



2011 Conservation Innovation Grants Showcase

ABSTRACT BOOK

Conservation Innovation Grants (CIG) is a voluntary program intended to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging Federal investment in environmental enhancement and protection, in conjunction with agricultural production. Under CIG, Environmental Quality Incentives Program funds are used to award competitive grants to non-Federal governmental or non-governmental organizations, Tribes, or individuals.

CIG enables NRCS to work with other public and private entities to accelerate technology transfer and adoption of promising technologies and approaches to address some of the Nation's most pressing natural resource concerns. CIG will benefit agricultural producers by providing more options for environmental enhancement and compliance with Federal, State, and local regulations. NRCS administers CIG.



The 5th Annual CIG Showcase is being held in conjunction with the Soil and Water Conservation Society International Annual Conference on July 17-20, 2011, in Washington, DC.

2011 Conservation Innovation Grants Showcase

Agenda

Monday July 18, 2011	Moderator	Lillian Woods , National Technology Support Coordinator, NRCS, Washington, DC
10:30 AM	Welcome	Dave White , Chief, NRCS, Washington, DC Bill Boyer , President, SWCS C. Wayne Honeycutt , Ph.D., Deputy Chief for Science and Technology, NRCS, Washington DC Anthony Kramer , Deputy Chief for Financial Assistance and Community Development, NRCS, Washington, DC Douglas Lawrence , Deputy Chief for Soil Survey and Resource Assessment, NRCS, Washington, DC
11:30 AM	Farmers Conservation Alliance and the Farmers Screen	Julie O'Shea , Farmers Conservation Alliance
12:00 PM	Lunch	
1:30 PM	Farming for Wildlife: Creating habitat rotations on working farms	Kris Knight , The Nature Conservancy
2:00 PM	Forest Biomass Retention and Harvesting Guidelines for the Northeast	Robert Perschel , Forest Guild
2:30 PM	Forest Makeover: Expanding the Local Knowledge of Sustainable Forest Management in the Appalachian Hardwood Region of Virginia	David Richert , Virginia Department of Forestry
3:00 PM	Break	
3:30 PM	Council on Sustainable Biomass Production -- Findings and Outlook	John Heissenbuttel , Council on Sustainable Biomass Production
4:00 PM	A Field Demonstration of Biochar Farming and Production Using Mobile Pyrolysis Technology	Richard Perritt , NC Farm Center for Innovation and Sustainability
4:30 PM	Adjourn	

2011 Conservation Innovation Grants Showcase Agenda

Tuesday July 19, 2011	Moderator	Lillian Woods , National Technology Support Coordinator, NRCS, Washington, DC
10:30 AM	Conservation Certification: Assurances for the Absentee Landowner	Jamie Ridgely , Agren
11:00 AM	Evaluating Sagebrush Mitigation Metrics as a Potential Credit Trading Tool	Jonathan Haufler , Ecosystem Management Research Institute
11:30 AM	From Concept to Implementation: The Story of the Northern Everglades -Payment for Environmental Services Program	Sarah Lynch , World Wildlife Fund
12:00 PM	Lunch	
1:30 PM	Driving Conservation Innovation and Sustainable Winegrowing Adoption through Performance Benchmarking, Tools and Resources	Allison Jordan , California Sustainable Winegrowing Alliance
2:00 PM	Optimizing Conditions for Phosphorus Removal from Anaerobically Digested Dairy Manure	Joe Harrison , Washington State University
2:30 PM	Pesticide Risk Mitigation Engine (PRIME)	Wade Pronschinske , IPM Institute of North America
3:00 PM	Break	
3:30 PM	Mitigating Manure Contaminated Drain Discharge with Controlled Drainage	Larry Geohring , Cornell University
4:00 PM	Preliminary results from Agricultural Drainage Water Management CIG Projects in Ohio	Norman Fausey , USDA, ARS, MWA, Soil Drainage Research Unit
4:30 PM	Adjourn	

Poster Presentations

1	Solving the Water Crisis in the Russian River with independent science and grower involvement	Laurel Marcus , CA Land Stewardship Institute
2	Policy and Ecology: A Rubric for Selecting Locally Native Seed Stock for Use on Maryland Roadsides	Sara Tangren , Chesapeake Natives
3	Development and Application of an Economic Anaerobic Digester Optimization (ADOPT) Model	Shannon Neibergsq , SES Washington State University
4	Precision Summer and Fall Seeded Cover Crop Impacts on Corn Productivity and Soil Health in No-Till Production Systems of the Northern Great Plains	Cheryl Reese , South Dakota State University
5	Cellulosic feedstock production in fields of complex topography.	Kurtis Reitsma , South Dakota State University
6	Developing Metrics to Measure On- and Off-Farm Sustainability Performance: The Stewardship Index for Specialty Crops	Andrew Arnold , SureHarvest
7	Project Find and Assit: Reaching Out to underserved smallscale landowners	Dennis Pate , Validus
8	Trials and Tribulations in the Adoption of a Systems Approach to Precision Nutrient Management Technology	Craig Yohn , West Virginia University Extension Service
9	Boone and Raccoon River Watershed Cooperative Conservation Project	Todd Sutphin , Iowa Soybean Association
10	An Integrated Approach to Conservation and Integrated Pest Management in Oklahoma Cropping Systems	Jeff Edwards , Oklahoma State University
11	Rapid Assessment of Carbon Sequestration Potential in Cropland for the Oklahoma Carbon Program	Jason Warren , Oklahoma State University
12	Adapting to climate change through increased use in prescribed fire and community-based partnerships	Maria Gutierrez , Texas A&M Institute of Renewable Natural Resources
13	Removing Soluble Phosphorus from Agricultural Drainage Waters using FGD Gypsum Filters	Arthur Allen , University of Maryland Eastern Shore
14	Alternative Methods of Biofuel Production to Enhance Farm Profitability While Improving Wildlife and Soil and Water Conservation	Ray Wright , Bradford Research and Extension Center

Oral Presentation Abstracts

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FCA and the Farmers Screen

Julie Davies O'Shea, Farmers Conservation Alliance (FCA)

In this presentation, Julie Davies O'Shea will tell the story of the Farmers Screen and Farmers Conservation Alliance (FCA). FCA is a nonprofit, social enterprise organization based in Hood River, Oregon and is responsible for bringing the Farmers Screen to market.

The Farmers Screen is a horizontal, flat plate fish screen technology that allows farmers to divert water without harming fish. In response to their own challenges of screening water and protecting fish, the Farmers Screen was invented by the Farmers Irrigation District in Hood River, Oregon and licensed to FCA with the conditions to refine the technology, sell as many screens as possible, and use profits to invest in other solutions that benefit both the environment and agriculture.

In 2006, FCA became a Conservation Innovation Grant recipient to support the adoption and development of the Farmers Screen. This presentation will discuss the evolution of the Farmers Screen including FCA's successes and lessons learned of technology transfer, outreach efforts, agency approvals and permitting, project installations, and most importantly, evaluations leading to process and technology refinement.

Keywords: fish screen, technology, water

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Farming for Wildlife: Creating habitat rotations on working farms

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Farming for Wildlife is a project where The Nature Conservancy and Skagit Valley farmers of Western Washington are working to create habitat for shorebirds and waterfowl on working farms by implementing habitat rotations. Farm fields are flooded for migrating shorebirds and then return to production after the habitat rotation. Project sites are located in the Greater Skagit Delta, 60 miles north of Seattle, Washington, an area that is recognized as one of the key Pacific Flyway stopover and wintering sites for migratory shorebirds. A pilot project conducted between 2006 and 2009 showed habitat rotations can attract a diversity of shorebird and waterfowl species and could offer soil fertility benefits for farmers. In 2009, The Nature Conservancy was awarded a Conservation Innovation Grant from the Natural Resources Conservation Service to continue researching the Farming for Wildlife concept. Currently, four demonstration sites are in place where shorebird and waterfowl use are being monitored and in cooperation with Washington State University, the soil fertility response to flooding is being measured. Studies are also underway with Washington State University to examine the role flooding could play in controlling soil pathogens that are detrimental to local crops. The conservation vision for the Farming for Wildlife project is to create habitat rotations at an ecologically meaningful scale for shorebirds on privately owned lands throughout the Pacific Flyway. This farming and stewardship practice is a market-based approach to conservation in which economic benefits are realized by farmers alongside the habitat benefits for shorebirds and other species.

Keywords: Private lands stewardship, habitat rotations, shorebird conservation

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Forest Biomass Retention and Harvesting Guidelines for the Northeast

Robert T. Perschel, Forest Guild

This session will review the set of guidelines published by the Forest Guild in June, 2010: Forest Biomass Retention and Harvesting Guidelines for the Northeast. In 2010-2011 the Forest Guild is working under a National Conservation Innovation Grant to promote the adoption of new, innovative conservation practices for the production, harvest and handling of sustainable forest biomass for renewable energy and demonstrate the Forest Guild's and other ecologically based guidelines in a nine northeastern states.

We will first review the process used to establish the guidelines. A 23 member Working Group consisting of forest practitioners and prominent environmental scientists and organizations worked for eight months to establish the guidelines. The participants used two scientific reports to evaluate the ecology of dead wood and the best management practices and regulations at the state level currently in place to protect important forest attributes during increased biomass harvesting. Enhanced Guidelines were identified for four Northeast forest types.

The second part of the session will report on the demonstration projects including methods of pre and post harvest inventory, implementation successes and challenges and data on economic and operational practicalities of implementing the guidelines.

The session will end with a review of state based policy approaches to integrating biomass guidelines into voluntary best management practices as well as the discussions and possibilities of coordinating state initiatives across the region.

Keywords: biomass harvesting guidelines, Forest Guild

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Forest Makeover: Expanding the Local Knowledge of Sustainable Forest Management in the Appalachian Hardwood Region of Virginia

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Background: A significant percentage of privately owned forestland in the Appalachian Hardwood Region of Virginia has a history of mismanagement and/or under-utilization. Diameter limit cutting and other high-grade timber harvests have reduced the short-term productivity of the forest. Few, if any forest producers avail themselves of cost-share programs (such as EQIP) to sustainably manage their forest land, and for some forest landowners, the prevalence of shortsighted silviculture has reinforced a mindset that no management is still the best available option for forest management.

Project Description: Project partners are coordinating a hands-on forest stewardship planning and implementation project with a group of 20-25 EQIP-eligible forest producers. These EQIP-eligible forest producers are experiencing sustainable forest management through a series of classroom training and field work, using Virginia's Matthews State Forest and participants' own forest land as a field laboratory. Specific forest management projects are being implemented using a combination of project funds, available cost-share funds, in-kind contributions, and participants' funds. Project partners are using these specific forest management projects to demonstrate the positive economic impact of sustainable forest management, and the benefit of participating in forestry cost-share programs.

Outcomes: Project partners anticipate that this project would increase the acres of sustainably managed forest land, and improve participation in forestry cost-share programs such as EQIP. These increases would result from an expanded local knowledge of sustainable forest management, and highly visible sustainable forest management projects.

Keywords: Sustainable forest management, stewardship planning, peer-to-peer learning

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A Field Demonstration of Biochar Farming and Production Using Mobile Pyrolysis Technology

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The use of Biochar as an agricultural soil amendment is attracting worldwide attention as a powerful tool to improve the quality of marginal soils, and as a possible on-farm strategy to reduce GHGs and sequester carbon in soils. The project presents some early findings of a national CIG grant award to evaluate the multiple benefits of biochar to improve soil nutrient conditions and water retention that may aid in increasing crop growth, especially in agricultural regions where poor soil quality and drought limit productivity.

The NC Farm Center applies a whole systems biochar management approach consisting of: 1) harvesting and drying farm waste woody biomass that is integrated with the WHIP habitat conservation program; 2) operating small scale mobile Pyrolysis technology to make biochar; 3) storing biochar safely; 4) spreading biochar on farm fields as a soil amendment and; 5) distributing the results to farmers and others in ways that help the understanding and adoption of biochar. These steps form one of the first images in the U.S. for what a biochar farming process might look like. The project provides valuable information to share about the limitations and promises for developing biochar management practices across the globe.

Specifically, some preliminary data and figures for biochar added to topsoil are shown for changes in plant mass, soil moisture levels and yields for typical North Carolina row crops including winter wheat, soybeans, corn and cotton. Finally, new directions are presented based on collaboration with the USDA/ARS Coastal Soils Center to experiment with new sources of feedstock that may lead to biochars that improve soil water holding capacity.

Keywords: Soil Quality, Carbon Sequestration

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Conservation Certification: Assurances for the Absentee Landowner

Jamie Ridgely, Agren

Conservation Districts of Iowa secured a three-year National Conservation Innovation Grant in 2009 to create a market-based incentive for Iowa farm operators to implement conservation-friendly management on land owned by absentee landowners. This incentive will be created through the development, implementation, and evaluation of a conservation certification program for operators. The idea for a conservation operator certification program originated at a March 2008 meeting of Iowa's conservation partnership and absentee landowners. The three-day forum was convened out of concern that 60 percent of Iowa's farm ground is leased, and a realization that the current conservation assistance infrastructure may not meet the needs of many of Iowa's landowners. The group envisioned a three-part program entitled Landowners and Operators Care About the Land (LOCAL) that will improve the mutual capacity and willingness of non-operator landowners and their operators to achieve conservation objectives. The proposed conservation certification program for farm operators is one part of the three-part vision. Conservation Districts of Iowa has partnered with Agren, Inc. and Dr. J. Gordon Arbuckle, Iowa State University sociologist, to conduct survey research, outreach to absentee landowners, and development and evaluation of the certification program. Ridgely's presentation will introduce concepts to assure landowners that their land meets conservation stewardship objectives, as well as the initial response of Iowa landowners to this type of programming.

Keywords: conservation certification, absentee landowner, CIG

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Evaluating Sagebrush Mitigation Metrics as a Potential Credit Trading Tool

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The Cooperative Sagebrush Initiative (CSI) has conducted a Conservation Innovation Grant project to evaluate a metric system for use in a potential credit trading system for off-site mitigation in sagebrush ecosystems. The metric system uses NRCS Ecological Sites to define a reference condition and then quantifies pre and post-treatment sagebrush vegetation conditions at the site level. It then evaluates landscape mitigation effects through habitat assessments for sagebrush-associated wildlife species. The metric system was applied in seven demonstration project sites in California, Idaho, Utah, and Wyoming. Results in terms of quantified changes resulting from various mitigation treatments demonstrated how the metric system could be applied to these actual sites. The results were then reviewed with local agencies, companies, and organizations to identify how they could fit into current or future mitigation crediting systems. The metric provided a clear method of determining if equivalent gains in site conditions or wildlife habitat were produced through mitigation activities to balance impacts of development in nearby areas. Use of the metric in a credit trading system will depend on perceived advantages of voluntary conservation actions, or will need more rigorous requirements for mitigation if a tangible market is to be developed. Numerous policy decisions that would need to be answered for application of the metric system were identified and discussed by those reviewing the system. Recommendations gleaned from these discussions are presented.

Keywords: sagebrush, mitigation, metrics, credit trading

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From Concept to Implementation: The Story of the Northern Everglades -Payment for Environmental Services Program

Dr. Sarah Lynch, World Wildlife Fund

Dr. Len Shabman, Resources for the Future, shabman@rff.org

The first solicitation under the new Northern Everglades and Estuaries - Payment for Environmental Services (NE-PES) Program will be released in early 2011 by the South Florida Water Management District (SFWMD). The solicitation will invite ranchers in the Lake Okeechobee, Saint Lucie and Caloosahatchee watersheds (the Northern Everglades) to submit proposals for providing either water retention (acre feet) or nutrient load reduction (lbs phosphorus or nitrogen) services on some or all of their ranch area. Ranch proposals selected through a competitive process using a reverse auction payment approach will enter into 10 year contracts with the SFWMD. The SFWMD has estimated a total initial solicitation value of roughly \$43 mil over the 10 year contract period. Multiple solicitations are anticipated over the next decade in order to grow the program to a target of 450,000 acre feet of retention in the Northern Everglades.

The NE-PES program is a product of and replaces the CIG funded Florida Ranchlands Environmental Services Project (FRESP). Implemented through a collaborative process that included ranchers, state and federal agency staff, research scientists and environmental groups, FRESP conducted a 5 year pilot project that included 8 on-ranch water management projects that allowed the field testing of tools, metrics and models that have now been incorporated into the NE-PES program. Lessons learned from the transition from a vision to actual PES program implementation will be shared, including the importance of on-the-ground projects and streamlining the permitting process.

Keywords: payment for environmental services, water retention, nutrient removal

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Driving Conservation Innovation and Sustainable Winegrowing Adoption through Performance Benchmarking, Tools and Resources - NRCS CIG 69-3A75-9-146

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Conservation is based on voluntary decisions made by land owners and managers. The presentation will address a model program that demonstrates effective methods for engaging decision-makers in landscape scale decision-making and evaluates impacts of outreach activities.

The winegrowing community initiated the California Sustainable Winegrowing Program to promote and adopt "ground to bottle" sustainable practices. The program's innovative "cycle of continuous improvement" consists of a comprehensive self-assessment workbook, customized reporting, targeted education, and action planning. A third party certification option was added in January 2010. CSWA's current CIG project involves industry-wide performance benchmarking, and creating tools and resources that drive conservation innovation and speed adoption of sustainable practices. Key CIG activities to date include engaging vintners and growers and identifying seven initial performance metrics - greenhouse gas (GHG) intensity and water and energy efficiency (both on-farm and in the winery), and nitrogen use in vineyards - that the industry will use to benchmark performance and set improvement targets. These metrics will help improve linkages between conservation and policy at the local, federal and international levels. It will also tie practices to performance metrics, providing growers with tools to better understand which practices lead to significant improvements, including reductions in energy/water use and GHG emissions.

CSWA is also working with the Stewardship Index for Specialty Crops, another CIG project that is developing and piloting a common set of performance metrics for all specialty crops through a multi-stakeholder process. Elements of this program can serve as a model for other commodities pursuing sustainable agriculture.

Keywords: Sustainable winegrowing, performance metrics, adaptive management, outreach and education

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Optimizing Conditions for Phosphorus Removal from Anaerobically Digested Dairy Manure

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Anaerobic digesters are commonly adopted for purposes of odor reduction and energy generation via methane destruction. In areas where electricity rates are relatively less expensive (i.e., the Pacific Northwest) there is a need to develop management strategies for economic sustainability of anaerobic digesters. Anaerobic digesters in Washington State utilize dairy manure and co-digested pre-consumer food-wastes. The digestate typically undergoes solids removal, with the remaining liquid used to irrigate nearby cropland. In various cases, the phosphorus contained in the liquid exceeds agronomic rates, and thus phosphorus removal from the liquid is desired. A fluidized bed struvite crystallizer has been developed and applied for this purpose at a co-digestion AD on a dairy farm in Washington State. Total phosphorus removal exceeding 70% and orthophosphate removal of 80% have been achieved, yielding a desirable granular struvite fertilizer. The struvite product can be easily transported offsite to provide phosphorus and other crop nutrients where phosphorus is needed. Operation of the system has enabled a determination of the operating conditions needed for desired phosphorus removal, and a projection of the economic characteristics of the system, including capital, labor, power, and net materials costs. Agronomic crop studies have demonstrated that struvite can serve as a nutrient source for production of triticale, wheat, oats, alfalfa, and corn silage.

Keywords: anaerobic digestion, phosphorus, struvite, dairy manure, land application

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Pesticide Risk Mitigation Engine (PRiME)

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Pesticides are invaluable tools for food and fiber production, but pesticide use presents risks that must be carefully managed. Developed through a Conservation Innovation Grant, the Pesticide Risk Mitigation Engine (PRiME) is a user-friendly web application designed to help mitigate the environmental impacts of pesticide use by improving the selection of pest management options and conservation practices. Using a novel approach to risk calculation based on site-specific conditions, pesticide properties and empirical field impact data (where available), PRiME estimates risk to workers, consumers, birds, small mammals, earthworms and aquatic ecosystems. PRiME weighs impacts of application methods and the quantity and frequency of application, and uses NRCS soils data and other site-specific information, such as conservation practices and the presence of sensitive areas, to improve the accuracy of risk calculations and help the user make informed decisions about pesticide use and risk mitigation. Using state-of-the-art pesticide fate and transfer modeling and a suite of environmental risk indicators to assess the need for and effectiveness of conservation practices at a given site, PRiME can be useful in supporting NRCS programs such as the application of NRCS 595 Pest Management Plans or the development of IPM Conservation Activity Plans. A beta version of PRiME has been online and operational since 2009 and has been pilot tested in a number of cropping systems across the U.S.

Keywords: pesticide risk mitigation, fate and transfer modeling

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Mitigating Manure Contaminated Drain Discharge with Controlled Drainage

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Land application of liquid manure can result in contamination of subsurface (tile) drain discharge and may cause environmental impact to receiving water. This contamination occurs rapidly following manure application, especially on soils exhibiting preferential flow characteristics and when precipitation follows shortly after manure application. Laboratory and field studies were initiated to better understand preferential flow processes and to quantify the extent of tile effluent contamination from liquid manure application. The laboratory leaching study consisted of replicated soil columns constructed with three different pore-size arrangements, and applying three different phosphorus application treatments. The laboratory study indicated phosphorus was leached most rapidly from soil columns with 3 mm diameter artificial macropores and from the liquid manure application with 3.5 percent solids, as opposed to no and 1 mm diameter macropore arrangements with applications of liquid manure containing 7 percent solids or with inorganic phosphorus fertilizer. The maximum phosphorus loss from the soil columns was only 0.14 kg/ha, but the peak phosphorus concentration in the leachate was 3.1 mg/L. In the field studies, the peak concentration of phosphorus in the tile drain effluent was 25 mg/L, which occurred within 40 minutes after the start of precipitation following a 47 m³/ha liquid manure surface application containing 7 percent solids on the wetter field plots. Peak concentrations for fecal coliforms and ammonia-nitrogen were 110,000 colonies/100 ml and 3 mg/L, respectively. The drain discharge from drier field plots did not occur as rapidly, but the initial concentrations were also similar. Phosphorus and fecal coliform concentrations were reduced significantly when precipitation occurred one week after the surface manure application or when the manure was thoroughly incorporated immediately after the application. The field study where the drain discharge was curtailed by temporarily raising the drainage weir control in a controlled drainage structure did not seem to have much effect on the effluent concentrations, so the primary benefit of controlled drainage appears to be one of delaying the initial drain discharge. This implies the contaminant load may be reduced somewhat with controlled drainage adjustment immediately following manure application, the extent of which depends on the antecedent soil moisture condition and the timing of precipitation after the manure application. The soil column leaching and controlled drainage field experiments, funded by a Conservation Innovation Grant, will be discussed during this presentation along with current efforts to identify vulnerable drained soils and implement controlled drainage on livestock farms.

Keywords: Controlled drainage, nutrient management, water quality, preferential flow, phosphorus

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Preliminary results from Agricultural Drainage Water Management CIG Projects in Ohio

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Field demonstrations were monitored to compare the crop yields, drainage discharge, and nutrient loadings to streams from managed and unmanaged subsurface drainage systems. Paired drainage systems within the same field, under similar soil, area, cropping, and management conditions, were identified. Eight fields in 6 different counties in northwest Ohio were identified. In each field, one system was managed with a free, unrestricted outlet while the other system was managed during the growing season and the non-growing season by elevating the outlet to restrict drainage outflow; but the outlet was unrestricted in preparation for and during planting and harvesting seasons. Farmers provided management records and georeferenced yields. Water elevation in the outlet control structures was recorded and used to calculate the drainage volume discharged from each outlet. Soluble N and P concentrations were determined on occasional grab samples of the discharge water. The preliminary analyses of the data indicate: no gain or loss in yield due to drainage water management; reduction in flow volume and nutrient loadings to receiving waters due to drainage water management.

Keywords: drainage, water quality, CIG, drainage water management

CIG Poster Presentation Abstracts

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Poster #1

Solving the Water Crisis in the Russian River with independent science and grower involvement

Laurel Marcus, California Land Stewardship Institute

The Russian River watershed in northern California is home to a vibrant wine industry as well as listed salmonids. Unlike most other agricultural areas, the Russian River has numerous individual agricultural water systems which include on-stream reservoirs, off stream reservoirs filled with direct diversions, groundwater wells and direct diversions from streams to frost and irrigation systems. In 2008 the National Marine Fisheries Service (NMFS) demanded that the State of California place a moratorium on the use of water for frost control. Such a moratorium would put over 25,000 acres out of production and result in a loss of over 7000 jobs. The NMFS demand was based on two isolated instances of salmonid juveniles stranding due to water diversions for frost control and an assumption that this is a systemwide problem that occurs every spring. However the conditions that resulted in the 2008 salmonid strandings were the driest spring on record and the worst frost season in 30 years. The assumption that the effect of frost control was the same every year in all locations was not supported with any data. From this conflict the Russian River Frost program was begun by the growers, Farm Bureau, a small irrigation district and the author. The solution proposed was to convene an Independent Science Review Panel following the guidelines of the National Academy of Sciences, train growers to monitor stream flow and coordinate diversions to avoid strandings and build off stream ponds to reduce direct diversions. The NRCS is a major partner through both the CIG program and the AWEP program. This approach is unique in incorporating independent science and monitoring into agricultural water use to assure that conflicts between agriculture and endangered species are avoided.

Keywords: frost control salmonids streamflow monitoring

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Poster #2

Policy and Ecology: A Rubric for Selecting Locally Native Seed Stock for Use on Maryland Roadsides

Sara Tangren, Chesapeake Natives

Determined that roadside plantings should be safe, aesthetic, good for the environment, and supportive of local economy and character, the Maryland State Highway Administration has begun exploring the use of locally native seed stock. However, criteria that were once used to assess the acceptability of candidate species were not adequate for evaluating locally native plants. The author invited stakeholders with diverse points of view from nonprofit, state, and federal organizations to form a panel of advisory experts. The panel discussions led to development of a review process, a rubric with 19 levels of evaluation, one level for each plant attribute that must be understood in order to decide whether or not a species is suitable for roadside use. The first 14 levels addressed ecological, soil stabilization, and roadside maintenance considerations. An additional 5 levels addressed agricultural production and therefore seed affordability considerations. Referred to as the Attributes Review Process, this rubric is the first quantitative, non-arbitrary method for reviewing species being considered for use in roadside soil stabilization projects in Maryland, and has the potential to be modified for application to purposes beyond soil stabilization and to locations beyond Maryland. The review process was applied to candidate species and three were selected and advanced to the seed source development stage of our project: gray goldenrod (*Solidago nemoralis* Aiton), beaked panicgrass (*Panicum anceps* Michx.), and Virginia wildrye (*Elymus virginicus* L.). The species advisory panel approach facilitated scientists, conservationists, and policy makers in building consensus and creating a useful product.

Keywords: roadside, policy, Maryland, native seed production, rubric, soil stabilization, *Solidago nemoralis*, *Panicum anceps*, *Elymus virginicus*

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Poster #3

Development and Application of an Economic Anaerobic Digester Optimization (ADOPT) Model

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Anaerobic digesters are capital intensive investments that have been constructed to improve the environmental sustainability of dairy farm nutrient management. Previous economic analyses of anaerobic digesters have applied capital budgeting to evaluate economic feasibility. However there is a need for a model that evaluates within year alternative management strategies that maximizes an anaerobic digester's economic sustainability. The Anaerobic Digester OPTimizer (ADOPT) programming model optimizes the annual net economic return of an anaerobic digester utilizing dairy manure with co-digested pre-consumer food-waste feedstocks. The feedstocks have variable value in terms of tipping fees, volumes delivered, nutrient composition and bio-gas electricity producing potential. ADOPT uses a daily time step to model mass balance inflows into the digester, anaerobic digester design and capacity constraints, regulatory constraints and the economic returns from electricity sales, tipping fees, separated solids compost production, the nutrient value of the digestate and other returns such as carbon credits and struvite production. The volume and nutrient composition of the digestate effluent into the system's storage lagoon is used to model nutrient application to the dairy's cropland subject to constraints on the farm's cropping needs, nutrient management plan and the system's design capacity. ADOPT's modeling parameters were obtained from ongoing project monitoring and testing at an operating anaerobic digester in Western Washington. The model is applied to scenarios analyzing a base case, accepting dairy waste from multiple dairies with redistributing digestate to contributing dairies, and accepting only high energy feedstocks that produce enough bio-gas to support an additional electrical power generator.

Keywords: anaerobic digestion, economics, feedstocks, dairy manure

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Poster #4

Precision Summer and Fall Seeded Cover Crop Impacts on Corn Productivity and Soil Health in No-Till Production Systems of the Northern Great Plains

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Cover crops were evaluated under continuous no-till culture in the Northern Great Plains spring wheat region from 2009 September to 2010 November as a tool to improve soil quality and for nitrogen (N) fertilizer replacement value in *Zea mays* L. (corn) following *Triticum aestivum* (hard red spring wheat-HRSW). Four treatments were established following HRSW grain harvest in 2009: (1) no cover crop; (2) cover crop seeded into wheat stubble; (3) cover crop seeded into corn (2010) at the six to seven leaf stage (corn V6-7); and (4) cover crops seeded both following the wheat harvest and seeded into the 2010 corn at V6-7. Experimental plots were established at summit and footslope areas within production fields. Cover crop species planted in 2009 September were *Raphanus sativus*, *Lathyrus sativus*, and *Brassica rapa*. Cover crop N replacement value was determined by surface broadcasting ammonium nitrate (0, 34, 67, and 134 kg-N ha⁻¹) randomly within each cover crop treatment in 2010 May. Cover crop species planted into corn at V6-7 (2010 June, in-season) were a mixture of *Lens culinaris*, *Triticum aestivum*, *Trifolium incarnatum*, and *Brassica rapa*. In-season cover crops were either broadcast or drilled into the standing corn. At 2010 corn harvest, the only species planted in-season into the standing corn that survived throughout the growing season was *Trifolium incarnatum*. Cover crop treatment impacts on soil moisture and quality, N replacement value, and corn yield are currently under evaluation.

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Poster #5

Cellulosic feedstock production in fields of complex topography.

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As the biofuels industry expands, more producers are harvesting corn stover, exporting organic carbon, nutrients, and exposing soil to erosive forces. Sustaining and improving productivity is highly dependent on management techniques. An option for managing land with variable productivity such as land with complex landscapes is to strategically place perennial grass and row crops where they will optimize productivity, profitability, and sustainability.

This project was designed to demonstrate practices used in producing multiple feedstocks within fields of complex topographies. Four locations with unique soil and landscapes were selected in three climate regimes. Perennial grass (switchgrass & prairie cordgrass) was planted the first year at all four sites; one site included a third crop of mixed prairie grasses and forbs. Row cropping consisted of a continuous corn system, with three sites managed under no-tillage and the remaining site tilled in the spring prior to planting. Total above ground biomass production was measured at the crest, back-slope, and toe-slope, replicated four times across the field. Soil organic carbon mineralization rates and maintenance requirements were calculated from in-field measurements at corresponding landscape positions within each crop treatment. Crop establishment, development, and productivity were found to be highly dependent on variations of residue management, topography, climate, and soil. Precision crop management strategies for biofuel feedstock production are likely to be site specific but have a high potential to improve sustainability, productivity, and mitigate environmental impacts.

Keywords: Biofuel, feedstock, precision farming, switchgrass, corn, prairie cordgrass,

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Poster #6

Developing Metrics to Measure On- and Off-Farm Sustainability Performance: The Stewardship Index for Specialty Crops

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The Stewardship Index for Specialty Crops (SISC) is a collaborative, multi-stakeholder initiative that seeks to provide a widely-accepted system for measuring sustainability performance, and advancing environmental, economic and social goals. Rather than set a fixed performance standard, the Stewardship Index will publish a set of "yardsticks" for measuring sustainability performance and outcomes, enabling all specialty crop growers, anywhere along a continuum of stewardship performance to (1) benchmark their own operations, (2) compare themselves to others to find opportunities for increasing efficiencies and lower costs, (3) enable data-backed claims of stewardship performance in the marketplace, and (4) minimize duplicative sustainability measurement and reporting systems. SISC is governed by a Coordinating Council made up of producers, buyers, suppliers, trade associations, environmental groups and public interest groups. From October 2009 until mid-2010, more than 400 supply chain stakeholders joined the SISC Metrics Review Committee and agreed upon a set of draft performance-based metrics to pilot test with the initial focus being on-farm metrics. The Coordinating Council approved the metrics in the following resource areas for pilot testing during the 2010 and 2011 growing seasons: energy; air quality; pesticides; water use; soil, nutrient and water quality; biodiversity; and waste. Work continues on refining and coming to a consensus on metrics for greenhouse gas (GHG) emissions and human resources. One hundred producers in 12 states growing 17 crops agreed to pilot test the metrics. Initial summaries of the pilot testing outcomes will be presented.

Keywords: Stewardship Index, Specialty Crops, performance, metrics, outcomes

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Poster #7

Project Find and Assit: Reaching Out to underserved small-scale landowners

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Conservation districts, a private conservation planning firm, and USDA have joined together to identify needs and improve service to small-scale landowners in Iowa.

Today, NRCS personnel typically have had little time for such outreach. In turn, because of their lack of familiarity with USDA, this group of landowners has had little contact with conservation agencies-and their needs have largely gone unmet.

Project Find and Assist is a replicable public/private partnership pilot project intended to identify, reach out, and connect traditionally-underserved, EQIP-eligible small-scale farm owners with conservation services and programs. Carried out with assistance from a Conservation Innovation Grant, the project gained new information about the conservation needs and preferences of small-scale landowners, as well as insights to the feasibility of their needs being serviced by technical service providers, private conservation planning firms, or NRCS.

Information to be shared on this project includes statewide feedback from a mail survey of 286 small-scale landowners (owners of from 5 to 100 acres); comments from two focus groups of small-scale farmland owners in Warren and Madison Counties; feedback from a survey of every small-scale landowner (2600 surveys mailed) in those two counties; and analysis from individual followup planning with every small-scale landowner in the two counties who expressed an interest in further discussion.

Small-scale landowner interest in conservation, preferred conservation practices, familiarity with EQIP and other USDA conservation programs, ability to find assistance, expectations for technical and financial help, and other key information needed by private and public conservation planners is included.

Keywords: public/private partnership; small-scale; surveyw; feedback

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Poster #8

Trials and Tribulations in the Adoption of a Systems Approach to Precision Nutrient Management Technology

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Precision Nutrient Management is interrelated practices that work together to monitor and apply nutrients in a precise manner. The grant provided a cost share program for a series of practices: precision soil sampling, variable rate application of nutrients, adaptive nitrogen management, cover crop planting and liquid dairy manure application away from the farmstead. The largest barrier to the program has been the cooperation and support of the commercial applicator.

Fewer acres have been precision sampled due to uncertainty of variable rate application. Acres that have been precision sampled, have not had variable rate applications made due to the lack of commercial equipment.

Fewer acres were treated with a split application of nitrogen. Sixteen fields totaling 534 acres qualified. The total commercial nitrogen not applied was 23,995 pounds saving producers over \$11,500 in nitrogen costs.

Cost share for cover crop plantings were tied to a late season nitrate stalk test. Over 850 acres were planted. Stalk tests were in the optimum or excess range.

Cost share payments were made to yield monitoring and variable rate planting. 244 acres of corn were planted at a variable rate. GPS Data was collected to calculate hay yields. Over 4,000 acres of corn and soybeans were harvested with yield monitors.

A cost share program to haul liquid manure away from the farmstead was developed. 3,467 miles have been driven moving 4 million gallons of liquid dairy off the farmstead. The program covers approximately 22% of the cost of hauling and spreading the manure.

Keywords: Enhanced Nutrient Management precision Adaptive Site Specific

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Poster #9

Boone and Raccoon River Watershed Cooperative Conservation Project

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Iowa Soybean Association's (ISA) 3-year Cooperative Conservation Project is designed to help local farmers optimize and document the results of voluntary conservation efforts using management tools that also improve profitability. The project is being implemented in five Boone and Raccoon River sub-watersheds using USDA-NRCS Conservation Innovation Grant (CIG) funding, leveraged with soybean checkoff and Agriculture's Clean Water Alliance (ACWA) funding.

This project is a pro-active effort to use the science, technology, and experience of local farmers, ISA, and collaborating public and private experts to advance local watershed health and demonstrate how effective a voluntary effort to address water quality with local stakeholders can be. ISA is providing technical assistance to organized watersheds in the development of functional watershed management plans in each of the sub-watersheds; and working with 15-25 producers in each watershed on the development of CEMSA (enhanced Resource Management) Plans. Individual producer plans are being linked to those at the watershed level to maximize conservation outcomes, achieve watershed goals, and strengthen farmer leadership in the watershed.

Results from watershed planning and resource assessment activities, water monitoring, nutrient management evaluation, and individual planning efforts are highlighted. Completed watershed management plans provided funding opportunities for plan implementation through various state and federal programs, including EPA section 319 and USDA-NRCS Mississippi River Basin Initiative (MRBI) grant programs. Outcomes from the integration of public and private partnerships leveraging technical and financial results; and the execution of these various grant programs will be discussed.

Keywords: Watershed planning, conservation innovation grant, resource management

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Poster #10

An Integrated Approach to Conservation and Integrated Pest Management in Oklahoma Cropping Systems.

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The overarching objectives of this project were to i.) deliver a comprehensive set of demonstration locations that will provide stakeholders with a visual reference of the beneficial aspects of crop rotation and no-till production systems, ii.) deliver opportunities for stakeholders to learn from one another through field day events and a statewide no-till conference, and iii.) provide demonstration and evaluation tools regarding Hessian Fly management through biological and chemical control mechanisms. To achieve our first objective, we established no-till demonstration plots at Goodwell, Altus, Lahoma, Union City, and Stillwater, OK during the 2008 - 2009 crop year. In order to demonstrate alternatives to continuous, monocrop wheat, each of these demonstration sites includes crop rotations that are appropriate to that region of the state. Thus far, our cover crop and crop rotation demonstration plots have been viewed by over 1,000 stakeholders and information on these plots has been distributed to an additional 1,125 farmers, crop advisors, and extension personnel. Project investigators have also monitored first and second generation Hessian fly abundance on susceptible, semi-resistant, and resistant wheat cultivars, and monitored the effectiveness of Gaucho XT wheat seed treatment for control of first generation Hessian fly. Thus far, resistant wheat cultivars appear to be an effective means of managing for Hessian fly in no-till systems, but the number of resistant cultivars available to producers remains limited.

Keywords: Crop rotation, cover crops, Hessian fly, wheat, no-till, grazing

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Poster #11

Rapid Assessment of Carbon Sequestration Potential in Cropland for the Oklahoma Carbon Program

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In 2008 the Oklahoma Carbon Program initiated a Pilot Project to assess the viability of a carbon offset market supplied by offsets generated on Oklahoma cropland. These offsets generally resulted from the conversion of cultivated cropland to no-till management or permanent grasslands. A general lack of data within the region to support the modeled estimates of sequestration required a rapid assessment of sequestration potential for Oklahoma Cropland. Therefore, soil samples were collected from no-till and adjacent cultivated cropland to a depth of 110 cm or bedrock. The average average sequestration rate calculated from this data thus far was found to be within the range of current estimates of 0.5 to 1.5 Mg CO₂ ha⁻¹. This data has been valuable in providing a level of validation for the current estimates used. However, the large level of variation in the data set requires continued sampling along with long-term monitoring to more accurately assess the sequestration potential of Oklahoma Cropland.

Keywords: Carbon Sequestration no-till

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Poster #12

Adapting to climate change through increased use in prescribed fire and community-based partnerships

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Our CIG project was designed to build capacity in the use of prescribed fire at regional and landscape scales. Specifically, to develop a partnership among state burning associations in Texas to increase the use of prescribed fire state-wide, and to provide critical support for associations to include timely information (i.e., latest science, policy), an improved communication framework, and support for training needs. Our program was developed to address three important barriers in the continued use of prescribed fire in the state: (1) development of state-wide organizational framework for prescribed fire associations, (2) improved education and communication among landowner associations, and (3) increased numbers of certified prescribed fire applicators. Our model was developed to increase prescribed fire use through a community-based partnership to include a Community of Practice (CoP), and increased use of web-based technology, particularly for education and training purposes. Promoting the use of prescribed burning can serve to maintain and improve grasslands in the Southwest and adapt to climate change in landscapes historically maintained by wildfires. We will provide detailed information on the (1) improved networking system developed for the burning associations (state-wide Prescribed Fire Alliance) and (2) improved communication and sharing of expertise through use of a Prescribed Fire Web Portal and Online Landowner Handbook, and (3) training support for state-certification required for practitioners through online web courses and field demonstrations.

Keywords: Climate Change Mitigation and Adaptation, Prescribed Fire

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Poster #13

Removing Soluble Phosphorus from Agricultural Drainage Waters using FGD Gypsum Filters

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Decades of applying chicken litter to meet nitrogen demand has led to accumulation of phosphorus (P) in soils of the Delmarva Peninsula. This legacy P that now approaches levels up to ten times the agronomic optimum is a major source of P entering drainage ditches that eventually empty into the Chesapeake Bay. A Flue Gas Desulfurization (FGD) gypsum ditch filter, constructed in April, 2007, precipitates soluble P as calcium phosphate. Although the filter removed 75% of soluble P from water that passed through the filter, large flow events exceeded the maximum filtration rate, and P-rich water bypassed the filter. Subsequent research on Coastal Plain soils of the Delmarva showed that lateral groundwater flow, during storm events when water tables are high, is the major pathway for soluble P delivery to ditches. In a phase two design, gypsum-filled trenches parallel to the drainage ditch were installed and monitored. Lateral flow was not obstructed by these "gypsum curtains," and soluble P was reduced by 50 to 95% as groundwater passed through the gypsum. Construction of a berm over the buried gypsum forces surface runoff to infiltrate and pass through the curtain, thereby treating 100% of the water entering the ditch. Surface application of gypsum to enhance infiltration and improve subsurface drainage is being investigated. Environmental concerns about slightly higher levels of mercury and arsenic in FGD gypsum than in naturally occurring mined gypsum have proved unfounded. Gypsum filters effectively remove soluble P and provide a beneficial use for an industrial byproduct.

Keywords: phosphorus, water quality, FGD gypsum, filtration, Chesapeake Bay

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Poster #14

Alternative Methods of Biofuel Production to Enhance Farm Profitability While Improving Wildlife and Soil and Water Conservation

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Concern over higher energy prices, air pollution, and global warming has fueled an explosion in the use and investment in alternative energy sources such as ethanol. To meet federal mandates, millions of acres of existing crop land will potentially be devoted to biofuel production. In addition, millions of acres that are currently in an existing stand of grass (i.e., enrolled in the Conservation Reserve Program) have the potential to be converted to crop land. Crops on many of these acres will be produced on marginal soils. Research continues to drive cellulosic biofuel production towards becoming economically feasible and a greater number of producers are considering the cultivation of switchgrass and certain non-native grasses for this purpose.

However, research indicates that monoculture stands of native and non-native grasses provide little or no benefit for wildlife. Native grasses are an important component for many species of wildlife that typically use these fields for the desirable structure and cover these grasses provide. The food value of seeds produced by native forbs and legumes are far superior to that of seeds produced by native perennial grasses. Mixed stands of grasses, forbs, and legumes provide for a wider assortment of food and cover needs for a variety of species. In addition, recent research from Minnesota has found that mixed stands of grasses and forbs produced greater biomass for use as biofuels than monocultures. A series of studies have been established at three locations in Missouri on a variety of soil types to provide agriculture producers interested in the economical production of biofuels with management alternatives that serve to enhance wildlife habitat and provide an alternative for livestock production. In addition, native legumes may provide sufficient nitrogen to the system to reduce or eliminate the need for commercial nitrogen fertilizer.