



7th Biennial Conference on University Education in Natural Resources

Transferring learning to work: making learning real for natural resource leaders and their employers

Bill Ashton, Ted Needham, Dirk Jaeger; University of New Brunswick, Faculty of Forestry and Environmental Management

Investing in leadership development for natural resource professionals increasingly means linking learning for participants to performance for their employer. We were challenged to develop meaningful learning outcomes and their assessment, which included making the learning 'real' for the participants and their employer. Working collaboratively with the Ontario Ministry of Natural Resources, we combined an outcomes-based approach with problem-based learning in an 8-day *Ecological Sustainability Leadership Program* for foresters, biologists, and other public service professionals. An important element of the curriculum was the transfer-to-work action plan. For participants, their plan results from reflection, discerning priorities, and making commitments to take action. From the employers view, their action plan encourages and promotes explicit transfer of learning outcomes to work. From an educator's perspective, their plan allows assessment of the suitability of the learning outcomes and our success in helping participants acquire them. Our presentation provides an overview of this leadership program, key elements of curriculum design, along with assessment, giving particular attention to the transfer to work online tools.

Keywords: professional development; online tools; learner, employer, and teacher perspectives

Distance Education and Active Learning - One Approach to Prepare Future State Park Managers

Aram Attarian, Associate Professor, North Carolina State University

One of the many challenges facing today's state park systems is its aging work force. As manager retirements increase over the next few years, how will the knowledge, experience, and institutional memory that leave with these retirees be retained? And what skills and knowledge will new state park managers need to meet the demands of their new jobs? To help address this concern the National Association of State Park Directors (NASPD) developed a set of nine competencies for new state park managers to: (1) gain an in-depth understanding of the primary competencies required to manage a state park; (2) develop an awareness of the traditions, trends, and future challenges associated with managing a state park; and (3) develop a network for the ongoing exchange of knowledge, ideas, information, and experiences. To deliver these competencies, NASPD partnered with North Carolina State University (NCSU) Department of Parks, Recreation & Tourism Management to create the *State Park Leadership School (SPLS)*. The SPLS curriculum was developed and written by a Board of Regents with oversight provided by NCSU and a curriculum committee. The SPLS was designed to be delivered to students in two parts: a Distance Education (DE) module and an on-site "active learning" component. The DE program was developed using *authorGEN* software and made available to students on CD-ROM. The 3-day on-site program utilizes a variety of active learning techniques (i.e., case studies, roundtable and panel discussions), which build on and reinforce content mastered from the DE delivered courses. The purpose of this University Education in Natural Resources program is to present the approaches taken by NASPD/NCSU partnership. Discussion will focus on the role of the Board of Regents, and the steps taken to develop, market, deliver, and assess this innovative training program.

Keywords: Succession planning, outreach, management development



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Singing in the rain: uses and misuses of field labs in natural resources education

J. D. Bailey, College of Forestry, Oregon State University

Natural resources educators, me included, have long relished the use of field labs and field trips in our courses. Such field time is considered essential for certain pedagogical objectives (e.g., teaching/training on field sampling and measurement techniques, and *in situ* soil characterization and plant identification). In addition, three-dimensional views in flexible landscape perceptions are fundamentally different from slide shows for providing visual images of course concepts. Finally, much of our role as natural resources educators is to motivate our students to learn; time in the field can be a key to stimulating interest, questions, discussions and the sharing of stories. This presentation will build on these and related learning objectives/outcomes that are well served by field labs, and thereby identify when it is important to integrate them into our indoor lectures and, perhaps, our distance education courses. By default, therefore, we will identify the over- and misuse of field labs (e.g., as lecture time in the rain) and share our stories of successes and failures such that this valuable teaching tool can better serve our students in the future.

Improving Student Writing Skills

F.A. Baker, Department of Wildland Resources and Ecology Center, Utah State University

Working with students to improve their writing skills can be frustrating and time consuming for both student and instructor. In a Forest Pathology course I use weekly, short (< 2 page) writing assignments to develop student learning skills and to reinforce major concepts. For example, students are asked to describe one diseased specimen for a student who missed the lab. As students become more comfortable with writing, the assignments focus on active writing and on structuring short writings. Two take home exams and a review paper provide further opportunities for students to improve writing. One of the major keys to getting students to work at writing is the grading rubric. Each paper is graded as +, which indicated good writing; 0, awarded for good effort but the writing needs improvement, or -, an indication that more effort is needed. This eliminates the need to grade each assignment with a "fine-toothed comb" and allows for more subjective feedback. Students can focus more on what they have to say, and less on how to say it. During labs, I meet with students for a few minutes to give them individual feedback, and provide specific examples of stronger writing. This is especially important for students whose native language is not English.



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Ten Tips For Teaching Online

F.A. Baker, Department of Wildland Resources and Ecology Center, Utah State University

Inspired by watching David Letterman while checking in on an online course, I offer my top ten tips for successfully teaching online. These have been gleaned from the literature and/or as a result of experience.

Please note that the writer's guild is still on strike!

10. Allow more time for teaching and preparation
9. You MUST engage the students
8. Facilitate building a learning community
7. Murphy Lives! Be prepared and be flexible
6. Demand excellence
5. Get students out of their seats and doing something
4. Keep course current
3. Budget for software, hardware and assistance
2. Let the students know you as a real human being
1. Allow more time for teaching and preparation!

A reference that I am particularly enjoying right now is Linda B. Nilson, 2003. *Teaching at its best*. Second Edition, Anker Publishing Company, Inc., Boston, MA. 245p.

Zen and the Art of Chainsaw Maintenance

G. Andrew Bartholomay; The Pennsylvania State University; DuBois Campus

Just as Pirsig's (1974) account of his motorcycle adventure explores the dichotomy of holistic and reductionistic philosophies, so too does a short course in chainsaw safety and tree felling incorporate these seemingly disparate viewpoints into a critical thinking exercise. Students entering college often lack critical thinking skills (National Commission on Excellence in Education 1983). The chainsaw course described here addresses this disparity via the transmission of two types of information: (1) subject matter and (2) how to process that subject matter (Schafer 1991); the latter is the essence of critical thinking. The chainsaw course has three modules taught over two days. Module one covers safety equipment and chainsaw techniques. Module two covers the disassembly and maintenance of the chainsaw. Module three allows the student to assess field conditions and integrate learned theories to safely fell trees. Over twelve hours, the student experiences authority-centered lecture, reductionistic discovery-based learning, and critical thinking. The objective is to formulate a holistic solution (felling a tree into a desired space) from integrated reductionist principles (forces and techniques). The expected outcomes for this course are a better understanding of safety and knowledge of one's technical limitations. I found, however, that students also develop a renewed interest in their chosen curricula, a more mature interaction with faculty, and an attitude of inquiry that permeates their continuing academic pursuits. I believe the noted changes in philosophical direction result from the combination of a uniquely interesting subject, an informal student/teacher relationship (student/teacher ratio of 3/1), and a rapid application of knowledge to confirm cause and effect. This philosophy lesson, disguised as a chainsaw safety course, can be replicated under many pretexts. The keys to implementation are to find a subject of passionate interest to students, share one's expertise, and challenge the students to find tangible solutions to real questions.

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First Stop Planning and Communication using Landhelp

Delwin E. Benson, Department of Fish, Wildlife and Conservation Biology, Colorado State University

A first stop Internet-based, storage, planning and communication system for professional and private users to manage lands, wildlife and people is branded "LandHelp" (www.LandHelp.info). LandHelp contains 31 broad categories of information which then link to approximately 3,000 more excellent resources that have been developed by other professionals or which have been placed in LandHelp via PDF files. Major topics include but are not limited to planning, water, forests, fire, range, fish and wildlife, livestock, rural community living, pests, emergencies, health and safety, recreation, tourism and value added enterprises, financial aid and programs, community assessment and management, education, green infrastructure and sustainability, and most recently leadership and "next child in the woods." This "first-stop-resource" for understanding and managing land, wildlife and people has been used about 200,000 times in the past year without promotion by the university except through personal communications. LandHelp can be used by faculty, students, professionals, and all persons with access to the Internet; it encourages people to help themselves to information and to practice conservation and simplifies communications. The Internet is the most convenient, uniform and accessible place to house, edit and to share important information. However, persons also need a helping hand to put information into action through work by our agencies and organizations. The next step for LandHelp is to get natural resources agencies, organizations and individuals around the country to store information therein and to communicate with their publics through the shared website. LandHelp could become the common Internet voice for all Natural Resources agencies and organizations.

Keywords: Conservation, education, Internet, landscapes, management, natural resources, planning, stewardship, wildlife

Students use leadership and communications in courses and with agency cooperators to recommend solutions for natural resources problems through Service Learning

Delwin E. Benson, Department of Fish, Wildlife and Conservation Biology, Colorado State University

Service learning provides relevance in education: meaning and action by students; interdisciplinary pedagogy by educators; support by cooperators; and outcomes that benefit the community. Applied scholarship, research and outreach are part of university missions, yet within education, knowledge is not necessarily transferred into action. Service learning takes action and applies course objectives to needs in the community. Using practical experiences, in cooperation with community partners, helps students to realize that the work of science, or any subject, must ultimately be sanctioned, supported and integrated into the needs of people in the community if there is to be a positive and lasting outcome. Service learning was used for over 100 community issues in cooperation with agencies and organizations in a series of courses entitled "*Public Relations in Natural Resources*" for upper division students, "*Leadership and Public Communications*" primarily for graduate students learning at a distance, and "*Science Society and the Environment*" for first year students. Service learning is recommended for new graduate leadership courses currently promoted through the Max McGraw Wildlife Foundation and Colorado State University. Final products from students are comprehensive strategic planning documents that are written for the courses and the cooperators. A verbal summary is also presented in most classes by students to students, faculty and cooperators. In all cases, students apply theories and techniques about communications and leadership that recommend solutions for extant environmental opportunities and problems. Service Learning: 1. stimulates educators to work on current and relevant issues; 2. is a thorough and empathetic approach to learning; 3. is a teaching tool that directly relates to course objectives; 4. is a logical way to contribute to multiple roles as a educators, researchers and service providers; and 5. is a means to link people to their place in the environment and social system.



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Making Service-learning Work for You

Gary Blank, Bronson Bullock, Patti Clayton, George Hess, JJ Scott; North Carolina State University

Consensus emerges about defining characteristics and transformative potential of service-learning. Designing pedagogy effectively around explicit learning and service objectives and in a way that helps nurture connections at intersections of learning goals, disciplines, and institutional units remains challenging. Individuals can attend any or all parts of this workshop; discussion will occur during each part.

Part 1 (30 min): Overview of the pedagogy, its non-traditional nature, benefits, and challenges. Service-learning integrates learning and service goals; academic learning and civic learning; collaboration between campus and community; and structured reflection. Community partnerships and critical reflection are key elements of intentional design for maximum impact.

Part 2 (60 minutes): Examples of service-learning in natural resources courses at NC State, from single-class activities to multi-course sequences. Service-learning has been integrated into a sequence of forest measurements courses to acclimate students to this approach. During the first course, students carry out a “one-shot” service-learning activity. The Natural Resources Measurements course at NC State is built around a service-learning project. Students have worked with county government to estimate trends of impervious surface levels through time, providing data used in drafting new storm water regulations. We are currently assessing the ecological value of Raleigh’s forests with several partners during a three-semester process in which data and information are passed from one course to the next.

Part 3 (90 minutes): Clinic to help interested faculty see how they might incorporate service-learning effectively into their courses and curricula. Working in small, facilitated groups, participants will engage in focused discussion of service-learning possibilities for their courses. We will offer an instructional design process and support participants in applying it collaboratively to their situations. Participants will leave with concrete ideas and a list of resources. The session is designed to be relevant to instructors new to service-learning as well as faculty experienced with service-learning.

The Community Forestry Research Fellowship:

John C. Bliss, Oregon State University

Co-Authors: Nils Christoffersen, Wallowa Resources

The Community Forestry Research Fellowship was founded in 1996 with the aim of “building the field of community forestry” as a legitimate field of academic inquiry. The Ford Foundation financed this new program to provide opportunities for universities and graduate students to engage in applied, participatory research in community forestry in the United States. The program’s strategy was to provide funding directly to graduate students, who would in turn identify and involve community partners and university faculty in research meaningful to all. Over the ten years that the program has been in existence it has supported 78 fellows from 25 institutions in research conducted in 26 states. Some communities have been involved with numerous students, leading to sustained interaction with the program. The program has evolved with respect to program structure, scope, and strategy. A major effort has been made to diversify the student population with respect to racial, ethnic, and cultural background, including development of an undergraduate program serving Historically Black Colleges and Universities. Moreover, program focus has broadened to address natural resource issues in both rural and urban settings. Having recently completed a ten year external assessment, the program is now undergoing intensive discussion of goals, objectives and strategies. The program is exploring ways to facilitate long-term university-community partnerships in order to build community capacity and resilience. It also aspires to improve understanding within the academy of the complexities of rural community development and natural resource management. This paper describes the program, shares results of the ten year assessment, and considers the program’s future prospects. It discusses more generally the challenges of program development and maintenance, securing funding, and dealing with the shifting priorities of funders.



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An Experiential Learning Approach to Graduate Education

John C. Bliss, Oregon State University

Co-Authors: Kate MacTavish, Oregon State University, Nils Christoffersen, Wallowa Resources

This paper assesses the promises and challenges associated with developing, conducting, and funding a rigorous, interdisciplinary, graduate field course with a strong experiential learning foundation. The course, *Communities and Natural Resources*, provides students from diverse backgrounds with an interdisciplinary, experiential learning opportunity. While the authors handle course logistics and provide students with relevant theoretical foundations from several disciplines, the actual instructors are county commissioners, health and education professionals, natural resource managers, ranchers, forest owners, tribal resource specialists, and other community leaders. Course objectives include;

1. To learn first hand from community leaders about current conditions and future prospects for rural, natural-resource - dependent communities.
2. To become familiar with the social science concepts of poverty, natural resource dependency, community well-being; social, human, economic and natural capital, land tenure, and sustainability.
3. To sharpen empathetic listening, analytical thinking, and effective communication skills.
4. To foster constructive dialogue between the university and rural communities.

The course has been offered for three years, involving students from forestry, anthropology, public policy, public health, agricultural economics, and other disciplines. In this paper we reflect on the experience of these past three years from the perspectives of students, community participants, and academic faculty. We consider what values such a course might contribute to graduate education and to university - community relations, what pitfalls might be encountered, and how the challenge of funding such a course might be addressed. A panel of student and community participants will share their perspectives on this mode of graduate education.

Collaboration in Campus-Wide Assessment: Defining Undergraduate Information Literacy Competencies for Oregon State University

Anne-Marie Deitering; Oregon State University Libraries

Colleges and universities across the country are feeling pressure from accrediting agencies and others to measure just what it is their students learn. Librarians at Oregon State University saw this as an opportunity to bring information literacy into a campus-wide conversation about what all OSU graduates should know. Working directly with faculty and other campus partners, OSU librarians defined undergraduate information literacy competencies that reflect the links between research, life-long learning, discovery and critical thinking. Ideally, the college experience affects students in a variety of complicated ways. Finding ways to make the complex and often abstract learning college students do measurable is a real challenge, even within clearly defined disciplines. Finding ways to measure student mastery of general skills and concepts (like "communication skills" or "information literacy") is even more challenging, because the learning experiences that lead to this mastery happen throughout the institution. OSU Librarians realized early that to successfully build a structure to support the assessment of Information Literacy skills at OSU, a collaborative process was needed. As a starting point, librarians adapted the Association for College and Research Libraries' Information Literacy Standards for Higher Education to fit OSU's needs. This initial draft was intended only as a starting-off point for discussions with a variety of campus partners. In focus groups, faculty described what they want for their students, confirming some of our assumptions and inspiring new thinking about others. In meetings with additional campus stakeholders representing a wide range of academic and administrative programs, we were deluged with suggestions for incorporating the competencies across the curriculum. The final product includes both general and disciplinary competencies and outcomes. Just as important, the partnerships that were built during this collaborative process have continued.



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Field Experience for Students Also Provides Critical Assistance for Family Landowners in the Southern Appalachians

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Co-Authors: Peter Bates, Natural Resource Conservation and Management Program, WCU

The southern Appalachian region epitomizes changes in forest land ownership that have occurred throughout much of the US during recent decades. These changes include the divestiture of industrial forest lands, increased fragmentation, changing demographics, and a shift in management objectives to include nontraditional forest products. While there is broad consensus among Southern Appalachian landowners that sustainable forest management is desirable, there are relatively few examples to demonstrate how it can be applied at the scale of family lands. The Western Carolina Forest Sustainability Initiative (WCFSI) was formed in 2001 as a partnership between the Natural Resource Conservation and Management (NRCM) Program at Western Carolina University (WCU), local land trusts, and The Conservation Fund to promote sustainable forest management on family lands. The director of WCFSI is a NRCM faculty member and the workers employed by WCFSI are undergraduate forestry interns who work year-round designing and actually implementing sustainable forest management practices on non-industrial private forest lands. Students also have opportunities to work on WCFSI projects through coursework. The initiative has provided undergraduate students income and a wide range of hands-on plus “minds-on” experiences in the application of sustainable resource management practices, while also helping families manage their forest lands in an ecologically and economically sustainable way. This presentation will describe the WCFSI and will illustrate how the program achieves its learning outcomes for the students while also achieving sustainability outcomes for the landowners.

Enhancing Science Teachers’ Understanding Of Ecology Using Qualitative Modeling and Summer Research Experiences

Marion Dresner, Portland State University; Andrew Moldenke, Oregon State University, Oregon

Through the course of a new NSF-funded science teacher education project, *Teaching Ecological Complexity*, educators and scientists use qualitative conceptual models as a means of conveying teachers’ understanding about ecological concepts learned during the process of participation in ecology research projects. Data obtained through teacher interviews and analysis of their essays written about their research projects is used as evidence as to how conceptual modeling activities promote a heightened understanding of ecosystem complexity (Groetzer and Perkins, 2000; Hogan and Weathers, 2003). The central aspects involved science teachers working in partnership with ecologists, conducting field research projects and using conceptual qualitative modeling. During this two-week training program, teachers participate in all stages of one or more field experiments, use qualitative conceptual modeling, and design lessons to teach field research to their own classes. We analyzed and scored the essays they wrote about their understanding of their research projects derived from their models. We then compared their “pre-research experience” composite scores with “post research experience” composite scores for a group of 10 teachers. Results were significantly improved for post-test. ($p < .0.01$). Use of qualitative conceptual modeling helped teachers to visualize what was going on in their experimental site. Helped them articulate, discuss, derive meaning from their experiments.

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Incorporating Outcome Assessment Strategies into an Undergraduate Fisheries and Wildlife Curriculum

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As the need and value of outcome assessment (OA) has become clear, university programs in natural resource management have begun to develop assessment strategies; however, results of this effort can be disjointed as OA is made to fit an existing curriculum framework. Ideally, assessment should be developed in concert with a curriculum so course content and organization are integrated. We report on how OA was integrated into a Fisheries and Wildlife undergraduate program highlighting the initial development of OA guidelines, how initial application of OA identified shortcomings in our curriculum and how we used that information to modify our undergraduate curriculum and integrate OA tools into our courses during a 10-year curriculum revision. Our OA plan focused on undergraduate performance in six skill areas and learner competencies were assessed annually, primarily in the Fisheries and Wildlife core curriculum. A review of two years of reporting data indicated that, while many skill areas were being routinely taught and assessed, several skills the faculty felt important to undergraduate education were under emphasized and the tools faculty were using to conduct assessments were not clear. In spring 2007, the FW faculty began a revision of the undergraduate curriculum and results from our OA efforts were used to eliminate some courses, require additional core science courses that increased the basic science foundation of our students, modify our physical science requirement, and create a two course capstone sequence that targeted integration of concepts, improving group problem solving skills and provide a better opportunity to strengthen and assess higher order thinking skills. We finished this process by ordering courses and allocating assessment obligations to more closely match the learner outcomes for each course and track development of learning throughout the curriculum.

Keywords: Integration, learner competency

Use of education technology to “discuss” controversial topics in large-enrollment classes within the natural resources.

John B. Dunning, Jr., Department of Forestry and Natural Resources, Purdue University

Introductory natural-resource courses at Purdue University are often taken by undergraduates from a wide variety of backgrounds to satisfy general science requirements. These courses therefore have large enrollments (>400 students per semester) of individuals with little background in the natural resource field. It is difficult to teach large groups of students effectively, and lecture in large-enrollment classes are often poorly attended, leading to reduced retention of the subject matter by many students. Individuals can often feel anonymous, with little ability to interact with the instructor. While this is common to many large-enrollment classes, it is particularly unfortunate for natural-resource courses, where we deal with many controversial topics being debated within society at large. Since 2004 I have been using educational technology called a classroom response system (CRS) to make my introductory course more interactive. CRS are sets of software and hardware that allow instructors to ask questions and have the individual students respond in class. Results are tabulated automatically and shown back to the students, giving instant feedback. In addition, the instructor receives a report from each CRS session, allowing me to assign credit for class participation. With this system, I ask students to give their opinions on controversial topics, such as fire management, protection of endangered species, land-use practices, and climate change. Students see what opinions their peers are willing to express, and which solutions proposed for particular issues have general support. Use of a classroom response system encourages students to attend class regularly, learn from their peers, and (hopefully) gain a greater understanding of the course material.



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Natural Resources Distance Learning Consortium Symposium

Gary R. Evans, Virginia Tech

This symposium consists of presentations and discussions looking to the future of natural resources distance learning concepts. Key issues that will be discussed include: faculty development, technology roles - from remote imaging transmitted to the classroom to iPod lecture series and field assignments, credit transfer among Consortium members, faculty recruitment, funding course development, and innovation in course delivery. The epicenter of discussion is meeting the needs of students currently employed who cannot afford time or cost to relocate at a university campus to complete graduate courses or degree programs, meeting needs of natural resource agencies (federal, state and local), and future roles of professional societies (professional licensing and certifications). Among the futures issues will be presentations on meeting the needs of the agencies with hybrid (on-line and in the field) courses, *Blended Learning* (using multiple media technologies to teach a single lesson), and the new role of the employee's career development system, e.g. *DoLearn* (Department of the Interior) and *AgLearn* (Department of Agriculture). Presenters will introduce issues the Consortium faces such as, developing and maintaining active course listings, common structure to on-line course listings, "what our students want, and what our agency clients want!", "academic credits from accredited institutions"; understanding *Learning and Content Management Systems* with focus on knowledge, skills and abilities, and linkages between extension faculty and faculty in graduate programs. Presenters also will focus on the contemporary issues of faculty recruitment and development, linkages between the Land Grant/McIntire-Stennis natural resource colleges to the State Colleges, and private sector vendors contracting to Federal and State agencies. The NRDL Consortium Policies and Procedures (draft) will be introduced.

Consortium members: Virginia Tech, Stephen F. Austin State University, North Carolina State University, University of Tennessee - Martin, Oregon State University, Penn State University, University of Idaho, University of Montana, and Northern Arizona University.

Keywords: On-line learning, faculty development, technology roles, course development, fostering innovation

What Consulting Foresters in Texas are Telling Us About Education Needs

Micheal Fountain, Stephen F. Austin State University

Co-Authors: Pat Stephens Williams; Stephen F. Austin State University

In an attempt to begin to understand some of the changing needs of the professional forester, this presentation provides information about a study that looked at the private consultant and the current needs of education to best prepare students to be successful in this specialization. Consultants in Texas were surveyed to determine what they are doing in the field, how they assessed their preparedness for those requirements, and what students need to be learning now to be prepared as top notch professionals and leaders. The presentation looks at the trends affecting decision making of the natural resource programs and how the pieces of what the consulting profession is telling us are the concerns for current and future foresters' education fit into those trends.

Keywords: Consultant, forestry, assessment



Making Teaching Count in P&T Decisions: Can We Document Good Teaching?

Nat B. Frazer, Dean, College of Natural Resources, Utah State University

Few scientists studying natural resources conduct research as haphazardly as we assess teaching effectiveness. Methodologies employed in our research have been thoroughly tested to determine their reliability and validity. But when assessing teaching we may collect information that would be considered anecdotal if we attempted to publish results in refereed journals. We ignore the extensive research (Seldin 1999, Arreola 2007) on four components providing information about teaching effectiveness:

- Student ratings provide meaningful information if the instruments are valid and reliable. Few institutions test home-grown rating forms for validity or reliability, but valid and reliable forms are available commercially.
- Peer review provides meaningful information if the process is valid and reliable. Valid observational checklists and reviewer training are required to minimize bias. Reviewers must be chosen carefully, provided with appropriate documentation, and perform sufficient numbers of observations to ensure reliability.
- Having candidates construct teaching portfolios provides meaningful information when candidates are given valid templates rather than “throw[ing] everything imaginable about teaching into a box and ship[ping] it off to the department chair or dean” (Bain 2004).
- The scholarship of teaching (Boyer 1997; Arreola 2007) should be documented, particularly by faculty for whom teaching is the predominate activity. Those choosing to make their marks on the profession by teaching, should expect their influence to extend beyond their own classrooms. Activities might include publishing pedagogical papers, conducting teaching workshops at professional meetings, and serving on committees having to do with teaching in professional societies.

A fifth element should be added to our assessment of teaching effectiveness:

- Efforts to improve – Just as good researchers keep current by attending conferences, seminars, workshops or symposia, good teachers seek opportunities to improve their teaching. By subsidizing their attendance, administrators send a strong message that good teaching is important and valued.

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Teaching Writing within Forestry

Eric Friginal, Department of English, Northern Arizona University

Co-Authors: Thomas Kolb and Martha Lee, School of Forestry, Northern Arizona University; Nicole Tracy-Ventura, Department of English, Northern Arizona University

In 2005 faculty in the Northern Arizona University School of Forestry initiated a project to replace the required sophomore-level writing course taught by the English Department with a new course, “Writing in Forestry,” taught within the School. The goal of the course replacement was to improve students’ experience and competence with the types of writing emphasized in upper division forestry courses as well as by professional forest managers. The School collaborated with graduate teaching assistants from the Department of English to develop and teach the new course. Our presentation will explain the learning outcomes, approach, and content of the new course which has been taught successfully for two years.



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Faculty mentoring faculty program

Samantha Gill, Natural Resources Management Department and BioResource and Agricultural Engineering Department, California Polytechnic State University

Getting through the tenure process can be extremely difficult. It is often difficult to know the right questions to ask or even to whom the questions should be addressed. In 2004, the College of Agriculture, Food, and Environmental Sciences at California Polytechnic State University started a faculty mentoring program. The vast majority of positions at Cal Poly are 100% teaching appointments, so much of the tenure process is based on teaching. In this program, non-tenured faculty members are paired with more senior tenured faculty. The mentoring program is completely separate from the tenure and promotion process. In fact, non-tenured faculty mentees are encouraged to be paired with a senior faculty member who is not involved in their tenure review. In this way, the mentee is freer to ask questions and explore options, without feeling pressure to follow through with all options. The program has been active for three years now and continues to be a strong program. Both mentees (non-tenured faculty) and mentors (tenured faculty) state that they have benefited from the program. Several mentees have stated that the program helped them get more quickly connected to the university, helped feel a sense of “fitting in” and helped them learn university procedures. Mentors stated that they benefited because it allowed them to get to know the non-tenured faculty and it helped them to remember what it is like to go through the tenure process. At Cal Poly, the requirements for tenure have been shifting over the last decade or so. Since mentors are often on tenure review committees, it gives them a better sense of what is now required for receiving tenure. Overall the mentoring program has been a success.

Keywords: Tenure, promotion process

Recruiting isn't rocket science so why shoot for the moon?

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Co-Authors: Nancy Allen, Department of Fisheries and Wildlife, Oregon State University

Undergraduate student enrollment is down in most academic natural resource programs nationwide while professional concern is up that minority engagement in natural resources is not increasing in proportion to minority population growth. Oregon State University Fisheries and Wildlife Science launched a recruiting program in 2002 that has developed a tiered and adaptive management approach to attracting and keeping students of all backgrounds. Our proportion of undergraduates from under-represented groups has increased from about 7% in 2002 to 13 % in 2007. This presentation will discuss a variety of strategies, tools and ideas for recruiting and retaining natural resource students including curricula flexibility, peer-mentoring, 3/2 programs, experiential learning, learning cohorts, “ SPAWN” presentations where students return to their natal high school, a student-produced DVD and salmon bookmarks. We have found one tool can't do it all and one recruiter can't either; thus a key to our program is to “out-source” recruiting and retention to existing labor pools. In summary, you don't have to set your sights on the moon – you can succeed by aiming close to home!

Keywords: Recruiting retention diversity



Taking Classroom to the Field: An Integrated Approach for Teaching Soil Science Courses at the University of Guam.

Mohammad Golabi, College of Natural and Applied Sciences, University of Guam

Recent educational reports have suggested that the developments or key transferable skills, such as group working in the field, are a necessary outcome of higher education. A group working soil lab exercises were developed to evaluate the effectiveness of group field work by assigning formalized, individual group roles. Student responses and instructor observations suggested that there was considerable merit in this approach in terms of development of academic and transferable skills. It is suggested that this could serve as a precursor to a more formalized identification of group roles that would benefit both instructors and students alike in terms of successful field soil course delivery and meeting learning outcomes. Studies shown that field work is an essential element to learning soil science that provides a practical and stimulating supplement to classroom lectures. If facilitated appropriately, field work can provide an invaluable opportunity for students to develop many generic and subject-based skills, in addition to being a highly enjoyable experience. Field work can provide experiential learning in different environments, enabling students to compare and contrast knowledge acquired in the classroom with observations in the field. Field work also provides team building opportunities, produces a cohesive student body and develops instructor-students relationships. Despite the concerns regarding the quality of learning in the field, teaching/learning in the field has been identified as essential for courses such as in Soil, Geography, and Environmental Sciences. The purpose of this article is to describe the use of group working in the field as a way of fostering active involvement of students in the natural resource classes that deal with natural settings. In this presentation some of the aspects of soil subject matter teaching and student learning in the field will be discussed and illustrated.

Creating Dirty Minds: The Promise of Outdoor Philosophy

Lissy Goralnik; Department of Fisheries and Wildlife, Michigan State University

Co-Authors: Michael P. Nelson, Michigan State University

While philosophy has historically been an exercise of the mind, well-suited for the indoor classroom, there has been a recent movement within environmental philosophy to engage students in the outdoors. Scholars are reacting to the general idea in environmental education – and in outdoor education specifically – that the outdoor learning experience elicits a transcendent or emergent property that does not arise from traditional classroom learning about the natural world. These scholars are teaching philosophy (specifically environmental philosophy) as if place matters, as if places – physically experienced both individually and as a community – contribute important information to thinking about and acting in relation to nature. However, the oft-asserted assumption that the relationship between the outdoors and environmental philosophy generates an emergent, valuable, and irreplaceable quality has not been formally articulated and defended. This paper will explore the arguments sometimes offered to articulate and defend the importance of outdoor experiences in learning about and acting toward nature. While there seems to be a number of incomplete ways to defend the relevance of outdoor places to academic environmental studies, we will offer a possible defense of this move within environmental philosophy that is rooted in Aldo Leopold's notion that we act ethically only toward those things with which we share a sense of social relatedness. We suggest that Leopold's theory implies the leap from a social to an ethical relationship with nature that underpins environmental education. A thorough defense of the centrality of outdoor educational experiences has the potential to profoundly affect not only education, but also our fundamental relationship with nature.

Keywords: Environmental ethics, experiential



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A Framework for Assessment: Determining Criteria for Effective Sustainable Natural Resource Programs in Higher Education.

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Over the last two decades, agricultural and natural resource management programs focused on sustainability have developed at our nation's institutions of higher education, found under a variety of titles but with the same goals and expectations for success. Periodic assessment of the program goal and outcomes is critical to maintaining a vital academic program. No standards and criteria currently exist that define the likelihood of program success in natural resource and agricultural resource education. To meet this need, we sought to identify the standards and criteria of program success. The two objectives for this project were: (1) To develop a framework of standards and criteria for assessing existing academic programs in sustainable resource management through a collaborative process of program stakeholders; and (2) To test the framework developed for applicability across diverse programs to answer the questions - Are the programs successful in meeting criteria? Are the programs considered effective in promoting changes in behavior? The second objective is summative assessment to determine how well programs are doing based on the determined set of standards. A goal of the project is that individual programs will perform their own formative assessments using the framework produced. This presentation will describe the results of our survey of existing sustainable agriculture and natural resource programs in higher education, the identified criteria for an effective program, the indicators for the criterion, and how variations in education programs will make them unique to their time and place.

Fostering Engagement in Natural Resources Through Forestry Research: A Case Study of a High School Summer Employment Program

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Co-Authors: Ara Erickson, University of Washington College of Forest Resources

WSU Extension launched the *Summer Youth Forestry Institute* in 2007 as a way to engage youth in meaningful outdoor summer employment, teach science and natural resource skills, raise awareness of the functions and values of working forest lands, encourage natural resource-related careers, and enhance the management of public forest lands through community-based science. The program's objectives are validated by research showing that nature-based, achievement-oriented learning experiences in adolescence are influential in resource professionals' choice of careers (Wolf 2007). Ten high school students from the greater Seattle area participate in the month-long program. They receive training in forest sampling methodologies and then collect data in permanent study plots on a 1,800-ac county-owned forest. The students learn how to use tools of the trade ranging from the simple (map and compass) to the complex (*Landscape Management System* forest growth projection/visualization software). They then provide the data to King County forest managers to be used in a long-term monitoring program. Area foresters and other professionals serve as mentors and speakers throughout the program, so that the students are exposed to a variety of natural resource-related careers. Students receive a stipend, enabling those who must earn money over the summer to participate. The program was successful the first year in attracting students from diverse backgrounds, in imparting skills, and increasing appreciation for forests and forestry. While all participants felt they gained exposure to new career possibilities, few mentioned that their interest in forestry careers rose as a result. Long-term follow-up would be needed to accurately gauge the program's impact on students' engagement in natural resources.

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The Wallowa Mountain Institute

Don Harker, Wallowa Resources

Co-Authors: Nils Christoffersen, Wallowa Resources

Wallowa Resources is focused on land and community stewardship – the opportunity to fulfill our responsibilities to land, community and future generations, and enjoy the resulting benefits. It is synonymous with husbandry, care and conservation. Within our work, it requires the integration of social, economic and ecological issues to identify and implement strategies that will conserve cultural and biological diversity, promote sustainable use, and ensure the equitable distribution of benefits. To this end, Wallowa Resources has created the *Wallowa Mountain Institute* (WMI) as an educational model for how rural areas create, access, share and use knowledge to benefit the community and environment. It encompasses multiple experiential learning opportunities, institutional partnerships and knowledge sharing networks. WMI uses technology to its strategic advantage including remote library access, internet, distance learning, and online delivery of knowledge and classes. Programs will include a K-12 program with multiple learning opportunities ranging from awareness to research, college-level courses and research opportunities, public seminars, and field trips offered through *The Nature Conservancy*, *Elderhostel*, other national and regional organizations, and universities. The central organizing theme for Wallowa Mountain Institute is stewardship, including the creation of a land and community stewardship ethic and an understanding of stewardship knowledge and practice. Stewardship occupies this central position because it is an integrative process by which we come to understand the complex nature of the working landscape. WMI teaches people how to understand, appreciate and value their place, explore it, research it, learn from others and apply what they learn. Once these knowledge processes are cultivated, learned and applied, they become a critical way of thinking about and knowing the world.

Making Service-learning Work for You

George Hess, North Carolina State University

Co-Authors: Patti Clayton, Bronson Bullock, Gary Blank, JJ Scott, Emrys Treasure

Consensus emerges about defining characteristics and transformative potential of service-learning. The challenge is to design effective service-learning experiences that nurture connections at the intersections of learning and service goals, disciplines, and institutional units. Individuals can attend any or all parts of this workshop; discussion will occur during each part.

Part 1 (30 min): Overview of the pedagogy, its non-traditional nature, benefits, and challenges. Service-learning integrates learning and service goals; academic and civic learning; collaboration between campus and community; and structured reflection. Community partnerships and critical reflection are key elements of intentional design for maximum impact.

Part 2 (60 minutes): Examples of service-learning in natural resources courses at NC State, from single-class activities to multi-course sequences. (1) We integrated service-learning into a three-course forest measurement sequence. A “one-shot” service-learning activity acclimates students to the approach during the first course; they advance to a semester-long service-learning project in the third course. (2) Natural Resources Measurements is built around a service-learning project. Students have worked with county government to estimate local trends in impervious surface levels, providing data used in drafting new storm water regulations. (3) We are assessing the ecological value of Raleigh’s forests with several partners during a three-semester process in which data and information are passed from one course to the next.

Part 3 (90 minutes): Clinic to help faculty see how to incorporate service-learning effectively into their courses and curricula. Working in small, facilitated groups, participants will engage in focused discussion of service-learning possibilities for their courses. We will offer an instructional design process and support participants in applying it collaboratively to their situations. Participants will leave with concrete ideas and a list of resources. The session will be relevant to instructors new to and experienced with service-learning.



A Sustainable Development Experiment for the Classroom

Steven J. Holland; Luther College

This classroom game is meant to help undergraduates understand the meaning and implications of “sustainability” without demanding advanced technical skills. In this multi-period experiment, groups of students represent either rich or poor nations that are allocated an initial endowment of a renewable resource, represented by beans, and physical capital, represented by oxen. The resource can be harvested to feed the population, purchase new capital, or to trade with other nations. Alternatively, the resource can be left to reproduce for the next time period. Therefore, students face a tradeoff between current consumption and the preservation of natural resources for the future. Physical capital does not produce food, but it does allow countries to increase food yields over time. The decision about how much of their resources to harvest and how much to leave in the ground determines whether the current population can eat, the level of physical capital accumulation, and the health of the resource stock for the future. Students end up doing simple calculations to determine how much they are able to consume without compromising the consumption of future generations. Subsequent discussion about different concepts of sustainability and the substitutability of physical capital for natural capital is more concrete after this game. The ethics of favoring either present consumption or the preservation of resources for future generations is central to this game as well. The experiment is easily completed in a single class period and always creates a lively atmosphere for discussion. The exercise is flexible and has been used to motivate discussion about population, foreign aid and migration in developing countries. The game has been primarily used in economics courses but could easily be adapted for use in natural science, philosophy or other social science classes in which sustainability is important.

How To Think More Like Albert Einstein and Less Like Homer Simpson

Jeffrey Hughes; University of Vermont

Confusing “criticism” and “critical thinking” stands in the way of effective problem solving because scrutinizing the weaknesses and faults of others (criticism) allows us to avoid scrutinizing our own faults, behaviors and perspectives. Unfortunately, faculty members unknowingly condone criticism over critical thinking when they malign or belittle those whose actions go against their own beliefs. To protect against this, we have shifted our instructional approach to target futuristic “desired outcomes” rather than “what’s wrong”. Channeling energy towards a desired state, rather than a villain or a pre-made solution, pushes students to think more critically, and students become noticeably less trusting of facile, simplistic bandwagons that they have not scrutinized carefully themselves. Once we establish a specific, attainable “desired outcome”, we introduce a problem solving road map (“*DOC’S KEY*”; Hughes 2007) that illustrates a step-by-step process for attacking problems that further promotes critical thinking. The explicit transparency of the road map allows students to see how each step fits into the bigger whole, and students report greater confidence, open-mindedness, and willingness to tackle seemingly overwhelming problems. We model techniques for each step of the problem solving road map multiple times and then direct teams of students to do likewise on a semester-long environmental problem of their choosing. Students document their actions via weekly or bi-weekly progress reports. For the first few weeks, the instructor reviews progress reports; thereafter, they are reviewed by fellow students before being reviewed by the instructor. To reinforce how the individual problem solving steps connect as a whole, we tackle (in class) an environmental situation that most see as a “problem” (e.g., clearcutting). Pre- and post-testing showed that students are much more cautious about trusting pre-conceived notions when they are presented with different but contentious problems.

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Got Groundwater?

Todd Jarvis, Institute for Water & Watersheds, Oregon State University

Approximately 40 to 50% of Oregon's population relies on groundwater for drinking water. Groundwater supplies 90% of rural residential drinking water, amounting to approximately 400,000 Oregonians using individual home water wells. Of the 3,550 public water supply systems existing in Oregon, approximately 3,050 rely strictly on groundwater. The vast majority of Measure 49 claims (to subdivide rural lands) are located outside of Urban Growth Boundaries (UGBs). The claims, if approved and built as outlined in the respective applications, will result in low-density, large-lot houses relying on individual wells rather than by community water systems found within UGBs. Counties are increasingly taking the lead on the nexus between land use and water quantity; some are requiring pumping tests to *prove* that proposed subdivisions have sufficient quantities of groundwater prior to county approvals and permits. The *Institute for Water & Watersheds* has developed many learning tools to cater to growing needs for knowledge on groundwater resources by the increasing number of groundwater users. Many of these rely on linking groundwater to every day use of groundwater by consumers in products and foods like bottled water, and linking water problems to *place*. The tools have been used in audiences ranging from K-Gray as well as local government.

Keywords: Education and Outreach

MSRI Online Masters Program: What Our Five Years Has Taught Us

Mike Legg, Stephen F. Austin State University

Co-Authors: Pat Stephens Williams, Theresa Coble, and Ray Darville, Stephen F. Austin State University

The Master of Science in Resource Interpretation (MSRI) is a 100% online masters program offering a thesis and non-thesis option. Housed in the College of Forestry and Agriculture of Stephen F. Austin State University in Nacogdoches, Texas, students attend classes weekly from remote locations from the tip of Alaska to the tip of Texas – and all points in between. The program has learned a lot in its five years of operation and progress. This session provides a brief overview of the program and its contents then offers information on key components for successes and of those not so successful attempts. Discussion will include, but not be limited to, course content, student camaraderie, and academia buy in.

Keywords: Online, distance education



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Higher forestry education under the auspices of the Bologna Process

Siegfried Lewark, President of Silva-Network, Deputy Coordinator of IUFRO education group 6.15.00

The Bologna conference in 1999 initiated far-reaching changes to the system of higher education in Europe and started a process of a dimension not known hitherto. Also, in higher forestry education, practically all study programs are coming due for fundamental revision, which have already been started some years ago in many places and are in different stages of realisation now. In addition to the structure of new study programs and the processes of introduction, many topics have to be discussed including: the *European Credit Transfer System* (ECTS), work loads, activation of students, self-study, e-learning, PhD-programs, and new subjects like forest and health or gender issue. It is not surprising that the Bologna Process and its consequences are discussed at many conferences on forestry education, including at the annual meetings of the Silva Network. That meeting in Wageningen in 2005 concluded (Lewark et al. 2006)¹:

“The Bologna Process aims at an improved mobility by standardisation of structures of curricula. Even in following this direction – mostly with three plus two years for Bachelor and Master curricula – a huge diversity is likely to persist.” ... “Recent developments indicate that competition among universities will get a stronger international dimension in the coming years, both from a quantitative point of view (student numbers), and a qualitative one (quality of education and research). On the other hand, universities can take advantage of international cooperation. An important condition for mutual benefits is to take advantage of each others niche expertise.”

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Resources through another lens: Developing multicultural perspectives in a natural resource program

Judith Li, Department of Fisheries and Wildlife, Oregon State University

The diverse contributions of immigrant and native cultures are generally overlooked as students learn about the development of natural resources in the American West. Presentation of these varied perspectives, from Alaska to the Southwest, from California to the Mississippi, helps students recognize and appreciate historical and contemporary roles played by highly diverse groups of Native Americans, Asians, Latinos, African Americans and Europeans. Initially funded through the USDA, these ideas were developed for an on-campus baccalaureate core course in the Department of Fisheries & Wildlife at Oregon State University that span anthropological, historical and contemporary uses of grasslands, tundra, oceans, deserts and forests; subsequently a 28-lecture video distance course, that is presently offered in DVD format, was created with assistance from the Agricultural Education Consortium. Curriculum development that incorporated data and image gathering at national and regionally appropriate cultural centers and museums, and learning activities that included written essays and online discussions will be discussed in this presentation. As the course was designed for students with interests in a wide range of disciplines, the importance of natural resources was established in the context of particular landscapes and climates. Fulfilling the university's Difference, Power and Discrimination requirement, the course emphasizes not only diversity, but also the discrimination experienced by many groups despite their important contributions in sustaining the explosive population growth in the West over the last 150 years. The breadth of backgrounds represented by the enrolled students enhances discussion of these ideas among them, and empowers them to work towards greater diversity in their particular work places and in their personal lives.



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Opportunities and Limitations in Teaching Forest Resources Continuing Education: Experiences with Southern Bottomland Hardwood Short courses and Workshops (An Update)

Brian Roy Lockhart, Research Forester, U.S. Forest Service, Southern Research Station

Co-Authors: Andrew W. Ezell and John D. Hodges, Mississippi State University

Adult continuing education plays a critical role in forest resources education. Past undergraduate curricula emphasized depth on technical subjects. Today's curricula emphasize greater breadth on a broader array of subjects at the expense of depth. In reality, we need both breathe of subjects and depth in particular subjects to develop forest resource professionals, but we simply do not have the available credit hours to teach desired breath and depth concurrently. Adult continuing education workshops and short courses help fill voids from undergraduate curricula. Continuing education workshops and short courses, in addition to providing important information to participants, also provide continuing education credits that are necessary to maintain professional registration or certification. The objectives of this paper are to list and discuss opportunities and limitations in teaching adult continuing education workshops and short courses that have a heavy outdoor emphasis. We will review the planning process in developing a workshop or short course, the logistics of indoor lectures and outdoor observations/field exercises, and the end-of-the-course evaluation. We will also relate our experiences through the long-running series of hardwood workshops taught through Mississippi State University and hardwood short courses at other institutions.

Keywords: Organization, planning process

Using Forest Ecology Exercises in Science Fairs to Increase Interest in Forest Resources Education: An Example From a Stand Development Study

Brian Roy Lockhart, Research Forester, U.S. Forest Service, Southern Research Station

Co-Authors: Buddy Cronk, Supervisor, Magellan Midstream Partners, L.L.P.

Undergraduate enrollment in forest resource programs has been on a decline for the past 10 years, with enrollment in some programs nearing critical levels. Efforts to increase enrollment include broadening program offerings, creating new majors (especially in spatial information system offerings), and increasing recruiting efforts. One recruiting effort often overlooked is working directly with junior high and senior high school students (grades 7 through 12) interested in natural sciences on forest resource specific science fair projects. Greater involvement from forest resource professionals in encouraging and developing science fair projects could help reverse the declining undergraduate enrollment trend. We will present an example of a stand development study presented by the junior author during a series of science fair contests. The study was conducted in northeastern Oklahoma, and utilized the stem reconstruction technique for determining age distribution and height development patterns of several hardwood species in a single plot. Hypotheses included "Does tree size reflect tree age?" and "Was the tallest tree always the tallest tree?". The project resulted in two first-place finishes and two disqualifications at four science fair contests. We will discuss implications of using stand development studies in science fairs, along with opportunities and limitations for forest-based ecological studies in science fairs, and how they can lead to increased interest in forest resources as a career.



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The value of recurring intradisciplinary meetings for preventing stagnation in natural resources education

Edward F. Loewenstein, Auburn University School of Forestry and Wildlife Sciences

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Most of the forces in academia work to develop highly specialized individuals. Training comes primarily from a single person, the dissertation advisor. Detailed field study of various forest types or physiographic provinces is often limited to where we trained and where we work (sometime both are in the same location or region). Even within our discipline we specialize, carving out a niche so that we are more competitive for grants and publication. Few opportunities exist that allow us to expand our focus. Our departments typically can justify only a single faculty member within a discipline so cross pollination of ideas can be difficult. Time is limited so our literature searches are often focused on our current research. Yet, as the subject matter expert, we teach the only course within our discipline that undergraduate students will be exposed to during their degree program. We spend our time looking through a microscope, but are expected to describe the entire landscape of our discipline to students. Given all of the circumstances working to constrain our efforts, is it any wonder that we become provincial in our outlook and classroom presentation? One way to prevent this inward focus and to ensure that we expose our students to the broad array of tools, approaches, and philosophies within our respective disciplines is to gather regularly with other subject matter experts from around the country. An excellent example of such a meeting is the Silviculture Instructors Field Tour, held annually in advance of the Society of American Foresters national convention. The location is rarely the same, and the local silviculturist is asked to develop a field tour to showcase the area's forest ecosystems, silvicultural practices, and research. This meeting requires annual allocation of time and travel funds, but the main beneficiaries of such expense are our students.

A research program to inform policy development and guide decision-making

Patrick MacQuarrie, Oregon State University

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There is a need for an interdisciplinary research community that can help inform policy development, facilitate improved understanding of the dynamic human dimensions of critical environmental problems, and guide decision-making under conditions of rapid change and high uncertainty in the Pacific Northwest. A comprehensive program that will effectively promote research and collaboration to inform policy must include innovative, interdisciplinary training of water resource professionals, access to a broad range of physical, environmental and social data that are required for informed management of water resources, development of partnerships to enhance institutional capacity for addressing water-related issues, and research on water governance. Here we describe efforts at Oregon State University to assist in the development of such a comprehensive program in the Pacific Northwest, including education, action and facilitation of cooperation, development of databases and partnerships, as well as case studies at different scales, illustrating how these approaches can be used to inform policy in the Pacific Northwest, regionally and internationally.



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The Florida Master Naturalist Program: innovation in statewide conservation education

Martin Main, University of Florida

Engaging, educating, and motivating the public to support and participate in conservation efforts is becoming increasingly important. Key to engaging the public is availability of effective outreach education programs. In particular, adult education programs present unique opportunities to prepare and empower individuals. Although local programs make important contributions, regional or statewide programs present opportunities to contribute to conservation efforts on a major scale. The challenges associated with developing, implementing, evaluating, and providing continued financial support for statewide programs that reach large audiences are substantial. This presentation details strategies that have proven successful for the *Florida Master Naturalist Program* (FMNP), a statewide conservation education program that includes multiple courses offered by a network of ~150 professional educators representing 80 organizations throughout Florida. The FMNP is curriculum-based and includes 3 core courses, each of which provides 40 contact hours of education that includes classroom learning, field trips, and practical experience in speaking and project development. The FMNP curriculum is supported by educational materials that include videos, presentations, and student manuals. Program evaluation mechanisms are incorporated into program which is fee-based and financially self-sustaining, which precludes the need for successive grants or state support. The objectives of this presentation, therefore, are to provide practical examples of successful strategies that will be useful for individuals and organizations interested in developing conservation education programs and to provide evidence of the programmatic success of the FMNP as obtained through evaluative procedures. Additional information about the FMNP including contact information is available online (www.MasterNaturalist.org).

Collaborative Resource Education and Stewardship in Northeastern Nevada

Kent McAdoo; University of Nevada Cooperative Extension

Co-Authors: Leta Collord, Northeastern Nevada Stewardship Group; Gary Back, SRK Consulting (U.S.), Inc.; and Gerald Miller, Northeastern Nevada Stewardship Group

In 1999, the *Northeastern Nevada Stewardship Group* (NNSG) formed as the result of frustrated citizens and agency representatives seeking common ground and collaborative resource stewardship alternatives. The NNSG is a diverse, community-based group that includes area ranchers, miners, conservationists, outdoor recreationists, businessmen, federal and state agency representatives, county commissioners, and other interested citizens. In part, the group's goals are to: (1) provide a community forum for scientific information/education related to healthy ecosystems and issue resolution through the collaborative process; and (2) develop sustainable relationships and expectations that reduce conflicts, simplify and streamline planning, and provide multiple use opportunities. In addition to regular membership meetings on various natural resource topics, the group has hosted 21 symposia and workshops. An impact evaluation survey of NNSG members ($n = 31$, response rate = 64%) for a 5-year evaluation period showed the following based on a 5-point Likert scale (1 = unsuccessful, 5 = very successful): building trust and respect among the NNSG constituency, 4.3; providing a community forum for education, 4.7; working to reduce conflicts, 4.0. In 2004, the NNSG's Sage Grouse Committee finalized the *Elko County Sagebrush Ecosystem Conservation Strategy*, NNSG's flagship project for several years and a galvanizing force within the organization. In 2006, the NNSG received a grant for \$153,530 to hire a project coordinator for conducting watershed-scale assessments basic to improving habitat for sage grouse and other sagebrush habitat obligates/associates. The NNSG has been recognized nationally, having received five awards for collaborative work on natural resource issues, including the BLM Director's 4-C's Award for "Making the World a Better Place through Consultation, Cooperation, Communication, and Conservation."



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Library Course Assignment Pages: Helping Students with Research Skills

Margaret Mellinger, Oregon State University Libraries

Co-Authors: Kim Griggs, Oregon State University Libraries

Like all undergraduates, students in natural resource fields need guidance in locating information for research projects and papers. Students, unaware of the wealth of information in libraries, rely primarily on familiar Internet sources for their scholarly work, often to the dismay of their instructors. Librarians have long collaborated with faculty to help students approach and access library resources through in-person instruction, print guides to research, and online help pages. OSU Libraries developed *Interactive Course Assignment (ICA)* web pages to highlight library resources in a more attractive and useful way. ICA pages display the most relevant library resources for a particular class or research assignment on one web page. These are dynamic web pages that integrate Web 2.0 features, chat and RSS feeds, etc. with traditional library content, such as catalogs and article databases. Using these pages, students quickly target research tools and information to successfully complete their assignments. The fresh design of the ICA pages gives OSU librarians a product to showcase with faculty, and a way to start a conversation about how to help students improve their research skills and resulting research papers and projects. Librarians partner with faculty to promote the pages and encourage student use. Preliminary feedback from students and faculty indicates that both find the pages helpful. In this session we will discuss the benefits of course-specific web pages and show some of the OSU pages. We will focus on how librarians collaborate and interact with faculty to create the pages, how they can be used in online education, and how students react to and use the pages.

Keywords: Collaboration, librarians, faculty, online

Socrates Goes to the Woods: Including Philosophy and Ethics in the Fisheries and Wildlife Curriculum

Kelly F. Millenbah; Department of Fisheries and Wildlife; Michigan State University

Co-Authors: Michael P. Nelson, Michigan State University

The Department of Fisheries and Wildlife (FW) at Michigan State University engaged in intensive curriculum revision in 2005, explicitly adding philosophy and ethics (some courses taught by other departments, some courses taught by us on those topics). We had a number of reasons for this inclusion: given the increasing call for policy rooted in “sound science,” natural resource professionals are now viewed as intricate to the policy process. Hence, environmental professionalism now includes proficiency in the human dimensions of natural resources. However, given that policy decisions are inescapably normative or ethical decisions, social science alone is insufficient to fully address natural resource policy. Coupled with this increased place of privilege on the part of natural resource professional comes a corresponding increased responsibility expected by the public: the responsibility to fully and clearly articulate and justify natural resource research and policy input. Moreover, with this increased public scrutiny comes an increased expectation to engage in ethical research. Finally, the inclusion of philosophy and ethics came out as necessary and valued by our stakeholders. We were so committed to this idea that we hired a professional environmental philosopher/ethicist as a regular member of our department. These moves, however, did not come without serious challenges. Finding an environmental philosopher willing and able to join the department was one. Internal resistance from faculty and students – concerns about the centrality and the necessity of philosophy and ethics, as opposed to more science or some other area of the humanities – was the other. We are now beginning discussions about the future of an even more robust incorporation of philosophy and ethics into our FW curriculum. Some ideas include adding an environmental ethics seminar series and future collaborations on research and grants between traditional fisheries and wildlife faculty and new philosophy and ethics faculty.

Keywords: Environmental ethics, philosophy, curriculum



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The Next Aldo Leopold: A Place for Moral Reasoning in Natural Resource Education

Kathleen Dean Moore, Department of Philosophy, Oregon State University

Co-Authors: Michael Nelson, Michigan State University; Fred Swanson, College of Forestry, Oregon State University and USDA Forest Service; and Carly Johnson, Dept of Philosophy, Oregon State University

“Examine each question in terms of what is ethically and aesthetically right, as well as what is economically expedient” Aldo Leopold advised; we must turn to “individual ethics as the basis of conservation policy.” But how should we reason about what is right or good or beautiful? How can we make reliable moral judgments and think critically about the moral arguments that ground decisions about natural resource use? How can we communicate moral convictions and encourage the development of the “ecological conscience” that is the foundation of the land ethic? These are the skills of moral reasoning that will be essential to the next generation of environmental leaders – the next Aldo Leopolds who might now sit in our classrooms. In this workshop, the presenters share their experience and ideas for bringing the skills of moral reasoning to students in natural resource classes, and invite participants to tell of their own strategies and experiences. With quick demonstrations, abundant hand-outs, stories, small group work, and a closing round-table discussion, the workshop will make the case for the importance of ethics education in natural resources curricula and offer ideas for how to provide it. These include a unit on critical thinking in moral reasoning based on arguments about hunting of wolves, from a fisheries and wildlife seminar; materials for an introduction to the structure of moral argument; a syllabus for a short field-course on the philosophy of nature, using literature to explore the ecological conscience; information about Long-term Ecological Reflections, a program that uses creative writing to explore ideas about what is ethically and aesthetically right; and a proposal for an environmental humanities curriculum. The workshop especially invites those who have already found useful ways to bring ethics education into the natural resources curriculum to share their experiences and materials.

The Students of Today at Penn State’s School of Forest Resources

Jamie Murphy; Instructor/Coordinator for Undergraduate Programs; University Park

Today’s “typical” School of Forest Resources’ (SFR) student is more difficult to describe than he or she may have been 20 years ago. The reason being, we face a much more assorted student population than we have in the past. Our three majors and 8 options are a testament to this dynamic group of young people. A recent study by the university describes today’s “millennial students” as: “racially and ethnically diverse, extremely independent, optimistic, and heavily influenced by peers and parents.” Millennial students are further portrayed as “adaptable, efficient, tolerant, confident, impatient, skeptical, blunt, and image-driven.” Do these descriptors apply to our SFR students? Yes, some of them, but all told, a forest resources student is a “horse of a different color.” It is clear that recruitment efforts targeting both new and traditional undergraduate populations must continue to evolve. Our School has managed to increase its enrollments while we continue to hear of the continued struggle that many programs face in maintaining undergraduate numbers. The success our program can be accredited to several factors. We are part of the College of Agricultural Sciences at Penn State, which allows us to collaborate with several departments and pull together greater recruitment ideas and resources. Our department actively recruits from the Division of Undergraduate Studies at Penn State and maintains strong ties with Associate programs in Forest Technology and Wildlife Technology. Our main recruitment materials include web sites, fliers, and brochures. We make personal contacts throughout the recruitment process. We continue to focus efforts towards advising and retention all the way through the undergraduate experience. We pride on excellent job placement and a quality curriculum and we perform exit interviews to evaluate our progress in these areas, making improvements wherever necessary.



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Fusing Science and Ethics: Tools for Natural Resource Educators

Linda M. Nagel, School of Forest Resources and Environmental Science, Michigan Technological University

Co-Authors: John Vucetich, Michigan Tech and Michael Nelson, Michigan State University

Natural resource educators are beginning to appreciate that formal critical thinking and ethical reasoning skills are not only important but absolutely necessary tools for the 21st century natural resource professional (both scientist and manager). However, given a historic lack of formal ethical reasoning within natural resource curricula combined with the separation of the sciences from the humanities over the past 100 years, a full embracing of ethics into natural resource curricula meets with resistance. One challenge associated with incorporating ethical reasoning into natural resource curricula appears to come from a misunderstanding of the very nature of ethics. While a certain characterization of ethics makes it appear to be at odds with science, intractable, and easy to dismiss, there are ways to characterize ethics and therefore allow for ethical discourse within the natural resource curricula that melds the two in a useful way. Another challenge involves the manner in which one recognizes, confronts, and works through ethical dilemmas. We address this problem by presenting some real-world examples amenable to ethical discourse and demonstrate how to work through at least two circumstances that are familiar to wildlife and forestry professionals. Finally, we suggest a minimal set of critical thinking and ethical reasoning skills that are crucial for the education of future natural resource professionals.

Keywords: Ethics, Critical Thinking, Problem Solving, Interdisciplinary



Literature Review Workshops for Graduate Students: Helping Students on the Journey to Becoming Successful Researchers

Hannah Gascho Rempel; Oregon State University Libraries

At Oregon State University Libraries, we discovered graduate students frequently run into several roadblocks while writing literature reviews for their theses or dissertations. As a result, several librarians created a workshop focusing on the literature review *process*. Most graduate students, regardless of discipline, are required to write some form of literature review, and they are often unsure of themselves at the beginning stages of this writing and research process. They have questions about how to use unfamiliar library resources, how to organize the information they find, how to keep up with the massive amounts of information available, and how to begin writing the actual literature review. From our experience working with students at the reference desk, in classes, and in individual consultations, we decided to approach these problems graduate students face by providing instruction to graduate students outside of a specific classroom setting. This allowed us to open up our instruction sessions to all graduate students on campus regardless of departmental affiliation or faculty buy-in. We began holding the literature review workshop in February 2007, and have been overwhelmed with the success of the program. Over 300 graduate students have attended the workshops, and an online version of the workshop has been added to serve students in our distance education programs. Workshop evaluations have been overwhelmingly positive. Elements of the workshop that have contributed to the workshop's success have been thoughtful promotion of the event, a balance of lecture and demonstration with student discussions and participation, and an overview of the theory behind writing literature reviews. I will show why we chose to teach graduate students about the literature review process, how we promoted the workshops, what we cover in our workshops, and what we have learned from planning and implementing this instructional service.

Comparing F2F and Online Student Success in a Lab-based Course

Ron Reuter; Oregon State University - Cascades Campus

Traditional soil science courses, especially with a hands-on lab component, have been face-to-face events. CSS 205, *Soils: Sustainable Ecosystems*, an introductory soil course with a lab for non-majors, has been taught via online delivery for four years. Skeptics of online science lab classes abound. The question remains: how does an online course compare to an on-campus offering with respect to student learning? This study compares student learning results for an on-campus and an online version of the same course. Students in both modes were assessed for soils knowledge pre-course using identical tests; answers for the assessment were not released to the students. In each course, the same lecture notes and lab assignments were used. Soils samples were mailed to online students and also used by on-campus students to provide consistent comparisons between the courses. Assessment at the end of the term consisted of assessment questions from the pre-assessment, additional course-relevant questions, and hand-texturing using the known texture samples. Results indicate no significant difference in final student success between the online and on-campus students. However, the path taken to reach that learning level was significantly different between the two groups. The study reveals interesting learning differences between the online learners and the on-campus F2F learners. Overall, field and laboratory skills are learned by the online population and indicate that laboratory classes can be taught online effectively.

Keywords: OSU-Ecampus; Distance Education; Soil Science



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Oregon Explorer— an online resource for educators

Janine Salwasser, Natural Resource Digital Library Program Director, OSU Libraries

The Oregon Explorer (www.oregonexplorer.info) is a natural resources digital library jointly developed by the Oregon State University Libraries and the Institute for Natural Resources. Access to digital archived documents, on-line mapping and reporting tools, as well as multi-media stories, imagery and expertise is provided at a variety of geographic scales. The Oregon Explorer enables users to learn about Oregon's environment, to actively engage in creating and sharing knowledge, and to make informed decisions about our natural resources throughout the State. The Oregon Explorer is comprised of a growing collection of basin and topic portals. The poster presentation will highlight the information and tools publicly accessible from the Wildfire Risk Explorer, Imagery Explorer, Land Use Explorer, Umpqua Basin Explorer and Willamette Basin Explorer.

Student Attraction to and Hesitancy about Matriculating in an Undergraduate Forestry Degree Program in the U.S.

Terry L. Sharik and Stacey Frisk, Department of Environment and Society, Utah State University

Undergraduate enrollments in forestry degree programs have been dropping sharply since the mid 1990s, causing considerable concern on the part of academic institutions that offer these programs and entities that hire graduates in this field, especially in the light of projected increases in the demand for these graduates. Accordingly, in 2004 and 2007 we surveyed undergraduate student leaders in forestry from around the country to determine what attracted them to matriculate in a forestry degree program and conversely, what, if anything, may have made them hesitant to have done so. The overwhelming reason given for deciding to matriculate in forestry was a love of the outdoors/nature, while the predominant reasons for hesitancy over doing so was a perceived lack of jobs and low wages. These results suggest that today's students are less idealistic and more market-driven than their counterparts in the late 1960s-early 1970s when student enrollments in forestry were at an all-time high. Such changes in student attitudes and perceptions may require educators to consider mechanisms for marketing their degree programs, and for employers to advertise more widely the availability of jobs and consider increasing salary levels.

Key Words: love of nature, lack of jobs, low wages



The Educational Values of Trees and Forests

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Learning is a complex phenomenon, involving three major modes: affective or emotional, cognitive or intellectual, and evaluative or values-laden (Kellert 2002, 2005). The environments in which this learning takes place can make a significant difference in the degree to which these modes of learning are enhanced. Natural ecosystems (in various stages of succession) have been shown to be among the most effective environments in this regard due mainly to their complexity, variability, and dynamism, which in turn elicit such responses as satisfaction, delight, joy, excitement, and curiosity (Cobb 1977, Kellert 1996). Moreover, it has been shown that encounters with nature can reduce stress or mental fatigue and thereby enhance cognitive functioning, creativity, and performance (Kaplan and Kaplan 1989, Hartig et al. 1991, Ulrich et al. 1991, Kaplan 1995, Kellert 2002, Burdette and Whitaker 2005, Taylor and Kew 2006). Furthermore, actual physical contact with nature in a spontaneous and unstructured way enhances learning skills much more strongly than structured or symbolic contact with or experience of nature, especially in children (Kellert 1996, 2005). These findings are in keeping with Kaplan's (1995) and other's (Chang and Pergn 1998, Hartig et al. 2003) observations that unstructured contact with nature following periods of structured and focused attention, and associated mental fatigue in adults, can result in restoration from such fatigue and thereby subsequently enhance learning and productivity. There is some evidence that contact with trees, especially in savanna settings, enhances learning more than contact with other life forms and ecosystems because of their importance to the survival of humans early in their evolutionary history (Quantz 1897, Heewagen and Orians 1993, Kahn 1999). These findings may have important implications for the teaching and learning process in institutions of higher education and beyond. In particular, they support the notion of less structured and more emotions- or values-laden environments for learning, which tends to run counter to traditional approaches in the academy.

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Using Lego® Blocks to Model Concepts of Reineke's Stand Density Index and Curtis's Relative Density

Monica Spicker, Spokane Community College

The concepts of versus stocking are critical to understanding silvicultural techniques. A variety of measures and approaches are used, including Reineke's Stand Density Index (SDI) and Curtis' Relative Density (RD). In order to teach these concepts and their applications, trees were modeled as Lego® block, where a 10" dbh tree with SDI of 1 is represented as a two peg wide Lego® block. One peg blocks then represent ½ SDI (dbh = 6.5"), a four peg Lego® represents a tree with dbh = 15.5" and an ADI of 2 and so on. Small boards are then filled with various tree sizes to show why RD values of .15, .35 and .55 have been determined to represent critical stocking levels on stands. Students are then given a drawn configuration of Legos® and asked to reduce stocking to a desired RD level while distributing SDI evenly among the size classes. They then try to "thin" the stand via an interactive, web-based program. Finally, students model the Legos® stand via the Landscape Management System and see what the model predicts will be the results of their proposed thinning or harvests. This progression of lessons seems to work well in furthering students understanding of SDI, RD and their applications.

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Out Standing in Left Field: Disciplinary Boundaries and Undergraduate Natural Resources Education*

Sarah Vonhof, SUNY-ESF

"Left field" implies something far from mainstream. In forest and natural resources education, biophysical science is the mainstream discipline. Biophysical sciences provide the knowledge to achieve desired forest and natural resource management goals. But an education that prepares students for successful careers must also provide understanding of the social context of forestry and natural resources. Social sciences and humanities are out— standing in the left field of forestry. A preliminary analysis of one hundred and eighteen accredited undergraduate forestry curricula at forty-four institutions revealed that there are few upper division requirements in the social sciences and humanities. Sixty one percent of curricula require only one or two courses, usually in economics and/or policy. Just one fourth of curricula require an upper division course in the humanities. Law, history, ethics, conflict management, sociology, and human dimensions are relevant topics that encompass the broader context of forestry and natural resources; but courses in these topics are seldom required. Are the social sciences and humanities in the left field of natural resources education? This study investigates the curricular requirements of undergraduate degree programs in forestry and natural resources management and analyzes these for their relative requirements among various disciplines at the upper division. Examining course requirements in biophysical science, social science, mathematics, management, and humanities, I evaluate which fields receive the most emphasis and which disciplines are under-represented. Undergraduate education in natural resources should embrace the variety of disciplines rather than designating some to left field. It is not only knowledge from biophysical science, but also from other disciplines that will empower forest and natural resource managers deal with people and grow into leaders with broader visions of their professional and societal roles.



A Pain in the Assessment? Teaching Evaluations and the Tenure Track

Sarah Vonhof, SUNY-ESF

Teaching assessment can be a pain; but it can also be an opportunity. This poster describes my experience with course evaluations and teaching assessment. Many colleges and universities require course evaluations, which are often used to assess teaching in the promotion and tenure process. The evaluations at my institution include ten questions, scored on a scale of 1 to 5, with 5 being the most positive response. I am a tenure-track instructor, with an eighty percent teaching allocation. I teach two required courses for our general education curriculum. Enrollment averages ninety students per course per semester. Thus, when I am up for promotion and tenure review, teaching evaluations are an important component of my documentation. My evaluations have ranged from 3.7 to 4.0 over the past few years. While some administrators and colleagues view these numbers as outstanding given the context, not all take the context into consideration. Evaluation numbers for other faculty, other required courses, or other departments are not made available for comparison. Because my scores have been considered average or even low by some, and because my promotion and tenure are dependent in part on the criterion of “student reaction to teaching,” I developed a supplemental course assessment instrument. This survey was designed to address the college instrument questions with low scores. I also included questions that addressed various course components and the context of the course as required for general education. The surveys supply valuable information. Not only do they provide additional clarification of scores on the college evaluations, but they also furnish information about student assessment of course lectures, readings, and assignments. The ongoing course assessment can then demonstrate commitment to teaching and to self-assessment.

It's the Holes: On Teaching about Soils

Benno P. Warkentin, Oregon State University

Today's education, conservation and research in natural resources for both plants and animals focuses on watersheds. Soil has the unique functions of habitat, decomposition of organic material, routing of water, and others. These functions are tied to the spaces among soil solid particles – the holes (pores or voids). But our teaching about soils focuses on the solids. This poster is a suggestion to change our approach, focusing on these spaces and their unique functions.



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Engaging Minds, Building Community: Research and Recommendations for Facilitating Community Engagement in the Rubenstein School of Environment and Natural Resources

Kate Westdijk, University of Vermont Rubenstein School of Environment and Natural Resources (RSENR)

One challenge to education in environment and natural resources fields is to convey and create practical knowledge in a multidisciplinary context. RSENR faculty approach this challenge through community-based teaching and research involving community organizations locally, nationally, or internationally. According to interviews and an online survey in which the majority of RSENR faculty and staff were represented, many faculty members partner extensively with the community through their teaching, research or service. RSENR faculty members are motivated by the benefits that community engagement can provide for their students and the community. However, the consensus among faculty was that time constraints and institutional disincentives (particularly in the reappointment, promotion, and tenure (RPT) process) are a significant barrier. Given the current extent of community engagement activities, the commitment of faculty to continue this work, and the support needs identified, we recommended: 1) providing faculty support at an individual level; 2) approaching service-learning planning from the curriculum level; 3) documenting and evaluating these activities at the school level; and 4) taking action at the policy level to ensure that engaged-scholarship is valued. In 2007, as a result of this research, the RSENR created a new Office of Experiential Learning with new staff support to plan and implement programming to facilitate and sustain community-based teaching and research in the School. This office is uniquely situated as a bridge between an academic unit and two central co-curricular offices (UVM Career Services and the Office of Community-University Partnerships and Service-Learning).

Forestry Education in the United States for the 21st Century: Round I

Pat Stephens Williams, Stephen F. Austin State University

Co-Authors: Mike Fountain, Stephen F. Austin State University; Ray Darville, Stephen F. Austin State University; Mike Legg, Stephen F. Austin State University

The Society of American Foresters has played an integral role in formal forestry education over the last century, including three major studies of forestry education in America: Graves and Guise's (1932) *Forest Education*, Chapman's (1935) *Professional Forestry Schools Report*, and Dana and Johnson's (1963) *Forestry Education in America*. Over 40 years have passed since SAF conducted a comprehensive look at forestry education in America. Many of the issues and discussions concerning the formal education of a forester remain the same: scope of the field, the increased body of scientific information, number of hours or years needed to produce a competent forester, and the number and types of classes devoted to general and/or technical education. However, though there are still similar issues and concerns, the programs and curricula reflect changes brought by cultural, educational, and technological influences over that time. SAF's second century of involvement in the formal education process makes now an opportune time to produce an update on forestry education in America. The *Forestry Education in North America for the 21st Century* is a multi-tiered, multi-faceted study to capture the depth and breadth of SAF accredited baccalaureate programs in their current states. This session informs about the scheduled process and methods of the study, provides preliminary results of the first-tier web survey, and solicits discussion. In addition, a roundtable protocol will encourage UENR attendees to provide input concerning information needs for the subsequent data collection from forestry programs, practicing foresters, and industry.

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Student Preparation for Professional Communications

Pat Stephens Williams; College of Forestry at Stephen F. Austin State University

Co-Authors: Mike Legg, Stephen F. Austin State University

Never before has it been more important for current and future natural resource professionals to be excellent communicators at all levels of interaction. This interaction includes, but is not limited to, legislative responsibilities, technology transfer, conflict resolution, public meetings, outreach, and daily correspondence. So how are our students prepared for this responsibility? What are ways that preparation can be easily integrated into the learning experience? This presentation/workshop looks at what is occurring in our SAF accredited baccalaureate programs, and then provides the opportunity for attendees to participate in a brief learning workshop. The presentation captures how 47 schools are meeting the communications requirements for SAF accreditation. The variety of models and classes will be discussed so the audience will be exposed to current practices in higher education. Following the presentation, the second half of the session provides the audience with the opportunity to receive handouts and instruction on ways applied communications can be incorporated into their classroom to build communications, leadership, service-learning, and free-learning capabilities, including the SAF Foresters' Communications Handbook.

Keywords: Education, writing, oral communication

Oregon Explorer: Natural resources information for current and future decision-makers

Andrea Wirth; OSU Libraries

Co-Authors: Janine Salwasser; OSU Libraries

Oregon Explorer (www.oregonexplorer.info), a natural resources digital library developed by Oregon State University Libraries and the Institute for Natural Resources, was created for Oregon's natural resource decision-makers to promote informed and streamlined public and private decision-making. Examples of projects and successes of the Oregon Explorer include a basin portal for the Umpqua River, developed in conjunction with the Partnership for Umpqua Rivers, as well as topic portals, such as the Land Use Explorer launched in October 2007 to inform Oregonians about land use history and current issues. We have learned that in the natural resources arena, user needs change with different geographies, yet the adaptations made at the local level are useful in expanding the content and services delivered at the statewide level. It is not enough to just provide access to data or documents. Users want access to a wide variety of integrated information resources – digital documents, interactive maps and reports, decision support, high resolution imagery, and access to available expertise. With Oregon Explorer becoming established as a tool for decision-makers and citizens, members of the team are exploring opportunities to use the digital library in classroom settings. Students in Oregon's K-12 schools and OSU's undergraduates are groups that we feel could benefit from the natural resources information and tools available. Proposals are being developed to extend Oregon Explorer's capabilities for use in primary and secondary education. Oregon Explorer is being used in several university classrooms and will become more integrated as the content and tools grow and as strategies for further incorporation are developed. This evolving natural resources digital library will enable current and future decision-makers to learn about Oregon's environment and to actively engage in creating and sharing knowledge before decisions are made.

Keywords: Digital library, K-12, undergraduates



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21st Century Fish and Wildlife Curricula

Bjorn Wolter; Michigan State University

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Potential employers of fish and wildlife graduates are increasingly looking for well-rounded employees that can communicate effectively, work autonomously, and solve problems. A paradigm shift in curriculum development has been driven by these requirements and intensified by an entirely new type of student. Historically, students in the natural resources have been characterized as introverts; however, the new generation of students, termed "Millennials", present a challenge to natural resource departments due to differences in sociability (McGlynn 2005), diversity (Broido 2004), and ethics (DeBard 2004). Academic changes are also impacting the ways in which students are taught (Aikenhead 2006), with an increasingly specialized professoriat and decreasing numbers of instructors who can teach a broad range of topics to undergraduates. The question then becomes: how can programs accommodate the demands of majors and graduate schools for specialization while providing well-rounded graduates sought by agencies and maintaining quality instructor for non-majors? We suggest updated fish and wildlife curricula that reflect these myriad demands, including quantitative competency, communications skills, problem-solving, organizational management, ethics and philosophy, human elements, fundamental science studies, the language of science, and experiential learning.

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Oregon Forests: Pathways to K-12 Student Success

Julie Woodward, Oregon Forest Resources Institute

Co-Authors: Norie Dimeo-Ediger, Oregon Forest Resources Institute

This presentation will provide an overview of the conference, "Oregon Forests: Pathways to Student Success" and how it was used to bring natural resource partners and school district educators together to discuss the need to ensure the sustainability of forestry education in Oregon's K-12 classrooms and to make forestry education plans for their school districts. Using this conference as the background, we will discuss how school administrators, teachers and forestry education providers established common goals, networked, strengthened partnerships and identified potential funding opportunities. This presentation will highlight place-based education models that enhance student performance with relevant, hands-on education experiences. In discussing this conference, we will share what we discovered about increasing forestry education in school districts statewide. This will include sharing success stories like that of Tillamook School District educators and community members who are using forestry/natural resources education to enhance learning in K-12 classrooms. This session will also cover details about the two-day conference and how five-member teams from school districts statewide are using forestry to meet district ESL, assessment and state standard needs and professional development models for teachers. We will discuss how community-based education, such as using local forests, can engage students and improve performance in key areas as reading, writing, math and science. We will share resource materials that we made available at no cost to schools to support forestry/natural resources education. Finally, we will share some of the plans developed by Oregon school districts who participated in the conference that will demonstrate how together we are creating pathways to student success.