An Overview of NRCS Infrastructure Relevant to USDA Regional Climate Hubs

INTRODUCTION

The USDA Natural Resources Conservation Service (NRCS) is the principal federal agency that provides technical and financial conservation assistance on private lands. Much of this assistance has the potential to mitigate climate change (reduced greenhouse gas emissions or increased carbon sequestration) and build greater resiliency (adapt) to variability in climate and weather. The following is a brief description of NRCS activities related to climate change, and relevant roles that NRCS may play in the seven USDA Regional Climate Hubs.

NRCS FRAMEWORK TO SUPPORT CLIMATE CHANGE HUBS – STAFFING, APPROACH, PROGRAMS

CONSERVATION TECHNICAL ASSISTANCE

As the foundation of its work, NRCS delivers conservation technical assistance through its voluntary Conservation Technical Assistance Program (CTA). CTA is available to any group or individual interested in conserving natural resources and sustaining agricultural production. The CTA program functions through a national network of locally-based staff located in nearly every county. Although the CTA program does not include financial or cost-share assistance, clients may develop conservation plans, which may serve as a springboard for those interested in participating in USDA financial assistance programs. CTA planning can also serve as a door to financial assistance and easement conservation programs provided by other Federal, State, and local programs. CTA employs activities and tools described in this document to help clients identify threats to the sustainability of their operations and to develop responses to meet those challenges.

Field Implementation

NRCS field structure is well-positioned to support producers in making best use of the information and resources made available through the Regional USDA Climate Hubs. More than 11,000 field professionals in state and local offices provide an invaluable resource for Hub activities in their regions. Employees located in NRCS's nearly 3,000 field offices have direct contact with farmers and ranchers on a daily basis. These conservation professionals guide private landowners as they make decisions about how best to address existing resources concerns. In addition, NRCS works closely with local Soil and Water Conservation Districts and state agriculture agencies – the core of NRCS's conservation partnership and leaders in local agriculture communities – who are also able to assist producers in understanding and adapting to the effects of climate change. As part of this structure, the NRCS has a network of soil scientists and other technical specialists distributed by Major Land Resource Areas (MLRA) across the U.S. These individuals are positioned geographically to provide expert technical assistance in soil interpretations and ecological site descriptions. NRCS's field, state, and MLRA staff can help encourage adoption

of climate change mitigation and adaptation measures most appropriate and relevant to the local landscape and operations, including site-specific cropping systems, management practices, livestock systems, soils, climate, etc.

National Support for Field Implementation

In addition to this on-the-ground implementation capacity, NRCS has eighteen national teams, centers, and Headquarter divisions that contribute to acquisition and development of technology for increasing resilience to and reducing causes of climate change and related extreme events. The technologies developed and acquired by these teams and divisions are transferred to field staff through the regional National Technology Support Centers, the National Soil Survey Center, and the National Water Management Center. Web Soil Survey provides a means for spatial extrapolation of technologies to appropriate soils and landscapes and provides base soil data and information for model simulations. Soil analyses for carbon and other constituents are supported by the Kellogg Soil Survey Laboratory in Nebraska.

LANDSCAPE CONSERVATION INITIATIVES

NRCS has implemented a broad spectrum of initiatives since January of 2009. These initiatives enable NRCS to more effectively address priority natural resource concerns by delivering systems of practices to the most vulnerable lands within geographic focus areas. The targeted conservation approach that underlies Landscape Conservation Initiatives has been shown to maximize the benefits associated with conservation activities. The Landscape Conservation Initiative framework is uniquely suited to rapidly adjust the delivery of conservation as regional issues associated with climate change are identified. Generally, through these initiatives, NRCS seeks to accomplish:

1. Conservation beyond boundaries — Landscape-scale natural resource concerns, such as species conservation and water quality, that cannot be treated effectively based on geo-political boundaries. NRCS recognizes that natural resource concerns transcend farm, county, and state boundaries.
2. A science-based approach — Findings from the multi-agency Conservation Effects Assessment Project (CEAP) indicate the most effective way to increase protection of natural resources is to target conservation to the most vulnerable or valuable areas and to apply a systems rather than a practice-by-practice approach. Within individual initiatives, the best available university and government science resources are used to define initiative targeting approaches.
3. Enhancement of existing locally-led efforts and partnerships — NRCS seeks to maximize the success of initiatives by leveraging partner interest and resources through programmatic and other tools.
4. Regulatory certainty for agricultural producers — Where applicable, NRCS is working with regulators so agricultural producers can have certainty that the voluntary conservation systems they implement are consistent with current and potential regulation, as well as sustained agricultural production.

Through Landscape Conservation Initiatives, NRCS targets additional conservation activities to accelerate the delivery of the right practices in the right locations to maximize the conservation benefit. Landscape Conservation Initiatives have been developed to address resource concerns such as water quantity (Bay Delta Initiative, Gulf of Mexico Initiative, and Ogallala Aquifer Initiative), soil and water quality (Mississippi River Basin Healthy Watersheds Initiative, Chesapeake Bay Watershed Initiative) and loss of habitat including wetland and forest habitats (Everglades Initiative, Northern Plains Migratory Bird Habitat Initiative, New England/New York Forestry Initiative, Long Leaf Pine Initiative, North Central Wetlands Conservation Initiative, and Red River Initiative).

FINANCIAL ASSISTANCE PROGRAMS

Environmental Quality Incentives Program

Through the Environmental Quality Incentives Program, NRCS has dedicated funding over the last several years to Energy and Air Quality (including greenhouse gas emissions) resource concerns.

Conservation Innovation Grants

The NRCS Conservation Innovation Grants (CIG) program enables USDA to accelerate technology transfer and adoption of promising technologies and approaches to address some of the Nation's most pressing natural resource concerns. Many CIGs have direct relevance to climate change mitigation and adaptation via use of new technologies or information in transforming conservation on America's private lands. The CIG program has been active for 10 years and many of the projects either have been or are being integrated into the NRCS conservation delivery stream, and into agricultural and natural resource management. In 2011, NRCS awarded more than $7.4 million in nine special CIGs that were specifically targeted to demonstrate practices that would reduce GHG emissions and/or sequester carbon, and also quantify with certainty these changes and then translate these "carbon credits" into emerging carbon markets. All grant recipients were tasked with verifying and certifying the credits, and then completing a credit transaction in the voluntary or compliance marketplace. In addition, NRCS provided up to $10 million in EQIP funding distributed across 13 states to enable recipients of these CIGs to further engage producers.

Grant recipients included organizations such as Ducks Unlimited, Environmental Defense Fund, the Fertilizer Institute, and the Dairy Research Institute. Some of the innovative practices being tested that have greenhouse gas reducing benefits include:

- Nutrient management in the Corn Belt states and Chesapeake Bay region
- Avoided conversion of grassland and CRP to row crops in the Prairie Pothole Region of N. Dakota
- Advanced residue and water management on rice fields in California, Arkansas, and Mississippi
- Innovative dairy and livestock management practices in numerous states

The Ducks Unlimited CIG is a good example of how these CIGs are leveraging investment for GHG and climate benefit. This CIG is exploring how to preserve herbaceous cover on marginal (agriculturally) CRP lands in the Prairie Pothole Region of the Dakotas and thus maintain soil carbon, while simultaneously preserving nesting habitat and improving soil, water and air quality. In 2013 NRCS has provided additional EQIP funding to further enhance the impact and value of the CIG by recruiting producers and implementing conservation practices that will generate carbon credits by avoiding tillage of expired/expiring CRP lands. Chevrolet Motor Company has voluntarily agreed to purchase the carbon credits generated by this CIG. Proceeds from carbon credits will provide farmers and ranchers with an alternative revenue stream that avoids conversion to cropland.

Emerging environmental markets and valuation of ecosystem services may offer a unique opportunity for U.S. agriculture to harness a new revenue stream, and corporate leaders and shareholders are beginning to realize the multi-faceted benefits of conservation. These CIGs are providing pioneering experience in this realm.

As an example of how future CIGs will do even more to address climate change mitigation and adaptation, NRCS is just beginning multi-year support for a CIG that will support development of a model that accounts for the impacts of organic material chemical composition (e.g., crop residue and animal manure lignin, cellulose, carbon, nitrogen, etc.), organic material placement, temperature, water, soil particle size, and mineralogy on rates of soil carbon sequestration and its relationship with soil available water holding capacity. As some models already exist that account for some of these variables on crop residue decomposition and soil organic matter, the most pressing and remaining step is to quantify and model the relationships between soil organic matter content and available water holding capacity for a range of soils. This will allow prescribing particular crop rotations, cover crops, green manures, animal manures, and tillage practices for specific soils and regions in order to increase soil resiliency to both drought and heavy precipitation. The effort will be accompanied by support from the NRCS Kellogg Soil Survey Laboratory, NRCS modeling units, and the network of NRCS PMCs. It is expected that model development will occur in 2013-2014, model calibration and validation will be performed in 2014, and national release will occur in 2015.

SPECIAL PROJECTS AND ACTIVITIES ADDRESSING CLIMATE CHANGE

NATIONAL SOIL HEALTH EMPHASIS AND CAMPAIGN

In late 2012, NRCS launched an effort to increase the adoption of Soil Health Management Systems (SHMS) among America's farmers and ranchers. Improving soil health contributes to climate change mitigation by increasing soil carbon sequestration (i.e., increasing soil organic matter), and adaptation by increasing resilience to drought, heavy precipitation, and extreme temperatures. Additional benefits accrue from reducing the amount of tillage, resulting in fewer greenhouse gas emissions, and from using fewer petroleum-based products for fertilizer and pesticides.

Four key management principles are emphasized to improve soil health:

1. Minimize physical and chemical soil disturbance to allow the soil food web to rebuild;
2. Keep the soil covered as much as possible throughout the year through use of cover crops and/or minimizing residue removal to maximize carbon return to the soil;
3. Keep a living root growing as long as possible to feed the soil microbes and transfer more solar energy into the soil; and
4. Use crop diversity to add biological diversity in the soil.

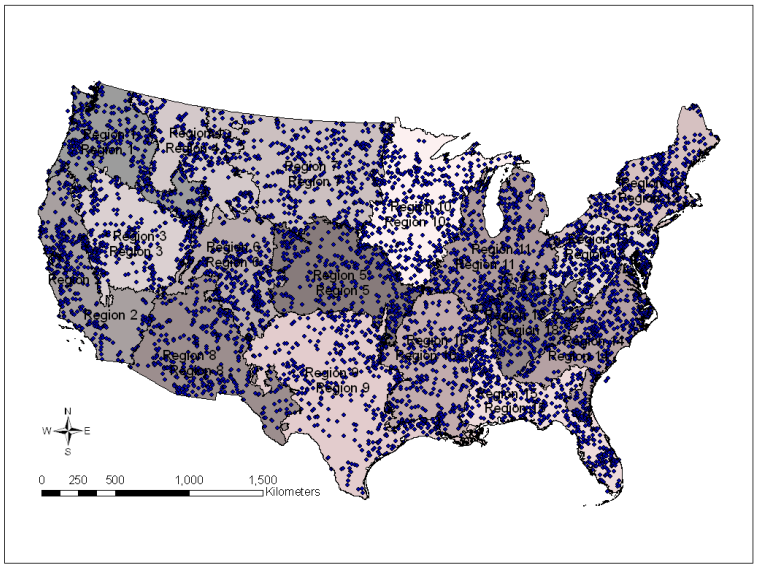
Application of these management principles in conservation planning will increase cropping system resilience to extreme climatic events. NRCS is developing specific SHMS conservation practice criteria; training and preparing the NRCS workforce; developing tools for assessment and interpretation of soil health status; integrating agency programs and planning to facilitate SHMS adoption; and developing and implementing a soil health awareness and education campaign.

There is also increasing interest in soil health from a wide range of stakeholder groups, organizations and businesses that recognize the potential benefits of SHMS relative to production improvements, sustainability, profitability and resource protection – all of which are advantageous to their constituents. Many of these organizations appear poised and eager to help spread the word about the basics and benefits of Soil Health Management Systems and to encourage their adoption. Consequently, NRCS will explore these partnerships to further advance the message and adoption of soil health.

RAPID CARBON ASSESSMENT

Understanding the dynamics of soil carbon is key to addressing excess carbon dioxide (CO_2) in the atmosphere. Soils act as either a sink or a source of atmospheric CO_2 depending on land use and management. Soil carbon content is affected by such soil properties as particle size, mineralogy, drainage class, and depth; along with other site-specific parameters such as microclimate, vegetation, topography, and management practices. The major outcome of this assessment will be the most comprehensive inventory of carbon concentration and stocks by soil group, region, and land use in the U.S.

NRCS has performed an assessment of the current carbon stocks in soils of the United States using statistically reliable methods in its Rapid Carbon Assessment (RaCA) project. The study takes into consideration ecosystem properties, soils that behave similarly for carbon retention, land cover and agricultural management. Approximately 32,500 soil profiles have been sampled at 6500 locations to develop the largest soil carbon dataset in the world, as depicted below.



Reports from the RaCA are currently available for total carbon stocks for cropland, Conservation Reserve Program (CRP), forest land, pasture, rangeland, and wetland. Data can be further refined (i.e. disaggregated) to be valuable for model calibration (such as for the COMET-Farm and APEX models—see below) and quantifying land management impacts on soil carbon for environmental markets.

CONSERVATION EFFECTS ASSESSMENT PROJECT (CEAP)

CEAP is a multi-agency effort to quantify the environmental effects of conservation practices and programs and to develop the science base for managing the agricultural landscape for environmental quality. Project findings are used to guide USDA conservation policy and program development and help conservationists, farmers and ranchers make more informed conservation decisions. Through CEAP, NRCS has determined the following:

1. Conservation practices reduced soil carbon loss by approximately 6.8 million tons annually on 304 million cropland acres from 2003-2006 over what would have been the case in a no-practice scenario, as reflected in the nationwide survey of farming and conservation practices for that period.
2. NRCS conservation practices reduced soil carbon loss by 684,000 tons annually on another 40 million acres of cropland from 2006-2011.
3. Adoption of conservation tillage systems during the 2003 to 2006 survey period reduced fuel use on cropland by 770 million gallons annually (diesel equivalents).

Future CEAP related monitoring and modeling activities will enhance the development of cost and benefit analyses of conservation practices as they relate to climate change metrics. These include measurement and prediction of potential carbon sequestration/loss and net GHG emission changes under current conditions as compared to simulated conditions predicted by climate change projection models. The current CEAP national cropland survey will be used to estimate changing conservation treatment needs, assess production goals and sustainability, and predict efficiencies of conservation practices or suites of practices given a variety of future climate scenarios, including elevated carbon dioxide levels, changing weather patterns, and increasing extreme weather events. The grazingland, wetland, and wildlife components of CEAP have successfully invested with key research universities and other federal partners in the development of modeling technologies for assessing interaction between predicted climate change and conservation practices on these land uses. CEAP surveys will serve as an important baseline as the CEAP team and its partners begin to develop assessment procedures for the effects of climate change and subsequently provide similar estimates of impacts, practice benefits and treatment needs for these lands.

CONSERVATION PRACTICES EVALUATED FOR REDUCING GREENHOUSE GAS EMISSIONS

NRCS maintains hundreds of conservation practice documents that include practice standards, handbooks, job sheets, and many others. Every year, approximately one-fifth of these documents and associated background materials are reviewed and updated to ensure that they reflect the latest scientific knowledge and technology. In 2011, all (>160) NRCS Conservation Practice Standards were evaluated and ranked for their potential to reduce greenhouse gas emissions and increase carbon sequestration. Thirty-five of these Conservation Practice Standards were identified as having particularly positive benefits, as provided at the following link: http://www.airquality.nrcs.usda.gov/. This allows conservation planners to readily choose practices to reduce greenhouse gas emissions and/or increase carbon sequestration. All support documents will be reviewed from 2013 through 2017 from the perspective of the potential impacts of climate change and variability on the integrity of the recommendations/guidelines provided. For example, relevant and scale-appropriate climate change predictions, as they become available, will be used to evaluate the adequacy of engineering design parameters (e.g., for animal manure storage lagoons) in light of any changes in extreme precipitation statistics.

Implementation of Nutrient Management Practice Standard (590) to Reduce Greenhouse Gas

The NRCS Nutrient Management Conservation Practice Standard (590) released in 2012 will be fully adopted by all states in 2013 and beyond. This standard will support adoption of conservation practices that improve nitrogen use efficiency (i.e., reduce emissions of nitrous oxide – a potent greenhouse gas) through use of controlled release fertilizers, nitrification and/or urease inhibitors, nutrient management technologies, and incorporation/injection of manures.

The standard also promotes the use of legumes and cover crops to provide nitrogen through biological fixation and nutrient cycling. In order to improve nutrient use efficiency producers are encouraged to use an "adaptive nutrient management" process to lay out on-farm test strips to evaluate yield response to various nutrient application rates. This allows producers to gain understanding and confidence to tailor nutrient rates to their individual fields.

Manure Management Practices

Manure management conservation practices potentially can have significant positive impacts on climate change. Through the proper use of anaerobic digestion, methane, which is lost through normal manure storage, is captured and converted to energy and carbon dioxide, with a net reduction in GHG emissions. Use of manures as fertilizer for crop production can help to reduce the need for commercial fertilizers. Most of these inorganic fertilizers require significant energy inputs to produce and transport the products. With more efficient use of animal manures there can be a net reduction in the amount of fossil fuels consumed. Through feed management high quality feed such as that associated with grain diets or high quality forage decreases the amount of methane produced in the rumen which can result in a net reduction of greenhouse gas emissions.

SNOW SURVEY AND WATER SUPPLY FORECASTING PROGRAM

The NRCS Snow Survey and Water Supply Forecasting Program (SS/WSF) in the Western U.S. provides important historical, current and projected information on western snowpack, precipitation, stream flow and water supply. As part of this effort NRCS maintains the SNOw TELemetry (SNOTEL) network of 860 stations located in 13 States, including Alaska, and transmits snowpack and climate data hourly. The data collected at many of these sites includes snow depth, snow water equivalent, temperature, precipitation, relative humidity, solar radiation, wind speed and direction, and barometric pressure. In addition, many of the SNOTEL sites measure soil moisture and soil temperature at various depths. This is a critical source of high-elevation climate data for the mountainous West, and is used extensively in climate change studies. In addition to the automated SNOTEL sites there are nearly 1,000 manual snow courses providing snowpack and snow water equivalent data on a monthly basis during the winter and spring throughout the West, and many have extremely long and valuable historical records. Many climate groups, such as NIDIS (National Integrated Drought Information System), identify the NRCS Snow Survey as a major source of climate data for the U.S. These data are a cornerstone for climate studies in the West, and will be a particularly valuable contribution to the Pacific Northwest, Southwest, Northern Plains and Southern Plains Climate Hubs.

SCAN SYSTEM

Soils can store large quantities of water and also greatly impact whether snowmelt and rainfall either infiltrate the subsurface or become runoff. Soil moisture and soil temperature relate closely to carbon storage, plant health, evapotranspiration and drought determination. NRCS operates the Soil Climate Analysis Network (SCAN) in 40 States and U.S. Territories. SCAN consists of 193 stations similar to SNOTEL that collect climate parameters, along with soil moisture and soil temperature at various depths below the surface. These data are valuable input for making management decisions (e.g. planting, irrigation, fertilization, harvest dates), drought assessment, soil climate and trends assessment, and flood forecasting. These networks will make significant contributions to monitoring and predicting changes in climate.

PLANT MATERIALS CENTERS

The NRCS network of geographically distributed Plant Materials Centers (PMCs) is positioned to contribute regionally adapted plants that increase carbon sequestration, increase nitrogen fixation, enhance soil health, reduce runoff, increase soil water holding capacity, increase bioenergy production, provide wildlife habitat (including pollinators), enhance drought tolerance, reduce soil-borne diseases, and provide numerous other contributions to regional climate change hubs.

A network of PMCs with support from the National Soil Health and Sustainability Team, ARS and the National Soil Survey Center are conducting a coordinated evaluation of cover crop species mixes and seeding rates across climates, soils, and cropping systems to identify optimal combinations of cover crop mixes and management practices to increase soil carbon sequestration and drought resilience through enhanced soil health. These field evaluations will serve as training sites for training NRCS field staff and transferring technology to farmers and ranchers to increase adoption of these conservation practices for reducing greenhouse gas emissions and increasing carbon sequestration. The evaluations will continue for 3 years (2012-2015); however, it is NRCS' goal to make these field projects an invaluable resource for training and technology transfer.

The PMCs can compile information and screen existing conservation plants for tolerances to projected climate changes (e.g., lower rainfall, higher temperatures, etc.). Plants may be screened to identify attributes for tolerance to factors such as precipitation, cold/heat tolerance, regrowth, disease/insects, ultraviolet radiation and other environmental changes that may result from climate change. This compilation of information and assessment of plant characteristics may be used to improve plant recommendations for greater environmental adaptability and update species recommendations for NRCS practices.

PMCs are working to develop eradication and restoration technology for areas occupied by invasive plant species such as salt cedar and cheatgrass. Climate change may result in the expansion of invasive species. PMCs can determine appropriate restoration/revegetation seeding mixes for revegetation efforts after invasives are eradicated and for reducing the spread of invasive species. In addition, new questions may arise for which the network of Plant Materials Centers are uniquely positioned to address.

NATIONAL RESOURCES INVENTORY

The NRCS National Resources Inventory provides nationally consistent information on natural resource status, condition, and trends on the nations land cover and use over the 28 year period from 1982 to 2010 including information on cropland, pastureland, forest, rangeland, developed land, water, and wetlands. The data spans the entire United States, except that there is limited data on Alaska (only 2007), at present. Estimates are readily accessible upon request. In addition, on-site survey data is available for rangeland collected every year from 2003 to 2011 that includes detailed information on plant species, soil conditions, and rangeland health. On-site survey data will also be available for pastureland, as a national survey started in 2013, also collecting detailed information on plant species, soil conditions, and pastureland health. The pastureland data will be available by mid-2015.

NUTRIENT TRACKING TOOL

NRCS has worked with USDA Agriculture Research Service (ARS), Colorado State University (CSU), and other partners to develop the Nutrient Tracking Tool (NTT). The tool estimates nitrogen, phosphorus, and sediment loss from fields managed under a variety of cropping patterns and management practices through its user-friendly linkage to the Agricultural Policy/Environmental eXtender (APEX) model. APEX is for use in whole farm/small

watershed management. The model evaluates land management strategies considering sustainability, erosion, economics, water supply and quality, soil quality, plant competition, weather and pests. It can be used to evaluate the effects of global climate/CO2 changes. NTT provides farmers, government officials, and others with a fast and efficient method for estimating water quality, water quantity, and farm production impacts associated with conservation practices, such as reducing nitrous oxide (a greenhouse gas) emissions through practices that improve nitrogen use efficiency. NTT can also be used for identifying nitrogen and phosphorus credits for water quality trading.

COMET-FARM

NRCS has partnered with Colorado State University to develop the on-line CarbOn Management Evaluation Tool (COMET-Farm: http://www.comet-farm.com) to help farmers and ranchers understand and assess impacts of changes in land management and farm and ranch operations on carbon and greenhouse gases (GHGs). Building on the previous version of the model primarily for soil carbon estimates only (COMET-VR 2.0), COMET-Farm provides a whole-farm and ranch accounting and reporting system for carbon and GHGs. Landowners and operators, and conservation planners can quickly determine carbon flux and GHG emission changes (including soil nitrous oxide and livestock methane emissions), and evaluate alternative management scenarios for reducing GHG emissions and/or increasing carbon sequestration. COMET-Farm can be used for evaluating a variety of management options on different aspects of farms and ranches, including fertilization and fuel use, feed management, manure management, tillage, crop rotation types, and many others.

NRCS CLIMATE CHANGE TRAINING MATERIALS

The NRCS develops and/or delivers a tremendous amount of climate-related conservation training to its staff as well as for the public. An entire system of climate change, air quality and energy training was developed by the NRCS and is now available to anyone online. Courses include Air Quality, Climate Change and Energy, Greenhouse Gases and Carbon Sequestration, Introduction to Environmental Credit Trading, and Why Do We Care About Climate Change. Introduction to Climate Change Adaptation and Introduction to Carbon Credit Trading are two additional courses in development. Public websites where these courses can be accessed are: http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/climatechange/resources/?cid=stelprdb1048146 and http://www.extension.org/pages/26362/nrcs-online-air-quality-energy-and-climate-change-courses.

Since 2006 the NRCS Science and Technology National Centers and Teams have sponsored or presented webinars to train employees, partners and the public, and provide information needed to more effectively use conservation practices on the land. Science and Technology webinars focus on soil health, cropping systems, resource assessment, fish and wildlife, nutrient management, social sciences, and many other resource and land use topics, including climate change. The webinars are presented by USDA, university, or other topic experts. Live event and webinar replays are made available at the Science and Technology Training Library (http://conservationwebinars.net). The training library provides a calendar of upcoming events, access to more than 125 conservation webinar replays, participation tracking, estimates of Green Savings, professional CEUs, and attendance certificates. Outreach for Science and Technology webinars is extensive, and there are no fees or advance registration requirements to participate. Live events routinely attract 300 logins or an estimated 450 participants. The USDA NRCS East National Technology Support Center has built an announcement list of webinar participants and voluntary subscribers that exceeds 5,800 email addresses. This list is approximately 67% USDA staff and 33% partner and public. In addition, there are more than 8,000 email subscribers to the

ConservationWebinars.net system. ConservationWebinars.net is made available in partnership with Southern Regional Extension Forestry, which represents 13 university extension programs, as well as USDA and USFS.

ECOLOGICAL SITE DESCRIPTIONS

Two relatively new initiatives from the NRCS Soil Survey are dynamic soil properties (DSP) and Ecological Site Description (ESD) databases. DSPs are those properties that change at the human time scale as a result of management or other disturbance, and ESDs are delineations of landscapes based on soil, vegetation and response to disturbance. Both DSPs and ESDs consider climate as a major factor and have relevance to the analysis of the impacts of climate change and the identification of opportunities for mitigation and adaptation at an individual field, farm, watershed or landscape scale. DSPs and ESDs can be used to classify existing land management systems and to predict the response to climate change, including how changes in climate will interact with management. Any land inventory, analysis, and resulting management decisions require the knowledge of these individual sites and their interrelationships to one another on the landscape. DSP and ESD databases are also invaluable sources of information for modeling efforts to predict the impacts of climate change, where mitigation opportunities are most effective and how management changes can improve the ability to adapt.

NRCS COVER CROP ACTION PLAN TO ADDRESS CLIMATE CHANGE

NRCS is in the process of developing a Cover Crop Action Plan to enhance the use of cover crops by farming enterprises. Key components of the plan will include an outreach/education strategy to communicate the benefits cover crops provide to improve soil health, mitigate impacts of climate change and reduce production costs. It will also provide technical and financial assistance to encourage innovative management practices for seeding and terminating cover crops, intercropping, and using cover crops for grazing and biofuel.

DROUGHT RESILIENCY

NRCS is focusing a Drought Initiative on areas that have suffered prolonged drought over the last five years. For Fiscal Year 2013, NRCS has made available over $16 million in EQIP funding to farmers and ranchers for conservation practices that address water conservation and improve drought-impacted wildlife habitat. The initial focus is to provide drought relief by implementing conservation practices that utilize residual nutrients, reduce soil erosion, and improve or maintain water quantity and quality. Examples of these practices include cover crops, nutrient management, and prescribed grazing. Additional emphasis will be placed on providing financial and technical assistance to landowners for conservation practices that support irrigation and animal watering infrastructure (e.g., wells, pipelines, and watering facilities), and improve water use efficiency. NRCS also now has specific CIGs addressing drought. Focus areas include projects that demonstrate and quantify innovative cropping or grazing systems that use water conserving crops, provide innovative cultural practices that increase drought tolerance, demonstrate innovative approaches to increase water use efficiency; that increase drought resilience through improved soil health, increased infiltration, and increased soil available water holding capacity; , and that demonstrate nutrient management practices to protect water quality following an extended drought. These CIG projects will continue through 2016. The results from each project will be evaluated for potential to increase resilience to drought, and will be used to develop innovative conservation practices and to educate field staff for extending this knowledge to landowners.

FLOOD DAMAGES AVERTED BY NRCS PROGRAMS

In 2011, Hurricane Irene caused damages in 15 states with up to a 500-year storm event experienced in some locations. Immediately thereafter, Tropical Storm Lee caused damages in 25 states with up to a 1,000-year storm event reported in some locations. Analysis of individual watersheds in which NRCS had sponsored floodwater retarding structures, drainage improvement channels, and other land treatments showed that these projects averted approximately $40 million in damages from Hurricane Irene and $35-40 million in damages from Tropical Storm Lee.

INTERAGENCY REVIEW OF PROPOSED ENVIRONMENTAL REGULATIONS

USDA is tasked with providing input regarding the potential impacts of proposed environmental regulations on agricultural and natural resource interests. NRCS has taken a leadership role for the Department in the Interagency Review process for regulations related to air quality and greenhouse gases. As an example, NRCS is assisting the Department in providing input to the EPA deliberation on how to treat biogenic emissions of carbon dioxide in the greenhouse gas permitting process for energy derived from biomass. Carbon in biomass was sequestered from carbon dioxide in the atmosphere, and there are questions as to if and/or how this sequestration should be factored into the calculation of total carbon dioxide flux arising from the combustion of biomass.