

**9th Biennial Association of
Natural Resource Extension Professionals Conference**
May 18-22, 2014
Hyatt Regency, Sacramento, California

Golden Opportunities

The Role of Education and Community Engagement in
Sustaining Natural Resources

Poster Abstracts



1**C.L.U.E. Youth Camp: Helping Youth Explore Careers in Extension Disciplines**

Holly Abeels, University of Florida IFAS Brevard County Extension, habeels@ufl.edu

Careers and Life Under Exploration (C.L.U.E.) camp was designed to enhance life skills of youth and give them an opportunity to learn about jobs in natural resource, family and consumer science, agriculture, and horticulture disciplines. Under each discipline, youth were given the opportunity to be part of a community and to explore and engage in the various jobs offered during the 6 sessions of the camp. These jobs included feeding chickens, creating healthy snacks, greenhouse gardening, and fish habitat and care. Youth were able to choose which job they wanted to focus on but knew they were still going to be able to participate in the other jobs because one discipline was highlighted each session. Just as in real life, the youth were given a paycheck for completing their job and then they learned about one of the other disciplines. The next part of the evening included kids bringing their paycheck to the CLUE bank and paying taxes, balancing their checkbook, depositing and withdrawing monies and then visiting the CLUE store so they can purchase items that were made during the job phase of the session. They also learned about the benefits of paying it forward. Kids put money toward various non-profits that was matched by real dollars given by the Brevard County Fair. Ultimately the youth donated with their camp cash \$25 to the Sea Turtle Preservation Society, \$20 to the Humane Society and \$10 to a local food bank. Out of the 12 youth that participated in this first year of the program, preliminary evaluations indicated that this was the first time they had donated real money to a non-profit organization, over half of them feel more comfortable with money management skills and 80% enjoyed the entrepreneurship of selling their goods at the CLUE store.

2**Mastering the Classic Art of Fly Fishing While Inspiring Youth**

Holly Abeels, University of Florida IFAS Brevard County Extension, habeels@ufl.edu

Vanessa Spero-Swingle, University of Florida

Programs that inspire youth to be active in their environment and create a strong connection with nature, such as fishing, are an essential element in youth development. A survey of participants in a national fishing education program found that youth who participated in programs that included fishing were more likely to show environmentally responsible behavior due to the knowledge they gained in relation to the sport. Further studies have found that outdoor teaching increases motivation for learning, creates a more positive attitude toward science and environmental concepts, and aids in attaining knowledge and skills. The University of Florida IFAS Brevard County Extension Service partnered with the Back Country Fly Fishing Association (a Federation of Fly Fisherman affiliated club) to develop a youth fly fishing program geared towards 12-18 year olds. Fly fishing requires practice and skill not usually necessary for other fishing methods. The fly casting technique is one that needs to be practiced and is easier to learn if someone can guide and teach participants. Through this collaboration, a basic Fly Fishing program to teach youth this classic skill was created. Through a combination of classroom teaching and hands-on outdoor activities, proper fly fishing techniques such as casting, knot tying, and making flies, are taught. Youth learn essential fly fishing knowledge such as the different species of fish they can catch on the fly and which flies are best for catching fish. Youth also learn about angling ethics, sportsmanship, the environment and natural resources, and boating safety. The outdoor activities revolve around practicing and learning casting techniques. Upon conclusion of the program, youth are confident in their fly fishing techniques and have learned about their environment while having fun, spending time with other youth, and developing a relationship with an adult volunteer who serves as a mentor.

3**Using Partnerships to Educate Youth in Natural Resources Issues**

Janice Alexander, University of California Cooperative Extension, jalexander@ucanr.edu

While providing outreach on natural resource issues in Marin County, CA, an opportunity arose to work with the 4-H Youth Development program. In the context of environmental education, how can experts from the realms of natural resources and youth development effectively work together to provide age-appropriate and

scientifically-accurate outreach to youth? In our case, this led to four distinct projects and more than five years of collaboration. We parlayed this internal collaboration into partnerships with external organizations, further strengthening the projects and expanding their reach. The projects include: (1) the “Can My Tree Catch the Flu?” program and other youth activities focused on sudden oak death, with the California Oak Mortality Task Force; (2) a training series for AmeriCorps members to become environmental stewardship leaders, with the Conservation Corps North Bay; (3) the Firewood Pest Passport activity about invasive forest pests moving on firewood, with the California Firewood Task Force; and (4) the “Trees for you and me!” urban forestry program delivering scientific information to underserved youth, with the USDA-Forest Service. These internal and external partnerships have strengthened the overall natural resources outreach program, while providing relevant science-based materials to youth. We have recognized the benefit of expanding this natural resource information beyond the usual professional and homeowner audiences. For 4-H, it has been beneficial to reach urban youth via other natural resource issues and move beyond agricultural stereotypes. With decreasing resources, working across disciplines and agencies allows for a greater impact than one program can make alone. Through this lens of partnership, we invite you to add your own thoughts and experiences via a survey on our Environmental Education Resources web page.

4 Collaborative Efforts to Save Hemlocks in Ohio

David Apsley, Ohio State University Extension, apsley.1@osu.edu
Stephanie Downs, Hocking College; Jerome Iles, Ohio State University Extension

Eastern hemlocks dominate the vegetation in the beautiful sandstone gorges of the Hocking Hills. This region hosts more than 3 million visitors which generates \$115 million in business activity annually and supports more than 900 jobs. Loss of hemlocks in the region would seriously impact the tourism industry in the region. In 2012 Hemlock Woolly Adelgid (HWA) was found in Ohio near the Ohio River. This prompted Ohio State University Extension (OSUE) to begin to work with partners to develop educational programs to enhance awareness of HWA among the public and natural resources managers. In February 2013, HWA was detected in Hocking Hills State Park. Since this discovery, OSUE has worked with the Ohio Department of Natural Resources (ODNR), Ohio Department of Agriculture (ODA) and the newly formed Hocking Hills Conservation Association to confirm, delineate and map HWA positive hemlock within the state park; develop and offer training opportunities on hemlock inventory and HWA survey methods; establish an insectary for HWA predator beetles in landscapes near the Ohio River; and chemically treat more than 500 trees in the infested area and adjacent buffer zones. OSUE plans to continue to work with partners to develop educational programs and materials for a variety of audiences. We also plan to be actively involved in efforts to enhance early detection and rapid response capabilities; inventory hemlock stands to be utilized in the formulation of future plans of action; seek external funding sources; continue to establish HWA predator beetle populations; and expand these efforts to other areas of the state with native hemlock populations. In an environment of shrinking budgets and a seemingly constant barrage of invasive pests, it is imperative that Extension is positioned to respond with partners in a timely manner. This effort can serve as an example of how Extension can collaborate with others to have a positive impact.

5 Loblolly Pine Genetics Verification Test for Private Non-Industrial Landowners

Jon Barry, Arkansas Forest Resource Center, jbarry@uaex.edu
Victor Ford, Southwest Research and Extension Center

Forest industry has invested in loblolly pine genetics to improve growth, branching, and form. Superior families were destined for industry lands with little of this superior genetics available for other landowners. Seedlings of superior genetic families and from mass-controlled pollination (MCP) are now available to NIPF landowners at a greater cost than seedlings from first generation selections. The University of Arkansas System Division Agriculture conducts variety and verification trials for agronomic crops and serves as a source of unbiased information on crop genetics. This study applies the same philosophy to loblolly pine genetics by testing growth, survival, form, and branching in southwest Arkansas. The families included Weyerhaeuser first and second-

generation select families, four select families from ArborGen, an MCP family from ArborGen, and un-rogued and rogued first generation seed orchard mixes from the Arkansas Forestry Commission. These plantings were established in January 2009 in southwest Arkansas on a clayey upper Gulf coastal plain soil. Nine families were planted in 100-tree blocks with four replications. Weeds were controlled the first two years after planting. Tree height measurements and survival counts have been made annually. Survival after five growing seasons was lowest (57%) in the Forestry Commission un-rogued mix and highest (90%) in the Weyerhaeuser first generation family, averaging 82% overall. This is impressive considering 2011 was a record drought year. Height after five growing seasons was least (13.3 ft) in the Weyerhaeuser first generation family and greatest (17.2 ft) in the ArborGen AG-34 and ArborGen M-22M families, averaging 15.5 ft. Branching and form cannot be evaluated until after crown closure.

6 Developing a Model Invasive Pests Outreach Program for Arkansas

Jon Barry, Arkansas Forest Resource Center, jbarry@uaex.edu
Tamara Walkingstick, Arkansas Forest Resources Center

Prior to 2012, Arkansas had no coordinated invasive pest outreach program. A Cooperative Agricultural Pest Survey committee for the state had been in place since 1982, however its primary function had been to coordinate pest surveys in Arkansas and share information collected from those surveys.

In 2011, the Arkansas State Plant Board received a grant from APHIS to develop an outreach program for forest invasive pests to serve as a template for a larger invasive pest outreach program within the state. The State Plant Board entered into a memorandum of understanding with the University of Arkansas System Division of Agriculture's Arkansas Forest Resources Center to develop a web site and training program to teach natural resource professionals to recognize signs and symptoms of six forest invasive pests that are threatening Arkansas.

The web site, ARInvasives.org, was initially developed to house information about six invasive pests that are perceived as a serious threat to Arkansas' forests. The pages discuss general biology of the organism; origin, current range, and spread of the pest; pest identification; symptoms of pest damage; and tips for preventing spread of the pest. An on-line training module will be developed to support the web site. The module will provide directed, self-paced training leading to an ability to recognize pests and symptoms in the field. Professional continuing education credits will be offered as an incentive to gain participation from natural resource professionals.

The web site also provides information describing how and to whom to report sightings. Fourteen reports have been received both through the web site and via email and telephone. Upon report of an invasive pest, a representative of the State Plant Board or APHIS contacts the reporter for further information. A site visit is scheduled if the report merits one. None of the reports have yet proven to be one of the target invasive pests.

7 California Rangelands in the Classroom - A New High School Curriculum

Theresa Becchetti, University of California Cooperative Extension, tabecchetti@ucanr.edu

Rangelands comprise the largest land classification in California and contribute many goods and services as well as contributing to the history of the state. However, many people living in the state are not aware of all that rangelands have provided and still contribute to the economy, health, and ecological processes. Efforts in other western states such as Idaho, Oklahoma, Arizona, and Texas have been very successful in incorporating rangelands into high school curriculum. California is undertaking an effort parallel other Western States to bring rangelands into the high school aged youth curriculum. The targeted audiences are the 4-H Science, Engineering, and Technology (SET), high school ag teachers, and the already established Range and Natural Resources Camp operated by the California Pacific Section of the Society for Range Management. All three are in need of a curriculum that can be experiential in the style of learning. California rangelands provide a perfect opportunity to help students learn many different disciplines. The most obvious is in science and biology. Natural processes

can be studied and observed and lend themselves very easily to an experiential style of learning. Rangelands can also be a learning environment for math, geometry and algebra. Different monitoring practices can help reinforce math skills, calculating areas, moving between grams per square feet to pounds per acre, or using mapping skills with smart phones and GPS apps are all examples of different ways rangelands can be incorporated into math. Rangelands also play an integral part of history for California and the Western States. The art of Cowboy Poetry could be used for English lessons. The different ways rangelands can be incorporated into curriculum is only limited to the imagination. Teachers and 4-H leaders will be offered a hands-on training for the new curriculum with follow up surveys to measure effectiveness and improve the curriculum.

8 The Promise and Pitfalls of Collaborative Forest Management: A Southern Oregon Case Study

Max Bennett, Oregon State University Extension Service, max.bennett@oregonstate.edu

There is growing interest in collaborative forest management, with new collaborative groups emerging recently in communities throughout the western US where the bulk of forest lands are federally owned. This presentation tells the story of a collaborative in southern Oregon from the perspective of an Extension forester who has participated in the group as a board member and in many of the group's activities ranging from timber sale monitoring to proposing a new management strategy for the area's 2 million acres of federal forest land. Major forest management challenges in this region include wildfire, municipal watershed management, T & E species, loss of mill infrastructure, and payments to counties, among others. There is strong local support for thinning overstocked stands to improve forest health and mitigate fire hazards, but conflicts fester over road building, riparian buffers, diameter and age limits on harvested trees and, especially, regeneration harvests. The community was historically timber-dependent, but has transitioned into a largely service- and tourism-based economy. Nevertheless, county finances have remained reliant on timber receipts, and many community leaders are calling for increased harvests. I will focus on the Middle Applegate pilot project, one of three pilot projects in southern Oregon designated by the US Secretary of the Interior that was intended to demonstrate ecologically and economically viable forestry practices in the region. The Southern Oregon Forest Restoration Collaborative has been intimately involved in the development of the Pilot, which has generated timber sales, non-commercial service work, and its fair share of conflict. The Pilot provides a window into the possibilities for collaborative forest management on federal lands in southern Oregon and similar western communities, and raises questions about the potential roles of Extension in such groups.

9 MI Conservation Stewards Program: Engaging Citizens Through Community-Based Volunteer Management

Bindu Bhakta, Michigan State University Extension, bhaktabi@anr.msu.edu

Dr. Shari Dann, Michigan State University, Associate Professor, Department of Sustainability

The Michigan Conservation Stewards Program (CSP), an innovative statewide volunteer training and leadership program geared toward diverse suburban/urban audiences, is designed to educate and engage citizens in community-based conservation management activities through high-quality, locally based learning opportunities and which creates an informed citizenry who practice community-based volunteer conservation management activities locally. Through classroom and hands-on field-based sessions, participants learn how to identify plants, animals and landscape features as well as the interconnections between and within ecosystems, explore how all human activity affects them, and gain experience developing plans to make management decisions. The program's trademark is that it builds collaborations among community-based conservation volunteers and partners, and leading conservation organizations, agencies, and educational institutions to create a statewide network of dedicated, well-prepared and organized volunteers. Participants use the science-based knowledge they gain to understand, promote, support, and actively contribute to and/or lead significant volunteer conservation management and outreach activities using an ecosystem-based management approach to support local communities. The program is modeled in part on programs such as the Master Gardener and Master Naturalist programs. Since the program's inception in 2005, participants have increased their knowledge in ecology and conservation management; knowledge of and experience with ecosystem-based management;

awareness and support toward natural resource management and affiliated agencies, organizations and institutions; skills needed to perform conservation activities; and engagement with existing natural resources stewardship activities. Through 2013, 148 Conservation Stewards have been trained in Oakland County alone. Through 2012, these volunteers have performed more than 17,000 hours of high-quality work in their communities and acquired an additional 3,100 advanced training hours independent of what is provided through the program. For those considering implementing programs to engage individuals in urban areas in community-based volunteer conservation service, Michigan program outcomes, success stories, lessons learned and next steps will be discussed.

10 Climate Change Perceptions, Attitudes and Continuing Education Needs of Southern Forestry Profession

Leslie Boby, Southern Regional Extension Forestry, lboby@sref.info

William Hubbard, Southern Regional Extension Forestry; Mark Megalos, North Carolina State University; Hilary Morris, North Carolina State University

The affects of climate change (CC) and increasingly intense weather events are beginning to have a noticeable impact on the health, productivity and resiliency of southern U.S. forests. Private landowners control a majority of these forests and often rely directly or indirectly on the forestry profession for advice, direction and management. These forestry professionals, particularly those who interact directly with private forest owners will need reliable, scientific-based information and tools in order to effectively combat the negative aspects of cc and capitalize on any positive effects. A needs assessment survey of southern foresters was conducted to ascertain perceptions of cc, personal observations and interest in continuing education. We found that 62% of southern foresters accept the occurrence of cc. Those who accept cc were likelier to be concerned about specific climate challenges (and had seen more incidences of “out” of normal events). A majority of foresters desired to learn more about climate science, climate change and forest resiliency. Differences in foresters’ perceptions were found by demographic variables such as age, political affiliation, gender and state of residence. Climate-smart education programs are now being developed to meet the professional forester’s educational needs and to maximize success. We are segmenting audience needs and delivery based on their acceptance of cc and interest in climate science/change information, and willingness to learn more about resiliency. Our efforts will focus on improved forest management through resiliency recommendations for all audiences, while more receptive groups will have access to education programs that favor climate science, climate variability and information on resilient forestry tools. We will utilize trusted “early adopters,” who can provide demonstrations to their friends and neighbors.

11 Creating Sustainable Fish Communities through Habitat Restoration in the Huron-to-Erie Corridor

Mary Bohling, Michigan Sea Grant Extension, bohling@msu.edu

L.E. Vaccaro, Michigan Sea Grant; B.A. Manny, USGS Great Lakes Science Center; J.G. Read, Michigan Sea Grant; D. Bennion, USGS Great Lakes Science Center; G.W. Kennedy, USGS Great Lakes Science Center; E.F. Roseman, USGS Great Lakes Science Center; J. Boase, US Fish & Wildlife Service; M.V. Thomas, Michigan Department of Natural Resources

Fish communities in the international waterways that flow between Lakes Huron and Erie have suffered greatly since the arrival of the first Europeans over 300 years ago. In the late 1800s and early 1900s, the waterways of the St. Clair River, Lake St. Clair and Detroit River supported large populations of lake sturgeon, whitefish and a highly profitable commercial fishery. Beginning as early as 1850, portions of the waterways were deepened to allow for commercial usage by large ships and later by freighters. Analysis of historical records reveals how the construction of these shipping channels removed or covered highly productive fish spawning areas, which contributed to fish population declines. Overfishing and pollution also played a role in the decline but ecological studies indicate that today access to suitable fish spawning habitat continues to be the limiting factor in the recovery of native fish. To mitigate historical habitat losses, Michigan Sea Grant Extension led a broad coalition of organizations to conduct habitat restoration of fish spawning beds in the corridor. To date, the coalition has constructed three rock-rubble, fish spawning reefs in the St. Clair and Detroit Rivers, with plans for several more.

With each project, the team compiles lessons learned to improve and inform future projects. Lessons learned, include fish preferences for different rock substrates, proximity of nursery habitat to reef locations and hydrologic conditions. Pre and post restoration monitoring and innovative hydrodynamic modeling technology have improved the team's ability to effectively site, design, construct and evaluate artificial reefs. Fourteen species of native fish, including lake sturgeon, lake whitefish, and the endangered northern madtom, have spawned on the artificial reefs. Positive results and effective communication tools, including videos, fact sheets and public presentations have helped project partners secure additional funding and apply the best available science to develop new, cost effective restoration projects.

12 Development of a Private Well Test Interpretation Tool for Ohioans

Joseph Bonnell, Ohio State University Extension, bonnell.8@osu.edu

An increase in testing of private drinking water wells in conjunction with oil and gas drilling operations in Ohio has resulted in an increase in well water testing. Many water well owners need help interpreting their lab test results. OSU Extension has worked closely with the Ohio Department of Health and the Ohio Environmental Protection Agency to develop an online well test interpretation tool that allows homeowners to enter their lab test results into the tool and receive helpful information about those results. The poster describes the tool, how it was developed, and additional education and outreach efforts OSU Extension is undertaking to educate private water well owners.

13 Informing Family Forest Owner Educational Program Development: A Systematic Evidence Review Approach

Deanne Carlson, Oregon State University, Deanne.Carlson@oregonstate.edu

PRESENTING: Janean Creighton janeancreighton@oregonstate.edu, 541-750-7316, Oregon State University

Oregon is a heavily forested state, and even though the majority of the forest is owned by the federal government, Oregon's 141,000 private family forest owners are significant. Most of the family forests are located at the interface between agricultural lands and forested uplands at the margins of the river valleys, and in the wildland urban interface. Designing and delivering educational programs to forest owners requires a clear understanding of their interests, needs, desires, and constraints that may affect their actions. This information is often collected through formal needs analyses, using mail and web-based surveys, focus groups, workshops, key informant interviews, and the like. These methods are time-consuming, expensive, and often have limited response. In this work we set about to analyze the body of information that had already been accumulated from family forest owners in Oregon over the past 10 years, using a systematic, evidence review approach. We identified 18 literature sources based on studies conducted between 2000 and present that met our search criteria, including 10 journal articles, 7 unpublished agency or organization documents, and one published agency document. A content analysis was conducted of each of these source documents, with content categorized into manifest content (intent is clear) and latent content (intent may be inferred). Additionally, a set of evaluation criteria were created to assess the validity and generalizability of the source documents to a given construct, namely the Oregon Family Forest Owner (OFFO). A model was created to calculate a reliability of the generalized inference score (RGI) for each of the sources in order to gauge the relevance of the source material for making inferences about family forest owners statewide. This presentation discusses the results of this analysis and its usefulness for assessing existing literature for determining forest owner interests.

14 Service Learning in Florida's Coastal Environments

Libby Carnahan, UF/IFAS Extension, Florida Sea Grant, lcarnahan@ufl.edu

UF/IFAS Florida Sea Grant in Pinellas County provides college students with experiential service learning opportunities that will increase knowledge, build skills, and offer a life-changing experience in Florida's environment. In turn, student volunteers help Extension Programs conduct beneficial projects and impactful programs not otherwise possible. The Ohio State University (OSU) BUCK-I-SERV, Students Engaged in

Responsible Volunteering, matched 22 interested students for week-long visits to Pinellas County in December 2011 and 2012. Students were educated about the nearshore and coastal habitats of Tampa Bay and the Gulf of Mexico, local wildlife, ethical fishing, and social marine issues. Trainings included classroom seminars, field hikes and guided canoe trips, and continuous "teachable moments" during service fieldwork. Service fieldwork included environmental restoration, coastal marine debris removal, and youth fishing clinic implementation. Students assisted with restoration of 23 acres at Weedon Island and Shell Key Preserves in Pinellas County. Students mentored 15 at-risk youth at a fishing clinic in 2012. They also developed 3 YouTube videos- 1 promoting Florida Sea Grant/Pinellas County Extension education programs and 2 testimonials of their service learning experience. Since inception of this service learning partnership, OSU students have donated 756 hours of service, a value of \$14,000 (\$18.66/hour value of volunteer hour). Through pre/post tests, OSU students verified increased knowledge of natural resource issues (+26%). All students demonstrated practical skills including exotic plant removal, species identification, and ethical angling, as witnessed by the Sea Grant Agent. Students reported increased likelihood to volunteer with an environmental organization (92%), share information with others about ethical fishing practices (100%) and organize a volunteer event to benefit the environment or community (71%) as a result of the program. We have clearly demonstrated that Extension can help students diversify their academic skill set while providing a meaningful experience through service learning programs.

15 Which Trees Matter: The Importance of Tree Evaluation Programs

James Chatfield, Ohio State University Extension, chatfield.1@osu.edu

James Zwack, Davey Tree Expert Company; Scott Maco, Davey Tree Expert Company; Erik Draper, Ohio State University Extension

Selecting trees for urban forests is a key to sustainable community forests. This presentation will focus on a range of plant evaluation case studies which help community forest programs in determining which trees work best over time. Examples of evaluation studies will include those for disease, pest and stress resistance and hardiness, from elm to crabapples, from birch to ash. Such evaluations need to be nurtured over time in order to understand the changing genetics of resistance to pests and pathogens including emerging exotic pests and range changes of native pests due to climate change. Evaluations of trees in replicated, randomized situations help move beyond anecdotal observations, especially when trials are conducted over a wide geographical area with differing environmental conditions, such as those of the nationwide elm research trials and those of the International Ornamental Crabapple Society. Evaluations are also critical for which trees provide the best environmental services for particular aspects, such as energy savings and air quality benefits, and time-based evaluations, such as the Ohio Street Tree Program study of the survival and growth of community forest tree species over decades to help with perspectives on which trees provide the best impact to the community over time. We will also discuss the ArboCharette program for determining tree selection protocols for campus and urban forests and the Why Trees Matter and Tree Campus USA programs for involving students and the entire campus and other communities in tree selection decisions.

16 Tribal climate change resiliency and collaborative water management and adaptive strategies

Karletta Chief, University of Arizona, kchief23@gmail.com

Native Americans in the Southwest are vulnerable to climate change because of their intimate relationship with the environment upon which their culture, tradition, and livelihood depend upon. Climate change may overwhelm tribes already stressed by economical and development challenges. A primary example is Nevada's largest tribe, Pyramid Lake Paiute Tribe, located at the terminal end of the Truckee-Carson River, who are deeply connected "culturally, physically, and spiritually" to Pyramid Lake and its ecosystem. Another example is the Navajo Nation who have a long history of intimate relationship with their physical environment. Their respect for their ancestors and "Mother Earth" speaks of a unique value system different from modern American values. However, on the Navajo Nation, many residents do not have access to water for domestic purposes, have fewer

water supplies of low quality and are situated in regions with lower rainfall that are subject to extremes in temperature and weather conditions. Management of tribal water resources must consider climatic and non-climatic stressors which will immediately impact the tribal resilience and thus attention is needed to apply a multi-disciplinary approach that will integrate human and physical sciences to find commonly-agreed solutions. Capacity building of tribal resources is required in order to anticipate, cope, and prevent the magnification of climate change threats on water resources.

17 Defining the benefits of different levels of infill to California agriculture and natural resources

Hyeyoung Choe, Geography Graduate Group, UC Davis, hychoe@ucdavis.edu

James H. Thorne, Dept. of Environmental Science and Policy, UC Davis; Jacquelyn Bjorkman, Dept. of Environmental Science and Policy, UC Davis

Given the rapid growth of human populations and urbanized areas, urban development strategies that protect unique ecosystems and natural resources are needed. Among urban development strategies, infill development is the practice of building on unused and underutilized lands within existing urban areas. Encouraging infill development has advantages in that; it reduces development pressures on outlying open spaces and the extent of automobile travel. However, some intervention by local government may be required for implementation, since many stakeholders are typically interested in infill sites. We used a spatially explicit urban growth model to assess the tradeoffs between different levels of infill, and the amount of open space preserved for any other purpose for ten counties in California.

We projected urban growth to the year 2050, adopting different proportions of infill development, using the UPlan land use model. UPlan projects future land use patterns by calculating land consumption of land used per type based on user-specified demographic and land use factors. For example, the user specifies persons per household, percent of households in each density class, and average parcel size for each density class to determine areas needed for future housing. We use the Public Policy Institute of California (PPIC) for population growth projections for the year 2050, and the Census data of each county to input necessary information for running the model. We made an assumption that infill development would have a different impact on each county based on urbanized degree of it. Thus, we selected ten counties representing different levels urbanization, and assessed the consumption of open space under four increasing levels of infill to accommodate the new population. This talk presents the results of the modeling in terms of the estimated impacts to agriculture, ranch lands, and natural resources.

18 Small Fruit Production in West Virginia

Brad Cochran, West Virginia State University Extension Service, bcochran2@wvstateu.edu

Melissa Stewart, West Virginia State University Extension Service

Many small farmers in West Virginia are looking for ways to diversify their farming applications, and through workshop interactions with these farmers it became quite apparent that small fruit production was a viable option for them. Through a Specialty Crop Block Grant from the West Virginia Department of Agriculture, West Virginia State University Extension Service hosted a series of 5 topical workshops on small fruit production. Over 300 individuals learned the basic production skills for brambles, strawberries, blueberries, grapes, and fruit trees. Through surveys received at the end of each workshop, it was found that approximately 60% of the participants planned to incorporate small fruits into their farming operation in the following growing season. Many of the participants indicated they were currently producing jams, jellies, wines, or other value added products, but were interested in adding to the current scale of their operation. During these workshops, the participants indicated they would be interested in visiting local orchards and vineyards as a way to see the management practices used on a larger scale. Subsequent field trips have been taken to three fruit tree orchards and also one vineyard around the state. These interactive field trips will continue to occur on an annual basis as we focus on the agritourism industry in West Virginia and the major role that small fruit production plays into this industry. Along with the educational workshops that were offered, three demonstration sites were created

as a way to offer hands-on learning to participants interested in pruning, insect and disease management, and fertilization, among other topics. These demonstration sites were developed in three different counties, with locations including a high school, a community center, and a local park.

19 The REAL Climate Science Crash Course

Heather Dinon Aldridge, NC State Climate Office / NC State University, hadinon@ncsu.edu

Heather Dinon Aldridge, Applied Climatologist, NC State Climate Office / NC State University; **Leslie Boby**, Extension Associate, Southern Regional Extension Forestry; **Sean Burns**, Extension Assistant, Texas A&M AgriLife Extension; **William G. Hubbard**, Southern Regional Extension Forester, University of Georgia; **Mark Megalos**, Extension Assoc. Professor, NC State University; **Eric Taylor**, Silviculturist III, Texas A&M Forest Service

Today's Extension natural resource professional has the daunting task of understanding not only the basic science of key natural resource management topics, but also the effects that environmental influences have on these natural resources. He or she must then develop educational programs to communicate any impacts of these environmental influences to natural resource stakeholders. This is particularly challenging in the area of climate change, where today's professional must work in an increasingly divisive and uncertain venue where misinformation and miscommunication is common. In this workshop, we will share fundamental concepts of climate science, including misconceptions about global warming and climate change, historical trends in temperature and precipitation, projected future changes, challenges with climate modeling, and potential impacts to natural resource management. Examples will be highlighted from the Southeast US as a case study for other regions. You'll also learn about tools, resources, and partners that will be useful for continued support and future professional development related to climate science. Lastly, you will learn how ANREP members from the South are working on an exciting project called PINEMAP and partnering with climatologists across the region to understand the basics of climate variability and change and their impacts on our natural resources as well as related tools and products that have been developed.

20 Silvopasture Diffusion through Extension and Partnering Agencies in the South

Adam Downing, Virginia Cooperative Extension, adowning@vt.edu

Greg Frey, Virginia State University; **Chris Teutsch**, Virginia Tech; **John Fike**, Virginia Tech; **Tim Mize**, Virginia Cooperative Extension; **John Munsell**, Virginia Tech; **J.B. Daniel**, USDA Natural Resources Conservation Services; **Miller Adams**, Virginia Department of Forestry

Silvopasture, one of five agroforestry practices, is of growing interest in Virginia. While trees have benefited Virginia livestock for eons by the shelter they offer, the purposeful integration of trees and forage, whereby both are managed to optimize system outputs, is rarely practiced. Public Service Agriculture and Natural Resource Professionals are a primary source of such innovations for producers, yet significant barriers limit information dissemination and exchange about silvopastures. Few resource professionals have technical expertise in both forage and forest management. We also have found that resource professionals' misconceptions of what silvopasture is, and their lack of willingness to develop better understanding of the practice (distinct from many historical uses of forests for livestock) present additional barriers to adoption. This presentation will share insights gained from trainings and surveys of various resource professionals in Virginia and the region and our experience in diffusing a new innovation on the backdrop of an old understanding.

21 Mobile Bug Lab: Extension Water Quality Education Innovation

Jim Ekins, University of Idaho Extension, Northern District, jekins@uidaho.edu

During summer 2013, University of Idaho Water Quality Extension Educator, Jim Ekins, developed an innovative educational tool to, literally, bring the field to the public, the Mobile Bug Lab. The primary audience is the public, who often fail to know about the presence of benthic macroinvertebrates in their local streams, and the importance of water quality to the bugs, and the bugs to the greater natural systems and fisheries. The poster presentation will highlight the trials and tribulations of learning how to effectively display these small but wild

creatures using low-tech and affordable technology. Technology includes a garden cart and plastic tote bins purchased from the local home store, inexpensive 2-way insect viewers, medium-power dissecting microscopes, ice cube trays for sorting, and an air pump for overnight bug-keeping. Initial curricular development will be highlighted, as will plans for future comprehensive K-12 and adult-ed curricula. The author will be actively seeking feedback and critiques of the program, and apologizes to all the entomologists out there who argue that the aquatic macrionvertebrates used in the Mobile Bug Lab should not be referred to as bugs.

22 WV Women Working in their Woods – Results of a Woodland Owner Needs Assessment

Tiffany L. Fegel, West Virginia University Extension Service, Division of Forestry and Natural Resources, T.fegel@aol.com
David W. McGill, West Virginia University Extension Service, Morgantown, WV

Non-industrial private forestlands make up the majority of the landscape in the eastern United States. Women as owners and co-owners comprise a large portion of this population. It is essential to learn how to engage this important, often overlooked, group who are making significant decisions regarding the forestlands of West Virginia. Peer-learning networks in a handful of locations across the country have attempted to engage women woodland owners with much success, however, research on the specific educational preferences of women forest owners is lacking.

We carried out a mail-based questionnaire to explore women's roles in woodland management, their level of engagement in woodland ownership activities, and their need for additional educational opportunities. Our study focused on two primary research questions:

Q1. What are women's roles in woodland management in West Virginia?

Q2: What are the educational preferences of women woodland owners and do these needs differ from those of their male counterparts?

This poster presentation will summarize the preliminary results of the survey and attempt to answer the above questions.

23 New Science and Resilience Institute at Jamaica Bay, Involving Cornell University/Extension

Gretchen Ferenz, Cornell University Cooperative Extension-NYC, gsf4@cornell.edu
Shorna Broussard Allred, Cornell University, Department of Natural Resources; Matthew Hare, Cornell University, Department of Natural Resources; Caroline Tse, Cornell University Cooperative Extension-NYC; Kathy Bunting-Howarth, NY Sea Grant Extension, Cornell University

Cornell University/Cooperative Extension is a founding member of the "Science and Resilience Institute at Jamaica Bay." Jamaica Bay is an 18,000-acre wetland estuary in Queens and Brooklyn, NY with numerous islands, waterways, meadowlands and freshwater ponds, and is an important part of the larger, regional urban ecosystem. Participation in this new institute provides Extension—locally in NYC, in NYS, and nationally— with the opportunity to contribute toward research and public engagement of this vital water body and ecosystem.

A Consortium of academic institutions formed in 2012 to develop a formal response to a request by NYC and US Department of the Interior to "establish a top-tier science research center focused on urban ecosystem restoration and resiliency within Jamaica Bay." This Consortium, led by City University of New York and including Cornell University, NY Sea Grant, Stony Brook University, Columbia University, NASA Goddard Institute for Space Studies, Rutgers University, Stevens Institute of Technology and Wildlife Conservation Society, was selected in August 2013.

Current goals include: Systems Analysis (examining the bay as a dynamic system and how resiliency practices fit into the current science); Indicators/Monitoring (creating the infrastructure/technology to monitor significant changes); Integrated Systems Model (large-scale computational modeling encompassing marine, terrestrial and social systems); and Decision-making Tools/Framework (designing frameworks for prioritizing resiliency measures).

In addition to engaging non-profit organizations and surrounding communities to serve an integral project role, Cornell's current contributions involve social science research/Extension, including a community needs assessment and measuring the practice of urban resilience, as well as proposed oyster restoration at area sites to optimize restoration methods towards increasing ecological complexity and building local social-ecological resiliency.

The Institute's first undertaking was a symposium (October 2013) that brought together global/local expertise to examine urban resilience in the era of climate change, including recovery from Hurricane Sandy and improving coastal resilience.

24 Exploring California's Resources Through the Research and Extension Center

Lisa Fischer, UC ANR Research and Extension Center System, lmfischer@ucanr.edu

California has the most diverse agricultural portfolio of any state in the nation, producing more than 400 commodities and more than one half of the nation's fruits, nuts and vegetables (California Agricultural Production Statistics, 2012). The Division of Agriculture and Natural Resources (ANR) leads agriculture and natural resource research, extension and education for the University of California (UC). ANR includes a statewide network of Cooperative Extension academics and programs located in every county as well as a system of nine Research and Extension Centers (RECs). The REC System operates across large and geographically widespread ecosystems representing nearly every type of agricultural and natural resource system in California. The REC system is the only statewide program in the UC that provides a premier research management organization including land, labor, facilities and equipment that deliver services to academics and the public. Benefits from the RECs span improved services, yield and production, farming methods and pest management, weed treatments and pest management, and animal science and health. The RECs also positively impact local and regional communities through outreach and education programs including youth and public education about nutrition, wildlife and watershed science, animal and human health and sustainable water use. Centers are also focal points for community participation in UC programs and for active involvement in identifying and addressing regional agricultural and natural resource challenges.

25 Lost in the Woods: Reaching out to Underserved Communities

Gregory Frey, Virginia State University, gfrey@vsu.edu

89% of private forest landowners in Virginia have less than 50 acres. While these numerous small-scale landholdings provide significant economic, environmental, and social value to the state, they are at a disadvantage because forest management and harvesting is something they do not practice on a daily basis. Also, many forest landowners in Virginia are underserved populations, with 12% minorities, 22% female, and 13% with annual incomes less than \$25,000. These populations are typically underrepresented in Cooperative Extension programming. Virginia State University, the 1890 Land Grant Institution for Virginia and partner in Virginia Cooperative Extension, has historic connections to many of these underserved communities. The poster will present how Virginia Cooperative Extension has implemented Lost in the Woods, a series of workshops being replicated around the state. The series brings in public and private foresters to discuss the benefits of management planning, where to access resources for forest management, and some of the basic concepts of forest management. We investigated the impacts in terms of demographics of participants and changes in knowledge, skills, and abilities through questionnaires at the event and changes in behavior through a survey between one and two years following the event. We found that, among other things, our participants were 28% minority (compared to 10% among all forest landowners in VA), and obtention of a forest management plan increased from 21% before the event to 42% 1-2 years after the event.

Laurie Gharis, NCSU, lwilson@ncsu.edu

Robert Bardon, NCSU; Dennis Hazel, NCSU

The North Carolina Sentinel Landscapes Partnership is a new effort in Eastern North Carolina focused on maintaining and enhancing working lands, conservation, and the ability of the military to train for national defense. Economic growth spurs the development of new homes, businesses, industries, and roads. Without collaboration and coordination, this growth puts significant pressure on farms and forests and the rural communities they support. North Carolina, along with many other states, is now addressing competing land use challenges on a significant scale. Groups such as NC Extension Forestry, NC Farm Bureau, NC State, conservation districts, non-governmental organizations, military installations, and others have set out to demonstrate their ability to work together to produce success through the NC Partnership. The NC Partnership identified three initial efforts to protect working lands, conservation, and national defense. Each effort shares a common goal to enhance rural economies and local markets so that privately owned rural lands can be maintained. Natural resource Extension professionals have a major role in connecting natural resource, agriculture, and national defense agencies, organizations, and individuals. This presentation will demonstrate how Extension professionals can help encourage consensus among multiple, unique stakeholders to sustain working lands, conservation, and national defense in multiple, distinctive regions. Developing a replicable approach for bringing together multiple stakeholders in unique regions will produce solutions at a larger and more economical scale in rural America and will better insure that urban America continues to receive adequate supplies of food and fibers. From a broader perspective, it can provide an organizing framework for increasing communication and coordination in confronting the complex and often conflicting issues of future population growth, economic development, and land resource protection, issues that will continue to challenge the United States and that will continue to require the expertise of natural resource Extension professionals.

Kenneth Gioeli, University of Florida/IFAS, ktgioeli@ufl.edu

Joan Bradshaw, University of Florida/IFAS Citrus County Cooperative Extension; James Cuda, University of Florida/IFAS, Entomology and Nematology Department; Jennifer Gillett-Kaufman, University of Florida/IFAS, Entomology and Nematology Department; Raymond Hix, Florida A&M University; Verena Lietze, University of Florida/IFAS, Entomology & Nematology Department; William Overholt, University of Florida/IFAS, Indian River REC; Judy Shearer, US Army Corps

Objectives: Hydrilla is an invasive aquatic weed. Millions of dollars are spent each year managing it in the southern US. Funded by a 4-year grant from the USDA National Institute of Food and Agriculture, the University of Florida / IFAS, Florida A&M University and U.S. ARMY Corps of Engineers are studying new control methods as part of an overall hydrilla integrated pest management (IPM) plan and transferring the information to stakeholders. The goal is to increase stakeholder awareness of research-based information regarding this hydrilla IPM plan. **Methods & Results:** SurveyMonkey was used to determine stakeholder perceptions and preferred information delivery methods. 541 stakeholders completed the survey. Responses indicated that the internet, boat launch signage, Florida Fish and Wildlife Conservation Commission, and Extension Offices were the preferred outlets for stakeholders to receive information about Hydrilla IPM. Extension faculty developed Hydrilla IPM RAMP 1-yd vinyl fishing rulers, 6-in rulers/bookmarks, brochures and web cards for distribution to Extension offices and collaborators. A web portal was developed. **Conclusions:** Tactics such as the herbivorous hydrilla tip miner will be incorporated into Hydrilla IPM programs throughout Florida. The information obtained through this perception survey will have enabled Extension faculty to effectively target their educational efforts.

28 Feral Hog Management Practices Inventory in Florida

Kenneth Gioeli, University of Florida, ktgioeli@ufl.edu

Early explorers and settlers brought hogs with them to Florida. Many of these animals escaped from captivity and established feral populations. Current estimates indicate that the population of feral hogs may exceed 500,000 animals in Florida. Unfortunately, feral hogs have proven to be difficult to manage. The UF/IFAS St Lucie County Cooperative Extension conducted a feral hog management practices survey to (1) determine what control practices are being employed by managers of both public and private natural areas and (2) to determine whether or not these practices are effective. SurveyMonkey was the survey instrument utilized. The survey was distributed via email through networks such as the Cooperative Invasive Species Management Area, Florida Invasive Species Partnership and feral hog trappers. Eighty seven land managers responded to the survey. Overall, results showed that land managers are continuing to struggle with feral hog damage they deem to be moderate to severe in scope. Hunting and trapping strategies have been employed by these land managers, and the majority of them use smaller portable single-hog traps when trapping. Current control strategies being employed have resulted in marginal success while a fourth of the land managers indicate total failure to manage feral hogs. There is an obvious need for increased education to help teach land managers how to adopt an adaptive management strategy to improve feral hog management practices.

29 Goldspotted Oak Borer Education and Outreach Program

Janis Gonzales, University of California Cooperative Extension, San Diego, jggonzales@ucanr.edu

Lorin Lilikoi Lima, University of California Cooperative Extension, San Diego; Thomas A. Scott, University of California Cooperative Extension, Riverside; Kevin Turner, University of California, Agriculture and Natural Resources, Riverside; James Bethke, University of California Cooperative Extension, San Diego; Cheryl Wilen, University of California Cooperative Extension, San Diego

Since 2008, extreme oak mortality in San Diego County and later in Riverside County has been attributed to the goldspotted oak borer (GSOB) *Agrilus auroguttatus*, (Coleoptera: Buprestidae), an invasive flathead borer non-native to California. It is estimated this pest has killed over 80,000 oaks across all land ownerships: public, private and Native American tribal lands, costing more than an estimated \$8 million in public and private funds. Susceptible oak species are coast live oak, *Quercus agrifolia*, California black oak, *Q. kelloggii*; and canyon live oak, *Q. chrysolepis* - native oak species found through California and southern Oregon. This poster presents GSOB, the threat and the comprehensive GSOB education and outreach program developed by Extension Specialists with the University of California Division of Agriculture and Natural Resources (UC ANR). During the two-year period of initial program development, a number of program successes were realized. More than 5,100 key agency staff and early adopter stakeholders throughout southern California were identified and contacted. Collaborating workgroups with staff from sixteen organizations have worked cooperatively to obtain funding, provide a rapid response, secure a Zone of Infestation with the California Board of Forestry and support the California Firewood Taskforce. Both traditional and digital educational delivery methods were utilized. An interactive website was created and serves as the centralized location for GSOB resources. Twelve different handouts on GSOB with new information were developed and over 500,000 copies were distributed. Two hundred events were held reaching over 5,000 public and private land owners, Native American representatives and industry professionals. Survey responses indicate that 98% have taken some action to help manage GSOB ranging from sharing the information with others, becoming a oak monitoring volunteer, organizing another GSOB event or simply changing their firewood movement behavior and subscribing to the GSOB listerserv.

30 Pond Safety Kits For Rural Ponds

Gary Graham, Ohio State University Extension, graham.124@osu.edu

Rural Holmes County in northeast Ohio is populated by the largest Amish settlement in the United States, which makes up 50% of the county's population. There are 2,500 ponds scattered among the 454 square miles of the county with a majority of these located on Amish properties. The ponds serve many purposes from irrigation, livestock water source, sport fishing, and of course swimming in most all the ponds no matter the primary use designation. Due to the Amish belief of separation from the outside world many never receive any formalized swimming lessons. Developing a formalized swimming lesson program would not be of interest; however a safety program to promote the installation of pond safety kits at swimming locations does work. In the summer of 2012 the Holmes County Extension Office developed a pond safety kit program. Holmes County has had three drowning's in ponds in the last three years. This confirmed the need for pond safety devices. Over 60 units have been installed at Amish ponds within the county. This program has many underling components beyond the safety kit installation: 1) it provides the opportunity to talk about the importance of teaching swimming and safety to the families, 2) to diagnose pond weed/water quality issues they may be having, 3) the one on one connections help build inroads to the Amish community which otherwise many not use Extension services, 4) it gives Extension more opportunities to address this underserved audience. Another benefit is that the County Health Department and County Fire Marshall are partners in promoting the Extension based program and getting more ponds safer for the families using them. Given the religious and cultural practices restricting involvement in the outside world this program has been a great success as it has opened the door for more interactions and interest in Extension programming.

31 Engaging landowners of farmlands and woodlands in West Virginia—A pilot assessment

Valerie C. Grant, West Virginia University Extension Service, vcgrant@mix.wvu.edu

David W. McGill, West Virginia University Extension Service

A distinction between woodland owners and agricultural producers is often blurred and some evidence points to the fact that ownership objectives and motivations are distinct, or at minimum, relatively different. As such there is a need to continue to refine our understanding of the needs and objectives of landowners. By making these refinements, we might better tailor our educational outreach programs to support their efforts and encourage an increased level of land stewardship.

It is well known that not all landowners are equal in their motivations, land management priorities, and resource and educational needs. A recent project by the Sustaining Family Forests Initiative (SFFI) used woodland owner information to classify landowners into attitudinal groupings. These grouping allow natural resources management professionals to better understand motivations that landowners have for their ownerships and permits natural resource professionals to approach and engage landowners with a better feeling for the breadth of ownership objectives.

Simultaneously there is an effort by the USDA Forest Service to bring woodland stewardship planning to the "landscape" scale, acknowledging the fact that all lands are important in generating healthy forests and wildlands. Issues like invasive species control, wildlife habitat development, and water quality are such that property boundaries are meaningless, but all depend on the condition and sound management of the various agricultural and woodland cover types.

We undertook a pilot research project in West Virginia to explore opportunities for landowner engagement. Our primary research question was:

How are the educational interests and management motivations of West Virginia's woodland and agriculture land owners different based on percentage of recorded land use?

This poster will describe preliminary results of this study.

32 Google Earth: Accessible GIS for Landowners

Tristan Huff, Oregon State University Extension Service, tristan.huff@oregonstate.edu

Geographic information such as remotely sensed images and maps of soil types, streams, and roads are invaluable to landowners who seek to actively manage their property and maps are a critical part of any written management plan. Technology, in the form of computer-based GIS systems, has revolutionized mapping and hand-drawn paper maps are rare in natural resources management today. However, while very powerful, most GIS systems are expensive and have a very steep learning curve. The inaccessibility of modern computer GIS has limited their use by family forest owners who often can't afford the expense or the time investment required to learn and implement these systems. Consequently, many owner-written management plans utilize hardcopy, hand-drawn maps which, while functional and useful, are time intensive to create, difficult to update, and can be spatially imprecise. Google Earth (GE) is a simple and freely available GIS that can meet the needs of smaller family forest owners. Users can utilize the system's built-in remotely sensed images, create and display features relevant to their management plans, and print or digitally share maps. Additionally, features and maps can be saved for use in later plan updates so work doesn't need to be recreated down the road. While GE is fairly user-friendly and accessible, many small landowners will benefit from training on how to use GE in a management planning context. To meet this need, I offered several 3-hour hands-on workshops throughout Oregon introducing GE to landowners in a management planning context. Workshops were evaluated immediately upon completion and impact assessments were contacted at least 6 months after to assess successful utilization. Preliminary results of these assessments indicate significant usage of GE for management planning purposes but also a need for follow-up refresher courses for some participants.

33 Creating Educational Materials for Forest Vegetation Management in Pennsylvania

David Jackson, Penn State Extension, drj11@psu.edu

This project created a publication and web-site focused on forest vegetation management. The publication, entitled *Herbicides and Forest Vegetation Management: Controlling Unwanted Trees, Brush, and Other Competing Forest Vegetation*, was published by The Pennsylvania State University, College of Agriculture Sciences. A companion Forest Vegetation Management website (<http://extension.psu.edu/fvm>) describes an Integrated Pest Management (IPM) approach to vegetation management. Forests are important to Pennsylvania. Its forest products industry contributes 16 billion dollars to the state's economy annually. In addition, the state's forests provide important ecological and social benefits. Sustaining these forests is critical and involves five challenging issues, which are increasing the need for integrated forest vegetation management: 1) Natural forest regeneration is generally insufficient 2) Tree species composition is changing 3) High-grade cutting practices are commonly applied 4) Competition from invasive plants is increasing 5) Small diameter and low-grade wood markets are declining. The implementation of integrated forest vegetation management practices can help address forest sustainability challenges. The *Herbicides and Forest Vegetation Management* publication and supporting Forest Vegetation Management website integrate current research-based information for users to identify the most efficient, environmentally sound, and cost effective solutions for addressing forest vegetation management needs.

34 Focusing on the Future of Farming and Ranching Using a Learning Community Approach

Jeremy James, Sierra Foothill Research & Extension Center, jjjames@ucanr.edu
Maddison Easley, Sierra Foothill Research & Extension Center

Working farms and ranches provide an array of critical ecosystem services in California. However, over the last several decades, these agricultural operations have been heavily parcelized and converted to other land uses. At the same time, high land values and steep start-up costs act as major barriers for new farmers and ranchers to establish self-sustaining operations. The cumulative result is an aging farmer/rancher demographic and a continued erosion of key ecosystem services these working landscapes provide. While the start-up challenges

beginning farmers and ranchers face are discouraging, a substantial working knowledge exists within the local agricultural communities that may greatly enhance the ability of new agricultural professionals to establish competitive and viable enterprises. This poster details a recent effort in the California Sierra Foothills to develop and host a local forum as a mechanism to transfer knowledge that exists within the established agricultural community to youth considering a future in farming and ranching. This forum used a “Learning Community” approach, where established producers and youth co-developed, presented, and led discussions on key knowledge and experiences relevant to the future of farming and ranching in the regional community. Subject matter included use of niche markets, financing, partnering in agency conservation programs, and marketing of locally sourced products, among others. A unique and pivotal building block of this forum has been the mentorship-style component. Local producers will partner with youth interested in the future of agriculture to actively engage learning and hands-on experiences. Through the blending of generations, the anticipated outcomes will be an enhanced appreciation and understanding of what it takes to become involved in agriculture, sharing of resources and experiences to improve the overall health

35 Willingness of Professional Foresters to Provide Services to Small Acreage Woodland Owners

Jonathan Kays, University of Maryland Extension, jkays@umd.edu

From 1989 to 2006 the proportion of Maryland family forest owners who own 1-9 acres of woodland increased from 65 to 84 percent, and acreage in small parcels increased from 9 to 17 percent. The Woods In Your Backyard extension program was developed in 2006 in cooperation with Virginia and Pennsylvania Extension organizations to educate small acreage owners with less than 10 acres. There exists a disconnect between small acreage owners, many with non-timber objectives, and professional foresters who tend to focus on larger forest tracts and commercial harvesting. In 2010, a survey was sent to 197 licensed professional foresters in Maryland (47% response rate) to understand their willingness to work with the small woodland tract owner population. Results were reported for the top three respondent groups: consulting foresters (51%); service foresters (25%); and industrial foresters (14%). Providing forest stewardship and forest stand delineation planning services along with activities associated with timber harvesting are the most frequent activities of foresters, with greater differences between service foresters and private foresters. Common to all groups is the frequency of providing services to small acreage clients. Across all foresters, 81 percent had received requests for services for owners with less than 10 acres, and 70 percent who had received requests provide the services. More than three-quarters of foresters indicated they can justify providing services to clients with less than 10 acres (77% of state and consulting foresters and 54% of industrial foresters). In addition, about half of all foresters are interested in referrals from arborists or landscapers. The Society of American Foresters was the central professional organization for all types of foresters, making it a logical focal point for effective continuing education. The survey resulted in development of a Small-Acreage Professional Forester Directory. This presentation will discuss strategies and program approaches to engage foresters and small acreage owners, that will increase the availability of and services provided by professional foresters, leading to more sustainable outcomes on smaller parcels.

36 A Cooperative International Conifer Seed Collection Project- An Example

Chal Landgren, Oregon State University, chal.landgren@oregonstate.edu

In 2010, researchers and Extension colleagues from 6 regions in the US and Denmark began the process of coordinating a conifer seed collection project. The overarching goal of the project was to collect seed in Turkey, produce seedling and evaluate the progeny for Christmas tree potential. In total, seed from 100 families of Turkish fir (*Abies bornmuelleriana*) and Trojan fir (*A. equi-trojani*) from 5 regions was collected and processed in Turkey. The seed was shipped to Oregon and Denmark, seedlings grown, and research plots established in 2013. Two sites of 3000 seedling each were planted in OR./WA., MI., NC., CT., PA., and Denmark. The project is an example where collaboration resulted in opportunities than no single state or region could undertake alone. Seed collection in Turkey cost around \$30,000 and seedling growing around \$16,000 with each region

contributing. Each region also has their own interests in the evaluation of these progeny including- reduced insect and disease attacks, reduction in precocious coning, resistance to specific phytophthora diseases and niche Christmas tree markets. A number of interesting ancillary projects have emerged that were not envisioned at the time that the project stated. For example, excess seedlings will be used in screening trials for an emerging adelgid pest in WA. Likewise seedlings will be used in a Ph.D. program looking at phytophthora sp. resistance.

37 From Watersheds to Planter Beds: A Water Education Program

Lauren Martinez, UC Hansen Agricultural Research and Extension Center, lamarti@ucanr.edu

Susana Bruzzone-Miller, UC Hansen Agricultural Research and Extension Center

Undeniably, water is Earth's most precious resource. The UC Hansen Agricultural Research and Extension Center is working to promote water and agriculture literacy through the development of field trip lesson plans for grades 4-6. After a 2012 survey of current Ventura County agricultural education programs, it was determined that there is a gap in upper elementary school and middle school outreach. Therefore, development of an outreach program targeting this age group can help bridge that gap. Water became the central focus of the field trip because water: is significant globally, agriculturally and locally, aligns with state standards, focuses on SET learning for youth, and can be utilized by other REC centers in California. The objectives of the lessons are to educate about water and agriculture, engage through hands-on activities, and encourage individual action off the farm. Each lesson highlights one of five topics about water: the water cycle, evapotranspiration, water and soils, watersheds, and conservation. To explain the water cycle, students are a "drop of water" that travels in clouds, glaciers, the farm, etc. Students learn about evapotranspiration by viewing the xylem of celery and stomata on citrus leaves using microscopes. The soils lesson uses the scientific method to let students hypothesize about the optimal soil texture for crop growth and allows students to act out how water moves through soil. When discussing watersheds, students predict water movements on a topographical map and observe where water flows on a raised-relief map of California. To demonstrate conservation, students simulate the transfer of water through aqueducts or pipes and brainstorm ways to conserve water in the home and on the farm as well as test pH levels in samples of water to demonstrate the importance water quality. These lessons work to inspire student interest in agriculture and natural resource sustainability.

38 2013 Climate Change Attitudes of Southeast Forestry Professionals

Hilary Morris, North Carolina State University, hlcoble@ncsu.edu

Dr. Mark Megalos, N.C. State University; Dr. William Hubbard, University of Georgia/Southern Regional Extension Forestry;

Leslie Boby, University of Georgia/Southern Regional Extension Forestry

In early 2013, we administered a regional web survey of foresters' climate change attitudes and educational needs to identify opportunities and obstacles to outreach on resilient forest management strategies. While climate variability can profoundly impact Southeastern forests, we found foresters' perspectives on anthropogenic climate change (ACC) influence their receptivity to climate science, adaptive management, and mitigation tools. Segmenting the extension audience allowed us to analyze the origins and influence of foresters' ACC attitudes. Acceptance or doubt of ACC was a significant predictor of personal climate change observations, concern about forestry impacts from climate change, and perceived need for adaptive management strategies. Observed climate variability, concern about impacts, and need for management changes increased directly with acceptance of ACC, demonstrating the effect of climate change attitude on personal perceptions and management responses. Respondents' demographic characteristics were associated with acceptance of ACC: political ideology (liberals/moderates more accepting than conservatives); education (PhD foresters more accepting than those with a Masters or below); employer (federal natural resource agents and academics more accepting than employees of private industry, consulting companies, and TIMOs and REITs); location (Virginia, Oklahoma, North Carolina, and Kentucky foresters most accepting with Mississippi and Alabama foresters least accepting; forestry experience (less experienced, younger foresters more likely to accept ACC compared to more experienced, older foresters); gender (women more accepting than men); and field of highest degree (natural resource conservation and wildlife graduates more accepting than forestry graduates). Overall, demographic

trends for foresters are consistent with the general public. This suggests both audiences pose similar challenges for climate science outreach. To communicate effectively with foresters, we suggest considering audience ACC perspectives and focusing educational programming toward “no regrets” forest management solutions to address future uncertainty. This risk management approach should better align with the varied objectives and economic constraints established by foresters’ clients.

39 Teaching Master Gardeners to Problem-Solve: Incorporating Active Learning Strategies in MG Training

Nicole Pinson, UF/IFAS Hillsborough County Extension Service, pinsonn@hillsboroughcounty.org

OBJECTIVES:The Master Gardener Program teaches citizen volunteers horticulture information, providing tools to effectively answer residents' questions. Program goals are to teach problem-solving skills, increase horticulture knowledge and inspire confidence, critical thinking and application. After participating in training, students will report at least 30% increase in knowledge for each course topic and 80% will demonstrate ability to locate information and solve problems for homeowner clientele. **METHODS:**Agent created a training program utilizing active learning strategies including case studies, insect/plant pathology labs, think-pair-share activities, cooperative learning, concept map utilization, distance education, scavenger hunt and navigating online resources such as fact sheets, tables, charts and published research. **RESULTS:**85% of volunteers reported increased knowledge and are demonstrating ability to locate information and solve problems for clientele as measured by the number of clients served, additional volunteer hours, qualitative agent and peer evaluations and participants' self-perceived gains. Participants have new skills and feel more confident volunteering in the community. **CONCLUSIONS:**Training materials focused on problem-solving skills teach volunteers where to find information, and how to compare, analyze and explain information to clients. Well trained volunteers who possess an ability to solve problems and determine appropriate recommendations extend the education potential of the agent, provide cost-effective delivery of services, decrease environmental impacts and afford opportunities for connecting with the community.

40 Teaching Home Owners Associations how to host Productive Meetings through Parliamentary Procedures

Maria Portelos-Rometo, UF/IFAS Extension Sarasota County, mrometo@scgov.net

Teaching Home Owners Associations how to host Productive Meetings through Parliamentary Procedures Dr. M. Rometo* Sarasota County, and J. Gellermann*, Sarasota County Association Affiliation: FANREP/ANREP; Dr Rometo, Jp Gellermann Parliamentary Procedure provides a group with a structured, logical, consistent format under which to make decisions so that meetings can achieve their goals and objectives through a democratic process. Today, Robert's Rules of Order Newly Revised is the basic handbook of operation for most clubs, organizations and other groups. Sarasota County Extension is utilizing materials developed through the “Strengthening Extension Advisory Leaders” or (SEAL) program to assist Home Owner Associations and other groups how to conduct meetings in a more efficient and productive manner.

Objective: Defining parliamentary procedure and identify reasons for its use; Identify and describe how to adopt these procedures to meet the specific need of the Home Owners Association (HOA).

Methods: Multiple 2hr workshops were held to establish the basics of parliamentary procedure with two home owner associations in Sarasota County. The meetings also included a consultation on how to determine the most appropriate application options of parliamentary procedures. A discussion on Robert’s Rules was discussed and a mock scenario was completed by the participants.

Results: Twenty five post review surveys have resulted in 91% indicating a knowledge increase of basic parliamentary procedure knowledge, 87% having a greater understanding of the value of these procedures and 80% indicating that they are planning to utilize procedures in future meetings covered in this course they had not previously utilize.

Conclusion: The increase knowledge gain of parliamentary procedures has enabled audiences to host more efficient and successful group meetings. This has resulted in greater satisfaction and higher attendance for organizations adopting these practices.

41 Sustaining multifunctional working landscapes: Social, economic, and ecological insights from rancher decision-making surveys and interviews

Leslie M. Roche, UC Davis, Department of Plant Sciences, lmroche@ucdavis.edu

Tracy K. Schohr, UC Davis, Department of Plant Sciences; Mark Lubell, UC Davis, Department of Environmental Science & Policy; Lynn Huntsinger, UC Berkeley, Department of Environmental Science, Policy & Management; Rick B. Standiford, UC Berkeley, Department of Environmental Science, Policy & Management; Anthony T. O'Geen, UC Davis, Department of Land, Air, and Water Resources; Kenneth W. Tate, UC Davis, Department of Plant Sciences

Rangeland ecosystems encompass diverse land resources across the globe, representing complex coupled human and natural systems in which conservation goals must be balanced with the economic realities of agricultural production. In California, rangelands cover approximately 60% of the state, and are often at the nexus of wildland, agricultural, and urban landscapes. These expansive working landscapes support a broad range of ecosystem services—including food and forage production, water resource protection, biodiversity, and wildlife habitat. The long-term sustainability of these lands, and the services they provide, is of major importance to many stakeholder groups.

Balancing multiple conservation and agricultural production goals on these rangelands is a key challenge in an already variable and changing environment. Our project team has developed a broad, multipronged approach to directly integrate management and science in addressing the challenge of providing for multiple and diverse outcomes on working rangelands, and to gain insights into decision-making and drought adaptation on California's rangelands. Here, we highlight results and ongoing research from a mail-based social survey of 509 California ranchers and semi-structured interviews of 80 ranchers.

Survey analysis has so far revealed rancher experience and knowledge—indicated by the number of generations ranching, number and quality of information sources, and education level—positively influenced ranch goal prioritization and the management toolbox—indicated by the number of actively used conservation programs, number of key practices used, and diversity of forage resources. Goal setting and the management toolbox had direct positive effects on adaptive strategies for drought impact management—including the number of proactive and reactive drought management practices used. These types of interdisciplinary efforts and active stakeholder collaborations provide critical insights for policy and outreach strategies to conserve these multifunctional landscapes

42 Stormwater Management Education in Nebraska: Maximizing the Benefits of Integrating Extension, Teach

Steven Rodie, University of Nebraska - Lincoln, srodie@unomaha.edu

Stormwater management is a critical natural resource concern for communities with populations over 10,000 largely because of mandates to reduce runoff pollutants and volumes. A University of Nebraska-Lincoln (UNL) Stormwater Work Group was organized in 2006 to develop educational programs and materials to address best management practices for municipal stormwater management. A USDA-NIFA grant titled "Improving and Conserving Water Resources through Stormwater Management Education for Community Decision Makers of Today and Tomorrow" was received in 2009 which has further supported and greatly expanded work group efforts. This, coupled with support from numerous Nebraska communities and organizations, has successfully blended extension programming with university teaching and research components. The resulting synergy has helped communities and individuals more effectively manage stormwater quality and quantity while building a knowledge-base that will support future initiatives and programs. Extension programs have included: presentations for design and green industry professionals, stormwater program managers, municipal officials, Master Gardeners, and homeowners; all-day rain garden workshops/installations; rain barrel construction workshops; green infrastructure tours; web-based resources; an interactive rain garden model; numerous youth

activities; and publications. Research projects have evaluated rain garden hydrologic and plant growth attributes, homeowner perspectives on rain gardens, and bioretention design standards. Academic programs in both landscape architecture and landscape horticulture are expanding curriculum in green infrastructure, low impact development, and stormwater BMPs as a direct result of extension and research efforts. New course lectures, as well as studio design projects conceptually addressing real-world stormwater management projects, represent teaching deliverables. Key to the success of UNL stormwater management programming is the strong integration of extension, teaching, and research, which can often be a significant challenge. Fundamentals of this integration, examples of the multi-faceted products and activities that have been developed and used, and selected impacts will be illustrated in this proposed poster.

43 Longleaf Pine Participatory Tree Breeding - Good for Ecology and the Economy

Randall Rousseau, , rrousseau@cfr.msstate.edu

Gwendolyn Boyd, Alcorn State University; C. Dana Nelson, USDA Forest Service, Southern Research Station

The financial benefits of simply using genetically improved genotypes of southern pine have been demonstrated with gains of \$50 to \$300 per acre. However, the majority of the genetic and tree improvement work has and continues to focus on loblolly (*Pinus taeda* L.) and slash pine (*P. elliottii* Engelm.). Since the 1990s, changes in the USDA Forest Service management policies and restructuring of the forest products industry has led to a focus on loblolly and slash pine to the near exclusion of longleaf (*P. palustris* Mill.) and shortleaf (*P. echinata* Mill.) pines. Reversing this trend will be important for responding to societies' needs for resilient and productive forests under climate change and threats from invasive pests. In addition, longleaf pine, while still prized for its superior lumber and pole quality, may be of even more importance for its ecological significance as the climax species of the most diverse fire dominated ecosystem in the temperate climate zone. This presentation will describe our methodology of using forestry extension along with web-based tools to develop and deliver a longleaf pine participatory breeding program aimed at involving and training farmers and forest landowners in applied longleaf pine genetics and silviculture from site preparation to planting, to stand develop for the purpose of conserving and enhancing the species for current and future climate and pest challenges. Our approach is novel for forestry in that we are directly involving landowners at all scales, be it owning a few mature longleaf pine trees or hundreds of acres of farm or forest while also spanning those that have little experience in farming or forestry to those that have a wealth of experience. This approach of a landowner participatory breeding is also unique in that we are training and educating landowners on techniques for long-lived forest species where breeding generations can extend to 10 or more years.

44 Municipal green infrastructure needs assessment for New Jersey

Amy Rowe, Rutgers Cooperative Extension of Essex/Passaic Counties, rowe@njaes.rutgers.edu

Pat Rector, Rutgers Cooperative Extension of Morris/Somerset Counties; Michele Bakacs, Rutgers Cooperative Extension of Middlesex/Union Counties

The focus of this research project was to survey municipal officials regarding green infrastructure throughout New Jersey and to determine the barriers to implementation of low impact development techniques for the state's municipalities. An in-depth online survey was sent to various officials in each of the state's municipalities: the mayor, the town engineer, and environmental commission/green team members, etc. This allowed for the collection of data from multiple sources and to compare perspectives from the same town as well as among different municipalities. The survey was sent via email to local contacts and 22% of New Jersey's 565 municipalities responded. Of the respondents, 72% already had at least one green infrastructure practice installed in their town. Preliminary results showed that rain gardens were the most popular installation, with 62% of respondents reporting that type of practice had been installed in their town. Funding was stated as the primary barrier to green infrastructure installation, but many municipalities had not applied for grants to defray costs. The results of this survey were used to determine the agenda of a one-day forum that was held to address the green infrastructure needs of New Jersey municipalities. The conference focused on solutions for implementing green infrastructure and included current research, funding sources, and local case studies to

show that green infrastructure can be done in New Jersey! The forum was attended by 170 government, county, and municipal officials, as well as representatives from non-profit groups and consulting firms. Of the attendees that took the program evaluation, 100% responded that they found the information presented valuable (n = 64). Several evaluation respondents planned on taking action in their towns by advocating for green infrastructure, sharing what they learned with other officials, and using this information to secure funding for new green infrastructure projects.

45 Yavapai County Native and Naturalized Plant Database

Jeff Schalaus, University of Arizona Cooperative Extension, jschalau@ag.arizona.edu

Doug Tolleson, University of Arizona Cooperative Extension, V Bar V Ranch Experiment Station; Sue Smith, University of Arizona Master Gardener, Yavapai County

Yavapai County Native and Naturalized Plants (YCNPN, <http://cals.arizona.edu/yavapaiplants>) is a web-based plant database designed to assist everyday people in identifying native plants of the central highlands transition zone of Arizona. The website uses non-technical language instead of botanical terms, and features photographs showing plants at various times of year to capture seasonal differences in appearance. The YCNPN search function provides users a variety of searchable fields. Known data field information is entered and results return a series of thumbnail pictures to help narrow the search. Once a thumbnail is selected a variety of photos of that species are displayed allowing users to match the plant they saw in the field with the photo. Detailed descriptions of each plant are also included. In September 2013, the YCNPN database included 478 plants (4 cacti, 307 forbs, 77 grasses, 41 shrubs, 41 trees, 5 succulents, and 3 vines). Yavapai County Master Gardener volunteer and native plant enthusiast, Sue Smith, is a retired web programmer and leads the project. Thirteen other Master Gardener volunteers and professionals have contributed photographs. At its launch in 2010, the YCNPN website had 75 plants and over 100 photos. The website continues to expand and in 2013, had 478 plants listed, and over 2,000 photos. The website is used by multiple educational institutions, agencies, and non-profit organizations and receives 62,836 pageviews and 11,314 visitors per year (data from Google Analytics). University of Arizona Range Management Specialist, Doug Tolleson, also supported the YCNPN database and uses it with range management practitioners (<http://cals.arizona.edu/vbarv/rangeprogram/blue-collar-plants>). Yavapai County Master Gardeners continue adding plant photos and descriptions to the YCNPN database. Several requests for use of YCNPN photos are received each year. These are granted if the intended use is for educational purposes.

46 Advancing Youth Scientific Literacy: Natural Resources Curriculum Development and Implementation

Martin Smith, University of California, Agriculture and Natural Resources, Cooperative Extension, mhsmith@ucdavis.edu

It is widely agreed that scientific literacy is an important educational and societal goal. A scientifically literate population is able to participate in and contribute to a science-based society. However, low scores in science among K-12 youth on large-scale assessments have raised national concerns. Youth who lack foundational knowledge and skills in science will neither be able to pursue careers in science nor participate fully in modern society in ways such as helping to address important social challenges (e.g., climate change) and inform public policy (e.g., water quality and conservation), and making informed personal consumer choices (e.g., genetically modified food). The University of California's Division of Agriculture and Natural Resources (UC ANR) has identified scientific literacy as a key area for research and education. Nonformal education programs like 4-H can help address this need through programming that can complement classroom-based science education. One strategy to help strengthen 4-H programming in science is the development and implementation of effective in science curricula focused on natural resources, including *There's No New Water!*, a peer-reviewed, published curriculum that is used by 4-H programs across the United States. The *There's No New Water!* curriculum utilizes hands-on, inquiry-based teaching strategies that have been shown to be effective when teaching science. Furthermore, the curriculum emphasizes the direct application of knowledge and skills to authentic, community-based water issues, engaging youth in efforts to sustain natural resources within their local watershed. Research

results revealed that using a school enrichment model to implement the There's No New Water! curriculum improved participating high school students' content knowledge around water resources and environmental science and developed skills associated with leadership, communication, and the wise use of natural resources.

47 Engaging Natural Resource Volunteers: From Education to Action

Andrea Lorek Strauss, University of Minnesota Extension, astrauss@umn.edu
Amy RB Rager, University of Minnesota Extension

Volunteers are an increasingly important tool in the outreach work of Extension. Many natural resource education programs depend on volunteers to extend their reach. A number of "master volunteer" program have developed in recent years to meet the growing need for training, coordinating and serving these volunteers. Best practices for working with these master volunteers is a growing area of concentration for many Extension educators. This poster will describe a newly updated model of the volunteer life cycle, organized around three phases of volunteering: recruitment/training, service, and assessment. The emphasis is on keeping volunteers engaged through all phases of the volunteer life cycle.

48 Master CompostePrograms to Meet the Changing Clientele of Extension

Amanda Tedrow, University of Georgia Cooperative Extension, atedrow@uga.edu
Suki Janssen, Athens-Clarke County Solid Waste Department

The Georgia Master Composter Program is an adult environmental education course developed as a partnership between University of Georgia Cooperative Extension and Athens-Clarke County Solid Waste Department. The program was created in 2011 to address the growing requests for composting education across the state of Georgia. The program lasts for nine weeks and includes two weekend field trips with over 30 educational contact hours. The instructional sessions are customized and provide educational experience in the chemistry and microbiology of composting, types of and reasons for composting, climate and conditions in Georgia that impact composting, and lessons on teaching varied audiences. The program partners with various organizations statewide to provide unbiased, scientifically accurate information about composting in Georgia. Facilitators work with both public and private entities to provide experiential programming. More than half of the participants in the Master Composter program were not familiar with Extension education or programming before beginning the class. This project provides visibility for Cooperative Extension and has built diverse and lasting partnerships between Extension and a variety of Georgia communities and organizations. Participants have helped extend the efforts of Cooperative Extension by fulfilling more requests as well as building partnerships with a wide range of community groups. The 2012 program participants provided over 400 volunteer hours to their communities and interacted with over 800 community members. Participants trained in this program are an asset to their community and fill a vital role in waste reduction and soil improvement to their local environments.

49 Maryland's Forestry Correspondence Course: A Landowner Based Educational Tool

Bob Tjaden, University of Maryland, rtjaden@umd.edu
Nancy Stewart, ; Latice Fuentes,

Maryland's Forestry Correspondence Course – This course is delivered by either traditional correspondence course paper or web based format. Designed for individuals wishing to increase their understanding of forests and forest management. The course specifically targets Maryland forest landowners and other citizens with an interest in the principles and practices of forestry. However, others such as USDA professionals, high school teachers, environmental educators, and other natural resource professionals have take the course nationwide. Two hundred eighty-five have completed the paper version and eighty five have completed the web based version. The course leads participants to the development of a Forest Stewardship Plan. A certificate is awarded upon successful completion of course, with certificate signed by the Dean, instructor and course coordinator. <http://extension.umd.edu/forestry-course>.

50 The Challenges, Interests, and Needs of Extension Professionals in Sustainable Bioenergy

Patricia Townsend, Washington State University, patricia.townsend@wsu.edu

Stanley Asah, University of Washington; Shiba Kar, Washington State University; Kevin Zobrist, Washington State University

The state of Washington is leading efforts to develop a Pacific Northwest (PNW) biofuel industry that produces marketable transportation fuels. This study examines the perceived needs of extension professionals in the PNW for supporting biofuels. Our project, Advanced Hardwood Biofuels Northwest, is a University of Washington led consortium of universities and private industry that is examining the possibility of developing a supply chain using sustainably grown hybrid poplar feedstocks to produce gasoline, diesel and jet fuel. As a member of the consortium, Washington State University Extension is charged with developing the outreach portion of the project. However, there has not been a significant effort to determine the technical assistance, information and knowledge required by extension professionals for providing assistance to farmers, foresters and other landowners in their decision-making in this area. Our goals are to understand the perceptions of these professionals regarding biofuels, especially hybrid poplar as a feedstock and to determine how to best prepare them to support landowners growing woody crops for biofuel feedstock. Additionally, we want to know what resources would be most useful and relevant to them. We have conducted an electronic survey of agriculture, natural resource, and bioenergy extension professionals in Washington, Oregon, Northern Idaho and Northern California and have sent the survey to 140 extension professionals in the four-state region. We will discuss how the initial results are being used to guide biofuel extension and outreach activities that will assist in educating growers, foresters, and agriculture professionals and support the emerging biofuels industry.

51 Demonstrating Riparian Restoration Practices in the Willamette Valley, Oregon.

Brad Withrow-Robinson, Oregon State University Extension 4-H, brad.w-r@oregonstate.edu

Marvin Gilmour, Gilmour Farm, LLC; Peter Kenagy, Kenagy Family Farm, Inc.; Ed Peachy, Oregon State University, Department of Horticulture

The Willamette Valley is a heavily altered landscape which is home to about 70% of the State's population as well as a large and diverse agricultural sector. Once-extensive native prairies, oak savanna, and hardwood gallery forests have all been greatly reduced by a century of development, causing concern for a number of native species and sparking broad interest and major investments in restoration. Less effort and investment has gone into testing, demonstration and education about management practices to restore these habitats. Since much of the Valley is privately owned, involvement of the Valley's family farm and forest landowner community is critical to meeting landscape scale environmental objectives. Yet collaboration between these and the restoration community is not high. We have developed a demonstration site to illustrate management approaches to restoring bottomland hardwood forest communities. Specific objectives are:

- Restore a diverse and highly functional bottomland forest community
- Demonstrate the use of standard farming and forestry tools and methods for restoration, while illustrating different approaches including planting density, and arrangement based on forest ecology
- Broaden communication and involvement among the between the conservation, farm and forestry communities

The project involves a 27 acre farm field located on the flood plain along the Willamette River which was left uncultivated since the late 80's and occupied by invasive perennial weeds. Practices compared and demonstrated include:

- Site preparation
- Planting density (500 to 2700 plants per acre)
- Spatial arrangement (intermixed and clustered)

- Post planting weed control Irrigation (with and without)

Demonstration objectives are being achieved by documenting the restoration approaches, methods, tools, and the lessons learned which are then extended through on-line resources (website and blog), a series of student and public tours, and field days for the farm and restoration community.

52 Cooperative facilitates long-term stewardship of habitats along the Willamette River, Oregon

Brad Withrow-Robinson, Oregon State University Forestry and Natural Resources Extension, brad.w-r@oregonstate.edu
Crystal Durbecq, Benton County Soil and Water Conservation District

The Willamette Mainstem Cooperative (WMC) evolved from the efforts of local farmers, conservation groups and OSU Extension to create a mechanism to foster greater involvement in conservation efforts among farmers and public landowners along the main stem of the Willamette River. The Willamette Valley is largely in private ownership, much of it in family farms, so increasing voluntary private landowner involvement and stewardship is critical to conserving and improving wildlife habitat along the River and its flood plain. Although many groups and individuals undertake important conservation work along the river, no organization previously coordinated and facilitated these efforts. The Mainstem Cooperative is a pilot for a collaborative model. It is based at the Benton Soil and Water Conservation District (BSWCD) and functions much like an umbrella watershed council to identify, prioritize and coordinate habitat conservation and improvement activities on a reach of the river between the cities of Corvallis and Albany.

To accomplish this the WMC is:

- Surveying and mapping vegetation and invasive plants along the Willamette River.
- Assessing the condition of existing riparian habitats.
- Building a network of partners to guide its work.
- Developing collective priorities to guide and coordinate future conservation work along the river among public and private public landholders, and other stakeholders.

Accomplishments to date include:

- Permission from more than 50 landowners to conduct vegetation surveys of over 3,000 acres.
- Survey and mapping by habitat quality and weed threats on 2,500 acres.
- Development of working relationships with about 20 groups and agencies.
- Seeking and receiving grants with partners to control invasive weeds.

53 Engaging farmers in Wildlife Habitat Management

Brad Withrow-Robinson, Oregon State University Forestry and Natural Resources Extension, brad.w-r@oregonstate.edu
Frank Burris, OSU Extension, SEA Grant; Dan McGrath, OSU Horticulture Extension; Alex Stone, OSU Horticulture Extension; Mean Kleibacker, OSU Extension, SEA Grant; Guillermo Giannico, OSU Fish and Wildlife Extension; Dana Sanchez, OSU Fish and Wildlife Extension; Peter Kenagy, Kenagy Family Farm, Inc.

Much of the land in the Willamette Valley, including important native habitats, are in the hands of farmers and other private landowners. Long-term landscape-scale conservation goals along the Willamette are dependent on the stewardship of private landowners, and the successful integration of habitat resources within the agricultural landscape. A key will be making voluntary care of native habitats part of productive and economically viable working farms. Written management plans are an important tool to help landowners identify and achieve a variety of diverse objectives and benefits from a property. Written plans are seen as an important component of sustainable resource management, promoted by state and Federal agencies and often required for cost share. The planning process is also useful as an educational tool to inform, engage and

empower landowners. We developed an intensive four-day mixed classroom/fieldtrip workshop to guide participants through a management planning process to set goals, describe and assess habitat conditions, identify and prioritize conservation actions on their farms. The workshop was modeled after the Woodland Management Planning workshops created by OSU Forestry and Natural Resources Extension, and developed with colleagues in Horticulture, SEA Grant, and Fish and Wildlife Extension. The six farms participating in the 2012 pilot collectively manage about 5000 acres, and have several hundred acres of bottomland forests, oak woodland or wetland habitats. All developed draft management plans for their farms, and identified specific management actions to improve habitat. The resulting draft plans help participants prioritize and plan their conservation actions, coordinate with agencies and document their work and progress. Outcomes include a draft curriculum, guidelines for mentors, and relationships with collaborating agencies. The pilot was evaluated with input on its value and effectiveness gathered from participating farmers, agency personnel and other contributors, and the evaluation used to improve future workshops/programs.

54 Wildfire: Social Network Analysis to Understand Working Relationships & Opportunities

Sarah Workman, UGA, sworkman@sref.info

G. Michael Zupko, Southern Governors Association; William (Bill) Hubbard, Southern Regional Extension Forestry; Raina Sheridan, Woodard & Curran

An effort between government agencies, NGOs and other partners is underway to collaboratively address wildfire across the US. Developed in response to the 2009 FLAME Act, this work has resulted in a National Cohesive Strategy for Wildland Fire Management (CS). It represents the first time all stakeholders involved in wildfire management have come together to create a shared strategy and marks the first time parts of the country have an opportunity to contribute regional fire goals, objectives, and challenges. Southeastern groups have developed a Regional Strategy and Assessment representing the region's unique values, opportunities, and obstacles. Of critical importance to the success of the CS is the ability to work together across state and organizational boundaries. SREF is conducting a Social Network Analysis (SNA) of the fire community in the region. This presentation will share SNA results for networking or collaboration patterns among the organizations and agencies that are involved in fire management in the Region. All are engaged in Goal 2, 'Creating Fire--Adapted Human Communities': to decrease the risk to human populations and infrastructure from wildfire. Analyzing the networks of fire-related connections and interactions among stakeholder groups has identified clusters both central to and isolated from the network and highlights potential groups of influence. A survey of 67 groups, identified through a Stakeholder Analysis, provided data to depict current activity and outline where strengthening partnerships might be important. Of organizations surveyed in the Southern region, 23 were federal, 21 were state, 15 were private and 8 were professional associations. The data is being used to 1) construct visuals of networks that indicate strength of current interactions between organizations and 2) generate ideas about needs for outreach and education within the network. This includes an Extension role as we move into helping communities prevent, prepare for and recover from wildland fires.

55 Educating Farmers about Invasive Species in Pesticide Training Workshops

Gary Wyatt, University of Minnesota Extension, [wyatt@umn.edu](mailto:w Wyatt@umn.edu)

Dean Herzfeld, University of Minnesota Extension; Tana Haugen-Brown, University of Minnesota Extension

There is a growing number of important invasive species in Minnesota. These invasive species (insects, plants, etc.) are found in all landscapes including our rural and agricultural areas. In an effort to educate farmers about the most important invasive species which can affect farmers' income and environment, it was determined to conduct a short presentation during the private pesticide applicator workshops for farmers. Private pesticide applicator workshops are held in the winter months throughout the agricultural regions of Minnesota. These meetings give an update of new pesticide regulations, safety practices and pesticides. The workshops are required to update individual farmer's licenses to apply pesticides and are well attended. We focused on four invasive species affecting rural areas: Emerald Ash Borer (affecting Ash trees in windbreaks, rural communities and widely planted in farming regions), Brown Marmorated Stink Bug (affecting over 300 plants including apple

trees, grapes, corn and soybeans) Buckthorn (a small tree which is host to the over wintering soybean aphid and found in windbreaks and woodlands throughout the state) and Oriental Bittersweet (an extremely invasive perennial vine which changes the understory of windbreaks and woodlands). Workshop topics included history, life cycle, identification, damage and control. Free ID cards and handouts were available for participants. A similar presentation was added to the Ag Professional pesticide trainings held in MN also. A review of this educational program including topics and farmer evaluations has been documented. This program can be replicated in other states. It is important to educate rural residents about invasive species.

56 Weird Things In The Woods: The Fungi

Curtis E. Young, Ohio State University Extension, young.2@osu.edu
James A. Chatfield, Ohio State University Extension

When one speaks of mushrooms, the untrained may only think of a few types of edible mushrooms (e.g. portobello and white button (variations of *Agaricus bisporus*) sold in grocery stores. Additionally, because of a lack of knowledge to many, fungi are gross, something to fear, and/or a mystery as to what they are, where they come from and what they are doing. There are many misconceptions about the fungi such as which are poisonous, how to tell if a mushroom is poisonous, what are toad stools, what is the difference between mushrooms and other type of macrofungi (e.g. self fungi, morels, boletes, etc.), wives' tales about mushrooms, what is the function of the mushroom and what is the function of fungi in nature. The role of macrofungi in a forest can be hard to determine in some cases and easy in others. Macrofungi can be saprophytes (recyclers), parasites (destroyers) or mutualistic symbionts (helpers) and in some cases, switch their roles from parasite to saprophyte as a host passes from living to dead. Working with macrofungi (mushrooms, etc.) one can teach many aspects of biology/ecology to the public. There are numerous opportunities for a variety of educational activities involving macrofungi including but limited to mushroom forays, photography, and programs on classification, steps in identification, and their ecological significance and impacts on forest health. Studying macrofungi in their woodland settings helps bring people into natural areas which can lead to greater appreciation of these resources and the need to conserve them.

57 Integrated Regional Water Management (IRWM) Tribal Collaborative Effectiveness Study

Danielle V. Dolan, Masters Student, Community Development Graduate Group, danielle.dolan@gmail.com

The Integrated Regional Water Management (IRWM) Tribal Collaborative Effectiveness Study is a case-story example of Tribal/ Indigenous participation in contemporary water policy. Following indigenous collaborative research protocols, we conducted surveys, interviews and focus-group meetings with Tribal representatives, DWR staff, and others throughout the state of California. We offer socio-political/ cultural context and qualitative research data to illustrate both the scope of challenges Tribes face in meaningful participation in state water policy and possible solutions to resolving identified concerns. The IRWM program is in many ways broadly representative of emerging water policy initiatives worldwide, with similar challenges for Tribal/ Indigenous involvement. To this end, we briefly discuss the issues with Tribal participation in these initiatives as well as broader potential actions to improve Tribal engagement. This report is a comprehensive starting point to consider how to improve and enhance effective participation, collaboration, and leadership by California's First Peoples and Indigenous peoples worldwide, in state integrated water management initiatives.