Curriculum Committee by the Department of Student Life. The policy statement was forwarded to the Faculty Senate for information. The Americans with Disabilities Act (ADA) is a federal antidiscrimination statute that provides comprehensive civil rights protection for persons with disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities in Room B118 of Cain Hall or call 845-1637.
Section I - Key Topics and Questions

- **Introduction and orientation:** Purpose and scope of the course. Course structure, requirements, and grading.

- **Context – Economics, ecology, and ecological economics:** Economics versus ecology, economic growth versus sustainable development, is there common ground?

- **Carrying capacity – Renewable resources and the "Full" world:** Is carrying capacity real and if so is it fixed? How do we know the world is full? How does this relate to the concept of sustainability?

- **Nature of resources – 2nd law of thermodynamics, and externalities:** Are all substances resources? Why is the entropy concept important from an environmental perspective and does it impose constraints on economic activity? What are production and consumption externalities?

- **Spatial scale – Sustainability and the green footprint:** What is a green footprint? What is the appropriate scale for measuring ecosystem health? What are the implications of increasing globalization for sustainability and how do we deal with this?

- **Temporal scale – Equity and discounting the future:** What is opportunity cost? Should we discount the future values of resources? What discount rate will ensure intergenerational equity?

- **Ecosystem Services – Millennium Ecosystem Assessment:** What are ecosystem services and why are they important for human well-being? What are the four main categories of ecosystem services? How do we conceptually link the biophysical and human factors affecting the delivery of ecosystem services to ensure appropriate monitoring?

- **Ecosystem Services – Biodiversity:** What is biodiversity and why is it important? What is ecosystem resilience? How does biodiversity affect ecosystem services?

- **Ecosystem Services – Valuation tools:** What is the economic value of the world’s ecosystems and the services they provide? Can all ecosystem services be valued using standard market prices? What is B/C and NPV and how are they calculated? How do we value ecosystem services that are not traded in the market place?

- **Ecosystem Services – Efficient and equitable allocation:** What do we mean by efficient allocation of resources? How do we efficiently and equitably allocate resources?

- **Resource use incentives and property rights:** Who gets what and how? Private, common, and public property rights - definitions, and limitations. Why is it important to clearly define defendable rights to resources?
International Sustainable Community Development

Course Syllabus for ESSM 675
Fall 2014

Course Description
This course presents the global trends and a comparative framework on sustainable community development. Students will gain in-depth understanding of the paradigms and processes of community development toward sustainability; and provides students with case analyses for real world exposures in order to prepare them for possible professional careers in pertinent fields.

Instructor
Dr. Su-Hung “Vickey” Chen
Department of Ecosystem Science and Management (ESSM)
Office: Room 253, Centex Building
Phone: +1-979-845-1551
E-mail: ychenclass@gmail.com (preferred); vickeyusa@tamu.edu

Textbook
No required textbook. All materials will be provided on the course website.

Pre-requisite
None for graduate students; senior level undergraduates with consent of the instructor.

Course Delivery
3 credit hours, 100% web-based, distant course. All students are encouraged to schedule meetings via on-line chatting tools or face-to-face appointments.

Course Objectives
1. To present the global trends and a comparative framework on sustainable community development;
2. To help students gain in-depth understanding of the paradigms and processes of community development toward sustainability; and
3. To provide students with case analyses for real world exposures in order to prepare them for possible professional careers in pertinent fields.

Course Website and eLearning
Materials for this course, including articles, can be accessed at http://agrilife.org/essm675/. The eCampus portion of this course will be used to conduct class discussions, to answer questions, to provide a forum for interaction among students and instructors, to submit assignments, and to check grades. The course schedule and the weekly glance page will guide you through the assignments for each week. To access the eCampus portion of ESSM 675:

- Go to http://ecampus.tamu.edu/.
- Click "TAMU (NetID)". Use the NetID and Password that you created for your Neo e-mail account to access the class.
- Once you are in eCampus, select ESSM 675 from “My Courses” box to enter the course. Then you can start navigating through course contents.
International Sustainable Community Development

Course Assignments and Requirements

1. **Leading eLearning Discussion and Leader Summary Essay (5 %):** Each week, one student will be assigned to lead the week’s discussion. No leader will be assigned for Week One. The course instructor will provide 1 discussion questions for each weekly topic. The student leader will be responsible for posting OTHER discussion questions (not more than 3 questions) on the eCampus Discussion Board under “Week # Discussion.” Questions should be provided on eCampus by **Tuesday of the corresponding week at 11:59 PM (Midnight, Central Time).** See the Discussion Leader Assignments table on course website and eCampus for the leader assignments.

The student leader will also practice how to mediate the discussion (under instructor’s supervision) and will be required to submit a 1-3 page (500 – 1000 words) essay. The essay should summarize actual discussion contents, discussion dynamics, and your reflections as a weekly discussion leader. This is due on **Tuesday of the following week at 11:59 PM (Midnight, Central Time)** and should be submitted onto the eCampus Assignments section under “Leader Synopsis” tab.

2. **Participation in eCampus Discussions (10 %):** Students have to post at least one reply to each week’s questions and have to “interact” with other students. They are also encouraged to explore experiences and opinions related to the topic with the goal of gaining a more complete understanding of the issue presented. The discussion is due **Saturday of the corresponding week at 11:59 PM (Midnight, Central Time).**

3. **Weekly Synopses (15 %):** Each week, Students are required to submit a 1-3 page (500 – 1000 words) analysis of main points addressed in weekly reading materials. Address the most important concepts and their practical applications within the synopsis. Be concise and focus on major concepts and applications. The synopsis is due **Saturday of the corresponding week at 11:59 PM (Midnight, Central Time)** and should be submitted on the eCampus Assignments section under “Weekly Synopsis” tab.

4. **Term Project (70 %):** A term project on case analysis of a selected community development program or a selected NGO that advocates sustainable community development, in terms of leadership styles, management practices, program implementation, and accomplishment of goals, is required, and is worth 70% of your grade.

   1) The **Holistic Efficacy Assessment Routine (HEAR)** methodology will be the tool to conduct the assessment. The **Emycin formula** must be applied to analyze the data quantitatively.

   2) Detail and requirements for the term project are addressed in following sections---**Specifications for the Term Project and Format for the Term Project Report.** Other useful resources can be accessed from the eCampus course contents and Resources section under the course website.

   3) Prior to **project proposal/outline submission,** students have to schedule a face-to-face or an online appointment with the course instructor on **Week 5 to Week 6 (September 29 – October 3; October 6-10).** The purpose is to check whether
the proposed project interest is on the right track. The meeting is required and worth 5 (out of 100) points for the term project.

4) **The proposal/outline of the term project is due by Saturday, October 25, 2014 at 11:59 PM (Midnight) Central Time** (submit via eCampus).

5) Students are encouraged to consult with instructors via face-to-face or online appointments or via email anytime if needed.

6) **Term Project Report is due by Saturday, December 13, 2014 at 11:59 PM (Midnight) Central Time** (submit via eCampus Assignments section under “Term Project” tab).

### Specifications for the Term Project

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<thead>
<tr>
<th>Task</th>
<th>Points</th>
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<tbody>
<tr>
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<td>(quantitatively and qualitatively)</td>
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<tr>
<td>Write up a professional report for your term project</td>
<td></td>
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<tr>
<td><strong>Term project report due on 12/13, 11:59 pm (Midnight), Central Time</strong></td>
<td>40 points</td>
</tr>
<tr>
<td><strong>Total: 100 points</strong></td>
<td></td>
</tr>
</tbody>
</table>

Bonus: Powerpoint presentation document; earn extra points for term project if developing this document

### Format for the Term Project Report

1. Students are required to submit two (2) electronic files: (1) a well-written, professional paper in MS Word or PDF format; (2) an MS Excel file (as Appendix) with the process and formulas of qualitative analysis.

2. The paper should be written in MS Word or PDF format, 12 size font, double space, 15 pages or less (EXCLUDE References/Literature cited section and Appendix).

3. The paper should include following required sections (at least but not limited):
   1) **Abstract**: 150 words or less
   2) **Introduction**: Provide background information of your target community development program or the NGO that promotes sustainable development concisely.
   3) **Problem Statement or Goal and Objectives**: Please frame the issue or research question(s) that your paper is addressing; no more than one (1) page.
International Sustainable Community Development

4) **Literature Review**: How the issue or research question(s) has been dealt with? Provide brief description of relevant background and knowledge; five (5) references or more should be cited.

5) **Research (Investigative) Method**: What is your basic framework and scope? How do you conduct survey (please include the survey instrument itself as an Appendix)? How do you go about analyses of the research question(s) at hand?

6) **Results and Discussions**: Synthesize results of analyses; elaborate your views and arguments based on pertinent information you have gathered and in reference to relevant literatures.

7) **Conclusions**: Summarize and articulate your main findings.

8) **References or Literature cited**: should include 5 or more citation sources.

9) **Appendix**: have to include two (2) items in Appendix (at least but not limited)—(1) a survey instrument (questionnaire); (2) an MS Excel file with the process and formulas of qualitative analysis.

10) PowerPoint presentation file can help earn up to 5 extra bonus points if you developing the document.

4. Students are encouraged to team up with classmates with instructors’ permission. However, there will be no peer evaluation mechanism implemented into grade evaluation. Thus, all members in one group will earn the same grade for the term project.

**Grading Rubric**

- **Synopsis**:

  The full score of each week synopses is 15. The paper will be evaluated based on two major components—content (up to 10 points) and writing quality (5 points).

  1) Speaking of content quality, the synopses should be interesting, well-organized, easy to read, and persuasive on addressing the importance of particular topic. Also, to achieve high score, students are expected to include their own opinions and critiques.

  2) Writing quality is evaluated based on the format requirement, organization and structure, whether there is any writing error, etc. Here are detail specifications:

    - **Format Requirement**: Paper MUST contain more than 500 words and less than 1000 words EXCLUDING references and in-text citation (See Course Assignments and Requirements). It is essential to practice delivering your opinions effectively and concisely. Thus, this rule will be applied strictly. If it is not met, “1” point will be deducted.

    - **Organization and Structure**: An introduction paragraph and a clear thesis statement to present the main purpose of the particular synopses are expected. Each paragraph should contain clear argument, strong supporting evidences for the argument, and smooth transitions between ideas and sentences. Also, the linkage among paragraph should be strong and avoid jumping around.

    - **Writing errors**: Any mistake associated with grammar, typo, misspelling words, syntax, etc. can lead to the point deduction. The detail rules are: (1) Minor modification: deduct up to “0.5” point; (2) Major modification (i.e., in general, more than 10 places with mistakes): deduct up to “1” point; (3) If the content is
really sloppy (e.g., too many sentence are fragmented and required to be rephrased), the instructor may ask for resubmission.

After the general overview, we will look into if any extra point deduction due to late submission or bonus point reward should be taken place.

3) Deduction due to Late Submission: Students HAVE TO request for extending deadline and GET the permission priory. Otherwise, the late assignment will NOT BE ACCEPTED.
The detail deduction scheme is: (1) Less or equal to 1 week: up to “0.5” point deduction; (2) ≥1 to 2 weeks: “1.5” point (10% of 15) deduction; (3) ≥2 to 3 weeks: “3” points (20% of 15); (4) ≥3 to 4 weeks: “7.5” points (50% of 15) deduction; (5) ≥4 weeks: “12” points (80% of 15) deduction. However, if the deadline extension is granted universally for the entire class, no deduction will be applied.

4) Others: Few situations can help you earn extra bonus points, for example, including in-text citations and the citation list with the consistent and proper format.

Comments and the summary of grading will be provided for the graded assignment.

- **Discussion Leader Duty:**
The duty and corresponding grading scheme is:
1) Post your questions on time (by Tuesday midnight of the assigned week). This part is worth up to **2.0 out of 5 points**.
2) Practice how to “act” as a discussion leader and how to mediate the discussion section and. This part is worth up to **1.5 out of 5 points**.
3) Submit the leader summary synopsis by Tuesday midnight of the following week via eCampus. This part is worth up to **1.5 out of 5 points**.

- **Discussion Participation:**
  - The maximum grade is 10.
  - Students HAVE TO "answer" weekly questions ON TIME. If the answers are posted on time and respond to ALL QUESTIONS properly, the "BASIC" grade will be assigned ranging from 7.0 to 8.5, unless many mistakes in the posting (e.g., typos, grammar errors, unorganized structure, etc.).
  - Participation COUNTS!!! Because this is a "DISCUSSION" section, it is also important to "INTERACT" with others. In order to achieve higher grades, students are expected to "REPLY" to others' postings. Each reply posting can be rewarded up to **0.5 points**. All participation scores will be summed up and added to the "BASIC" grade. For example, a student has the basic grade--7.5 and total participation score--1.5. The final grade of the particular week discussion will be 9.0 (i.e., 7.5+1.5).
  - Although participation counts, the quality of reply postings still matter. At least, those respond, such as "Yes" or "I agree with you" WITHOUT ANY FURTHER EXPLANATION, will not be counted as a proper interaction and MAY NOT be rewarded any point.
If students did not answer to weekly questions directly, replied parts of questions, or only replied to others' postings, posted contents may be accepted. However, it will lead to the lower end of grades (i.e., lower than 7.0).

- Overall Grading Scheme:
  Individual grades will be posted on http://eCampus.tamu.edu.
  Grades: A: 90 or above; B: 80 – 89; C: <80.
  Leading eLearning Discussion and Leader Summary Essay: 5%
  Participation in eLearning Discussions: 10%
  Weekly Synopsis: 15%
  Term Project and Report: 70%

Help with Writing:
All students are strongly encouraged, regardless of ability, to take advantage of the resources provided by the University Writing Center (http://www.writingcenter.tamu.edu). These services include *free* consultations at any stage of the writing process. Students will get the most benefit out of these consultations if they attend them well before deadlines, and go to the consultations with complete information about the assignments, including the posted grading rubrics.

American Disability Act (ADA)
ADA is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life/Services for Students with Disabilities, in Cain Hall. The phone number is (979) 845-1637.

Academic Integrity Statement
"An Aggie does not lie, cheat, or steal or tolerate those who do."
For more information, read the Honor Council Rules and Procedures at http://www.tamu.edu/aggiehonor.

For further questions regarding course contents, contact Dr. Chen at vchenelass@gmail.com (preferred) or at vickeyusa@tamu.edu.
## International Sustainable Community Development

### Fall 2014 Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>September 1-5</td>
<td>Community development</td>
</tr>
<tr>
<td>2</td>
<td>September 8-12</td>
<td>Sustainable community goal setting</td>
</tr>
<tr>
<td>3</td>
<td>September 15-19</td>
<td>Community development methods and strategies</td>
</tr>
<tr>
<td>4</td>
<td>September 22-26</td>
<td>Community strategic visioning programs</td>
</tr>
<tr>
<td>5</td>
<td>September 29- October 3</td>
<td>Students should <strong>schedule a face-to-face or an online appointment</strong> with the instructor for discussing direction of term project</td>
</tr>
<tr>
<td>6</td>
<td>October 6-10</td>
<td>Making collaboration work in sustainable communities</td>
</tr>
<tr>
<td>7</td>
<td>October 13-17</td>
<td>Sustainable community indicators systems; <strong>Term project documents:</strong> (1) Getting start with the Term Project; (2) Term Project Instructions</td>
</tr>
<tr>
<td>8</td>
<td>October 20-24</td>
<td>Measure success and empowerment of sustainable communities</td>
</tr>
<tr>
<td></td>
<td><strong>Proposal/outline due by October 25, 2014 at 11:59 PM (Midnight) Central Time</strong></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>October 27-31</td>
<td>Sustainable community development with environmental protection; <strong>Term project documents:</strong> (3) The Calculation of HEAR Methodology and EMYCIN</td>
</tr>
<tr>
<td>10</td>
<td>November 3-7</td>
<td>Sustainable community development in economics</td>
</tr>
<tr>
<td>11</td>
<td>November 10-14</td>
<td>Sustainable community development with culture identity</td>
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<tr>
<td>12</td>
<td>November 17-21</td>
<td>Sustainable community development in education</td>
</tr>
<tr>
<td>13</td>
<td>November 24-28</td>
<td>How to develop communities sustainably? <strong>Thursday-Friday, Thanksgiving Holidays</strong></td>
</tr>
<tr>
<td>14</td>
<td>December 1-5</td>
<td>Community development in the future</td>
</tr>
<tr>
<td>15</td>
<td>December 8-12</td>
<td><strong>Term Project</strong>&lt;br&gt;Due Date: December 13, 2014 at 11:59PM (Midnight) Central Time</td>
</tr>
</tbody>
</table>
Leadership Development & Management for Environmental NGOs

Course Syllabus for ESSM 676
Fall 2014

Course Description
In this course (ESSM 676), we will review and discuss fundamental concepts and topics relating to environmental Non-Governmental Organizations. Our goal is to inform and exchange views. For each topic, your objectives are to understand the fundamental problems and potentials of each situation and to develop effective strategies. This is a 3 credit hour, distant-learning course. At the onset, the instructor will work with each student to develop his/her term project as professional practicum. Students are expected learn the methodology on integrated assessment of an NGO of his/her choice on the efficacy of the organization and/or its programs.

Instructor
Dr. Steven G. Whisenant
Department of Ecosystem Science and Management (ESSM)
Office: Room 308, Horticulture/Forest Science Building
E-mail: s-whisenant@tamu.edu

Co-Instructor/Program Coordinator
Dr. Szu-Hung ’Vickey’ Chen
Department of Ecosystem Science and Management (ESSM)
Office: Room 253, Centeq Building
Phone: (979)-845-1551
E-mail: vchenclass@gmail.com (preferred); vickeyusa@tamu.edu

Textbook
No required textbook. All materials are presented here or linked from other outside sites.

Pre-requisite:
None for graduate student; senior level undergraduates with consent of the instructor.

Course Delivery
3 credit hours, 100% web-based, distant course. On-campus students are encouraged to schedule regular meetings.

Course Objectives
This course is designed to present trends and increasing power of NGOs in environment and sustainable development; to help students gain in-depth understanding of the organizational structures, functions, planning and management processes of environmental NGOs; as well as to provide students with real world exposures and to help cultivate students’ technical skills and leadership qualities for possible professional careers with environmental NGOs.

Course Website and eCampus
The course description (e.g., course schedule and weekly topics) can be accessed at both the course website (http://agrilife.org/essm676/) and eCampus. The eCampus portion of this course will be used to conduct class discussions, to submit course assignments, and to check grades. The
course schedule and topics will guide you through the assignments for each week. To access the eCampus portion of ESSM 676:

- Go to http://ecampus.tamu.edu/.
- Click "TAMU (NetID)". Use the NetID and Password that you created for your Neo e-mail account to access the class.
- Once you are in eCampus, select ESSM 676 from “My Courses” box to enter the course.

Course Assignments and Requirements

1. **Leading eLearning Discussion and Leader Summary Essay (5 %):** Each week, one student will be assigned to lead the week’s discussion. No leader will be assigned for Week One. The course instructor will provide 1 discussion questions for each weekly topic. The student leader will be responsible for posting OTHER discussion questions (not more than 3 questions) on the eCampus Discussion Board under “Week # Discussion.” Questions should be provided on eCampus by Tuesday of the corresponding week at 11:59 PM (Midnight, Central Time). See the Discussion Leader Assignments table on course website and eCampus for the leader assignments.

   The student leader will also be required to mediate the discussion and submit a 1-3 page (500 – 1000 words) essay. The essay should summarize the discussion contents and your reflections on the topic. The essay should summarize actual discussion contents, discussion dynamics, and your reflections as a weekly discussion leader. This is due on Tuesday of the following week at 11:59 PM (Midnight, Central Time) and should be submitted onto the eCampus Assignments section under "Leader Synopsis" tab.

2. **Participation in eLearning Discussions (10 %):** Students have to post at least one reply to each week’s topic and have to “interact” with other students. They are also encouraged to explore experiences and opinions related to the topic with the goal of gaining a more complete understanding of the issue presented. The discussion is due Saturday of the corresponding week at 11:59 PM (Midnight, Central Time).

3. **Weekly Synopses (15 %):** Each week, Students are required to submit a 1-3 page (500 - 1000 words) analysis of the main points addressed in the weekly reading materials. Address the most important concepts and their practical applications within the synopsis. Be concise and focus on major concepts and applications. The synopsis is due Saturday of the corresponding week at 11:59 PM (Midnight, Central Time) and should be submitted on the eCampus Assignments section under “Weekly Synopsis” tab.

4. **Term Project (70 %):** A term project on evaluating a selected environmental NGO in terms of leadership styles, management practices, program implementation, and accomplishment of goals is required. This project is worth 70% of your grade.

   1) The Holistic Efficacy Assessment Routine (HEAR) methodology will be the tool to conduct the assessment. The Emycin formula must be applied to perform quantitative data analysis.

   2) Detail and requirements for the term project are addressed in following sections— Specifications for the Term Project and Format for the Term Project Report. Other useful resources can be accessed from the eCampus course contents and Resources section under the course website.
3) Prior to project proposal/outline submission, students have to schedule a face-to-face or an online appointment with the course instructor on Week 5 to Week 6 (September 29 – October 3; October 6-10). The purpose is to check whether the proposed project interest is on the right track. The meeting is required and worth 5 (out of 100) points for the term project.

4) Draft outline of the term project is due by Saturday, October 25, 2014 at 11:59 PM (Midnight) Central Time (submit via eCampus).

5) Term Project Report is due by Saturday, December 13, 2014 at 11:59 PM (Midnight) Central Time (submit via eCampus Assignments section under “Term Project” tab).

Specifications for the Term Project

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Bonus: Powerpoint presentation document; earn extra points for term project if developing this document

Up to 5 points

Format for the Term Project Report

1. Students are required to submit two (2) electronic files: (1) a well-written, professional paper in MS Word or PDF format; (2) an MS Excel file (as Appendix) with the process and formulas of qualitative analysis.

2. The paper should be written in MS Word or PDF format, 12 size font, double space, 15 pages or less (EXCLUDE References/Literature cited section and Appendix).

3. The paper should include following required sections (at least but not limited):
   1) **Abstract**: 150 words or less
   2) **Introduction**: Provide background information of your target NGO or NGO’s project concisely.
   3) **Problem Statement or Goal and Objectives**: Please frame the issue or research question(s) that your paper is addressing; no more than one (1) page.
4) **Literature Review**: How the issue or research question(s) has been dealt with?
Provide brief description of relevant background and knowledge; five (5) references or more should be cited.

5) **Research (Investigative) Method**: What is your basic framework and scope? How do you conduct survey (please include the survey instrument itself as an Appendix)? How do you go about analyses of the research question(s) at hand?

6) **Results and Discussions**: Synthesize results of analyses; elaborate your views and arguments based on pertinent information you have gathered and in reference to relevant literatures.

7) **Conclusions**: Summarize and articulate your main findings.

8) **References or Literature cited**: should include 5 or more citation sources.

9) **Appendix**: have to include two (2) items in Appendix (at least but not limited)—(1) a survey instrument (questionnaire); (2) an MS Excel file with the process and formulas of qualitative analysis.

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4. Students are encouraged to team up with classmates with instructors’ permission. However, there will be no peer evaluation mechanism implemented into grade evaluation. Thus, all members in one group will earn the same grade for the term project.

**Grading Rubric**

- **Synopsis**:
  The full score of each week synopses is 15. The paper will be evaluated based on two major components—content (up to 10 points) and writing quality (5 points).

  1) Speaking of content quality, the synopses should be interesting, well-organized, easy to read, and persuasive on addressing the importance of particular topic. Also, to achieve high score, students are expected to include their own opinions and critiques.

  2) Writing quality is evaluated based on the format requirement, organization and structure, whether there is any writing error, etc. Here are detail specifications:

  - **Format Requirement**: Paper MUST contain more than 500 words and less than 1000 words EXCLUDING references and in-text citation (See Course Assignments and Requirements). It is essential to practice delivering your opinions effectively and concisely. Thus, this rule will be applied strictly. If it is not met, “1” point will be deducted.

  - **Organization and Structure**: An introduction paragraph and a clear thesis statement to present the main purpose of the particular synopses are expected. Each paragraph should contain clear argument, strong supporting evidences for the argument, and smooth transitions between ideas and sentences. Also, the linkage among paragraph should be strong and avoid jumping around.

  - **Writing errors**: Any mistake associated with grammar, typo, misspelling words, syntax, etc. can lead to the point deduction. The detail rules are: (1) Minor modification: deduct up to “0.5” point; (2) Major modification (i.e., in general, more than 10 places with mistakes): deduct up to “1” point; (3) If the content is really sloppy (e.g., too many sentence are fragmented and required to be rephrased), the instructor may ask for resubmission.
Leadership Development & Management for Environmental NGOs

After the general overview, we will look into if any extra point deduction due to late submission or bonus point reward should be taken place.

3) **Deduction due to Late Submission:** Students **HAVE TO** request for extending deadline and **GET** the permission priory. Otherwise, the late assignment will **NOT BE ACCEPTED**.

The detail deduction scheme is: (1) Less or equal to 1 week: **up to “0.5” point deduction**; (2) >1 to 2 weeks: **“1.5” point (10% of 15) deduction**; (3) >2 to 3 weeks: **“3” points (20% of 15)**; (4) >3 to 4 weeks: **“7.5” points (50% of 15) deduction**; (5) >4 weeks: **“12” points (80% of 15)** deduction. However, if the deadline extension is granted universally for the entire class, no deduction will be applied.

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Comments and the summary of grading will be provided for the graded assignment.

- **Discussion Leader Duty:**
  The duty and corresponding grading scheme is:

  1) Post your questions on time (by Tuesday midnight of the assigned week). This part is worth up to **2.0 out of 5 points.**

  2) Practice how to “act” as a discussion leader and how to mediate the discussion section and. This part is worth up to **1.5 out of 5 points.**

  3) Submit the leader summary synopsis by Tuesday midnight of the following week via eCampus. This part is worth up to **1.5 out of 5 points.**

- **Discussion Participation:**
  - The maximum grade is 10.
  - Students **HAVE TO** "answer" the weekly leader's questions **ON TIME.** If the answers are posted on time and respond to ALL QUESTIONS properly, the "BASIC" grade will be assigned ranging from 7.0 to 8.5, unless many mistakes in the posting (e.g., typos, grammar errors, unorganized structure, etc.).
  - **Participation COUNTS!!!** Because this is a "DISCUSSION" section, it is also important to "INTERACT" with others. In order to achieve higher grades, students are expected to "REPLY" to others' postings. Each replying posting can be rewarded up to 0.5 points. All participation scores will be summed up and added to the "BASIC" grade. For example, a student has the basic grade--7.5 and total participation score--1.5. The final grade of the particular week discussion will be 9.0 (i.e., 7.5+1.5).
  - Although participation counts, the quality of replying postings still matter. At lease, those respond, such as "Yes" or " I agree with you" **WITHOUT ANY FURTHER EXPANSION**, will not be counted as a proper interaction and **MAY NOT** be rewarded any point.

  - If students did not answer to the leader's question directly, replied parts of questions, or only replied to others' postings, the posted contents may be accepted. However, it will lead to the lower end of grade (i.e., lower than 7.0).
Leadership Development & Management for Environmental NGOs

- **Overall Grading Scheme:**
  - Individual grades will be posted on [http://ecampus.tamu.edu](http://ecampus.tamu.edu).
  - Grades: A: 90 or above; B: 80 – 89; C: <80.
  - Leading eLearning Discussion and Leader Summary Essay: 5 %
  - Participation in eLearning Discussions: 10 %
  - Weekly Synopses: 15 %
  - Term Project and Report: 70 %

**Help with Writing:**
All students are strongly encouraged, regardless of ability, to take advantage of the resources provided by the University Writing Center ([http://www.writingscenter.tamu.edu](http://www.writingscenter.tamu.edu)). These services include *free* consultations at any stage of the writing process. Students will get the most benefit out of these consultations if they attend them well before deadlines, and go to the consultations with complete information about the assignments, including the posted grading rubrics.

**American Disability Act (ADA)**
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life/Services for Students with Disabilities, in Cain Hall. The phone number is (979) 845-1637.

**Academic Integrity Statement**

"An Aggie does not lie, cheat, or steal or tolerate those who do."

For more information, read the Honor Council Rules and Procedures at [http://www.tamu.edu/aggiehonor](http://www.tamu.edu/aggiehonor).

For further questions regarding course contents, contact Dr. Whisenant at s-whisenant@tamu.edu or Dr. Chen at vchenclass@gmail.com (preferred) or atvickeyusa@tamu.edu.
## Fall 2014 Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Dates</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>September 1-5</td>
<td>Visioning of E-NGOs</td>
</tr>
<tr>
<td>2</td>
<td>September 8-12</td>
<td>Environmental NGOs and their Operations</td>
</tr>
<tr>
<td>3</td>
<td>September 15-19</td>
<td>Knowledge and Skills for Effective Environmental Decision Making</td>
</tr>
<tr>
<td>4</td>
<td>September 22-26</td>
<td>Research Methods for NGO Management</td>
</tr>
<tr>
<td>5</td>
<td>September 29-October 3</td>
<td>Leadership for NGOs &lt;br&gt; Students should <strong>schedule a face-to-face or an online appointment</strong> with the instructor for discussing direction of term project</td>
</tr>
<tr>
<td>6</td>
<td>October 6-10</td>
<td>NGOs, Development and Social Change &lt;br&gt; Students should <strong>schedule a face-to-face or an online appointment</strong> with the instructor for discussing direction of term project</td>
</tr>
<tr>
<td>7</td>
<td>October 13-17</td>
<td>NGO Management I: Systems and Strategies; &lt;br&gt; <strong>Term project documents</strong>: (1) Getting start with the Term Project; (2) Term Project Instructions</td>
</tr>
<tr>
<td>8</td>
<td>October 20-24</td>
<td>NGO Management II: Program Development and Capacity Building &lt;br&gt; <strong>Proposal/outline due by October 25, 2014 at 11:59 PM (Midnight) Central Time</strong></td>
</tr>
<tr>
<td>9</td>
<td>October 27-31</td>
<td>Financial Resource Management; <strong>Term project documents</strong>: (3) The Calculation of HEAR Methodology and EMYCIN</td>
</tr>
<tr>
<td>10</td>
<td>November 3-7</td>
<td>Issue and Opportunity Analysis, Agenda Setting and Program Development</td>
</tr>
<tr>
<td>11</td>
<td>November 10-14</td>
<td>Agenda-oriented Networking and Coalition Building</td>
</tr>
<tr>
<td>12</td>
<td>November 17-21</td>
<td>Policy Development and Advocacy</td>
</tr>
<tr>
<td>13</td>
<td>November 24-28</td>
<td>Marketing and Promotion of Environmental Programs &lt;br&gt; <strong>Thursday-Friday, Thanksgiving Holidays</strong></td>
</tr>
<tr>
<td>14</td>
<td>December 1-5</td>
<td>International Relations Management</td>
</tr>
<tr>
<td>15</td>
<td>December 8-12</td>
<td><strong>Term project</strong>&lt;br&gt; <strong>Due Date: December 13, 2014 at 11:59PM (Midnight) Central Time</strong></td>
</tr>
</tbody>
</table>
ESSM 681
Seminar
Spring 2014
HFSB 104
4-5 pm Tuesday

Instructor: Robert B. Shaw
225d ANIN
rbshaw@tamu.edu
10-11 MTWT

Course Description: Reviews and discussions of current topics and advances in
Ecosystem Science and Management.

Learning Outcomes: Students will be able to discuss current issues within the field of Ecosystem
Science and Management. They also will be able to organize and conduct a research seminar, as well as
defend questions concerning their research topic.

Prerequisite: Graduate classification.

Grading: Participation (attendance and discussion) 50%, presentation 50%.

Requirements: Students are expected to attend each scheduled seminar. Also, each student will be
required to give a 50 minute presentation on their research topic.

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comprehensive civil rights protection for persons with disabilities. Among other things, this legislation
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accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For
additional information visit http://disability.tamu.edu.

Academic Integrity Statement and Policy
Honor Code - “An Aggie does not lie, cheat or steal, or tolerate those who do.”
For further information see Honor Council Rules and Procedures on the web:
http://aggiehonor.tamu.edu.)
Department of Ecosystems Science & Management  
Fall Semester 2014 Seminar Series  
Incorporating Grand Challenges into the ESSM Mission

Seminar Description
This seminar series has been organized to engage qualified academics in a discussion of how the Department of Ecosystem Science & Management (ESSM) may most meaningfully contribute to the Grand Challenges established by the College of Agriculture and Life Sciences. The nexus between energy, water, and food security, as it relates to navigating tradeoffs among these components, represents a primary focus and contribution of ESSM to the Grand Challenges. This seminar series is intended to inform an approach that is capable of framing and assessing this nexus and contributing to the management of these Grand Challenges.

Seminar Speakers
Sept. 16. Dr. Alan Sams, Associate Dean, COALS. Leader of College Grand Challenges Initiative – Engaging Grand Challenges in the College of Agriculture and Life Sciences.


Sept. 30. Dr. Kevin Wagner, Associate Director, Texas Water Resource Institute, TAMU. Capacity and Goals of the Texas Water Resources Institute.

Oct. 7. Dr. Rebeca McCulley, Associate Professor, Plant and Soil Sciences, University of Kentucky. Land Use and Great Plains Grassland Ecosystem Function.

Oct. 14. Dr. Bruce McCarl, Distinguished Professor, Agricultural Economics, TAMU - Climate Change, Developments and Embodied Challenges for the TAMU AgriLife Scientist.

Oct. 21. Dr. John Nielson-Gammon, Regents Professor, Atmospheric Sciences and Texas State Climatologist, TAMU. The Great Texas Drought of 2062-2074.

Oct. 28. Dr. Ronald Kaiser, Professor and Chair, Texas Water Program, Recreation, Parks, and Tourism, TAMU - Texas’ Grand Water Challenges: What is the Universities Role?


Nov. 11. Dr. Ann O’M. Bowman, Professor and Hazel Davis and Robert Kennedy Endowed Chair in Government and Public Service. Governments and Environmental Policy: Changing the Landscape.
FRSC 420 – Arboriculture
Spring 2014 Syllabus and Class Policies

CLASS MEETING TIMES AND LOCATIONS
T 5:00pm-8:00pm, 317 ANIN

INSTRUCTOR
Dr. W. Todd Watson, PhD, BCMA
Cell: 979-218-0783 (yes, I have 24-hour voice mail)
Hm. 936-825-7697 (emergencies only and not before 7:00 am or after 9:00 pm)
todd-watson@earthlink.net
Office hours are by appointment (except the hour preceding class)

COURSE DESCRIPTION AND PREREQUISITES
Tree selection and planting to fit climatic, space and edaphic conditions; diagnosing tree
abnormalities and practicing intensive tree care. Frequent field work and demonstrations.
Prerequisite: Senior classification or approval of instructor.

LEARNING OUTCOMES
Arboriculture deals with the care of trees. In its broadest sense, arboriculture includes shade
trees, ornamental trees, food trees, timber trees, and amenity trees. This course deals more
specifically with trees in urban areas. Shade trees are the largest living organism in the urban
landscape and therefore have high economic, ecological, and social values for urban dwellers.
Because of this, a great amount of effort is expended to care for urban and community trees.
This course is designed so that the student will be able to:
1. discuss new and better ways to help trees stay healthy, safe, and attractive,
2. explain how trees grow, defend themselves, and eventually die,
3. comprehend legal, ethical, and business issues associated with urban trees,
4. identify arboricultural equipment and safe work practices,
5. diagnose common physiological and structural problems in trees,
6. demonstrate professional skills and standards of excellence that will be invaluable in a
   professional career.

TEXT (Not Required)

REQUIRED MATERIALS
Internet access with an email account (active throughout the semester)
Access to a computer with Word, Word Perfect, or other word processing software
Enrollment on class website at http://groups.yahoo.com/group/FRSC420/
GRADE CRITERIA

<table>
<thead>
<tr>
<th>Category</th>
<th>Points</th>
<th>% of grade</th>
<th>Grading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>100</td>
<td>25%</td>
<td>360-400 = A</td>
</tr>
<tr>
<td>Exam 2</td>
<td>100</td>
<td>25%</td>
<td>320-359 = B</td>
</tr>
<tr>
<td>Exam 3</td>
<td>100</td>
<td>25%</td>
<td>280-319 = C</td>
</tr>
<tr>
<td>Final Exam</td>
<td>100</td>
<td>25%</td>
<td>240-279 = D</td>
</tr>
<tr>
<td>Totals</td>
<td>400</td>
<td>100%</td>
<td>&lt;240 = F</td>
</tr>
</tbody>
</table>

Students will be accountable on exams for all course materials covered in lectures, guest lectures, texts, additional reading, and web pages. The final exam will be cumulative. In order to be fair to all students, final grades may be curved up. Grading criteria will follow policies outlined in Texas A&M University Student Rules (see http://student-rules.tamu.edu/). There is no outside/extra work for extra credit; however, bonus points may be included on exams.

CLASS WEBSITE

Lecture notes, study questions, helpful websites, syllabus, and other helpful information will be posted on the Yahoo website to assist you in performing well in this class. The website contains a message board that allows you to ask questions of the class or me. In addition, there is a chat room that you are welcome to use to meet with other students and study for the exam or ask questions. The website contains a calendar that will notify you of important assignments that are outlined in the syllabus. The website will notify you of any changes that I make to the website. It is your responsibility to sign into the website (using your official Texas A&M University Neo email address) to stay current with assignments and other useful information. If you are having trouble logging in, please let me know.

I will also post your grades on the website using a four digit number of your choosing. You will be given the option on the first exam to decide whether you want your grades posted and the identification number that you want to use. Grades will be posted as quickly as reasonably possible. All grades posted to the web should be considered unofficial. In addition, your class participation grade will not be posted on the web because of the possibility of someone associating your identification number with you. The information on the website is not available for public access. My authorization is required before anyone is allowed to join the website group and view any of the information contained therein. Please meet with me personally for detailed information about your grade.

MAKE-UP ASSIGNMENTS:

Make-up assignments will follow policies outlined in Texas A&M University Student Rules (see http://student-rules.tamu.edu/ and http://attendance.tamu.edu). It is the student's responsibility to read and follow the Student Rules. Make-ups will be given only for acceptable, excused absences on the official University list.

ACADEMIC HONESTY AND INTEGRITY

"An Aggie does not lie, cheat, or steal or tolerate those who do."

Upon accepting admission to Texas A&M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the
FRSC 420 Syllabus and Class Policies

philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System.

For additional information please visit: http://www.tamu.edu/aggiehonor/

CLASS DEMEANOR

It is the responsibility of Texas A&M University to provide a learning environment, and it is the responsibility of the students to respect the rights of others. Disrupting class is more than discourteous; it is a violation of Texas A&M’s policy (see http://student-rules.tamu.edu/). Out of respect for the other students, the instructor, and university regulations, electronic communication devices, such as beepers and cell phones, must be inactive during class time. Violation of this policy will result, at minimum, in the student being asked to leave the class. Similarly, other types of disruptions that interfere with the opportunity for others to learn, such as conversation, snoring, music, or riffling through the latest issue of the Battalion during the lecture will not be tolerated.

LEARNING ASSISTANCE

I always welcome the opportunity to assist students interested in learning about arboriculture. I will try to use several teaching and testing methods to accommodate the varied learning styles of the students in class, and I make it a point to be very approachable outside of class. I am also very interested in positive and negative feedback that will help me to improve the course or my teaching style. Interaction between teachers and students is a very powerful way of learning information. Office hours are set aside for this purpose as well as other times by appointment. You can also leave me a note, call me, or send email. Because Texas A&M sets the standard for professionalism, please review the textbook and additional readings first before asking questions. This technique will serve you well in your professional careers. Out of fairness to all students, I never make my lecture notes available other than what is passed out in class or posted on the class website, so it is your responsibility to obtain additional notes from a classmate. My goal is to motivate and challenge you intellectually while providing instructional support, so if you are having a difficult time grasping the material, please let me know. It is your responsibility to let me know if you need help!

DISABILITIES

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Cain Hall or call 845-1637.
## 2014 LECTURE SCHEDULE*

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic</th>
<th>Text Chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>T 1/13</td>
<td>Class Intro; Tree Biology</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>T 1/21</td>
<td>Tree Biology</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>T 2/28</td>
<td>Tree Biology; Tree Pruning</td>
<td>2 &amp; 14</td>
</tr>
<tr>
<td>4</td>
<td>T 2/4</td>
<td>Tree Pruning; Tree-Soil Relations</td>
<td>4, 7, &amp; 14</td>
</tr>
<tr>
<td>5</td>
<td>T 2/11</td>
<td>EXAM #1; Tree-Soil Relations</td>
<td>4, 7, &amp; 13</td>
</tr>
<tr>
<td>6</td>
<td>T 2/18</td>
<td>Tree Nutrition and Fertilization</td>
<td>12</td>
</tr>
<tr>
<td>7</td>
<td>T 2/25</td>
<td>Tree Support and Protection Systems</td>
<td>17</td>
</tr>
<tr>
<td>8</td>
<td>T 3/4</td>
<td>Safe Work Practices</td>
<td></td>
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<tr>
<td>9</td>
<td>T 3/11</td>
<td>Spring Break! 🎉</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>T 3/18</td>
<td>Tree Selection, Installation, and Management</td>
<td>5-6 &amp; 8-10</td>
</tr>
<tr>
<td>11</td>
<td>T 3/25</td>
<td>EXAM #2; Plant Health Care</td>
<td>18-19</td>
</tr>
<tr>
<td>12</td>
<td>T 4/1</td>
<td>Plant Health Care</td>
<td>18-19</td>
</tr>
<tr>
<td>13</td>
<td>T 4/8</td>
<td>Trees and Construction</td>
<td>10-11</td>
</tr>
<tr>
<td>14</td>
<td>T 4/15</td>
<td>Tree Assessment and Risk Management</td>
<td>16 &amp; 18</td>
</tr>
<tr>
<td>15</td>
<td>T 4/22</td>
<td>EXAM #3; Treevia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T 5/6</td>
<td>FINAL EXAM 6:00pm-8:00pm</td>
<td></td>
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</tbody>
</table>

* I reserve the right to make reasonable changes (with prior notice) to the topics and reading assignments outlined in the course schedule to accommodate guest lecturers and to improve the course content and learning opportunity for the students.

GOOD LUCK AND BEST WISHES FOR A SUCCESSFUL SEMESTER!
OBJECTIVES
The primary objective of this course is to survey the principles and concepts of ecology for undergraduate students taking their first course in ecology. The course emphasizes the relevance of ecology to contemporary society by relating ecological principles to high profile issues including, biodiversity, sustainable resource use, human population growth, and global change. As a result of taking this course, students should appreciate and understand:

- The importance of science and ecology to contemporary society,
- Vital ecological services provided by various ecosystems,
- The effects of organism-environment interactions and how they shape organism adaptation and distribution,
- Population growth patterns in contrasting environments, and
- Patterns and characteristics of major ecosystems of North America and the Earth.

INSTRUCTORS
Dr. David D. Briske  
Ecosystem Science & Management Dept.  
Room 328  
Animal Industries Building  
Telephone: 845-7331  
Email: dbriske@tamu.edu

Dr. Michael L. Morrison  
Wildlife & Fisheries Sciences Dept.  
Room 216B  
Old Heep Building  
Telephone: 862-7667  
Email: mlmorrison@tamu.edu

Dr. Briske will teach the first two units of the course and Dr. Morrison will teach the last two units. Each instructor will teach their respective units in both sections (501 and 502) of the course. This enables students to attend lectures in either section, but exams must be taken in the section for which you have registered.

TEXTBOOK

EVALUATION PROCEDURES
There will be three one-hour exams during the semester and a final exam at the end of the term. Each examination will consist of 50 multiple choice questions worth 2 points each, for a total of 100 points. The final exam will not be comprehensive, but will consist of a 100-point exam of Unit IV. Eleven 10 point quizzes, consisting of 10 multiple choice questions each, will be taken in class during the semester, and the lowest grade will be dropped. These quizzes will be conducted with an i-clicker so each student is required to have one each class period. Six concept analyses valued at 10 points each will opportunities to investigate important ecological concepts in greater depth outside of class. Grades will be assigned as a percentage of 550 total points acquired in the four exams, 10 highest quizzes, and 5 highest concept analyses scores. Students completing all six concept analyses will receive extra credit for the sixth assignment. Ten i-clicker participation activities totaling 30 points will be presented in-class as bonus points to encourage attendance and participation.
Evaluation Instruments and Point Values
4 100-point class examinations  400 points
10 10-point in-class quizzes    100 points
5 10-point ‘Concept Analyses’  50 points
10 3-point ‘Participation Activities’  30 bonus points

Grade Assignments
A=90-100%  (495-550 points)
B=80-89%    (440-494 points)
C=70-79%    (385-439 points)
D=60-69%    (330-384 points)
F=0-59%     (< 330 points)

Exams will be scantron graded; students must provide their own full page scantrons (NCS mp90051 or 0-101607-TAMU). A valid student identification card, a scantron, and a No. 2 lead pencil with an eraser are required for all exams. Points will be deducted for students that do not fill in their scantrons properly. No personal electronic devices may be used during the exams.

MAKE-UP EXAMINATIONS
Make-up examinations will be given provided that students present a documented University-excused absence within 1 week of the scheduled exam. An excused absence means that illness or some other problem beyond your control prevented you from taking the scheduled exams. Make-up exams must be taken within 4 weeks of the scheduled exam. Instructors are under no obligation to provide an opportunity for students to make up course work missed because of unexcused absences (see TAMU Regulations below). Make-up exams will include a combination of short answer, fill-in-the-blank, and graph interpretation questions in addition to multiple choice. Opportunities to make-up missed quizzes and concept analyses will require clear, valid documentation. No opportunity will be provided to make-up participation activities. These policies will be strictly enforced.

ATTENDANCE
Many examination questions originate from the lectures and experience shows that those students who attend class consistently obtain the highest scores. Attendance is expected and will be recorded during most class periods with i-clickers. The University views class attendance as an individual student responsibility. Students are expected to attend class and to complete all assignments. Instructors are expected to give adequate notice of the dates on which major tests will be given and assignments will be due.
7.1 The student is responsible for providing satisfactory evidence to the instructor to substantiate the reason for absence.
7.3 If the student is seeking an excused absence, they must notify his or her instructor in writing (acknowledged e-mail message is acceptable) prior to the date of absence if such notification is feasible. In cases where advance notification is not feasible (e.g. accident, or emergency) the student must provide notification by the end of the second working day after the absence. This notification should include an explanation of why notice could not be sent prior to the class. If needed, the student must provide additional documentation substantiating the reason for the absence, that is satisfactory to the instructor, within one week of the last date of the absence. The make-up work must be completed in a timeframe not to exceed 30 calendar days from the last day of the initial absence.
7.4 The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence. (Texas A&M University, Student Rules, 2013; student-rules.tamu.edu/rule07).
RENR 205 on eCampus
RENR 205 on eCampus (http://ecampus.tamu.edu/) will contain the syllabus, lecture outlines, concept analysis assignments, and grade information for the course. An eCampus page will be set up automatically for each student and this page will contain a link to the RENR 205 page. The user name and password for your eCampus page are the same as those for your NEO account. Lecture outlines are designed to facilitate note taking during lecture and do NOT provide a complete study guide.

LEARNING ENVIRONMENT
Please contribute to a positive and constructive learning environment throughout the semester by:
• Attending class on time and staying through the entire session
• Sitting near the front of the room
• Turning off all electronic devices (except if you write notes on a laptop)
• Minimize talking and other distracting activities

RENR 215 LABORATORY
This one credit hour class is a separate course from RENR 205. Students wishing to take it must register for it separately. Please contact your undergraduate academic advisor for questions regarding this course. Students often take RENR 215 after completing this course.

AMERICANS WITH DISABILITIES ACT
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Our policy is to assign a grade of zero for any exam on which a student is cheating, which will very likely result in course failure. These individuals will also be reported for honor code violations.
<table>
<thead>
<tr>
<th>Book Chapter</th>
<th>Lecture Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit I: Instructor-Briske</strong></td>
<td></td>
</tr>
<tr>
<td>Chapter 1</td>
<td>Introduction: What is Ecology?</td>
</tr>
<tr>
<td>Chapter 2</td>
<td>Soils, Climate &amp; Climate Change</td>
</tr>
<tr>
<td>Chapter 2</td>
<td>Life on Land</td>
</tr>
<tr>
<td>Chapter 3</td>
<td>Life in Water</td>
</tr>
</tbody>
</table>

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**EXAMINATION I (Wednesday, February 5)*******************************************************************************

**Unit II: Instructor-Briske**

| Chapter 16 | Species Abundance and Diversity                   |
| Chapter 22  | Geographic Ecology                                |
| Chapter 18  | Primary Production and Energy Flow                |
| Chapter 19  | Nutrient Cycling and Retention                    |
| Chapter 20  | Succession and Stability                          |

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**EXAMINATION II (Friday, February 28)*******************************************************************************

**Unit III: Instructor- Morrison**

| Chapter 5   | Temperature Relations                             |
| Chapter 6   | Water Relations                                   |
| Chapter 7   | Energy and Nutrient Relations                    |
| Chapter 9   | Population Distribution and Abundance            |
| Chapter 10  | Population Dynamics                               |

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**EXAMINATION III (Wednesday, April 2)*******************************************************************************
<table>
<thead>
<tr>
<th>Book Chapter</th>
<th>Lecture Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit IV: Instructor- Morrison</td>
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<tr>
<td>Chapter 11</td>
<td>Population Growth</td>
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<td>Chapter 4</td>
<td>Population Genetics and Natural Selection</td>
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<td>Chapter 12</td>
<td>Life Histories</td>
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<td>Chapter 13</td>
<td>Competition</td>
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<td>Chapter 14</td>
<td>Exploitation: Predation, Herbivory, Parasitism and Disease</td>
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<td>Chapter 15</td>
<td>Mutualism</td>
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<td>Chapter 23</td>
<td>Global Ecology</td>
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******************************************************FİNAL EXAMİNAȚİON******************************************************

Section 501: Monday, May 5, 8:00 - 10:00 am
Section 502: Tuesday, May 6, 3:30 - 5:30 pm
RENR 405 Geographic Information Systems for Environmental Problem Solving
& ESSM 651 Geographic Information Systems

Course Syllabus for Spring 2014

Credit Hours
3 credit hours

Class Time and Location
Online only

Instructor
Dr. Rusty Feagin
Department of Ecosystem Science & Management
Centex Building Room #221C
2120 TAMU (mail stop)
Phone: (979) 862-2612

Co-Instructor
Ms. Sasathorn ‘Sasa’ Tapaneyakul, Ph. D. Candidate
Centex Building Room #253
2138 TAMU (mail stop)
Phone: (979) 845-1551
E-mail: TAMUSTARRLAB@gmail.com
Office Hours: Monday - Friday 8 a.m. to 5 p.m. by appointment

Contact Methods
Questions and comments must be submitted to TAMUSTARRLAB@gmail.com. Expect 12-24 hour response time. DO NOT SEND YOUR INQUIRIES TO ECAMPUS OR NEO EMAILS. Important messages sent to the whole class will be delivered to your Neo Email. Do not reply to the Neo Email and inquire via TAMUSTARRLAB@gmail.com instead.

Frequently asked questions will be posted on eCampus Discussion Board. Students are encouraged to communicate with each other and ask questions via the Discussion Board. Be sure to check this regularly.

Prerequisites
Basic knowledge of using computers and installation of software/data.

Computer Requirements
It is recommended that the computer used for the course meet the following requirements:

- Windows Operating System with:
  - Minimum 2 GHz processor
  - Minimum 2 GB RAM
  - Minimum 5 GB of free Hard Drive space
  - DVD-ROM drive
• A reliable high-bandwidth web connection (LAN, cable modem, or DSL)
• A reliable e-mail address that supports attachments
• The following software:
  o Microsoft Office: Word, Excel, and PowerPoint
    Available for $10 through Software Evaluation and Licensing Library (SELL)
    (http://software.tamu.edu)
  o Adobe Acrobat Reader (http://www.adobe.com)
• ArcGIS software is not compatible with Mac (and there is no mac-compatible version of
  this software). If you have a Mac computer, please consult with the school’s Help Desk
  (http://hdc.tamu.edu/) for options and assistance to install Windows on your Mac.

Course Materials
No textbook is required for this class; reference materials will be provided via course packet,
course website, and eCampus.

Within the first week of the course, students enrolled in Sections 599 or 699 will be required to
come by Animal Industries Building Room 322 to pick up the course packet between 8 a.m. to
noon and 1 to 5 p.m. from Ms. Maria Martinez. Please bring a valid form of identification as you
will be required to sign out for the packet. You will not be allowed to pick up the course packet
for anyone other than yourself.

Students enrolled in Sections 700, 701, 720, or 721 need to send an email to
TAMUSTARRLAB@gmail.com with preferred mailing address so that the course packet can be
mailed out promptly. The course packet will include: a copy of ArcGIS software, course DVD
(containing all required datasets and course materials), course syllabus, and software installation
instructions (Module 1).

Course Website and eCampus
The course will be delivered using the course website, eCampus, email, and course DVD.
Materials for this course can be accessed from the course DVD (under “Learning_Materials”
folder and “Module_Instructions” file) OR at http://starr.tamu.edu/gis. The eCampus portion of
this course will be used to complete weekly assessments, conduct class discussions, submit
midterm examination and final project, and check grades. The course Schedule & Assignments
and the Topic (under each week’s schedule) pages will guide you through the topic and
assignments for each week.

To access the eCampus portion of the course: Go to http://ecampus.tamu.edu. Click “Log In.”
Use the NetID and Password that you created for your Neo E-mail account to access the class.
Once you are in eCampus, Select “14 SPRING ESSM 651_RENR 405: Gis Env Problem
Solving” to enter the course.

Learning Outcomes
1. General Outcomes
   • Integrate data and information from a variety of sources, from both spatial and
     non-spatial databases.
   • Identify data needs and appropriate processing methods in the context of a GIS project.
- Formulate and assess spatial models and their applicability for solving problems in natural resources.
- Generate and organize a plan for geoprocessing that leads to a desired project outcome.
- Interpret and discuss the principles of GPS technologies, combine that information in the context of a GIS.
- Design maps as a form of visual communication according to cartographic principles.
- Display a recognition of the responsibility of adhering to ethical standards in decision-making on behalf of clients and the public, in the context of managing a project, collaborating within a project team.
- Prepare and deliver a technical presentation that outlines a natural resource problem of a spatial nature and justifies its solution as a series of steps using spatial technologies.

2. Specific Outcomes
In addition to the general course learning outcomes, students shall cultivate knowledge, skills, abilities and methodologies to conduct integrated Quality of Life (QOL) assessment. QOL is a hot-pursued subject matter in urban planning, city management and community development. Specific objectives include:
- Help students gain critical-thinking ability to structure problem-solving process in real world environment.
- Facilitate students’ gaining of spatial knowledge and analytic skills pertaining to the use of GIS tool for problem-solving in a spatial context.
- Enable students to apply critical-thinking abilities, spatial knowledge and problem-solving skills to conduct integrated assessment on QOL and on issues in their respective domains of interest.

Course Description
The class will be conducted as an online course.

The class is self-paced with deadlines for assessments, midterm examination, and final project (and additional project for ESSM 651; see the schedule below). Each week, students will read the materials from the course DVD (or course website) AND complete weekly assessment and/or other assignments as suggested by the schedule.

Students should send an email message to TAMUSTARRLAB@gmail.com as soon as they are able to complete Module 1, i.e., successfully install and open ArcGIS on the computer. Students who are unable to complete Modules 1 and 2 by the end of week 2 should contact Sasa immediately.

As deemed necessary, ad hoc meetings will be held at Center 253 on the A&M campus. Off-campus students may request a conference call.

Questions submitted to TAMUSTARRLAB@gmail.com will be answered promptly. Relevant questions and answers, with identifying information removed, will be posted on eCampus Discussion Board and/or send to the whole class via Neo Email.

Course assignments must be completed and submitted by the assigned due dates through eCampus (for weekly assessments, midterm examination, final project, and additional project)
and via email to TAMUSTARRLAB@gmail.com (for midterm examination, final project, and addition project).

Assessments
Students complete one assessment for each week (for weeks 1-7 and weeks 10-13, i.e., 11 assessments in total). The assessments are located on eCampus under the “Assessments” tab.

Midterm Examination
Students complete one midterm examination that can be found on eCampus under “Midterm Examination” tab. The exam will be submitted as an attachment to TAMUSTARRLAB@gmail.com AND on eCampus by clicking on the “Midterm Examination” tab. The exam must be submitted in the form of an Adobe Acrobat (.pdf) or Word Document (.doc or .docx).

Final Project
Students complete one final examination in the form of a final project that integrates the knowledge and skills derived from prior learning materials and modules. Students will develop a map-based Quality of Life (QOL) report with pertinent parameters set by each individual student. Final projects are to be completed individually. No collaboration. Specific requirements for the final project can be found on the course website or in the course DVD under “Final Project Requirements.” Instructions for the project are covered in Modules 8-10 in the Module Instructions file. The final project will be submitted as attachments to TAMUSTARRLAB@gmail.com AND through eCampus by clicking on the “Final Project” tab. The Final Project must be submitted in the forms of an Adobe Acrobat (.pdf) or Microsoft PowerPoint (.ppt or .pptx) presentation AND an ArcMap Document (.mxd).

Grading
RENR 405 and ESSM 651 is a stacked course meaning that ESSM 651 students will complete all of the required work of RENR 405 with one exception.

ESSM 651 students will be required to complete an additional project along with the final project. The additional project can be located under the “Additional Project” tab on eCampus and on your course DVD. The additional project must be completed and submitted by the assigned due date to TAMUSTARRLAB@gmail.com and through eCampus. The additional project and the final project will be averaged together worth a total of 25% of your final course grade.

RENR 405 students can complete the additional project as an option to earn up to 10 extra points on top of your final course grade.

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<thead>
<tr>
<th>Category for RENR 405</th>
<th>Weight</th>
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<tr>
<td>Completion of 11 assessments @ 5% per assessment</td>
<td>55%</td>
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<tr>
<td>Midterm Examination</td>
<td>20%</td>
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<tr>
<td>Final Project</td>
<td>25%</td>
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<tr>
<td>Total</td>
<td>100%</td>
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### Category for ESSM 651

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<th>Category</th>
<th>Weight</th>
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<tr>
<td>Completion of 11 assessments @ 5% per assessment</td>
<td>55%</td>
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<tr>
<td>Midterm Examination</td>
<td>20%</td>
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<tr>
<td>Final Project/Additional Project</td>
<td>25%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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### Student Participation

You are expected to complete **one assessment for each week (11 assessments in total), a midterm examination, and a final project (and an additional project for ESSM 651)**, and communicate with Sasa regarding your progress, especially if you are unable to complete the coursework.

Additionally, we ask that you record the amount of time you spend completing each module and report that information to Sasa at the end of the semester. This information will only be used to guide the efforts of future students.

### Course Policies

Online course is a different learning experience for many. Your active participation and time management are keys to succeed in an online class. You need to keep up with the schedule and deadlines as if you were attending class on campus. Plan ahead, manage your time wisely, and allow sufficient amount of time to complete course assignments. The course will move at a fast pace. Do not procrastinate! Go through the materials and submit work in a timely manner. Make use of the provided materials in the course packet, course website, and eCampus. Follow the module instructions strictly. Do not jump from one step to another. The modules are built upon each other for the most part. Therefore, you need to complete the previous steps before moving on to the next. Log on to eCampus frequently to keep track of the courses and communicate with others. If you have questions, check the eCampus Discussion Board first and do not hesitate to ask if such questions have not been raised.

### Deadlines

Assignments are due by 4:00 am (Central Time) on the day specified on the schedule, unless stated otherwise. You are accountable for staying on the semester schedule should technological or other problems arise. You should contact Sasa immediately if an emergency may affect your ability to meet course deadlines.

### Late Work

Late work will not be accepted unless it is university excused.

### Make-up Assessments, Assignments, or Exams

No make-up assessments, assignments, or exams will be given.

### Technical Issues

It is imperative that you strictly follow the steps in the module instructions. Save and back up the data files frequently. Loss of data, corrupted files, or technical issues related to the computer are not acceptable grounds for an assignment extension.
Working Ahead
Since the course is self-paced, you may work ahead on assignments and complete the course earlier than scheduled.

Collaborations
Students are encouraged to communicate via eCampus Discussions and work together. However, each has to produce and submit his or her original work. If similarities are found, a grade of zero will be assigned.

Navigate the Course
Each week, you are required to:
1. Read course materials
   - Available on the course website under each week’s topic on Schedule & Assignment page OR on the course DVD under the folder “Learning_Materials”
2. Go through the Module Instructions
   - Available on the course website under each week’s topic on Schedule & Assignment page OR on the course DVD under the file “Module_Instructions”
   - And concurrently work on ArcGIS following the steps in the Module Instructions
3. Complete weekly assessment (for weeks 1-7 and weeks 10-13) that may be due that week located on eCampus under the “Assessments” tab.
4. Complete midterm examination (for week 8) and final project (and additional project for ESSM 651; from week 10 onward) located on eCampus under the “Midterm Examination,” “Final Project,” and “Additional Project” tabs according to the schedule and deadlines.

American Disability Act (ADA) Policy Statement
The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information, visit http://disability.tamu.edu.

Academic Integrity Statement
“An Aggie does not lie, cheat, or steal, or tolerate those who do.” For more information, read the Honor Council Rules and Procedures at http://aggiehonor.tamu.edu/.

Spring 2014 Schedule & Assignments
All assessments are due on Saturday at 4:00 a.m. (Central Time) of the corresponding week according to the schedule. See the specific due dates on the schedule below for further information.

The only exception is the first assessment, Assessment I, which is due the following Saturday, January 25 at 4:00 a.m. (Central Time). Midterm examination and final project are due as specified on the schedule.
By Week 13 (starting April 7), RENR 405 students can continue working on the final project, while attempting on the additional project (optional for RENR 405). ESSM 651 students can work on both required projects concurrently. The assessment for this week, Assessment 11, is still REQUIRED for both RENR 405 and ESSM 651 students.

<table>
<thead>
<tr>
<th>WEEK</th>
<th>MODULE</th>
<th>TOPIC</th>
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<tbody>
<tr>
<td>1</td>
<td>Module 1</td>
<td>Installation of Course Materials and Introduction</td>
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<tr>
<td>January 13-17</td>
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<td>- Install ArcGIS Software</td>
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<td></td>
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<td>- Upload Datasets</td>
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<td></td>
<td></td>
<td>- System operability test</td>
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<td></td>
<td>Assessment 1 due Saturday, January 25 at 4:00 a.m. Central Time (log on to ecampus.tamu.edu)</td>
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| 2          | Module 2 | Fundamentals of GIS Operations                                    |
| January 21-24 |        | - Learn the basic operations of:                                  |
|            |        | 1. ArcCatalog                                                    |
|            |        | 2. ArcMap                                                        |
|            |        | 3. Applicable Extensions                                         |
|            |        | - Be able to give an example of an environmental problem         |
|            |        | - Understand the basic problem solving steps                     |
|            |        | Assessment 2 due Saturday, January 25 at 4:00 a.m. Central Time (log on to ecampus.tamu.edu) |

| 3          | Module 3 | Maneuvering of Digital Elevation Model (DEM)                     |
| January 27-31 |        | - Learn to analyze, interpret, and classify Elevation Data       |
|            |        | - Acquisition, importing and processing DEMs                     |
|            |        | - DEM analysis for delineation of the project area               |
|            |        | - Raster to vector conversion of DEM generated areas of interest |
|            |        | Assessment 3 due Saturday, February 1 at 4:00 a.m. Central Time (log on to ecampus.tamu.edu) |

<p>| 4          | Module 4 | Data Manipulation and Extraction                                |
| February 3-7 |        | - Acquisition, importing and processing of Census data          |
|            |        | - Overlay of shapefiles: the integrated use of Census and flood data |
|            |        | - Spatial-attribute analysis for damage assessment               |
|            |        | Assessment 4 due Saturday, February 8 at 4:00 a.m. Central Time (log on to ecampus.tamu.edu) |</p>
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<th>WEEK</th>
<th>MODULE</th>
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<tr>
<td>5</td>
<td>Module 5</td>
<td><strong>Editing Spatial Data</strong></td>
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<tr>
<td>February 10-14</td>
<td></td>
<td>• Create new features</td>
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<td>• Modify features</td>
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<td>• Cut polygons</td>
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<td>• Extending the basic skills, e.g. Clipping</td>
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<td><strong>Assessment 5 due Saturday, February 15 at 4:00 a.m.</strong> (log on to ecampus.tamu.edu)</td>
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<tr>
<td>6</td>
<td>Module 6</td>
<td><strong>Automate the Address Locating Process</strong></td>
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<tr>
<td>February 17-21</td>
<td></td>
<td>• Basic use of Address Locator function in GIS</td>
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<td>• Automation of address locating process</td>
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<td></td>
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<td>• Creating new GIS layer from results of address locating process</td>
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<td>• Creating attribute data in a database management system and link it to the newly created GIS layer</td>
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<td><strong>Assessment 6 due Saturday, February 22 at 4:00 a.m.</strong> (log on to ecampus.tamu.edu)</td>
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<tr>
<td>7</td>
<td>Module 7</td>
<td><strong>Geo-Referencing: Making raw imagery usable in GIS</strong></td>
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<tr>
<td>February 24-28</td>
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<td>• Acquisition, importing and processing of raw imagery of an area that carries information of interest</td>
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<td>• Preliminary setup and fitting of raw imagery to a reference GIS layer</td>
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<td>• Registering control points and iterative refinement of raw imagery toward creating a geo-referenced dataset</td>
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<td>• Linking attribute data to features of interest on the newly created geo-referenced dataset</td>
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<td><strong>Assessment 7 due Saturday, March 1 at 4:00 a.m.</strong> (log on to ecampus.tamu.edu)</td>
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<tr>
<td>8</td>
<td>Midterm</td>
<td><strong>Midterm Examination Due Saturday, March 8, 2014 at 4:00 a.m.</strong></td>
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<tr>
<td>March 3-7</td>
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<td>Central Time (log on to ecampus.tamu.edu)</td>
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<td>9</td>
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<td>Spring Break</td>
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<td>March 10-14</td>
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<td>WEEK</td>
<td>MODULE</td>
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| 10  March 17-21 | Module 8 | **Framing the Problem and Identifying Data Needs for QOL Analysis**  
- Identifying factors and associated data sets that contribute to QOL of a city/community  
- Converting between vector and raster data and their integrated use for subsequent QOL analysis |
|      |        | **Assessment 8 due Saturday, March 22 at 4:00 a.m. Central Time (log on to ecampus.tamu.edu)** |
| 11  March 24-28 | Module 9 | **Support Tools, Data Assembly, and Preliminary Processing**  
- Basic of raster data manipulation  
- Flow directions and flow paths  
- Distance functions  
- Geo-statistical analysis  
- Normalizing Data |
|      |        | **Assessment 9 due Saturday, March 29 at 4:00 a.m. Central Time (log on to ecampus.tamu.edu)** |
| 12  March 31-April 4 | Module 10 | **Map Algebra, Emucin Equation, and Creation of a Final Report for QOL Analysis**  
(City of College Station is used as the case study)  
- The use of Map Algebra in the Raster Calculator  
- Encoding fuzzy logic algorithm of Emucin as Map Algebra for use in the Raster Calculator  
- Iterative process of combining indices derived from various factors contributing to QOL of a township  
- Manipulation of the final result, including its conversion from raster to vector  
- Spatial overlays and queries for the depictions of locale-specific and city-wide QOL indicators  
- Design of map-based documents  
- Integration of spatial, graphic, attribute data into a cohesive reporting document |
<p>|      |        | <strong>Assessment 10 due Saturday, April 5 at 4:00 a.m. Central Time (log on to ecampus.tamu.edu)</strong> |</p>
<table>
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<tr>
<th>WEEKS</th>
<th>MODULE</th>
<th>TOPIC</th>
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</table>
| 13     | Module 11: Additional Project (Optional for RENR 405) | **Evaluating Environmental Impacts from an Environmental Problem or a Natural Disaster**  
(Gulf of Mexico Oil Spill is used as the case study)  
- Framing the impact from an oil spill, i.e., progression of the oil spill  
- Locating, acquiring and organizing pertinent datasets (using wildlife and habitat as focus of practice)  
- Converting and normalizing data for integrated analysis  
- Map algebra to generate pertinent spatial-temporal indices  
- Reporting for professional audiences and for the general public  
Assessment 11 (REQUIRED for ALL students) due Saturday, April 12 at 4:00 a.m. Central Time (log on to ecampus.tamu.edu) |
| 14     | Final Project (and Additional Project) | **Work on Final Project(s)**  
- RENR 405 students’ assignment is on QOL Analysis using the City of College Station as the case study  
- ESSM 651 students have an additional project on Impact Analysis of Oil Spill using the Gulf of Mexico Oil Spill as the case study |
| 15     | Final Project (and Additional Project) | **Work on Final Project(s)**  
- RENR 405 students’ assignment is on QOL Analysis using the City of College Station as the case study  
- ESSM 651 students have an additional project on Impact Analysis of Oil Spill using the Gulf of Mexico Oil Spill as the case study |
| 16     | Final Project (and Additional Project) | **Final Project (and Additional Project) Due Saturday, May 3, 2014 at 4:00 a.m. Central Time** |
RENR 410 – ECOSYSTEM MANAGEMENT
SPRING 2014

Lecture: Tuesday and Thursday, 9:35-10:50 am, ANIN 317
Lab Section 501/502: Tuesday/Thursday 3:05-5:30 pm, ANIN 103B

Instructor: Urs P. Kreuter, ANIN 217, urs@tamu.edu, 979-845-5583
Teaching Assistant: Kyle Clifton, ANIN 203, clifontamu@gmail.com

Office Hours: Tuesday and Thursday 11:00 AM – 12:30 PM

COURSE DESCRIPTION
The course focuses on concepts and practices relevant to the development of Ecosystem Management Plans at various spatial scales.

PREREQUISITES
Junior or senior status in the Ecosystem Science & Management or consent of instructor.

VISION, GOAL AND OBJECTIVES
My VISION is for graduating students to view Ecosystem Management holistically.
The overall GOAL of the course is for students to learn and apply the principles and practices of Ecosystem Management.
To achieve this goal, students will focus on four specific OBJECTIVES:

1. Develop the systems thinking, critical thinking, writing, group participation and leadership skills required by "modern natural resource professionals."
2. Be able to describe the elements and principles of Ecosystem Management and to differentiate them from land management at the individual property scale.
3. Analyze examples of Ecosystem Management at different geographic scales.
4. Prepare reports on applications of Ecosystem Management viewed in field studies.

LEARNING OUTCOMES
Class lectures and discussions – (1) Articulate elements that lead to effective decision-making and problem solving within a systems framework; (2) Describe applications of complex multiple stakeholder Ecosystem Management.
Laboratory – (3) Through group activities, demonstrate skills needed to acquire, process, organize and present information, and to solve problems associated with stakeholder-supported Ecosystem Management plans.
Field Trips – (4) Provide written documentation of systems thinking, critical thinking skills, and multi-stakeholder decision making for natural resources challenges that require multi-stakeholder solutions.
REQUIRED BOOKS AND ASSIGNED READINGS

- Additional Assigned readings on web page.

Students must complete reading assignments BEFORE coming to class and must be ready to discuss the topics in class! Quizzes will be given randomly on assigned readings.

GRADERS

Comprehensive Tests
- Test 1 200 (13.3%)
- Test 2 200 (13.3%)
- Test 3 200 (13.3%)
Subtotal 600 (40%)

Writing Assignments
- Report 1 – Individual Writing Intensive report based on Field Trip 1 300 (20%)
- Report 2 – Group report of LIP Grant Proposal 75 (5%)
- Report 3 – Group report based on Field Trip 2 150 (10%)
- Final Ecosystem Management report (including Exec. Summary) 75 (5%)
Subtotal 600 (40%)

Preparation and Participation
- Class quizzes and active participation in class discussions 150 (10%)
- Active lab group participation 150 (10%)
Subtotal 300 (20%)

Total Score 1,500 (100%)

MAKE-UP TESTS, MISSED LABS, LATE SUBMISSIONS AND FIELD TRIPS POLICY

Make-up exams will only be given for University Excused Absences (Rule 7).

Lab exercises cannot be made up because the participatory process cannot be repeated.

Late submissions of written assignment will each incur a 10% grade deduction for the first late day and an additional 5% for each additional late day. No report will be accepted 2 weeks past due or after the final class meeting! You cannot pass this course without completing assignments on time!

PARTICIPATION IN THE FIELD TRIPS IS MANDATORY! See the teaching schedule for dates of each field trip! Only University Excused Absences will be accepted as reasons for non-attendance. Students who miss a field trip will be required to complete an additional report on a topic assigned by the instructor.
WRITTEN REPORTS

The written reports for the course consist of two field trip reports, a LIP grant proposal and a final integrative Ecosystem Management Report that includes revised versions of the individual reports. The three reports are as follows: Report 1 – Individual Writing Intensive report of Field Trip 1 (2000 words 12 pt Times Roman double spaced); Report 2 – Group LIP proposal; Report 3 – Group report of Field Trip 2 (2000 words 12 pt Times Roman double spaced). Each report will be written using information derived from assigned readings, individual notes, class discussions, and information gathered during the field trips. All reports must be typewritten using correct grammar, a plain and clear writing style, and supporting information. Use maps, photographs, and data where appropriate (but not to pad). You are expected to refer to relevant literature. Be sure to cite all work to which you refer whether you are quoting that work directly or using it indirectly. If you use a direct quote, use quotation marks. Failure to correctly cite references will result in a deduction of points.

Each report will include the following general structure: Abstract, introduction, procedure, findings, discussion, conclusion, and references. For more detailed information see the attached report guideline. The final Ecosystem Management Report will be arranged according to the attached structure and will include an Executive Summary that links the two detailed field trip reports and that provides an overall integrative conclusion. Each individual Writing intensive report will be graded and returned for revision and inclusion into the final Ecosystem Management Report. Initial graded drafts of the individual reports must be appended to the final report to allow the instructor to determine how you revised each report.

You are strongly encouraged to visit the University Writing Center (UWC), located in Evans Library at least once prior to submitting the first field trip report to ensure correct grammar and writing style. The UWC consultants will not proofread or edit your papers but they will help you improve your organizational and writing skills. When you visit the UWC, take a copy of your writing assignment, a hard copy of your draft and any notes that you may have, as well as any material with which you need help. To find out more about UWC services or to schedule an appointment call 458-1455 or visit the web page at http://writingcenter.tamu.edu.

PLAGIARISM

DO NOT PLAGIARIZE! Plagiarism consists of passing off as one’s own the ideas, words, writings, etc., which belong to another. You are committing plagiarism if you copy the work of another person and turn it in as your own, even if you have the permission of that person. Evidence of plagiarism will result in an automatic null mark for the assignment or test, and will be reported to TAMU authorities. If you have any questions regarding plagiarism, please consult the latest issue of the Texas A&M University Student Rules, under the section “Scholastic Dishonesty.”

ACADEMIC INTEGRITY STATEMENT

“An Aggie does not lie, cheat, or steal or tolerate those who do.”

As a student at Texas A&M University, it is your duty to know and live by the Aggie Honor Code. For details, please refer to the Honor Council Rules and Procedures at http://aggiehonor.tamu.edu

AMERICANS WITH DISABILITIES ACT

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, in Cain Hall, Room B118, or call 845-1637. For additional information visit http://disability.tamu.edu
ENVIRONMENTAL IMPACT ASSESSMENT
RENEWABLE NATURAL RESOURCES 470/660

Dr. Fred E. Smeins
Ecosystem Science and Management
Texas A&M University
College Station, TX

W 8:00 – 8:50
Th 4:00 – 6:00
MITCHELL PHYSICS BLDG. (MPHY) 205

Spring 2014
Grades:

<table>
<thead>
<tr>
<th></th>
<th>Undergraduates</th>
<th>Graduates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two Semester Examinations</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Final Examination</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Exercises, Quizzes, etc.*</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Semester Project</td>
<td>***</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>500 points</td>
<td>700 points</td>
</tr>
</tbody>
</table>

*Exercises should be turned in during class on the due date or to my office or to Maria Martinez's office (ANIN 322) by 5:00 on the due date.

ATTENDANCE

Role will be checked at the beginning of the semester to account for everyone on the roster. Thereafter role will NOT be taken EXCEPT when outside speakers make presentations to the class; a roster will be circulated at the end of each presentation for student's signatures. Absence from or early departure from a presentation by an outside speaker, without an adequate excuse, will result in a 10 point reduction in your total points (500/700) for the semester.

MAKE-UP EXAMINATION

If you miss a regularly scheduled examination, only excused absences will be accepted as a pass to take a make-up examination. An excused absence means that illness or some other problems beyond your control prevented you from preparing for, or being present at, a scheduled exam. You must register your excused absence within 7 days of the missed exam.

Exercises received after 5:00 of the due date will not be accepted unless accompanied by a written excuse.

ASSUMPTIONS

You are a Senior or Graduate Student.

You have a basic understanding of ecological concepts and the interrelatedness of ecosystem components.

You possess some knowledge of the scientific/technical aspects of air, water, soil, plants, animals, microbes, etc.

You have a basic familiarity with renewable and non-renewable resources and how they relate to environmental quality, ecosystem health and human health.

QUALIFICATIONS/LIMITATIONS

Impossible to cover all aspects of environmental impact assessment in one course.

Will focus on natural resource aspects of environmental assessment with less, but some, attention to environmental hazards and human health.

Will not deal with whether or not environmental laws are appropriate, fair, reasonable, etc. We
ENVIRONMENTAL IMPACT ASSESSMENT
RENR 470/660
Spring 2014

Instructor:

Dr. Fred E. Smeins
Ecosystem Science and Management
ANIN 319
Phone 845-5573
E-mail: f-smeins@tamu.edu

Learning Outcomes:

1. Appreciate the conservation/environmental history of the United States and how that has influenced current views, laws and regulations related to the environment and land use.

2. Be able to assess various approaches to environmental impact assessment

3. Be familiar with the content, purpose and process of the National Environmental Policy Act (NEPA)

4. Be able to prepare and review environmental assessments and environmental impact statements necessary for NEPA compliance

5. Be able to provide the content for and facilitate the permitting process to comply with the Endangered Species Act, the Clean Water Act, the National Historic Preservation Act and other resource related laws.

6. Be cognizant of the myriad of laws and regulations that apply to environmental/land use issues and the professional approach to deal with these often contentious issues

Prerequisites:

Senior or graduate student status in a department dealing with environmental/economic/social aspects of environment/natural resource management.

Textbook and Class Notes:

No Textbook Required

Two books that are excellent references for NEPA background are:


Class notes will be available through eLearning.
will accept that they exist and our objective is to assess the environment in the context of existing laws and regulation, and become familiar with the permitting process.

Environmental assessment is not a fixed subject – Science, Technology, Methodology, Laws, and Regulations keep changing and you must constantly make adjustments to those changes.

Several outside experts will participate in the course to assist with selected topics.

**AMERICANS WITH DISABILITIES ACT (ADA) POLICY STATEMENT**

The American with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact the Department of Student Life, Services for Students with Disabilities, in Room 126 of the Koldus Building or call 845-1637.

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For more information see the Honor Council Rules and Procedures on the web at; http://www.tamu.edu/aggiehonor

**COPYRIGHT**

The handouts used in this course are copyrighted. By "handout," we mean all materials generated for this class, which include but are not limited to syllabi, quizzes, exams, lab problems, in-class materials, review sheets, and additional problem sets. Because these materials are copyrighted, you do not have the right to copy the handouts, unless we expressly grant permission.

As commonly defined, plagiarism consists of passing off as one's own the ideas, words, writing, etc., which belong to another. In accordance with this definition, you are committing plagiarism if you copy the work of another person and turn it in as your own, even if you should have the permission of that person. Plagiarism is one of the worst academic sins, for the plagiarist destroys the trust among colleagues without which research cannot be safely communicated.

If you have any questions regarding plagiarism, please consult the latest issue of the *Texas A&M University Student Rules*, under the section "Scholastic Dishonesty."
COURSE OUTLINE

Wednesday January 15  Introduction, Course Topics, Requirements
Thursday January 16  Resources/Environment/Population/commons, Environmental Impact Assessment
Wednesday January 22  Resources/Environment/Population/commons, Environmental Impact Assessment
Tuesday January 23  Evolution of Conservation/Environmental Laws, Regulations, Agencies, and Significant Events
Wednesday January 29  Conservation/Environmental Laws, etc.
Thursday January 30  NEPA
Wednesday February 5  NEPA
Thursday February 6  NEPA
Wednesday February 12  NEPA
Thursday February 13  NEPA
Wednesday February 19  NEPA
Thursday February 20  Examination No.1

The following portion of the outline is from last year. The same general topics will be covered, however, exact dates and topics are yet to be determined. An updated outline will be posted when speakers, topics and dates are finalized.

Wednesday February 26  Clean Water Act
Phase I Environmental Site Assessment Clean Water Act
Thursday February 27  Endangered Species Act
Law/Sections
Dr. Karen H. Clary
Senior Program Manager
Plant Conservation Program
Lady Bird Johnson Wildflower Center

Wednesday March 5  Finish Clean Water Act
National Pollution Discharge Elimination Act (NPDES)
<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thursday</td>
<td>March 6</td>
<td>Waters of the U.S. Law Regulations, Delineation, Permits</td>
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<tr>
<td></td>
<td></td>
<td>James Thomas, Ricky Wilson</td>
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<td></td>
<td></td>
<td>HDR Engineering</td>
</tr>
<tr>
<td>Monday-Friday</td>
<td>March 10-14</td>
<td>SPRING BREAK</td>
</tr>
<tr>
<td>Wednesday</td>
<td>March 19</td>
<td>Review Thomas/Wilson Presentations</td>
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<tr>
<td></td>
<td></td>
<td>Agricultural/Rural Waters of the U.S.</td>
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<tr>
<td>Thursday</td>
<td>March 20</td>
<td>Floodplains</td>
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<td></td>
<td></td>
<td>Laws, Regulations, Procedures</td>
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<tr>
<td>Wednesday</td>
<td>March 26</td>
<td>TBA</td>
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<tr>
<td>Thursday</td>
<td>March 27</td>
<td>Wetland Mitigation</td>
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<td></td>
<td></td>
<td>Matt Stahman</td>
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<td></td>
<td></td>
<td>Senior Project Manager</td>
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<td></td>
<td></td>
<td>SWCA Environmental Consultant</td>
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<tr>
<td>Wednesday</td>
<td>April 2</td>
<td>Examination No. 2</td>
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<tr>
<td>Thursday</td>
<td>April 3</td>
<td>National Historic Preservation Act</td>
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<td></td>
<td></td>
<td>Bill Martin</td>
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<td></td>
<td></td>
<td>Texas Historical Commission</td>
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<td></td>
<td></td>
<td>Procedures, Historical Properties, MOA</td>
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<tr>
<td>Wednesday</td>
<td>April 9</td>
<td>TBA</td>
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<tr>
<td>Thursday</td>
<td>April 10</td>
<td>Graduate Student Presentation</td>
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<td></td>
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<td>Hydraulic Fracturing</td>
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<td></td>
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<td>David Burnett</td>
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<td>Director of Technology</td>
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<td>Global Petroleum Research Institute</td>
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<td></td>
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<td>Gaye McElwain</td>
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<td></td>
<td></td>
<td>Texas Railroad Commission</td>
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<td>Wednesday</td>
<td>April 16</td>
<td>Texas Riparian Law</td>
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<td>Thursday</td>
<td>April 17</td>
<td>Graduate Student Presentation</td>
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<td></td>
<td></td>
<td>Texas State Water Plan</td>
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<td></td>
<td>Groundwater Laws, Regulations</td>
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<td></td>
<td></td>
<td>Edwards Aquifer HCP</td>
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<td></td>
<td></td>
<td>Brenner Brown</td>
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<td></td>
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<td>Texas Water Development Board</td>
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<td></td>
<td></td>
<td>Todd Votteler</td>
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<td></td>
<td></td>
<td>Guadalupe-Blanco River Authority</td>
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<tr>
<td>Wednesday</td>
<td>April 23</td>
<td>TBA</td>
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<tr>
<td>Day</td>
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<tr>
<td>Thursday</td>
<td>April 24</td>
<td>Graduate Student Presentation</td>
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<tr>
<td></td>
<td></td>
<td>Endangered Species Act (Mitigation)</td>
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<tr>
<td></td>
<td></td>
<td>Matt Wagner</td>
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<td></td>
<td></td>
<td>Deputy Director</td>
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<td></td>
<td></td>
<td>Wildlife Division</td>
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<td></td>
<td></td>
<td>Texas Parks and Wildlife</td>
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<tr>
<td>Friday</td>
<td>May 2</td>
<td>Final Examination 10:00-12:00</td>
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</tbody>
</table>
Appendix E – Assessments
E-1. TAMU Undergraduate Learning Outcomes
E-1. TAMU UNDERGRADUATE LEARNING OUTCOMES

A student who graduates from Texas A&M University with a baccalaureate degree will have acquired the knowledge and skills necessary to:

Master the depth of knowledge required for a degree, including the ability to
- articulate disciplinary and interdisciplinary theories, concepts, principles, skills, and practices;
- synthesize knowledge across courses and other experiences; and
- apply knowledge from core curriculum courses, discipline-based courses, and other experiences in a range of contexts to solve problems and make decisions.

Demonstrate critical thinking, including the ability to
- evaluate, analyze, and integrate information from a variety of sources;
- use appropriate strategies and tools to represent, analyze, and integrate information; and
- develop critical, reasoned positions.

Communicate effectively, including the ability to
- demonstrate effective oral communication skills (which could include the use of languages such as American Sign language for those who do not communicate orally);
- demonstrate effective writing skills;
- demonstrate effective nonverbal communication skills (which could include appropriate use of performance, design, or representations such as maps, tables, and graphs);
- listen actively and critically;
- present work effectively to a range of audiences; and
- effectively communicate original and creative ideas.

Practice personal and social responsibility, including the ability to
- practice ethical leadership;
- recognize an ethical dilemma and apply rational decision-making in order to address it;
- choose ethical courses of action in research and practice;
- acknowledge and address the consequences of one’s own actions; and
- engage in local and global civic activities.

Demonstrate social, cultural, and global competence, including the ability to
- live and work effectively in a diverse and global society;
- articulate the value of a diverse and global perspective; and
- recognize diverse economic, political, cultural, and religious opinions and practices.

Prepare to engage in lifelong learning, including the ability to
- exhibit the skills necessary to acquire, organize, reorganize, and interpret new knowledge;
- show proficiency in current technologies and the ability to adapt to emerging technologies;
- recognize and participate in activities that enhance wellness of body, mind, and spirit;
- formulate a plan of personal goals for continued professional growth; and
- demonstrate intellectual curiosity.

Work collaboratively, including the ability to
- participate effectively in teams;
- consider different points of view; and
- work with others to support a shared purpose or goal.
E-2. ESSM Revised (DRAFT) Program Learning Outcomes
# E-2. ESSM REVISED (DRAFT) PROGRAM LEARNING OUTCOMES

Graduates from ESSM BS degree programs will be expected to:

<table>
<thead>
<tr>
<th>1. <strong>Understanding Ecological Systems</strong>: Describe the basic components of ecological systems and interpret processes at the organism, population, community, ecosystem, landscape, and global levels.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. <strong>Natural History of Plants</strong>: Identify plants, their uses, distribution, habitats, and relationships with other organisms.</td>
</tr>
<tr>
<td>3. <strong>Science</strong>: Describe how climate, soils, and biota interact with to influence energy flow, hydrology, and biogeochemistry.</td>
</tr>
<tr>
<td>4. <strong>Spatial Sciences</strong>: Apply the concepts and demonstrate ability to conduct basic spatial analysis.</td>
</tr>
<tr>
<td>5. <strong>Ecosystem Economics and Policies</strong>: Develop strategies for dealing with economic, policy, and business environments relevant to ecosystem management.</td>
</tr>
<tr>
<td>6. <strong>Analysis of Data</strong>: Apply basic statistics concepts and methods to develop sampling designs and collect, analyze, and interpret natural resources inventory and monitoring data.</td>
</tr>
<tr>
<td>7. <strong>Management Strategies</strong>: Design and/or select management strategies for restoring and sustaining ecosystem goods and services.</td>
</tr>
<tr>
<td>8. <strong>Critical Thinking/Problem Solving</strong>: Illustrate critical thinking and demonstrate problem-solving skills.</td>
</tr>
<tr>
<td>9. <strong>Communication</strong>: Demonstrate an ability to acquire, interpret, and present conclusions orally and/or in writing.</td>
</tr>
<tr>
<td>10. <strong>Collaboration and Leadership</strong>: Demonstrate the ability to work collaboratively in teams and exercise leadership skills on projects.</td>
</tr>
<tr>
<td>11. <strong>Environmental Ethics, Civic and Global Responsibility</strong>: Demonstrate environmental stewardship, professional ethical behavior, civic responsibility, and global citizenship.</td>
</tr>
<tr>
<td>12. <strong>Lifelong learning</strong>: Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge.</td>
</tr>
</tbody>
</table>
E-3. ESSM Departmental Rubrics
E-3. Texas A&M Ecosystem Science and Management Departmental Rubrics

This packet contains rubrics for the 14 program learning outcomes listed below:

1. Understanding Ecological Systems
2. Natural History of Plants
3. Science
4. Spatial Science
5. Ecosystem Economics and Policies
6. Quantitative Analysis of Data
7. Management Strategies
8. Critical Thinking/Problem Solving
9. Communication
10. Collaboration
11. Environmental Ethics, Civic and Global Responsibility
12. Lifelong Learning

The purpose of these rubrics is to establish a consistent definition for each of these outcomes. Once they are finalized, the rubrics will be used to revise courses in the curriculum, create new courses, gather consistent feedback from employers and graduate school faculty, design program and course assessments, and provide a benchmark for what students entering the program should be able to do. These rubrics can also be given to students in the program so they can track their progress and have a clearly defined goal to work towards.

Instructions for Developing and Evaluating a Rubric

Thank you for taking time to develop and revise these rubrics. The sample rubric on the following page describes the terms used below.

As you are looking through a rubric, read the **outcome description** first. It will give you background about what the rubric should contain. Edit it to make sure it is clear and concise. This is especially important because it can only be a sentence or two long and will often be the way people identify each outcome.

Then move to the **performance indicators**. Make sure that the ones listed fully encompass everything in that program outcome. Think about if a similar performance indicator appears in another rubric or if an additional performance indicator needs to be added. There should be at least two but no more than five performance indicators per individual outcome.

Next, consider the descriptors in the **main body** of the rubric. For each row, do the descriptors match the performance indicator? Do they start with a verb that is specific and measurable? Do they increase in complexity as the student moves from level 1 to level 4? Are the expectations at each level reasonable? Could the descriptor be written better? Do the descriptors assess the skills that you are developing in the students or do they all focus on content knowledge? Skills can be taught using content, but must be intentional (e.g., programming, graphics and visualization, spatial data analysis, and systems thinking).

When you are finished, come back to the **outcome description** to make sure it contains information about all of the important parts of the rubric.
**Departmental Level Program Learning Outcome - Ecosystem Science and Management Department, College of Agriculture and Life Science - Texas A&M University**

**Description (After graduation, the student will know and be able to:)**

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
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<tbody>
<tr>
<td><strong>Exemplary:</strong></td>
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<tr>
<td><strong>Proficient:</strong></td>
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<tr>
<td><strong>Developing:</strong></td>
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<tr>
<td><strong>Introductory:</strong></td>
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</tbody>
</table>

Each of these performance indicators breaks the overall outcome into 3-5 main ideas.

The main body of the rubric contains descriptors for each performance indicator. These are specific, measurable tasks that the student will be able to do. They increase in difficulty as the student moves through the program.

Level 4 is the highest level that is offered to students in the program. It is not required of all students.

Level 3 is highest level that is required of specific students in the program. Students of (program) should be at this level or higher when they graduate.

Level 2 is an intermediate level used to show the development of knowledge or skills. At some point during the curriculum, each student will meet this requirement.

Level 1 is an observation of a typical student after their first year within the ESSM program.
1. Understanding Ecological Systems

After graduation, the student will be able to:

Describe the basic components of ecological systems and interpret processes at the organism, population, community, ecosystem, landscape, and global levels.

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
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</thead>
<tbody>
<tr>
<td><strong>Exemplary:</strong></td>
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<td><strong>Proficient:</strong></td>
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<td><strong>Developing:</strong></td>
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<tr>
<td><strong>Introductory in program:</strong></td>
<td></td>
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</tr>
<tr>
<td>a. Basic Components of Ecological Systems</td>
<td>Synthesize new approaches using basic components of ecological systems.</td>
<td>Apply basic components of ecological systems.</td>
<td>Analyze basic components of ecological systems.</td>
<td>Identify basic components of ecological systems.</td>
</tr>
<tr>
<td>b. Interpretation of Processes at the Organism, Population, Community, Ecosystem, Landscape, and Global Levels</td>
<td>Evaluate processes at the organism, population, community, ecosystem, landscape, and global levels.</td>
<td>Apply processes at the organism, population, community, ecosystem, landscape, and global levels.</td>
<td>Analyze processes at the organism, population, community, ecosystem, landscape, and global levels.</td>
<td>Identify processes at the organism, population, community, ecosystem, landscape, and global levels.</td>
</tr>
</tbody>
</table>
2. Natural History of Plants

After graduation, the student will be able to:

Identify plants, their uses, distribution, habitats, and relationships with other organisms.

<table>
<thead>
<tr>
<th>Performance Indicators</th>
<th>4</th>
<th>3</th>
<th>2</th>
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<tbody>
<tr>
<td><strong>Exemplary:</strong></td>
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<td><strong>Proficient:</strong></td>
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<td><strong>Developing:</strong></td>
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<tr>
<td><strong>Introductory:</strong></td>
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<tr>
<td>a. Plant Identification</td>
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<tr>
<td>Identify important plant species through sight identification and keying.</td>
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<td>Understand major taxonomic categories and be able to place species in them correctly.</td>
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<tr>
<td>b. Understanding Relationships of Plants with Other Organisms and Their Environments</td>
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<tr>
<td>Apply knowledge of the relationships between plants, other organisms, and their environments to solve ESSM problems.</td>
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<tr>
<td>Analyze the relationships between plants, other organisms, and their environments.</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Explain the relationships between plants, other organisms, and their environments.</td>
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<tr>
<td>Describe relationships between plants with other organisms and their environments.</td>
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3. Science

After graduation, the student will be able to:

**Describe how, climate, soils, and biota interact to influence energy flow, hydrology, and biogeochemistry.**

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<th>Performance Indicators</th>
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<th>Introductory:</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Interactions and Relationships Influencing Ecosystem Functions</td>
<td><strong>Interpret</strong> how different processes and factors influence important ecosystem functions.</td>
<td><strong>Analyze</strong> how different processes and factors influence important ecosystem functions.</td>
<td><strong>Explain</strong> how different processes and factors influence important ecosystem functions.</td>
<td><strong>Describe</strong> basic ecosystem processes, functions, and their relationships.</td>
</tr>
<tr>
<td>b. Applied Biological Sciences</td>
<td><strong>Apply</strong> biological principles and ESSM practices to solve ecosystem problems.</td>
<td><strong>Analyze</strong> biological principles as they relate to ESSM concepts and practices.</td>
<td><strong>Explain</strong> the relationship of biological principles to ESSM concepts and practices.</td>
<td><strong>Describe</strong> basic biological principles (botany, genetics, etc.).</td>
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</table>
4. Spatial Sciences

After graduation, the student will be able to:

**Apply the concepts and demonstrate ability to conduct basic spatial analysis.**

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<tbody>
<tr>
<td>a. Solving Environmental Problems Using Spatial Science Principles</td>
<td><strong>Formulate</strong> integrated analysis of environmental problems using processing methods in spatial science.</td>
<td><strong>Assess</strong> spatial models and their applicability for environmental problem solving.</td>
<td><strong>Apply</strong> spatial science solutions to environmental problems through software applications.</td>
<td><strong>Identify</strong> fundamental concepts of spatial science operations using basic problem solving steps.</td>
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</tbody>
</table>
5. Ecosystem Economics and Policies

After graduation, the student will be able to:

Develop strategies for dealing with economic, policy, and business environments relevant to ecosystem management.

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<th>Performance Indicators</th>
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<tbody>
<tr>
<td><strong>Exemplary:</strong> Desired level at graduation.</td>
<td>Proficient: Minimum Proficient level at graduation.</td>
<td>Developing: Intermediate level.</td>
<td>After first year in program:</td>
<td></td>
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<tr>
<td><strong>a. Economics and Business Analysis</strong></td>
<td>Develop natural resource management strategies that effectively balance business or economic outcomes and ecosystem sustainability</td>
<td>Assess the relationship between economic or business outcomes and ecosystem sustainability of natural resource management</td>
<td>Identify microeconomic tools for analyzing economic consequences of natural resource management</td>
<td>Summarize key concepts related to the diverse and changing business &amp; economic environments associated with natural ecosystems.</td>
</tr>
<tr>
<td><strong>b. Social Analysis</strong></td>
<td>Develop natural resource management strategies that incorporate the consideration of human dimensions along with other criteria.</td>
<td>Assess the human dimension aspects of coupled human and natural systems</td>
<td>Identify analytic tools for analyzing human dimension aspects of coupled human and natural systems</td>
<td>Identify key concepts and principles governing coupled human and natural systems</td>
</tr>
<tr>
<td><strong>c. Policy Science</strong></td>
<td>Design appropriate policy tools for ecosystem management, including diverse government and community-based interventions.</td>
<td>Assess the appropriateness &amp; effectiveness of existing &amp; potential future policy tools for ecosystem management using concepts from microeconomics &amp; policy science.</td>
<td>Identify policy tools available for ecosystem management, &amp; understand how current policies utilize these tools.</td>
<td>Identify natural resource and environmental policies relevant to ecosystem management.</td>
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</table>
6. Quantitative Analysis of Data

After graduation, the student will be able to:

Apply basic statistics concepts and methods to develop sampling designs and collect, analyze, and interpret natural resources inventory and monitoring data.

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<tr>
<td>Data Analysis, Interpretation and Application</td>
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<tr>
<td><strong>Formulate</strong> decisions based on statistical and quantitative data using statistical analysis.</td>
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<tr>
<td><strong>Interpret</strong> statistical and quantitative data using statistical analysis.</td>
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<tr>
<td><strong>Analyze</strong> statistical and quantitative data using statistical analysis.</td>
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<tr>
<td><strong>Collect</strong> data and <strong>Identify</strong> basic statistics concepts</td>
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</table>
**9. Management Strategies**

After graduation, the student will be able to:

**Design adaptive management strategies for restoring and sustaining ecosystem goods and services.**

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<th>Performance Indicators</th>
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<tr>
<td><strong>Ecosystem Management and Land Use</strong></td>
<td>Design adaptive ecosystem management plans which incorporate socioeconomic, business, and ecological considerations for restoring and sustaining ecosystem goods and services.</td>
<td>Analyze the relationships between ecosystem management, socioeconomic, and business factors using collected data and analytical tools.</td>
<td>Explain the relationships between ecosystem management, land use, and socioeconomic and business factors.</td>
<td>Identify key socioeconomic and business factors that influence ecosystem management. Describe basic principles of ecosystem management.</td>
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8. Critical Thinking/Problem Solving

After graduation, the student will be able to:

**Illustrate critical thinking and demonstrate problem-solving skills.**

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<tr>
<td><strong>a. Problem Recognition</strong></td>
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<tr>
<td><strong>Synthesize</strong> from disparate information a comprehensive statement of a problem suitable for formulating an ESSM solution.</td>
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<td><strong>Define</strong> the information required to characterize an ESSM problem and formulate a solution.</td>
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<td><strong>Categorize</strong> a wide range of ESSM problems among sub-disciplines and branches of knowledge (e.g., ECOR, FORS, RENR, RLEM, SPSA, etc.).</td>
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<td><strong>Identify</strong> problems ESSM professionals typically address in practice (e.g., ecological systems, processes, and management; geographic information systems, plant identification, ecosystem interactions and processes, etc.).</td>
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<td><strong>b. Problem Solving</strong></td>
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<tr>
<td><strong>Apply</strong>, working independently and in teams, standard ESSM problem solving techniques with high levels of uncertainty and ill-definition.</td>
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<tr>
<td><strong>Apply</strong>, working independently and in teams, standard ESSM problem solving techniques with minor levels of uncertainty and ill-definition.</td>
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<td><strong>Explain</strong> the use of multiple ESSM problem solving techniques for well-defined problems in multiple sub-disciplines.</td>
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<td><strong>Use</strong> basic mathematical and scientific principles to solve elementary, well-defined problems in math and science.</td>
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<tr>
<td><strong>c. Critical Thinking</strong></td>
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<tr>
<td><strong>Analyze and critique</strong> information, perspectives, experiences, and personal thought processes when analyzing problems and synthesizing problem solving approaches.</td>
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<td><strong>Demonstrate</strong> awareness or analysis of one's own learning or thinking processes to recognize and solve problems.</td>
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<td><strong>Summarize</strong> strategies in analyzing one's own learning or thinking processes in order to recognize and solve problems.</td>
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<td><strong>Recognize</strong> one's own learning and thinking processes and fundamental limitations.</td>
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9. Communication

After graduation, the student will be able to:

Demonstrate an ability to acquire, interpret, and present conclusions orally and in writing.

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<tr>
<td><strong>Verbal Communication</strong></td>
<td>Persuade technical and non-technical audiences on the merits of ESSM concepts, strategies, or approaches. Maintain eye contact and enthusiasm. Respond to audience questions.</td>
<td>Develop and deliver presentations appropriate to the technical level of the intended audience. Anticipate and prepare for questions.</td>
<td>Develop public speaking skills regarding eye contact, word choice and extemporaneous speaking. Craft a coherent and logically presented message.</td>
<td>Choose words and grammar appropriate to a professional setting. Communicate effectively in group discussions. Read from notes with proper enunciation</td>
</tr>
<tr>
<td><strong>Written Communication</strong></td>
<td>Write clearly and meaningfully for a variety of purposes and contexts. Create appropriate, professional documents that take audience, purpose, and medium into account. Explain rhetorical choices made for each writing context.</td>
<td>Organize reports into formats commonly used in professional practice with executive summary, body of report, and appended calculations.</td>
<td>Write in the style of accepted norms for technical writing, with emphasis on precision. Reference all sources of information properly.</td>
<td>Create concise and grammatically correct communications. Organize written communications into proper paragraphs with a logical flow of thought.</td>
</tr>
<tr>
<td><strong>Graphical and Visual Communication</strong></td>
<td>Create presentations that convey a clear message within an allotted time period that are appropriate to both technical and non-technical audiences.</td>
<td>Integrate slides into an effective oral presentation. Integrate figures and models into a written report in a logical manner.</td>
<td>Create slides for oral presentations with an appropriate amount of text, professional formatting, and logical sequencing.</td>
<td>Properly label graphs and plots. Prepare appropriate visual aids to help support presentations and documents.</td>
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10. Collaboration and Leadership

After graduation, the student will be able to:

Demonstrate the ability to work collaboratively in teams and exercise leadership skills on projects.

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<tr>
<td>a. Responsible Team Member Behavior</td>
<td>Recognize and seek additional team input when beneficial. Be considerate of other team members.</td>
<td>Adjust approach based on teammates’ suggestions. Volunteer to take responsibility for major tasks.</td>
<td>Actively participate in group work. Evaluate suggestions from team mates. Adhere to agreed-upon schedule.</td>
<td>Participate in discussion. Show interest in project. Perform assigned tasks on time.</td>
</tr>
<tr>
<td>b. Delivering a Quality Project</td>
<td>Describe the necessary pieces to create a quality project. Stimulate quality consciousness among team members. Take responsibility for the quality of all work done by the group.</td>
<td>Recognize the need for all defined project tasks. Help team members on specific tasks when asked in order to deliver a quality project.</td>
<td>Identify his/her role in delivering a quality project.</td>
<td>Recognize his or her apathy alone could result in a poor product. Minimally connect to end product.</td>
</tr>
<tr>
<td>c. Response to Conflict</td>
<td>Address destructive conflict directly and constructively, helping to resolve it in a way that strengthens the team.</td>
<td>Identify and acknowledge conflict and stay engaged with it.</td>
<td>Redirect focus toward common ground, toward task at hand, and away from conflict.</td>
<td>Passively accept alternate viewpoints, ideas, and opinions.</td>
</tr>
<tr>
<td>d. Leadership Principles and Attitudes</td>
<td>Organize and direct the efforts of a group using leadership principles and attitudes.</td>
<td>Apply leadership principles and attitudes.</td>
<td>Explain the role of a leader. List leadership principles and attitudes (respect, initiative, adaptability, confidence, integrity, etc.).</td>
<td>Define leadership and the role of a leader.</td>
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</table>
11. Environmental Ethics, Civic and Global Responsibility

After graduation, the student will be able to:

Demonstrate environmental stewardship, professional ethical behavior, civic responsibility, and global citizenship.

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<tr>
<td><strong>a. Ethical Decision Making</strong></td>
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<tr>
<td>Analyze a situation involving multiple conflicting professional and ethical interests and determine an appropriate course of action.</td>
<td>Describe the ethical tests that could be used to analyze a situation (cost-benefit, respect for persons, etc.).</td>
<td>Identify an ESSM situation that is or could become an ethical dilemma.</td>
<td>Identify an everyday situation that is or could become an ethical dilemma.</td>
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<tr>
<td><strong>b. Global Citizenship and Civic Responsibility</strong></td>
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<tr>
<td>Apply principles of global citizenship and civic responsibility to the solving of ESSM problems.</td>
<td>Analyze situations within ESSM where global citizenship and civic responsibility are most evident.</td>
<td>Identify examples of best practices of global citizenship and civic responsibility.</td>
<td>Describe global citizenship and civic responsibility from personal experiences.</td>
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<tr>
<td><strong>c. Global Issues and Environmental Stewardship</strong></td>
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<tr>
<td>Solve ESSM problems in the context of multicultural environmental stewardship and current and future global issues.</td>
<td>Analyze principles of environmental stewardship and the effects and causes of current and emerging global issues.</td>
<td>Identify relevant global issues affecting ESSM.</td>
<td>Identify global issues that are not necessarily relevant to ESSM.</td>
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</table>
After graduation, the student will be able to:

Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge.

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<table>
<thead>
<tr>
<th>a. Initiative</th>
<th>Utilize resources from a variety of sources to solve problems beyond classroom requirements.</th>
<th>Make connections between concepts learned in different classes to solve problems.</th>
<th>Utilize outside resources to expand on in-class learning.</th>
<th>Attend class and complete required work.</th>
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</thead>
<tbody>
<tr>
<td>b. Academic and Professional Reflection</td>
<td>Analyze, and synthesize understanding from prior knowledge and experience and apply resulting new approaches to academic and professional growth.</td>
<td>Critique and draw conclusions from prior learning and experience to guide academic and professional growth.</td>
<td>Infer meaning from prior learning concepts and experiences to guide academic and professional growth.</td>
<td>Identify prior learning concepts and experiences to guide academic and professional contexts.</td>
</tr>
<tr>
<td>c. Intellectual Curiosity</td>
<td>Actively explore new concepts. Eagerly investigate a topic in depth and perform integrated designs.</td>
<td>Eagerly participate in discussions. Illustrate development of interest in detailed analysis of individual subjects.</td>
<td>Engage in discussions at superficial levels. Show interest in the subject and ask occasional questions.</td>
<td>Minimally engage in insightful discussion.</td>
</tr>
</tbody>
</table>
E-4. Program Learning Outcome
Course Matrix
**Understanding Ecological Systems**: Describe the basic components of ecological systems and interpret processes at the organism, population, community, ecosystem, landscape, and global levels.

**Natural History of Plants**: Identify plants, their uses, distribution, habitats, and relationships with other organisms.

**Science**: Describe how climate, soils, and biota interact with to influence energy flow, hydrology, and biogeochemistry.

**Spatial Sciences**: Apply the concepts and demonstrate ability to conduct basic spatial analysis.

**Ecosystem Economics and Policies**: Develop strategies for dealing with economic, policy, and business environments relevant to ecosystem management.

**Critical Thinking/Problem Solving**: Illustrate critical thinking and demonstrate problem-solving skills.

**Communication**: Demonstrate an ability to acquire, interpret, and present conclusions orally and/or in writing.

**Analysis of Data**: Apply basic statistics concepts and methods to develop sampling designs and collect, analyze, and interpret natural resources inventory and monitoring data.

**Management Strategies**: Design and/or select management strategies for restoring and sustaining ecosystem goods and services.

**Collaboration and Leadership**: Demonstrate the ability to work collaboratively in teams and exercise leadership skills on projects.

**Environmental Ethics, Civic and Global Responsibility**: Demonstrate environmental stewardship, professional ethical behavior, civic responsibility, and global citizenship.

**Lifelong Learning**: Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge.

<table>
<thead>
<tr>
<th>University Core (42 hr)</th>
<th>ESSM Core (42 hr)</th>
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<tbody>
<tr>
<td>AGEC 105 Introduction to Agricultural Economics (3)</td>
<td>ESSM 201 Exploring Ecosystem Science &amp; Math (1)</td>
</tr>
<tr>
<td>Biology 101 or Biology 113</td>
<td>ESSM 301 Wildlife and Watershed Management (3)</td>
</tr>
<tr>
<td>CHEM 101, 111 Chemistry Communication (6)</td>
<td>ESSM 302 Wildland Plants of N. America (3)</td>
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<tr>
<td>American History (6)</td>
<td>ESSM 306 Plant Pest Ecol. &amp; Adap. (3)</td>
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<td>Humanities elective (6)</td>
<td>ESSM 311 Biogeochemistry &amp; Global Change (3)</td>
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<tr>
<td>MATH (6)</td>
<td>ESSM 406 Natural Resources Policy or RENR 470 Environmental Impact Assessment (3)</td>
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<tr>
<td>Political Science (6)</td>
<td>or RENR 470 Environmental Impact Assessment (3)</td>
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<tr>
<td>RENR 215 Fundamentals of Ecology Lab (1)</td>
<td>ESSM 313 Sampling Methods &amp; Design (3)</td>
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<td>ESSM 318 Coupled Social &amp; Ecol. Sys. (3)</td>
<td>ESSM 313 Sampling Methods &amp; Design (3)</td>
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<th>1. Understanding Ecological Systems</th>
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<td>2. Natural History of Plants: Identify plants, their uses, distribution, habitats, and relationships with other organisms.</td>
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3. **Science**: Describe how climate, soils, and biota interact with to influence energy flow, hydrology, and biogeochemistry.

4. **Spatial Sciences**: Apply the concepts and demonstrate ability to conduct basic spatial analysis.

5. **Ecosystem Economics and Policies**: Develop strategies for dealing with economic, policy, and business environments relevant to ecosystem management.

6. **Critical Thinking/Problem Solving**: Illustrate critical thinking and demonstrate problem-solving skills.

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12. **Lifelong Learning**: Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge.
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E-5. ESSM Implementation Plan and Assessment Plan
E-5. DRAFT TAMU ESSM Implementation Plan and Assessment Plan
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TAMU ESSM Implementation and Assessment Plan

The TAMU ESSM undergraduate program recently redesigned the curriculum offered to students. This curriculum and assessment plan provides a framework and details some of the procedures related with implementing and assessing the curriculum. The main purpose is to ensure that the TAMU ESSM undergraduate program continues to prepare well-qualified future professionals for the field.

Purpose of the Ecosystem Science and Management Program

The mission of the ESSM undergraduate programs is to prepare students for leadership in the science and stewardship of rangeland, forest and wetland ecosystems across the rural-urban gradient. It offers Bachelors of Science degrees in Ecological Restoration, Forestry, Rangeland Ecology and Management, Renewable Natural Resources, and Spatial Sciences.

Philosophy of Ecosystem Science and Management Program

Our vision of science-based problem solving in Ecosystem Science and Management guides our education, research, and extension programs. We’re problem solvers who use technology with a fresh approach.

Rationale

The Ecosystem Science and Management Program faculty, in collaboration with professional environmental scientists, environmental agencies at the local, state, and federal levels, policymakers, and private enterprise believe in their ability to develop a preparation program that will meet the needs of students who wish to enter the industry as able practitioners within their chosen field. This program recognizes the diversity of attitudes, policies, environments, and practices that are present in the industry today.

ESSM Program Implementation and Assessment Committee

The ESSM Undergraduate Assessment Committee is responsible for overseeing the implementation and assessment of the ESSM curriculum to ensure that both the undergraduate program and the curriculum continue to prepare high-quality graduates to enter the ESSM field. These processes are undertaken concurrently with the
University-level WEAVEonline assessment process. The Committee will be comprised of the ESSM Program Undergraduate Coordinator and the Program Leads of each of the ESSM undergraduate programs.

Committee members are responsible for coordinating a number of different areas:

1. Implementation of the new curriculum
2. Assessment of the new curriculum (analysis of collected artifacts measuring different program learning outcomes)
3. Working together with faculty to make changes based on assessment data and creating appropriate action plans
4. Communication to stakeholders regarding curriculum decisions and other information
Table 1: Committee Composition and Specific Roles

| Committee Chair (Undergraduate Coordinator) | The ESSM Program Undergraduate Coordinator serves as the Committee Chair and serves on a continuous basis. Responsibilities include:  
• Orient new instructors and faculty to the assessment process  
• Send out annual reminder of what artifacts are going to be collected and what program learning outcomes for that year are going to be measured  
• Coordinate and assist with collection, evaluation, and analysis of course artifacts  
• Summarize and report program assessment analysis and data to faculty (established evaluation and analysis procedures are followed to ensure inter-rater reliability)  
• Maintain and update the ESSM Program website (With possible GANT assistance)  
• Program Assessment GANT can collect, organize, and statistically analyze student teaching evaluations and test scores |

| Committee Members (Undergraduate Program Leads) | These members are the leads of an ESSM undergraduate program and serves as long as they are a program lead. Responsibilities include:  
• Assist with collection, evaluation, and analysis of course artifacts (established evaluation and analysis procedures are followed to ensure inter-rater reliability)  
• Summarize and report undergraduate program |
Implementation Plan

Overview
This implementation plan is overseen and coordinated by the ESSM Undergraduate Assessment Committee and has three components:

1. Communication and Information Dissemination—documents what information will be shared with whom and the manner in which it will be shared.

2. Professional Development and Reflection—documents the professional development and reflection procedures in place to help department and faculty address areas of improvement identified by program assessment.

3. New Faculty/Instructor Course Orientation —documents procedures and provides resources for new course instructors. Information includes orientation guides that include sample syllabi, curriculum information, and additional resources.

Communication and Information Dissemination
The ESSM Undergraduate Assessment Committee is responsible for coordinating communication and dissemination of information related to ESSM program curriculum assessment and required University WEAVEonline reporting. Both assessment processes are concurrent, and data collected via the ESSM undergraduate program curriculum assessment can be easily incorporated into WEAVEonline. The Committee works with the College’s/department’s communication and web specialists to establish and follow a communication and information dissemination plan that considers the information to be disseminated, the stakeholders who receive the information, how the information is shared, and when it is shared. Internal communication refers to communication to only faculty or confined to within the department, program or
college. **External communication** refers to communication disseminated to outside sources such as students, the public, academic advisors or donors.

The TABLE below presents considerations when it comes to communication and information dissemination.
<table>
<thead>
<tr>
<th>What</th>
<th>Who (Audience)</th>
<th>How</th>
<th>When</th>
<th>Internal/External</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curriculum and Course Changes</td>
<td>Faculty</td>
<td>Email</td>
<td>No later than 1 day after decision is final</td>
<td>Internal</td>
</tr>
<tr>
<td></td>
<td>Faculty, Administrators</td>
<td>Face-to-face</td>
<td>Faculty meetings</td>
<td>Internal</td>
</tr>
<tr>
<td></td>
<td>Public, donors, faculty, academic advisors</td>
<td>Website</td>
<td>No later than 3 days after decision is final</td>
<td>External</td>
</tr>
<tr>
<td></td>
<td>Parents, students, academic advisors</td>
<td>Email</td>
<td>No later than 1 day after decision is final</td>
<td>External</td>
</tr>
<tr>
<td></td>
<td>Students</td>
<td>Brochure, flyer, handout, or face-to-face announcement</td>
<td>New student orientation</td>
<td>External</td>
</tr>
<tr>
<td>What</td>
<td>Who (Audience)</td>
<td>How</td>
<td>When</td>
<td>Internal/External</td>
</tr>
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<tr>
<td>Program Learning Outcomes, Assessment Rubrics, Curriculum Map, and Program Graphic</td>
<td>Faculty, students, academic advisors</td>
<td>Email, face-to-face announcement</td>
<td>New student orientation</td>
<td>External</td>
</tr>
<tr>
<td>Program Information, Updates, and Announcements</td>
<td>Public, donors, students, advisors</td>
<td>College website</td>
<td>No later than 3 days after decision is final</td>
<td>External</td>
</tr>
<tr>
<td></td>
<td>Students, academic advisors</td>
<td>Email, listserv</td>
<td>No later than 1 day after decision is final</td>
<td>External</td>
</tr>
<tr>
<td></td>
<td>Students</td>
<td>Brochure, flyer, handout, or face-to-face announcement</td>
<td>New student orientation</td>
<td>External</td>
</tr>
<tr>
<td>Faculty Course Schedule and Assignment Changes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What</td>
<td>Who (Audience)</td>
<td>How</td>
<td>When</td>
<td>Internal/External</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------------</td>
<td>------------------------------------------</td>
<td>-------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Assessment Committee Updates and Announcements</td>
<td>Faculty</td>
<td>Email, listserv, and also via updated master schedule on department shared drive managed by department head, course/ area lead and available to all faculty</td>
<td>ASAP, as soon as changes are needed they should be updated</td>
<td>Internal</td>
</tr>
<tr>
<td>Assessment Committee Membership</td>
<td>Faculty</td>
<td>Email, listserv</td>
<td>Meeting updates no later than 1 day after most recent meeting</td>
<td>Internal</td>
</tr>
<tr>
<td>Assessment Plan Overview and Procedures</td>
<td>Public, administrators, faculty</td>
<td>Faculty webpage</td>
<td>Updated no later than 3 days after new committee members added</td>
<td>External</td>
</tr>
<tr>
<td>What</td>
<td>Who (Audience)</td>
<td>How</td>
<td>When</td>
<td>Internal/External</td>
</tr>
<tr>
<td>------</td>
<td>---------------</td>
<td>-----</td>
<td>------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td>Faculty</td>
<td>Email, documents on shared drive, faculty meetings</td>
<td></td>
<td>Internal</td>
</tr>
<tr>
<td></td>
<td>Public, donors, administrators, parents, students, academic advisors</td>
<td>Website</td>
<td></td>
<td>External</td>
</tr>
</tbody>
</table>

**Scholarships**

<table>
<thead>
<tr>
<th>What</th>
<th>Who (Audience)</th>
<th>How</th>
<th>When</th>
<th>Internal/External</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Public, donors, parents, students, Academic advisors</td>
<td>College website</td>
<td>Any changes updated no later than 3 days after decision</td>
<td>External</td>
</tr>
<tr>
<td></td>
<td>Students, academic advisors</td>
<td>Email, listserv</td>
<td>No later than 1 day after decision is made</td>
<td>External</td>
</tr>
</tbody>
</table>
Professional Development and Reflection

The Committee is responsible for creating and coordinating a professional development and reflection process to help support overall ESSM undergraduate program curriculum assessment. It also works together with stakeholders to ensure that all appropriate professional development and reflection resources are communicated and made available to faculty and instructors in an organized and systematic manner. Professional development and reflection resources may be shared according to the program communication and information dissemination plan.

The TABLE below presents considerations when it comes to professional development and reflection.

<table>
<thead>
<tr>
<th>Information</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conferences faculty and TAs encouraged to attend</td>
<td>ESSM conferences</td>
</tr>
<tr>
<td>Other professional development opportunities faculty and TAs are encouraged to attend</td>
<td>Climate/diversity workshops and lectures, Center for Teaching Excellence workshops/programming (faculty and TAs), Graduate Teaching Academy workshops/programming (TAs), GSPDT (TAs)</td>
</tr>
<tr>
<td>Motivation to attend professional development opportunities</td>
<td>If the department/college will pay expenses they will be more likely to attend</td>
</tr>
<tr>
<td>Self-reflection framework</td>
<td>Developed with CTE, Workshops</td>
</tr>
<tr>
<td>Peer-review of teaching framework</td>
<td>Developed with CTE, Workshops</td>
</tr>
</tbody>
</table>
New Faculty/Instructor Course Orientation

The Committee is responsible for creating and coordinating a new faculty/instructor orientation framework to ensure undergraduate program/course continuity and to support new faculty and instructors. Orientation materials will contain information such as undergraduate program curriculum map, where individual courses fall within that map, what artifacts—if any—are to be collected for program assessment in that class, and other teaching/departmental resources. All this information will be updated as curriculum or course changes are made. Rather than a set of hard copies, new faculty/course instructors will access information digitally via website.

The TABLE below presents considerations when it comes to new faculty/instructor orientation.

Table 4: New Faculty/Instruction Orientation

<table>
<thead>
<tr>
<th>Information</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orientation materials for new instructors of a course</td>
<td>New course orientation website</td>
</tr>
<tr>
<td>Professional development support</td>
<td>PD opportunities will be shared with faculty and TAs</td>
</tr>
<tr>
<td></td>
<td>New TAs must go through the required University-level training as well as the required department-level training</td>
</tr>
<tr>
<td></td>
<td>Required college or departmental-level orientation meeting for all new TAs (?)</td>
</tr>
<tr>
<td>Teaching resources, course materials, and other curricular resources</td>
<td>Shared via meetings, handouts, shared server space, University office links</td>
</tr>
<tr>
<td>Formal support systems for new faculty, instructors, and TAs</td>
<td>Faculty advisors and primary instructors mentor TAs</td>
</tr>
<tr>
<td>Required Faculty University Training</td>
<td>TAMU Online HR Resources</td>
</tr>
</tbody>
</table>
Assessment Plan

The Committee is responsible for coordinating and overseeing both undergraduate program implementation and assessment. The ESSM undergraduate program assessment has been designed to work seamlessly with the University-level WEAVEonline system. Data can simply be taken from the ESSM program assessment data and transferred into WEAVEonline. The ESSM program assessment process collects specific student artifacts from designated courses (Table 7). The artifacts are then evaluated using faculty-created program learning outcome rubrics. The data are analyzed and shared with faculty who then work together with the Assessment Committee to come up with recommendations and action plans (Table 1). All relevant information will be shared with stakeholders according to the communication and information dissemination plan (Table 2).
### Table 5: Undergraduate Program Learning Outcomes

<table>
<thead>
<tr>
<th>Abbrev.</th>
<th>ESSM Program Learning Outcome</th>
<th>Related TAMU Undergraduate Learning Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Understanding Ecological Systems</strong></td>
<td>Describe the basic components of ecological systems and interpret processes at the organism, population, community, ecosystem, landscape, and global levels.</td>
<td>Master the depth of knowledge required for a degree, Demonstrate critical thinking</td>
</tr>
<tr>
<td><strong>Natural History of Plants</strong></td>
<td>Identify plants, their uses, distribution, habitats, and relationship with other organisms.</td>
<td>Master the depth of knowledge required for a degree, Demonstrate critical thinking</td>
</tr>
<tr>
<td><strong>Science</strong></td>
<td>Describe how, climate, soils, and biota interact with to influence energy flow, hydrology, and biogeochemistry.</td>
<td>Master the depth of knowledge required for a degree, Demonstrate critical thinking</td>
</tr>
<tr>
<td><strong>Spatial Sciences</strong></td>
<td>Apply the concepts and demonstrate ability to conduct basic spatial analysis.</td>
<td>Master the depth of knowledge required for a degree, Demonstrate critical thinking</td>
</tr>
<tr>
<td><strong>Ecosystem Economics and Policies</strong></td>
<td>Develop strategies for dealing with economic, policy, and business environments relevant to ecosystem management.</td>
<td>Master the depth of knowledge required for a degree, Demonstrate critical thinking, Practice personal and social responsibility, Demonstrate social, cultural, and global competence</td>
</tr>
<tr>
<td><strong>Critical Thinking/Problem Solving</strong></td>
<td>Illustrate critical thinking and demonstrate problem-solving skills.</td>
<td>Demonstrate critical thinking, Communicate effectively</td>
</tr>
<tr>
<td>Communication</td>
<td>Demonstrate an ability to acquire, interpret, and present conclusions orally and in writing.</td>
<td>Communicate effectively, Demonstrate social, cultural, and global competence</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Statistics, Research Methods, Sampling, and Models</td>
<td>Apply basic statistics concepts and methods to develop sampling designs and collect, analyze, and interpret natural resources inventory and monitoring data.</td>
<td>Master the depth of knowledge required for a degree, Demonstrate critical thinking</td>
</tr>
<tr>
<td>Management Strategies</td>
<td>Design management strategies for restoring and sustaining ecosystem goods and services and adaptive management concepts.</td>
<td>Master the depth of knowledge required for a degree, Demonstrate critical thinking, Practice personal and social responsibility</td>
</tr>
<tr>
<td>Collaboration and Leadership</td>
<td>Demonstrate the ability to work collaboratively in teams and exercise leadership skills on projects.</td>
<td>Demonstrate critical thinking, Communicate effectively, Practice personal and social responsibility</td>
</tr>
<tr>
<td>Environmental Ethics, Civic and Global Responsibility</td>
<td>Demonstrate environmental stewardship, professional ethical behavior, civic responsibility, and global citizenship.</td>
<td>Work collaboratively, Demonstrate social, cultural, and global competence, Practice personal and social responsibility, Demonstrate critical thinking</td>
</tr>
<tr>
<td>Lifelong Learning</td>
<td>Recognize the need for lifelong learning and exhibit the skills necessary to acquire, organize, and reorganize new knowledge.</td>
<td>Prepare to engage in lifelong learning, Demonstrate critical thinking</td>
</tr>
<tr>
<td>Timeframe</td>
<td>Action</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
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<td></td>
</tr>
<tr>
<td><strong>Initial Cycle</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>Assessment Committee sets up regular monthly meetings to discuss undergraduate program assessment and also decides on best way to keep faculty and all other stakeholders updated on program assessment.</td>
<td></td>
</tr>
<tr>
<td>May</td>
<td>Assessment Committee (or designated representative) sets up ongoing meetings—either regular or as needed—with College of Agriculture/ESSM communications office and website administrator to discuss content updates, content dissemination and related communication processes.</td>
<td></td>
</tr>
<tr>
<td>June</td>
<td>Assessment Committee sets up/modifies infrastructure and process to collect student artifacts (e.g. organized folders on the shared drive, communication emails to faculty, planned schedule/timeline to meet to evaluate artifacts using the undergraduate program learning outcome rubrics).</td>
<td></td>
</tr>
<tr>
<td><strong>Subsequent Cycles</strong></td>
<td></td>
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</tr>
<tr>
<td>September-May</td>
<td>Assessment Committee asks faculty to collect and store chosen student artifacts from Fall and Spring semesters. Faculty teaching courses where those artifacts are created are responsible for collecting</td>
<td></td>
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<tr>
<td>Timeframe</td>
<td>Action</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>-------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>March-May</td>
<td>Assessment Committee meets and following established Committee procedures evaluates stored student artifacts measuring that assessment cycle’s 4 undergraduate program learning outcomes using the undergraduate program learning outcomes rubrics. Committee can analyze Fall data starting in March and the most recent Spring data in May.</td>
<td></td>
</tr>
<tr>
<td>May-June</td>
<td>Assessment Committee analyzes data and identifies areas of improvement. Committee also communicates with faculty and provides preliminary overview of results.</td>
<td></td>
</tr>
<tr>
<td>June-August</td>
<td>Assessment Committee continues to communicate with faculty regarding the data, results, areas of improvement, and possible solutions.</td>
<td></td>
</tr>
</tbody>
</table>

Findings entered into WEAVE by August 1

Action Plans and Achievement Summary/Analysis entered into WEAVE by September 1
Table 7: Assessment Artifacts

<table>
<thead>
<tr>
<th>Undergraduate Program Learning Outcome</th>
<th>Course Demonstrated</th>
<th>Required Artifacts</th>
<th>Target</th>
<th>Action Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding Ecological Systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural History of Plants</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Science</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Spatial Sciences</td>
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<tr>
<td>Ecosystem Economics and Policies</td>
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</tr>
<tr>
<td>Critical Thinking/Problem Solving</td>
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<td></td>
</tr>
<tr>
<td>Communication</td>
<td></td>
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<tr>
<td>Quantitative Analysis of Data</td>
<td></td>
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<tr>
<td>Management Strategies</td>
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<tr>
<td>Collaboration and</td>
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</tr>
<tr>
<td>Undergraduate Program Learning Outcome</td>
<td>Course Demonstrated</td>
<td>Required Artifacts</td>
<td>Target</td>
<td>Action Plan</td>
</tr>
<tr>
<td>--------------------------------------</td>
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</tr>
<tr>
<td>Leadership</td>
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<td></td>
</tr>
<tr>
<td>Environmental Ethics, Civic and Global Responsibility</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lifelong learning</td>
<td></td>
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</tbody>
</table>
Table 8: ESSM IRD Matrix
Table 9: ePortfolio Options

Use this section to outline the artifacts (and accompanying reflections) that should be included in the ePortfolio corresponding to the appropriate undergraduate program learning outcomes.

<table>
<thead>
<tr>
<th>Undergraduate Program Learning Outcome</th>
<th>Course Demonstrated</th>
<th>Optional Artifacts</th>
<th>Required Artifacts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>
E-6. Graduate Student Evaluation Forms
E-6. Graduate Student Evaluation Forms

This section should be completed for ALL students:

<p>| How well does the student meet your expectations in the following areas? |</p>
<table>
<thead>
<tr>
<th>(Note: Expectations should represent a common level of proficiency demanded of all students in this program)</th>
<th>Above Expectations</th>
<th>Meets Expectations</th>
<th>Below Expectations</th>
<th>Not Observable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhibits a coherent understanding of discipline-specific knowledge?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applies discipline-specific knowledge in a range of contexts to solve problems, make and justify decisions?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uses a variety of sources and evaluates multiple points of view to analyze and integrate information?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communicates effectively?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaches or explains the subject matter in their discipline to a broad range of audiences?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exhibits proficiency in technology appropriate to solve problems in their discipline?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chooses ethical courses of action in research and practice?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This additional section should be completed for M.S. (Thesis Option) & Doctoral Students only:

<p>| How well does the student meet your expectations in the following areas? |</p>
<table>
<thead>
<tr>
<th>(Note: Expectations should represent a common level of proficiency demanded of all students in this program)</th>
<th>Above Expectations</th>
<th>Meets Expectations</th>
<th>Below Expectations</th>
<th>Not Observable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develops clear, hypothesis-driven research plans?</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conducts valid, data-supported and theoretically consistent research?</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Effectively disseminates research results in appropriate contexts?</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Additional Comments (optional):

Would you recommend that this student go on to a Ph.D. program, or to pursue a post-doc position? (Circle One) Yes No

Degree Being Pursued: ____________________________
Date Form Completed: ____________________________
College of Agriculture and Life Sciences
Last Revised: September 2013
### Graduate Student Self-Evaluation

#### Domestic Experiences

<table>
<thead>
<tr>
<th>Activity</th>
<th>Course</th>
<th>Affiliated w/ Course</th>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internship (paid or unpaid) or Field Experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study Away or Study Abroad Experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of Creative Works (e.g. multimedia development, curriculum development)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Experience (unrelated to thesis or dissertation research)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### International Experiences

<table>
<thead>
<tr>
<th>Activity</th>
<th>Course</th>
<th>Affiliated w/ Course</th>
<th>Course</th>
</tr>
</thead>
</table>

#### Lectures

<table>
<thead>
<tr>
<th>Experience</th>
<th>Total # of Different Courses</th>
<th>Total # of Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsible for instruction of a course lecture or lab (e.g. GAT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assisted course instructor (e.g. GANT)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Labs

<table>
<thead>
<tr>
<th>Experience</th>
<th>Total # of Different Courses</th>
<th>Total # of Sections</th>
</tr>
</thead>
</table>

#### University or Department Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Total # of Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral presentations made at each of the following venues</td>
<td></td>
</tr>
<tr>
<td>Poster presentations made at each of the following venues</td>
<td></td>
</tr>
</tbody>
</table>

#### Regional Scientific Meeting

<table>
<thead>
<tr>
<th>Total # of Sections</th>
</tr>
</thead>
</table>

#### National or International Scientific Meeting

<table>
<thead>
<tr>
<th>Total # of Sections</th>
</tr>
</thead>
</table>

#### University Research Publications

<table>
<thead>
<tr>
<th>Type of Publication</th>
<th>Submitted</th>
<th>Accepted, In-Press or Published</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refereed or peer-reviewed scientific publications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-refereed or editor-reviewed scientific publications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Popular press articles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other writing intensive experiences</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Grant Proposals

<table>
<thead>
<tr>
<th>Grant Proposal Category</th>
<th>Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grant proposals up to $5,000</td>
<td></td>
</tr>
<tr>
<td>Grant proposals ranging from $5,001 to $20,000</td>
<td></td>
</tr>
<tr>
<td>Grant proposals over $20,000</td>
<td></td>
</tr>
</tbody>
</table>

---

**Date Form Completed:** ________________________  
**College of Agriculture and Life Science**  
**Last Revised:** September 2013

---

**Student Name:** ________________________  
**Student UIN:** ________________________  
**Dept:** ________________________  
**Major:** ________________________  
**Degree Being Pursued:** ________________________
E-6. Graduate Student Evaluation Forms

**Graduate Student Self-Evaluation**

Please provide data about the number of awards or competitive fellowships and/or scholarships you have received while in your current degree program:

<table>
<thead>
<tr>
<th>Awards (teaching, research, or presentation)</th>
<th>Department-level</th>
<th>College-level</th>
<th>University-level</th>
<th>National or International</th>
</tr>
</thead>
</table>
17. Competitive Fellowships or Scholarships (based on academic merit, not financial need) |                  |               |                 |                          |
18. Please list any prestigious awards, fellowships or scholarships (if applicable): |                  |               |                 |                          |

Please rate your proficiency in meeting the following university learning outcomes:

<table>
<thead>
<tr>
<th>Proficient</th>
<th>Acceptable</th>
<th>Developing</th>
<th>Do you think that your committee would agree with you? (Y/N)</th>
</tr>
</thead>
</table>
20. Exhibit a coherent understanding of discipline-specific knowledge |                  |               |                                                             |
21. Apply knowledge of discipline in a range of contexts to solve problems, make and justify decisions |                  |               |                                                             |
22. Use a variety of sources and evaluate multiple points of view to analyze and integrate information |                  |               |                                                             |
23. Communicate effectively |                  |               |                                                             |
24. Teach or explain subject matter in your discipline to a broad range of audiences |                  |               |                                                             |
25. Exhibit proficiency in technology appropriate to solve problems in your discipline |                  |               |                                                             |
26. Choose ethical courses of action in research and practice |                  |               |                                                             |

Please only respond to #27-29 if you are submitting a thesis or dissertation:

27. Develop clear, hypothesis-driven research plans |                  |               |                                                             |
28. Conduct valid, data-supported and theoretically consistent research |                  |               |                                                             |
29. Effectively disseminate research results in appropriate contexts |                  |               |                                                             |

Generally, how well has your committee met your expectations? (Circle One)

<table>
<thead>
<tr>
<th>Above Expectations</th>
<th>Meet Expectations</th>
<th>Below Expectations</th>
<th>Unsure</th>
</tr>
</thead>
</table>
30. Please specify any and all ethics training courses you have completed (e.g. IRB, IACUC, etc.): |                |
31. When did you begin your current degree program (semester and year)? |                |
32. When do you expect to graduate from your current degree program (semester and year)? Are there any major factors that have (or will) prolong your degree? |                |

Date Form Completed:________________________ College of Agriculture and Life Science Last Revised: September 2013
E-7. Student Learning Outcomes Assessment Plan
E-7. STUDENT LEARNING OUTCOMES ASSESSMENT PLAN

PhD Programs in Ecosystem Science and Management

Department of Ecosystem Science and Management
College of Agriculture and Life Sciences

October 2013

Contact
Tom Boutton
e-mail: boutton@tamu.edu
tel.: 979.845.8027
MS: 2138

Program Mission
The mission of the Ph.D. programs in Ecosystem Science and Management is to prepare students to become competent scientists, educators and professional leaders in research, education, and management of diverse ecosystems.

Outcomes
The program is centered on several overarching student learning and program outcomes.

Graduates will demonstrate:

1. mastery of disciplinary knowledge and skills;
2. ability to critically analyze disciplinary knowledge;
3. competence in independent scientific research;
4. proficiency in communication;
5. competence in scientific teaching in respective fields; and
6. engagement in professional activities.

Assessment Methods
The assessment of each of the student learning outcomes is based on responses from the COALS faculty evaluation and student self-evaluation. The information collected from these surveys will be tabulated annually and evaluated to provide feedback to program planning.
### Table 1. Assessment areas, measures and targets for graduate student learning outcomes in the Ph.D. degree program in Ecosystem Science and Management.

<table>
<thead>
<tr>
<th>Assessment areas</th>
<th>Measures</th>
<th>Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Disciplinary expertise: Graduates will demonstrate mastery of disciplinary knowledge and skills.</td>
<td><strong>Academic indirect measures</strong>&lt;br&gt;Responses from a student’s advisory committee on the COALS Graduate Student Evaluation (questions 1 and 6)</td>
<td>At least 80% of graduates will be rated “meets expectations” or “above expectations” on questions 1 and 6 of the COALS Graduate Student Evaluation.</td>
</tr>
<tr>
<td></td>
<td>“Master degree program requirements:”&lt;br&gt;  ▪ theories, concepts, principles and practice;&lt;br&gt;  ▪ develop a coherent understanding of the subject matter through synthesis across courses and experiences; and&lt;br&gt;  ▪ apply subject matter knowledge to solve problems and make decisions.”&lt;br&gt;“Use appropriate technologies to communicate, collaborate, conduct research and solve problems.”</td>
<td>Responses from the student on the COALS Graduate Student Self-Evaluation (questions 20 and 25)</td>
</tr>
</tbody>
</table>
2. Critical thinking: Graduates will demonstrate ability to critically analyze disciplinary knowledge.

***

**Association with TAMU student learning outcomes—doctoral:**

"Apply a variety of strategies and tools, use a variety of sources, and evaluate multiple points of view to analyze and integrate information and to conduct critical, reasoned arguments."

<table>
<thead>
<tr>
<th>Academic indirect measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responses from a student’s advisory committee on the COALS Graduate Student Evaluation (questions 2 and 3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Academic indirect measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responses from the student on the COALS Graduate Student Self-Evaluation (questions 21 and 22)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Academic indirect measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least 80% of graduates will be rated “meets expectations or “above expectations” on questions 2 and 3 of the COALS Graduate Student Evaluation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Academic indirect measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least 80% of graduates will rate themselves as “acceptable” or “proficient” on questions 21 and 22 of the COALS Graduate Student Self-Evaluation.</td>
</tr>
</tbody>
</table>
3. **Scientific research**: Graduates will demonstrate competence in independent scientific research, including command of literature in respective fields, ability to develop a solid research hypothesis and proposal, and success in publishing in peer-reviewed professional journals or other outlets.

***

**Association with TAMU student learning outcomes—doctoral:**

“Develop clear research plans; conduct valid, data-supported, theoretically consistent and institutionally appropriate research; and effectively disseminate the results of the research in appropriate venues to a range of audiences.”

“Choose ethical courses of action in research and practice.”

<table>
<thead>
<tr>
<th><strong>Academic indirect measures</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Responses from a student’s advisory committee on the COALS Graduate Student Evaluation (questions 8–10)</td>
</tr>
</tbody>
</table>

| **Responses from the student on the COALS Graduate Student Self-Evaluation (questions 27–29 and 10–12)** |

| **At least 80% of graduates will be rated “meets expectations or “above expectations” on questions 8, 9 and 10 of the COALS Graduate Student Evaluation.** |

| **At least 80% of graduates will rate themselves as “acceptable” or “proficient” on questions 27, 28 and 29 of the COALS Graduate Student Self-Evaluation.** |

| **At least 80% of graduates will indicate on questions 10–12 of the COALS Graduate Student Self-Evaluation that they have submitted or published one peer-reviewed journal article or other publication.** |
4. Communication skills: Graduates will demonstrate proficiency in communicating science and management issues to professional peers and broader audiences through both written and oral outlets.

***

**Associations with TAMU student learning outcomes—doctoral:**

“*Communicate effectively.*”

“*Teach and explain the subject matter in their discipline.*”

<table>
<thead>
<tr>
<th><strong>Academic indirect measures</strong></th>
<th>At least 80% of graduates will be rated “meets expectations or “above expectations” on questions 4 and 10 of the COALS Graduate Student Evaluation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responses from a student’s advisory committee on the COALS Graduate Student Evaluation (questions 4 and 10)</td>
<td>Responses from the student on the COALS Graduate Student Self-Evaluation (questions 8, 9, 23 and 29)</td>
</tr>
<tr>
<td>At least 80% of graduates will be rated “meets expectations or “above expectations” on questions 4 and 10 of the COALS Graduate Student Evaluation.</td>
<td>At least 80% of graduates will indicate on questions 8 and 9 of the COALS Graduate Student Self-Evaluation that they have given either oral or poster presentations.</td>
</tr>
<tr>
<td>At least 80% of graduates will rate themselves as “acceptable” or “proficient” on questions 23 and 29 of the COALS Graduate Student Self-Evaluation.</td>
<td></td>
</tr>
</tbody>
</table>

5. Teaching experience: Graduates will demonstrate competence in scientific teaching in their respective fields.

***

**Association with TAMU student learning outcomes—doctoral:**

“*Teach and explain the subject matter in their discipline.*”

<table>
<thead>
<tr>
<th><strong>Academic direct measures</strong></th>
<th>100% of teaching assistants will successfully complete the Center for Teaching Excellence Teaching Assistant Institute training modules.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching assistant participation in the Center for Teaching Excellence Teaching Assistant Institute</td>
<td>100% of teaching assistants will successfully complete the Center for Teaching Excellence Teaching Assistant Institute training modules.</td>
</tr>
<tr>
<td><strong>Academic indirect measures</strong></td>
<td><strong>At least 80% of graduates will be rated “meets expectations or “above expectations” on question 5 of the COALS Graduate Student Evaluation.</strong></td>
</tr>
<tr>
<td>Responses from a student’s advisory committee on the COALS Graduate Student Evaluation (question 5)</td>
<td>Responses from the student on the COALS Graduate Student Self-Evaluation (questions 5–7 and 24)</td>
</tr>
<tr>
<td>At least 80% of graduates will be rated “meets expectations or “above expectations” on question 5 of the COALS Graduate Student Evaluation.</td>
<td>At least 80% of graduates will rate themselves as “acceptable” or “proficient” on questions 23 and 29 of the COALS Graduate Student Self-Evaluation.</td>
</tr>
<tr>
<td>At least 80% of graduates will have taught at least one semester as a TA or instructor or have completed the Graduate Teaching Academy</td>
<td></td>
</tr>
</tbody>
</table>
6. **Professional involvement**: Graduates will demonstrate engagement in professional activities.  

**Indirect measures**  
Responses from the student on the COALS Graduate Student Self-Evaluation (questions 8 and 9)  

At least 80% of graduates will indicate on questions 8 and 9 of the COALS Graduate Student Self-Evaluation that they have participated in professional societies by giving either oral or poster presentations.
Appendix F – Undergraduate Handbook
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CONTACT INFORMATION

For further information concerning degrees in the Department of Ecosystem Science and Management please contact:

Heather Janke
122D KLCT
(979) 862-8993
hjanke@tamu.edu

INTRODUCTION

This handbook is for undergraduates majoring in the department of Ecosystem Science and Management (ESSM) at Texas A&M University (TAMU). It will answer many of your questions as you progress toward a Bachelor of Science Degree by explaining methods and procedures used by the University.

While this handbook summarizes the more important information from all sources, you are ultimately responsible for observing all University rules and regulation pertaining to your academic program and progress. Therefore, you should also read the Texas A&M Undergraduate Catalog and the latest edition of the Texas A&M University Regulations. These will provide complete information on the various rules and regulation and may contain recent changes which have not been included in this handbook.

Use this handbook as a reference manual while you are here at Texas A&M, and watch for revisions. You will likely refer to it often for information about your academic program. For any questions or problems not adequately covered in this handbook, you should see your advisor.

A revised Undergraduate Catalog is published each year by the University and is available online. You may follow any catalog edition published after you have entered college. In order to change your catalog, you must talk with you academic advisor.

DEGREES

Forestry: Designed to both educate and train professionals to manage forests and conduct forest research. Whether the primary goal of forest management is timber, water, wildlife, or recreation, students graduating from this option will be well-equipped to provide the forest values which society demands.

Rangeland Ecology and Management (Ranch Management Option) (RLEM RMO): Students majoring in Rangeland Ecology and Management are taught to integrate knowledge and technology in a systems approach to manage land for sustainable utilization of natural resources. Emphasis is placed on conservation and maintenance of biological diversity in wet to arid environments. This degree is designed for students preparing for careers in ranch management and agribusiness. This option emphasizes management and utilization of rangeland for livestock and wildlife production. It provides excellent preparation for students desiring to obtain a Master of Agriculture degree in ranch management. Employment opportunities are available on private ranches, businesses, and industries supporting ranches and with state and federal agencies.
Rangeland Ecology and Management (Rangeland Resources Option) (RLEM RRO): Students majoring in Rangeland Ecology and Management are taught to integrate knowledge and technology in a systems approach to manage land for sustainable utilization of natural resources. Emphasis is placed on conservation and maintenance of biological diversity in wet to arid environments. This degree is designed for students preparing for careers in the private, state and federal sectors in the area of natural resources conservation and management. It also provides good preparation for graduate study leading to positions in extension, teaching, research and consulting. It allows maximum flexibility to orient a degree program towards specific career interests. Students are encouraged to develop an emphasis area by selecting 15 hours of directed elective courses in related disciplines.

Ecological Restoration (ECOR): is designed for students preparing for a professional career in the restoration or reclamation of degraded or severely damaged lands. Job opportunities are available with environmental consulting companies, governmental and non-governmental land management organizations, regulatory agencies and private individuals. This curriculum provides a solid foundation for students planning to pursue an advanced degree in restoration ecology, disturbed land reclamation or natural resources management.

Renewable Natural Resources (RENR): degree is for students with a broad interest in natural resources and ecology, including forestry and associated values such as range and wildland, wildlife, recreation, water, and other environmental sciences. Students may design degree plans emphasizing natural resource management, social and public policy, or biophysical sciences.

Spatial Sciences (SPSA): Degree gives students the knowledge and skills to use computer-based technologies such as Geographic Information Systems (GIS), Global Position Systems (GPS), and Remote Sensing (RS). These technologies help natural and environmental resource managers in mapping geographical features, patterns, changes, and conditions for environmental decision-making, planning, and problem solving purposes. Texas A&M University, through the Department of Ecosystem Science and Management (Spatial Sciences Laboratory) and the Department of Geography, offers a degree in spatial sciences that combines a solid background in spatial science and environmental studies. This degree provides students with an advanced knowledge of the spatial sciences, experience in interpretation of aerial photographs and satellite images, as well as a broad understanding of computer applications and database management. Through core coursework in spatial sciences and supporting courses students will learn to utilize the full potential of the spatial sciences in real-world problem solving. From real-time wildfire risk assessment to crime analysis, the spatial sciences are fast becoming an integral part of modern resource management.

**CLASSIFICATIONS**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Grade Level</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>U1</td>
<td>Freshman</td>
<td>0-29</td>
</tr>
<tr>
<td>U2</td>
<td>Sophomore</td>
<td>30-59</td>
</tr>
<tr>
<td>U3</td>
<td>Junior</td>
<td>60-89</td>
</tr>
<tr>
<td>U4</td>
<td>Senior</td>
<td>90+</td>
</tr>
</tbody>
</table>
**Parent/Guardian Access to Grades**

A parent or guardian may access midterm and final grades on Howdy after the student sets the parent access password. Please discuss this with your parent. The Office of the Registrar cannot see the passwords created by the students for parental access; therefore, you must give your password to your parent.

**Departmental Advising System**

The advisor for the department of Ecosystem Science and Management is Heather Janke. The advising office is in Room 122D of the Kleberg Building. The degree plans available to you are included later in this handbook and also in HOWDY.

**Entering Freshman:**

For information regarding freshman admission requirements you should review the Freshman handbook found online. This will give you information on admission requirements, including SAT/ACT testing information, course requirements, as well as any important deadlines. Once admitted by the Office of Admissions and Records, all entering freshman in this degree program will meet with an advisor during their freshman new student conference usually held in the summer months. Course scheduling will take place at this time.

**Entering Transfer Students:**

Students transferring to TAMU from other universities will have a set new student conference. The advisor will review your transfer credits and determine appropriate substitution hours on your degree plan. Currently, our degree programs require a minimum 2.5 GPA and 24 transferable graded course hours in order to be considered for admission. Students transferring from other colleges within the University will need a change of curriculum approved by the academic advisor of Ecosystem Science and Management. The most important courses a transfer student can take prior to transferring to TAMU are the “Core Curriculum”, also known as “The Basics”. The courses include English, mathematics, history, government, speech, and science, and should correspond to the Texas Common Course Numbering System to determine how courses will transfer to TAMU. (See Page 11)

**Change of Curriculum Students:**

Students transferring from one major within the College of Agriculture to the department of Ecosystem Science and Management will consult with the academic advisor. The advisor will review all courses taken by you as well as your current GPA. If you meet the criteria, then a change of curriculum form will be filled out and signed by the appropriate individuals.
**DEGREE REQUIREMENTS**

Our advisor is here to help you define and achieve your educational goals. During the first meeting with the advisor, degree emphasis will be discussed and a tentative set of courses agreed upon. You may check with the advisor at any time to amend this emphasis area or add a minor. You can find your degree audit by contacting your advisor as well as logging on to Howdy.

**PREREGISTRATION**

***BEFORE Preregistration can be attempted you have to do your Lab Safety Acknowledgement in HOWDY under the “my record tab”***

Preregistration is the term used to describe the period in which students preregister for classes which will be taken the following semester. All students currently enrolled will be blocked from registering until they have scheduled an appointment with the advisor and discussed their next semester course plan. By reviewing the degree plan, there will be fewer delays in graduation because of skipped courses, etc. Preregistration for fall semester generally starts during the third week in March; spring semester preregistration generally starts in mid-October. Each student will be given a registration time from the University which will be stated in an email posted on the Howdy Portal. You will also receive an email from your advisor so you can call and schedule an appointment to discuss your future courses. Courses for the upcoming semester can be found on Howdy.

Note: There is no preregistration for summer school. Registration will occur the same time a student is assigned to register for fall course. Consult your advisor for dual enrollment (classes taken outside TAMU while working on your degree).

**ADDING AND DROPPING COURSES**

You may drop courses during the first four class days of a fall or spring semester and during the first three class days of a summer term or 10-week summer semester with no record. You may add courses during the first five class days of a fall or spring semester during the first four days of a summer term or 10-week summer semester. Refunds or supplemental billings will be made for courses dropped or added during these times. Refunds will be mailed to your local address.

Note: Refunds will not be made for courses dropped during the Q-drop period.

(See below)

You are not allowed to drop all of your courses through the drop/add process. Once you have registered and paid fees, you must go through the withdrawal process in order to drop all courses and withdraw from the University. This is done through the COALS deans office located on the 5th floor of the AGLS Building.

**Q-Drop Policy:**

Undergraduate students will normally be permitted four Q-drops during their undergraduate studies; however: State law prohibits students from having more than six dropped courses from all state institutions attended during their undergraduate career if they entered higher education as a first-time enrolled freshman beginning the 2007 fall semester or after. Q-drops in one-hour courses will not count in the Texas
A&M limit of four **but** will be included in the State-mandated limit of six dropped courses. If a lecture and companion lab are dropped at the same time, this will count as one Q-drop rather than two. *(Texas A&M University Student Rule 1.16.4)* Q-Drop Request Form you must submit to your major department. You must bring the completed form to your major department for approval. Forms may also be available in your major department.

**Student-Athletes** (including practice players, managers, and trainers) **MUST** receive approval from Athletic Compliance before dropping below 12 hours in a fall or spring semester. These drops will be forwarded to the Office of the Registrar by Athletic Compliance for processing. Contact your advisor with questions regarding Q-Drops. For all drop and add procedures, you should see the advisor to initiate the Q-drop. During summer sessions the deadlines are much sooner than during a regular semester.

**Withdrawal from the University**

While we hope it does not happen to you, students occasionally find it necessary to withdraw from the University during a semester. This may be due to illness, accident or family problems requiring your presence away from campus. Should you need to withdraw from the University during a semester, it is important that you take the time to follow the correct procedures. Failure to do so will result in you receiving a grade of “F” in each course. These grades will remain on your official transcript and will seriously affect your grade point ratio.

To properly withdraw from the University, you should follow these steps:

1. Visit with your academic advisor, who may be able to offer some suggestions that will allow you to remain in school.
2. If you decide to withdraw after visiting with your academic advisor, she will provide the instructions to properly withdraw from the University.

Note: It is your responsibility to properly withdraw to prevent unnecessary penalties.

**Course Sequences**

Before you register for a course, check the catalog to be sure you have the listed prerequisites. Without the prerequisites, you may not have the background information necessary to understand the course material. When in doubt, check with the instructor. Some of the upper division courses are offered only every other year. Please take note of this when planning your schedule.

**Electives**

Directed technical electives are designated by the option to educate you in that particular field. The free electives on the other hand are chosen by the student to enhance his or her particular expertise or interest in an area. You should consult with your academic advisor on these electives to get the most out of the emphasis chosen.

**Transfer Credit from Another University**

If you have transferred to TAMU from another college or university, the Registrar’s Office will have evaluated your previous coursework to determine its acceptability, and
if acceptable, the TAMU equivalent courses. Most transfer courses will be accepted as direct replacements for TAMU courses. For example, the first English course you took at another university will probably transfer as credit for TAMU’s English 104. (See Page 16)

Some courses may transfer “by title only”. Courses accepted “by title only” are those for which TAMU does not have an equivalent course or TAMU’s course is taught at a higher level. Courses accepted “by title only” are counted in the total hours of college credit; however, they may not necessarily be accepted as credit toward your degree. Sometime during your first semester you should check with your academic advisor to determine which of the courses transferred “by title only” will be accepted as part of your degree plan in the department of Ecosystem Science and Management. Final approval by your academic advisor is required.

After enrolling at TAMU you may wish to take courses at another college or university to substitute for a course required here. Before taking a course at another college or university, you should check with your academic advisor. We can tell you the exact course you need to take at another college to transfer to TAMU. This will prevent you from taking a course and not being able to receive credit you expected.

In order to receive credit for courses completed at other institutions, you should have an official transcript sent to the Office of Admissions and Records located at the General Services Complex.

**DUAL ENROLLMENT**

You may wish to take courses at TAMU and another college simultaneously. You do not need permission from your department before being enrolled in two colleges or universities simultaneously, but it is advisable to check with your academic advisor about the courses you plan to take.

If you are receiving financial aid, it is advisable to check with the Financial Aid Office (second floor of The Pavilion) to make sure your type of support will allow dual enrollment.

**GRADUATION REQUIREMENTS**

There are a number of requirements and procedures which must be followed to ensure you graduate on time and with minimum stress. Failure to meet any of these requirements on time may delay your graduation.

Some of the more important graduation requirements are as follows:

1. You must have completed 120 hours of approved coursework. If you have completed the advanced Military Science program, you may need 12 additional hours to graduate.
2. To graduate, you must have an overall GPR of at least 2.000 and a GPR of 2.000 for all major courses taken. Degree applicants should have their diploma fee assessed with their tuition fees during preregistration of their final semester. Complete the necessary degree application forms on line at http://degreeapp.tamu.edu within the first week of the semester you plan to graduate. Also check with your academic advisor throughout the semester to make sure all requirements have been met.
Note: A grade of a “D” is NOT acceptable in a writing intensive course! If you need clarification of this, please consult with your academic advisor.

**Satisfactory and Unsatisfactory**

The hours for which you receive a grade of “Satisfactory” (C or above) are not included in the computation of your grade point ration, but, a grade of “Unsatisfactory” (D or F) is included at 0.0 grade points per credit hour.

**Double Degree/Double Majoring**

To obtain two B.S. degrees, you must have been in residence at TAMU for at least two academic years, must have completed all of the required coursework for both degrees, and must have a total of at least 30 semester hours in addition to the greater number required for either of the two degrees. It is necessary to discuss a second degree plan with your academic advisor so this can be added to your degree plan. Double major may be considered less hours especially if the 2nd discipline is closely related to the first. See your advisor for more information.

Many students contemplating two degrees should consider a Masters degree in the second discipline. It normally takes only a little more time and may be more valuable.

**Incomplete**

The temporary grade of “I” (incomplete) indicates you have completed the course with the exception of a major quiz, final examination, term project, or other work. The instructor is authorized to give an “I” only if the deficiency is due to a university excused absence or other cause beyond the control of the student.

Instructors are required to fill out an “Incomplete Grade Report” stating the reason for awarding the grade. Incomplete work must be completed before the end of the next full semester. If the incomplete work is not completed within this period of time, the “I” will automatically become an “F”. If you register for the same course again, it will appear on your transcript twice, once with an “F” and once with the new grade.

**Scholastic Probation**

In the event your overall GPR drops below 2.000 (a “C” average), you are considered to be scholastically deficient and will be placed on scholastic probation for the following semester. The standard probation term is a “C” (average) + “X” (quality grade points). A grade of “B” in a three credit course would produce three quality points; similarly, a grade of “A” would produce six quality points. A “D” or “F” reduces quality grade points in the same way. If you fail to fulfill your assigned probation terms, you will be blocked from registering for classes in the next semester. A student is given one semester to make up the GPR deficit or on a case-by-case basis show substantial improvement toward his/her academic performance and you may be required to take a study skills courses. If a student does not meet either, then the student will officially be dismissed from the department. In the case that a student does show substantial improvement toward his/her academic performance, then they will remain on academic probation for another semester. The requirements will remain the same and be assessed at the end of the semester following grades.
**Scholarships**

There are two different ways for you, as a student in Ecosystem Science and Management, to apply for scholarships. You can apply through the Department of Financial Aid online every year to earn university scholarships and you can also apply through the Department of Ecosystem Science and Management for departmental scholarships. The department annually gives out approximately $170,000 in scholarships. Your academic advisor will send out a call for applications in January. The deadline usually falls sometime around the middle of February. The department has an annual banquet in April to award the scholarships.

**CONTACT INFORMATION**

For further information concerning degrees in the Department of Ecosystem Science and Management please contact:

Heather Janke  
122 KLCT  
(979) 862-8993  
hjanke@tamu.edu

**GET INVOLVED!**

Join clubs that involve your major!

- **American Society for Photogrammetry and Remote Sensing**  
  Contact Dr. Sorin Popescu

- **Range Club**  
  Contact Dr. Robert Knight

- **Society of American Foresters**  
  Contact Dr. Jason Vogel

- **Forestry Conclave**  
  Contact Dr. Jason Vogel

- **Society for Ecological Restoration Student Guild**  
  Contact Dr. Georgianne Moore

- **Undergraduate Range Mgmt Exam Team**  
  Contact Dr. Mort Kothmann

- **Soil & Water Conservation Society**  
  Contact Dr. Robert Knight

- **Plant Identification Team**  
  Contact Dr. Robert Knight
**TEXAS COMMON COURSE NUMBERING SYSTEM**

The Texas Common Course Numbering System (TCCNS) has been designed for the purpose of aiding students in the transfer of general academic courses between colleges and universities throughout Texas. Common courses are freshman and sophomore academic credit courses that have been identified as common by institutions that are members of the common course numbering system. The system ensures if the student takes the courses the receiving institution designates as common, then the courses will be accepted in transfer and the credit will be treated as if the courses had actually been taken on the receiving institution’s campus.

The table below lists the courses Texas A&M University had identified as common and their TCCNS equivalents. Before using this table, students should be sure the institution they attend employs the TCCNS.

This table is revised quarterly in January, March, June, and September. The most recent version may be obtained from the Office of Admissions and Records.

The current version of this document may be found on the Office of Admissions and Records website at www.tamu.edu/admissions/undergrad/tccns.shtml.

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Appendix G – Graduate Handbook
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Key resources

- Graduate catalog: catalog.tamu.edu
  > details about the all the steps you must take towards finishing your degree
- Office of Graduate and Professional Studies (OGAPS): ogs.tamu.edu, 979.845.3631
  > Document Processing Submission System: ogsdpss.tamu.edu
  > academic process, forms, dates and deadlines, Thesis Office
- International Student Services: iss.tamu.edu
- Registrar: registrar.tamu.edu
  > academic calendar, registration details, records
- Howdy portal: howdy.tamu.edu/cp/home/displaylogin
  > course schedules, class registration, your record, eCampus access
- Computers and plotter
  > graduate student computing lab: location TBD
    - Contact Sara Eliason (see next page) for access to the lab.
  > key software:
    - ArcGIS Desktop, Microsoft Visual Studio, SAS, SigmaPlot
  > wide-format plotter to print posters for professional meetings: Centeq 130B
    - Contact Jeff Wythe (see next page) to arrange printing.
- Library: library.tamu.edu
  > subject librarians:
    - Deva Reddy, devaereddy@library.tamu.edu
    - Jenni Simonsen, simonsen@tamu.edu
- Writing Center: writingcenter.tamu.edu
- Career Center: careercenter.tamu.edu
  > CV writing, job postings, career/job search, graduate student workshops
    - Contact Dr. Katie Stober, kstober@tamu.edu
- Student Counseling Services: scs.tamu.edu
  > career counseling, stress management, crisis intervention, etc.

Academic calendar

- The general academic calendar for each semester is posted online at registrar.tamu.edu/General/Calendar.aspx.
  > Check this for the dates of registration, add/drop deadlines, finals, graduation and holidays.
- The Office of Graduate and Professional Studies calendar for each semester is posted online at ogs.tamu.edu/current-students/dates-and-deadlines.
  > Check this for the deadlines of academic process steps, such as filing your degree plan, scheduling your preliminary exams, requesting your final oral exam/defense and applying for graduation.
Key People

ACADEMIC PROCESS, RESOURCES, SUPPORT

Dr. Tom Boutton
Associate Department Head for Graduate Studies
Room 419 Animal Industries Building (ANIN)
[December 2014: 213 Kleberg Center (KLCT)]
boutton@tamu.edu | 979.845.8027

Sara Eliason
Graduate Program Coordinator
Room 418 Animal Industries Building (ANIN)
[December 2014: 213 Kleberg Center (KLCT)]
skeliason@tamu.edu | 979.862.6470

Jeff Wythe
computing resources
wythe@tamu.edu | 972.914.9446

Dr. Katy Kavanagh
Department Head

Chris Wilson, Assistant to the Dept. Head
Room 305 Horticulture and Forest Sciences Building (HFSB)
a-wilson@tamu.edu | 979.845.5000

Dr. Mort Kothmann
Assoc. Dept. Head for Undergraduate Studies
119 Kleberg Center (KLCT)
m-kothmann@tamu.edu | 979.845.5575

BUSINESS OFFICE—in HFSB

Jeanne Andreski
tuition and fees, human resources
jandreski@tamu.edu | 979.862.2128

Miki McClenton
payroll
mmcclenton@tamu.edu | 979.845.5570

Facilities

BUILDINGS

> Horticulture and Forest Science Building (HFSB)
> Kleberg Center (KLCT)
> Centeq Research Plaza (CEN)

RESEARCH FACILITIES

> Ecology and Natural Resources Teaching Area
  (1183 Fishtank Road, CS)
> Forest Science Laboratory
  (1042 Agronomy Road, CS)
> La Copita Demonstration Ranch and Research Area
  (near Alice, TX)
> S.M. Tracy Herbarium
  (3380 University Dr. East, University Services Bldg., CS)
> Sonora Research Area
  (Sonora, TX)
> Spatial Sciences Laboratory
  (1500 Research Pkwy, Suite B223, Centeq Building, CS)
> Stable Isotopes for Biosphere Science Laboratory
  (4th floor ANIN)
> Vernon Research Area
  (Vernon, TX)
**Academic process**

**ADVISORY COMMITTEE**
You will work with your advisor to form an advisory committee that consists of members of the graduate faculty who represent your fields of study.

- Doctoral students must have at least four committee members, including your advisor.
- Master’s students (all master’s degrees) must have at least three committee members.
- The committee chair (i.e., your advisor) must be from the Department of Ecosystem Science and Management, and at least one committee member must be from another department.
- Students working with off-campus ESSM research faculty must have an on-campus ESSM academic co-chair.

It is to your advantage to establish your advisory committee by the end of your first long (i.e., fall or spring) semester. You will formalize your advisory committee membership on your degree plan.

**NOTE:** Once your committee is set, you may make changes to it, including changing advisors. You do this via DPSS (ogsdpss.tamu.edu), using the change of committee section of the “Long Form” petition.

**DEGREE PLAN**
You will work with your advisor to develop a plan for the course work and research credits you will take. This degree plan also formally declares your degree objective and advisory committee membership. You must submit your degree plan to OGAPS for approval.

Submit your degree plan using the OGAPS Document Processing Submission System (DPSS): ogsdpss.tamu.edu.

**DEADLINE:** As a Ph.D. student in Ecosystem Science and Management you must submit your degree plan early in your fourth long (i.e., fall or spring) semester.

**DEADLINE:** As an M.S. student in Ecosystem Science and Management you must submit your degree plan early in your second long (i.e., fall or spring) semester.

**PLEASE NOTE:** If you do not submit your degree plan by this deadline, OGAPS will place a hold on your record, blocking you from registering until your degree plan is on file.

**NOTE:** After your degree plan has been approved, you may make changes to it if necessary. You do this via DPSS (ogsdpss.tamu.edu), using the course change section of the “Long Form” petition.
# Credit and Course Requirements

You will plan most of your courses in consultation with your advisory committee. However, a few courses are required and limits on certain course types apply for master’s students.

<table>
<thead>
<tr>
<th>Degree</th>
<th>Minimum credit hours</th>
<th>Course requirements/limitations</th>
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| Doctor of Philosophy                        | 64 credit hours beyond a master's degree  
96 credit hours beyond a bachelor's degree  | > 2 credit hours of graduate seminar are REQUIRED (ESSM 681).  
> Research credits (ESSM 691): a reasonable amount. |
| Master of Science >thesis option            | 32 credit hours (Students typically take around 24 hours of formal courses plus directed studies, seminar and research hours.)  | > 1 credit hour of graduate seminar is REQUIRED (ESSM 681); a maximum 2 hours of seminar is allowed.  
> No more than 12 hours of 685 (directed studies) and 691 (research), combined, with a:  
  ▪ maximum 8 hours of 685  
  ▪ maximum 8 hours 691.  
> Maximum 9 hours of 300- or 400-level undergraduate courses. |
| Master of Science >non-thesis option        | 36 credit hours (Students typically take at least 30 hours of formal courses plus directed studies and seminar hours.)  | > Maximum 2 hours of seminar (681).  
> No more than 12 hours of 684 (internship) and 685 (directed studies), combined, with a:  
  ▪ maximum 8 hours of 684  
  ▪ maximum 8 hours 685.  
> Maximum 9 hours of 300- or 400-level undergraduate courses. |
| Master of Natural Resource Development >non-thesis (online or on campus) | 36 credit hours (Students typically take at least 30 hours of formal courses plus directed studies and seminar hours. Of these 36 credits, approximately 12 credit hours will be outside your degree option.)  
(Check the distance program webpage for potential distance-based courses: essm.tamu.edu/academics/graduate/degrees-and-certificates/distance-mnrdd-courses/)  | > Maximum 2 hours of seminar (681).  
> Total 684 and 685 hours may not exceed 25% of your total credits, with a:  
  ▪ maximum 8 hours 684  
  ▪ maximum 8 hours 685.  
> No research (691) credits are allowed.  
> Maximum 9 hours of 300- or 400-level undergraduate courses. |
| Master of Agriculture                       | 36 credit hours (Students typically take at least 30 hours of formal courses plus internship, directed studies and seminar hours. Of these 36 credits, approximately 12 credit hours will be outside your degree option.)  | > Maximum 2 hours of seminar (681).  
> Total 684 and 685 hours may not exceed 25% of your total credits, with a:  
  ▪ maximum 8 hours 684  
  ▪ maximum 8 hours 685.  
> No research (691) credits are allowed.  
> Maximum 9 hours of 300- or 400-level undergraduate courses. |

**Please Note:** These are minimum hours that the Department, College and OGAPS set. Your advisory committee may require additional hours depending on the scope of your research and previous coursework.
REGISTRATION

- You register for classes through the “My Record” tab in the HOWDY portal.
- “Pre-registration” is what the first weeks of registration are called. For spring semester registration, these typically start in mid-November. For summer and fall semester registration, these typically start in mid-April.
- “Open registration” starts immediately after pre-registration and runs up to 5:00 p.m. on the last working day prior to the first day of class, with a few days around graduation when registration is not available.
- Registration schedules are posted at registrar.tamu.edu/Current/GradRegSchedule.aspx.
- If you register after the published registration deadline, you will incur a late fee. (See sbs.tamu.edu/accounts-billing/tuition-fees/schedule/#FEE_LATE.)

Please note:

- Research, directed study, internship hours
  > When you register for these, sign up for the section connected to your advisor. If there is no section available with your advisor, please contact Sara Eliason to get one established.
- In-absentia sections
  > You may register in-absentia in a course offered on an individual basis [such as 684 (professional internship), 685 (directed study) or 691 (research)] and conducted away from the College Station campus and other TAMU System campuses or research/extension facilities. “Facilities” includes physical locations as well as human resources. By registering in-absentia, you avoid certain fees. If you are eligible to register in-absentia, be sure that there is an in-absentia section available with your advisor. If there is none, please contact Sara Eliason to get one established.

Minimum registration

- All students must register for at least one credit hour each fall and spring semester.
- Students on an assistantship or fellowship must register full time. Full time means:
  > Fall semester: 9 hours
  > Spring semester: 9 hours
  > Summer session: 6 hours
- Continuous registration: Ph.D. and M.S.-thesis students who have completed all coursework on the degree plan, other than 691 (research) credits, must register for at least one credit every semester until all requirements for the degree are fulfilled.
- Students with financial aid: You must be enrolled a minimum of half-time to be eligible for financial aid and to keep outstanding student loans on automatic in-school deferment. If you drop below half-time enrollment at any point during the semester, the Scholarships & Financial Aid Office will report you to the National Student Clearinghouse as enrolled less than half-time and your student loans will enter a grace period, at the end of which you will enter repayment. Please check with the Scholarships & Financial Aid Office (financialaid.tamu.edu/Contact-Us) to make sure you are in compliance with the terms of your student loans or aid.
- Failure to register: If you do not register for two consecutive long semesters (i.e., fall and spring), you will be considered inactive. In order then to continue with your degree, you then would be required to apply for readmission to the university and program.
- Leave of absence: Under extenuating circumstances, you may petition for up to a one-year leave of absence. If granted, you would not be required to register during the leave. You do this via the DPSS, using the waivers or exemptions section of the “Long Form” petition.
RESEARCH PROPOSAL: PH.D. AND M.S.-THESIS, STUDENTS

> **Ph.D. students:** You are expected to conduct independent research that makes a unique and significant contribution to a particular field of study.

> **M.S. students on the thesis track:** You are expected to conduct original research approved by your graduate committee.

> Your research project should be designed to produce a publication in a refereed journal.

In consultation with your advisor and graduate committee, you will develop a research project. This must then be formalized in a research proposal. Once your committee has met and approved your research proposal, you will submit it to OGAPS, along with the Proposal Approval Page, signed by each committee member and the department head.

**FORM:** Get the Proposal Approval Page on the OGAPS forms and information webpage: ogs.tamu.edu/incoming-students/student-forms-and-information/.

Generally, a research proposal entails about 10 pages of narrative that encompasses:

- **Justification and rationale:** summary and critique of previous current and relevant research on the subject, specific literature citations, and identification of particular problems that your study will help resolve.
- **Statement of hypotheses:** specific questions your research is designed to answer.
- **Objectives:** specifics of what you will accomplish to test your hypothesis, limits/boundaries of the proposed study.
- **Procedure:** methods to be used to accomplish objectives, including research site description, experimental design, research methodology, and timeline for data collection and analysis.
- **Budget:** Where practical, construct a budget for experience, but do not include it in the OGAPS copy.

**DEADLINE:** As a Ph.D. student in Ecosystem Science and Management you must submit your research proposal by the end of your fourth long (i.e., fall or spring) semester.

**DEADLINE:** As an M.S. student in Ecosystem Science and Management you must submit your research proposal by the end of your second long (i.e., fall or spring) semester.

**NOTE:** Your advisory committee should approve your proposal before you commence the research. You should report regularly to your major professor and your full advisory committee to apprise them of progress in your research and to gain approval of any redirection of your research.
**Preliminary Exams: Ph.D. Students**

Doctoral students: You must complete both written and oral preliminary examinations, which you will schedule when you have finished all but about 6 hours of the formal coursework on your degree plan [i.e., everything except 681 (seminar), 684 (internship) or 691 (research) hours]. These exams are based on your prior coursework and knowledge of the scientific literature in your general area of expertise. Usually the “prelim” involves a written exam from each advisory committee member, followed by an oral exam administered by the committee as a whole.

**Form:** To make sure you are otherwise eligible to take your preliminary exams, refer to and complete the Preliminary Examination Checklist:


Within ten days of passing your exams, you must submit this checklist along with the Report of the Preliminary Examination form to OGAPS. (Both forms are part of the Preliminary Exam Checklist file.)

**Note:** You must complete your final examination (i.e., your doctoral dissertation defense) within four calendar years of your preliminary exam, or you must retake the preliminary exam.
**Dissertation, Thesis, Professional Paper**

**Ph.D. and M.S.-thesis, students**
The culminating product of your graduate research is a dissertation (Ph.D. students) or thesis (M.S. students on the thesis track.) You will present a polished, properly formatted draft of your thesis or dissertation to your advisory committee after you and your advisor have agreed on the content. Your committee members have the right to reject documents with grammatical or formatting errors or that fail to meet high standards of scientific style.

> **Thesis Office review:** Once your advisory committee has deemed your dissertation or thesis acceptable, usually at the time of or shortly after your final exam, you must submit your dissertation or thesis to the Thesis Office, along with an approval form signed by your committee members. The Thesis Office reviews each dissertation and thesis for adherence to university guidelines for quality and consistency. You must receive their approval of your manuscript. The OGAPS calendar lists deadlines for clearing the Thesis Office in order to graduate in any given semester.

**FORM:** Thesis and dissertation approval forms are under the “Thesis/Dissertation Forms and Information” heading on ogs.tamu.edu/incoming-students/student-forms-and-information.

**M.S.-non-thesis, Master of Natural Resource Development and Master of Agriculture students**
A professional paper is required as the culminating product of your studies. The professional paper covers a relevant area of ecosystem science and management, or for Master of Agriculture students, may be an account of your internship that highlights the scientific and managerial principles you learned and applied during that experience. This paper is formulated in consultation with your advisory committee and may be based on literature reviews, surveys and other sources. Be sure to have your committee approve your proposed project and paper before you begin work on it. You should report regularly to your major professor and full advisory committee to apprise them of progress on your project and paper and to gain approval of any redirection. You do not need to submit your professional paper to the Thesis Office for approval.

**Writing resources**

> **Thesis Office:** ogs.tamu.edu/current-students/thesis-dissertation
  - guidelines and resources for preparing and submitting your manuscript, Thesis Manual
> **TAMU Writing Center dissertations and theses support:** writingcenter.tamu.edu/c/types-communication/dissertations-theses/
> **Writing studios:** P.O.W.E.R. (Promoting Outstanding Writing for Excellence in Research): power.tamu.edu
  - writing support program; sessions scheduled regularly throughout the year
> **OGAPS training/tutorials:** ogs.tamu.edu/workshops-and-trainings/
**Final Examination**

**Ph.D. students**
After your advisory committee accepts your dissertation for defense and you have completed all coursework on your degree plan [with the exception of any final research (691) hours], you must schedule a final oral examination. The final exam involves a public seminar on your doctoral research immediately followed by a formal dissertation defense with your advisory committee.

**M.S.-thesis, students**
After your advisory committee accepts your thesis and you have completed all coursework on your degree plan, except for those hours for which you are currently registered, you must schedule a final comprehensive examination. This involves a public seminar of your thesis immediately followed by a formal examination with your advisory committee, addressing the content of your thesis as well as your prior coursework. This exam may be written or oral or both.

**M.S.-non-thesis, Master of Natural Resource Development and Master of Agriculture students**
After your advisory committee accepts your professional paper and you have completed all coursework on your degree plan, except for those hours for which you are currently registered, you must schedule a final comprehensive examination. This involves a formal examination with your advisory committee, addressing the content of your paper as well as your prior coursework. This exam may be written or oral or both.

**All students:**
> Once you and your committee have set a date for the final examination, you must formally schedule the exam by submitting the Request and Announcement of the Final Examination form to OGAPS at least 10 working days prior to the exam. The OGAPS calendar lists deadlines for taking your final exam and submitting this form in order to graduate in any given semester.

**Form:** Request and Announcement of the Final Examination form is on the OGAPS forms and information webpage: ogs.tamu.edu/incoming-students/student-forms-and-information.

**Note:** You also must advertise the date, time and location of your defense seminar to the ESSM faculty and students by posting flyers in ANIN and HFSB and distributing the information over email at least one week in advance.
## Forms and Signatures

Dr. Boutton, Associate Department Head for Graduate Studies, may sign all forms or approve forms in DPSS. If Dr. Boutton is not available, then the department head may sign. Some forms also require approval and signature from the College of Agriculture and Life Sciences associate dean for graduate programs. Please contact Sara Eliason if you have questions.

<table>
<thead>
<tr>
<th>Forms you file via DPSS (ogsdpss.tamu.edu)</th>
<th>Forms you file via paper (ogs.tamu.edu/incoming-students/student-forms-and-information)</th>
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<td>• Preliminary Examination Checklist and Report</td>
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<tr>
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<td>• Request and Announcement of the Final Examination</td>
</tr>
<tr>
<td>• Long form</td>
<td>• Request for Exemption from Final Examination</td>
</tr>
<tr>
<td>&gt; petition to change course work</td>
<td>• Request for Letter of Completion</td>
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<tr>
<td>&gt; petition to change committee</td>
<td>• Letter of Intent to Pursue Another Graduate Degree</td>
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<tr>
<td>&gt; petition to extend time limits</td>
<td>• Graduation Cancellation Form</td>
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<td>&gt; petition for waivers/exceptions</td>
<td>• Special Request Letter</td>
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<td>• Reduced course load form (for F-1 an J-1 visa holders)</td>
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<td></td>
<td>• Thesis and dissertation approval forms</td>
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</tbody>
</table>
Academic standards

You are expected to make steady progress toward a degree and commensurate academic accomplishments.

Grades and GPA requirements

- You must maintain a minimum 3.0 GPR on the degree plan and cumulatively, with no grade lower than C in any course on your degree plan.
- New students are allowed one probationary semester.
- If your GPA falls below 3.0 after your first semester:
  - You will not be allowed to take preliminary or final exams until your GPA improves.
  - The department will place you on academic probation, giving you at least one semester to raise your GPA.
- Students with fellowships must maintain a minimum 3.25 GPR, with one semester of probation if you fall below this threshold.
- If you earn a D, F, or U (unsatisfactory) in a course on your degree plan, you must retake the course and earn at least a C or S, arrange a grade change with the instructor, or remove the course from your degree plan. (This final option does not remove the course from your record, and it would still count in your overall GPA, but it would then not count toward your degree plan credit hours.)

Student learning outcomes, as defined by the University:

- Master your degree program requirements.
- Apply subject matter knowledge.
- Apply a variety of strategies and tools.
- Use appropriate technologies.
- Develop clear research plans and conduct valid research.
- Communicate effectively.
- Teach and explain the subject matter of your discipline.
- Choose ethical courses of action.
Duration and time limits

Doctoral students

- A doctoral degree generally requires three years of full time work beyond a master's degree, or four to five years of full time work beyond a bachelor's degree.
- You must complete all degree requirements within ten years. Course work over ten calendar years old will expire and may not be applied toward the degree.
- You have one calendar year after your final oral exam to get your thesis or dissertation cleared through the Thesis Office. (If you will hit up against the ten-year time limit before this one year is out, the ten-year time limit takes precedence.)

Master’s students

- A master's degree generally requires at least two years of full time work beyond a bachelor's degree.
- You must complete all degree requirements within seven years. Course work over seven calendar years old will expire and may not be applied toward the degree.
- Thesis-option students: You have one calendar year after your final oral exam to get your thesis or dissertation cleared through the Thesis Office. (If you will hit up against the seven-year time limit before this one year is out, the seven-year time limit takes precedence.)

NOTE: While the department discourages you from taking longer than the time limits outlined above to complete your degree, you may request an extension of these time limits. You do this via DPSS (ogsdpss.tamu.edu), using the time limit extensions section of the “Long Form” petition.
Residency

**Ph.D. students**
- If you hold a master’s degree, you must register for two consecutive semesters (one academic year) with a minimum of 9 credit hours each (any combination of formal classes or research hours) on the College Station, TX, campus.
- If you hold a bachelor’s degree but no master’s degree, you must register for three semesters with a minimum of 9 credit hours each (any combination of formal classes or research hours) on the College Station campus. Two of those semesters must be consecutive (one academic year); the third need not be adjacent to this one year.

**M.S. students**
- You must take at least 9 credit hours during one semester on the College Station campus (any combination of formal classes or research hours).

**Master of Agriculture and on-campus Master of Natural Resource Development students**
- You must complete 12 credit hours on the College Station campus.

**Master of Natural Resource Development-Distance students**
- You have no residency requirement.

**NOTE:** To obtain a waiver of the residency requirement, you must submit a petition to OGAPS. You do this via DPSS (ogsdpss.tamu.edu), using the waivers and exceptions section of the “Long Form” petition.
Funding

There are opportunities for funding beyond any current grant money or fellowship support.

- Travel grants
  - Travel must be to a professional meeting. Travel to research sites is not eligible.
  - OGAPS Research and Presentation Grants: ogs.tamu.edu/funding-information/grants/grant-guidelines/
  - Graduate Student Council Travel Awards: gsc.tamu.edu
    - For students in ESSM to be eligible for these awards, the department must have a student representative to the GSC; this representative must attend meetings regularly.
  - ESSM travel grants
    - Available periodically. We will notify you whenever we are accepting applications for travel grants.

- Departmental fellowships and research grants:
  essm.tamu.edu/academics/graduate/financial-support/
  - We will notify you whenever we are accepting applications for departmental fellowships or research grants.

- College of Agriculture and Life Sciences fellowships:
  aglifesciences.tamu.edu/academics/graduate/funding-opportunities/

- Master’s students:
  - Willie May Harris Fellowship
  - National Science Foundation Graduate Research Fellowships

- Doctoral students
  - National Science Foundation Graduate Research Fellowships
  - Tom Slick Graduate Fellowships
  - Wasko Graduate Merit Fellowship
  - Willie May Harris Fellowship
  - OGAPS Dissertation Fellowship
  - Phil Gramm Doctoral Fellowship
Student life

DEPARTMENTAL ACTIVITIES

- ESSM fall picnic: typically mid-October
- ESSM spring reception: typically coincides with Parents’ Weekend (April 17–19, 2015)
- Departmental seminar: Tuesdays at 3:45.
  > Offered each semester, a mix of invited speakers and student presentations. You should attend even when you are not registered for the course (ESSM 681)
- ESSM Graduate Student Organization
- TAMU Graduate Student Council
- Student chapters of professional organizations:
  > Society for Ecological Restoration Student Guild, Advisor: Dr. Georgianne Moore
  > Soil & Water Conservation Society, Student Chapter, Advisors: Dr. Bob Knight and Dr. Sam Feagley
  > American Society of Photogrammetry and Remote Sensing, Faculty advisor: Dr. Sorin Popescu
  > Range Club, Faculty advisors: Dr. Mort Kothmann and Dr. Bob Knight
  > Texas A&M Chapter of the Society of American Foresters, Faculty advisor: Dr. Jason Vogel

PROFESSIONAL DEVELOPMENT

Opportunities to present research on campus
- Departmental seminar course (ESSM 681): offered each semester, a mix of invited speakers and student presentations
- GIS Day, poster exhibition, library.tamu.edu/about/collections/map-gis-collections-services/index.html: November 2014
- Ecological Integration Symposium, theeis.tamu.edu: March 2015
- Student Research Week, srw.tamu.edu: March 2015
- Molecular and Environmental Plant Sciences Symposium: meps.tamu.edu/symposia/2014

Opportunities to present research in Texas
- Texas Society for Ecological Restoration annual conference: chapter.ser.org/texas

Seminar series in other TAMU departments
- Agricultural Economics: agecon.tamu.edu/news-events-seminars
- Applied Biodiversity Science: biodiversity.tamu.edu/events/abs_seminars
- Biology: www.bio.tamu.edu/SEMINARS/index.htm
- Ecology and Evolutionary Biology: eeb.tamu.edu/events/eeb-seminars
- Entomology: insects.tamu.edu/news_events/seminars
- Geosciences: geosciences.tamu.edu/geosciences-seminars/826-spring-seminars-2014
- Molecular & Environmental Plant Sciences: meps.tamu.edu/index.html
- Soil and Crop Sciences: soilcrop.tamu.edu/media/seminars
- Water Management & Hydrological Science: waterprogram.tamu.edu/seminars
Graduate Teaching Academy: gta.tamu.edu
> professional development opportunities in the area of college teaching
> GTA seminars and workshops are FREE for graduate students
> Fall and spring seminar series presentations
> One-year GTA Fellows program: You may enter at the beginning of either the fall or the spring semester. Those who successfully complete the one-year program obtain a Certificate of Completion from the GTA and receive the designation of “Graduate Teaching Academy Fellow.”

Graduate certificate programs
- Graduate Certificate in Geographic Information Systems and Graduate Certificate in Remote Sensing: ssl.tamu.edu/education/graduate-certificate-program
- Graduate Certificate in Military Land Sustainability: military.tamu.edu/education
- International Agriculture and Resource Management Graduate Certificate Program: borlaug.tamu.edu/programs/academic-programs/iarm
- Bush School of Government and Public Service Graduate Certificate in Nonprofit Management: bush.tamu.edu/certificate/cnpm

Organizations
- Women in Science and Engineering: outreach.science.tamu.edu/wise.php (They host an annual professional development conference.)
- Minorities in Agriculture, Natural Resources and Related Sciences: manrrs.tamu.edu
- Student organizations in the College of Agriculture and Life Sciences: aglifesciences.tamu.edu/service-outreach/organizations

Writing resources
> TAMU Writing Center: writingcenter.tamu.edu
> P.O.W.E.R. (Promoting Outstanding Writing for Excellence in Research): power.tamu.edu

Graduate Career Services: careercenter.tamu.edu
> Offers workshops and seminars on job preparation, job searches/applications in both the academic setting and in other options for master’s/docotral degree holders.

Office of Graduate and Professional Studies professional development resources: ogs.tamu.edu/profdev

**STUDENT ACTIVITIES**
MSC Fall Open House: Sunday, September 7, 1:00 p.m.–5:00 p.m. mscopenhouse.tamu.edu

Student Activities office search for student organizations: studentactivities.tamu.edu/app/search/index
Suggestions for success

> Develop a strong and close professional relationship with your major professor.
> Develop strong and close professional relationships with other professors and with your fellow graduate students.
> Use your office. This creates opportunities for departmental interactions.
> Become a member of a professional society, attend their annual meetings and give talks or posters based on your research. This will facilitate development of your professional network.
> Keep up with the new literature in your fields of interest. Science changes rapidly and you need to be at the forefront of knowledge.
> Make your degree program your top priority. It’s a very demanding undertaking to handle your courses, maintain your research program and keep up with the new literature in your field.
> Make it a goal to become a leader in your field.

Summary: key steps and milestones

> Develop your research plan.
> Construct your graduate advisory committee.
> Develop a degree plan itemizing all classes you will take.
> Develop a research proposal.
> If in PhD program, complete comprehensive oral/written exams.
> Complete proposed lab and fieldwork to collect data.
> Statistically evaluate your data.
> Attend professional meetings to present your research.
> Submit manuscripts to journals for publication.
> Write your thesis/dissertation.
> Defend your dissertation/thesis to your graduate committee.
CHECKLIST FOR MASTER’S STUDENTS

☐ Meet with your major professor before registering for your first semester. (It also is a good idea to check in with your advisor before you register in any semester.)
☐ Have your final transcript from you bachelor’s degree sent to the Office of Admissions, if applicable.
☐ Meet regularly with your major professor to develop your research plan (thesis option) or project for your professional paper (non-thesis option).
☐ Establish your graduate advisory committee. (See page 4.)
☐ Develop a degree plan itemizing all classes you will take and submit it to OGAPS early in your second long semester (i.e., spring or fall semester). (See page 4.)
☐ Develop your research proposal (thesis option) in consultation with your advisor and advisory committee and submit it to OGAPS. (See page 7.)
☐ Complete proposed lab and fieldwork to collect data (thesis option) or complete your project tasks (non-thesis option).
☐ Statistically evaluate your data.
☐ Write your thesis (thesis option) or professional paper (non-thesis option). (See page 9.)
☐ International students: Confirm that you have met English language proficiency requirements.
☐ Meet the residence requirement. (See page 14.)
☐ Early in your last semester, apply for graduation online through the Howdy portal.
☐ Confirm that all your degree plan courses are met and that your degree plan and advisory committee information on file are up-to-date.
☐ Submit to OGAPS paperwork for any changes to your degree plan or advisory committee.
☐ Attend a pre-submittal conference offered through the Thesis Office or review the online pre-submittal conference.
☐ Submit your thesis or professional paper to your advisory committee.
☐ Schedule your final exam with your committee and submit to OGAPS the final exam request and announcement form. (See page 10.)
☐ Distribute to ESSM faculty and students an announcement of your defense presentation.
☐ Present and defend your thesis or professional paper to your graduate committee.
☐ Make any necessary corrections to your thesis or professional paper.
☐ Non-thesis option students: Deliver to the associate department head for graduate programs a copy of your professional paper, signed by your committee members.
☐ Thesis option students: Deliver to the Thesis Office the thesis approval form and upload your thesis to the Thesis Office. (See page 9.)
☐ Make any corrections the Thesis Office requires.
☐ Clear the Thesis Office.
☐ Complete exit interview/survey with the department.
☐ Arrange for a graduate cap and gown.
☐ Graduate!

Also check the OGAPS Steps to Fulfill Master’s Degree Requirements: ogs.tamu.edu/incoming-students/student-forms-and-information/getting-a-degree/masters-degree-requirements/
CHECKLIST FOR DOCTORAL STUDENTS

☐ Meet with your major professor before registering for your first semester. (It also is a good idea to check in with your advisor before you register in any semester.)
☐ Have your final transcript from you bachelor’s/master’s degree sent to the Office of Admissions, if applicable.
☐ Meet regularly with your major professor to develop your research plan.
☐ Establish your graduate advisory committee. (See page 4.)
☐ Develop a degree plan itemizing all classes you will take and submit it to OGAPS early in your fourth long semester (i.e., spring or fall semester). (See page 4.)
☐ Develop your research proposal in consultation with your advisor and advisory committee and submit it to OGAPS. (See page 7.)
☐ International students: Confirm that you have met English language proficiency requirements.
☐ Schedule and complete preliminary exams. (See page 8.)
☐ Complete proposed lab and fieldwork to collect data.
☐ Statistically evaluate your data.
☐ Write your dissertation. (See page 9.)
☐ Meet the residence requirement. (See page 14.)
☐ Early in your last semester, apply for graduation online through the Howdy portal.
☐ Confirm that all your degree plan courses are met and that your degree plan and advisory committee information on file are up-to-date.
☐ Submit to OGAPS paperwork for any changes to your degree plan or advisory committee.
☐ Attend a pre-submittal conference offered through the Thesis Office or review the online pre-submittal conference.
☐ Submit your dissertation to your advisory committee.
☐ Schedule your final exam with your committee and submit to OGAPS the final exam request and announcement form. (See page 10.)
☐ Distribute to ESSM faculty and students an announcement of your defense presentation.
☐ Present and defend your dissertation to your graduate committee.
☐ Make any necessary corrections to your dissertation.
☐ Deliver to the Thesis Office the dissertation approval form and upload your dissertation to the Thesis Office. (See page 9.)
☐ Make any corrections the Thesis Office requires.
☐ Clear Thesis Office.
☐ Complete exit interview/survey with the department.
☐ Arrange for a graduate cap and gown.
☐ Graduate!

Also check the OGAPS Steps to Fulfill Doctoral Degree Requirements: ogs.tamu.edu/incoming-students/student-forms-and-information/getting-a-degree/doctoral-degree-requirements/ and
Steps to Fulfill Preliminary Exam Requirements ogs.tamu.edu/incoming-students/student-forms-and-information/getting-a-degree/preliminary-exam-requirements/.
MYTH #1: If I have X number of publications, Y GPA, and research experience with Z, then I’ll probably get at least one tenure-track job offer.

FACT: There are FAR more Ph.D. graduates each year than tenure-track positions.

MYTH #2: There are not any opportunities for me other than teaching or research. So, if I can’t be a professor, I’m pretty much stuck.

FACT: There are many career paths available to Master’s and Ph.D. graduates in EVERY field.

If you’re interested in:

--exploring career options or developing a back-up plan
--polishing and perfecting your written application documents
--learning what you can do each semester to increase your chances of success
--developing and building a strong Network of professional contacts
--practicing your interview technique

...then visit the Career Center in 209 Koldus.

If you’d like to make a one-on-one appointment, call 979-845-5139.

If you’d like to bring your documents by without an appointment, graduate walk-in hours are M & F 8:30-11:00am and W 1:30-4:00pm.

Also, you can email any documents or questions to me at kstober@tamu.edu

Dr. Katie Stober ‘05

Associate Director for Graduate Student Services

Career Center, Texas A&M University