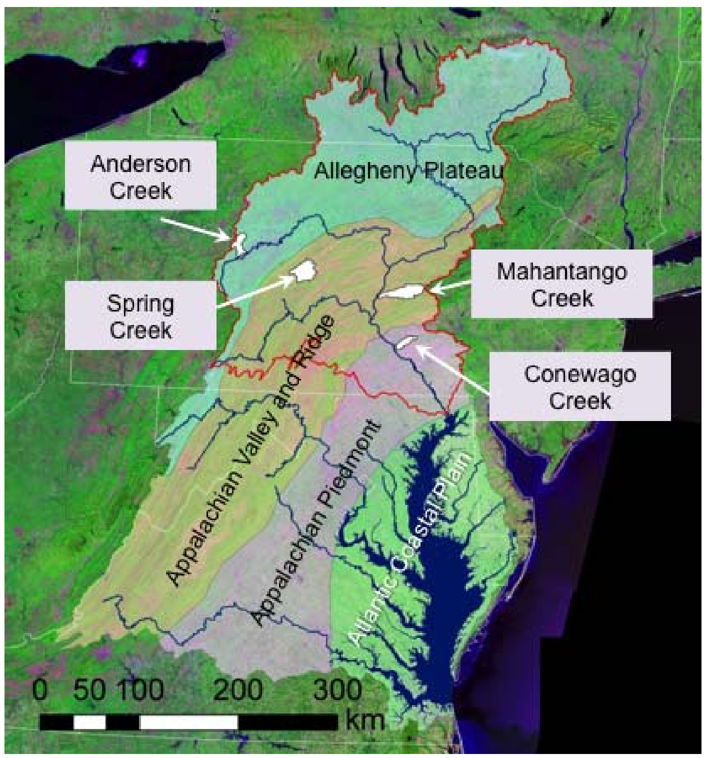
APPLICATION TO THE USDA-ARS

LONG TERM AGRO-ECOSYSTEM RESEARCH (LTAR) NETWORK

FOR THE

PASTURE SYSTEMS AND WATERSHED MANAGEMENT RESEARCH UNIT'S

UPPER CHESAPEAKE BAY / SUSQUEHANNA RIVER COMPONENT



PASTURE SYSTEMS AND WATERSHED MANAGEMENT RESEARCH UNIT
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NOVEMBER 15, 2011

Introduction

We propose to establish an Upper Chesapeake Bay/ Susquehanna River component of the nascent Long Term Agro-ecosystem Research (LTAR) network, with leadership of that component by USDA-ARS Pasture Systems and Watershed Management Research Unit (PSWMRU). To fully represent the Upper Chesapeake Bay/ Susquehanna River region, four watershed locations are identified where intensive research would be focused in each of the major physiographic provinces contained within the region. Due to varied physiographic and biotic zones within the region, multiple watershed sites are required to represent the diversity of agricultural conditions. The PSWMRU has a long history of high-impact research on watershed and grazing land management, and has an established nexus of regional and national collaborative networks that would rapidly expand the linkages desired under LTAR (GRACEnet, the Conservation Effects Assessment Project, the Northeast Pasture Consortium and SERA-17). Research from the PSWMRU underpins state and national agricultural management guidelines (Phosphorus Index, Pasture Conditioning Score Sheet, NRCS practice standards). However, it is the leadership of the PSWMRU in Chesapeake Bay mitigation activities, reflected in the geographic organization of the proposed network by Bay watershed's physiographic provinces that makes the proposed Upper Chesapeake Bay/ Susquehanna River component an appropriate starting point for the LTAR network.

Located on the Pennsylvania State University campus, the PSWMRU was established in 1992 by merging the Northeast Watershed Research Center with the U.S. Regional Pasture Research Laboratory. The Pasture Research Laboratory was the second of nine regional laboratories established under the Bankhead-Jones Act of 1935, with a mission to serve as a focal point for research in pasture improvement and to encourage cooperative research in solving pasture problems in the region. The Watershed Research Center was authorized by Congress in 1965 to provide scientific guidance on "programs for the control and use of water and stream channel systems in areas where agricultural, urban, and municipal use of soil and water must be given consideration on an integrated basis." Today's PSWMRU mission, "to support environmentally and economically sustainable farming in the northeastern US by improving agroecosystem management," is closely aligned with the unique problems facing agriculture in the Mid-Atlantic and Northeast regions of the US.

Overarching vision for LTAR in the Upper Chesapeake region

The LTAR network is being developed to underscore USDA's goal that the Nation's agriculture satisfy human needs for food, fiber and fuel, while enhancing the quality of the environment, maintaining economic viability, and improving the quality of life for society as a whole (Walbridge and Schafer, 2011). These ambitions need to be achieved in the face of evolving consumer demands and uncertainty over future climate, resource and environmental conditions. The Upper Chesapeake Bay/ Susquehanna River component of LTAR will support the program's efforts in a region that is characterized by a diversity of physiographic conditions, high human population and livestock density, diversified agricultural production systems and a predominance of small, family farms. These regional characteristics, combined with precedent-setting programs and activities to improve the health of the Chesapeake Bay, will place the following cross-cutting research themes at the fore of LTAR efforts in this region.

- *Coupling food and water security*.
  Coordinated research across the LTAR network is needed to better address the Nation's food and water security needs. Uncoupled strategies promoting food and water security create conflict between production of an inexpensive, safe food supply and maintenance of abundant, high quality water resources. Nowhere is this conflict more apparent than in agriculture's contribution to Chesapeake Bay eutrophication (i.e., the ecological aging of the Bay by nutrients). Once a net exporter of nutrients, the US now imports more than 50% of the nitrogen (N) used in agricultural production, and will become a net importer of phosphorus (P) within the next few decades. These nutrients no longer cycle within local farming systems but flow from areas of intensive row crop production to areas of intensive livestock production. Their long-term accumulation in regions such as the Chesapeake Bay watershed drives nutrient losses from livestock operations and is unaddressed by conventional conservation and nutrient management practices. Research within the LTAR network should help to tie our understanding of long-term forces driving nutrient pollution to strategies aimed at tightening, even closing local, regional and national nutrient cycles.

- *Maintaining viable small farms*.
  Coordinated research across the LTAR network is needed to promote the commercial viability of small farms. Long-term trends in US agriculture have resulted in the consolidation of farms, largely as a result of improved economic efficiencies with larger size. These trends have been constrained, in part, in the Chesapeake Bay region by historical factors and physiographic conditions. The persistence of small farms and their future viability increasingly depends upon their ability to meet local food, energy and ecosystem service demands while occupying niches unsuited to large-scale producers. There is a great need for new strategies, as seen with the testing and adoption of New Zealand style grazing by some dairy and beef farmers, that better integrate crop and livestock production systems on small farms with local markets where premium prices can often be obtained. New strategies range from exploring low-input production systems that maximize profit margins by minimizing input costs to increasing income from non-traditional farm products, including the emerging ecosystem credit trading markets found in the Chesapeake Bay region and elsewhere. The LTAR network offers an opportunity for systematic, comprehensive analysis of factors affecting the commercial viability of small farms, ranging from better crediting of their potential stewardship of natural resources, to focused guidance on optimizing the placement and management of crop, pasture and bioenergy systems.

- *Improving the use and function of marginal lands*.
  Coordinated research within the LTAR network is expected to advance alternative uses of marginal lands to balance their economic and ecosystem values. The Chesapeake Bay region includes significant areas of farmland that are restricted in their management and production potential due to erosion susceptibility, drainage limitations or historical mismanagement. Even so, these marginal lands provide important value to producers, representing a significant fraction of the land area of small farms, and often provide critical ecosystem services that are jeopardized by conventional management. Indeed,

critical sources and flow pathways of agricultural pollution are often found on marginal lands, making them priority targets for watershed remediation. Furthermore, some marginal lands (e.g., urban brownfields) hold great potential for specialized production given their geographic locations and undervalued status. Significant opportunities exist to improve the management and function of marginal lands, but the benefits of improvements are generally poorly revealed over the short-term, often inadequately represented with existing fate-and-transport models, and require empirical observations over the long-term.

- *Ensuring that agriculture is resilient to a changing climate*.
  Coordinated, long-term research is critical to ensuring that agriculture can adapt to climate change while contributing to the mitigation of climate change and its associated impacts. Changes in climate develop slowly, at time-scales of decades, with effects that can persist for centuries. Climate models predict greater seasonal and annual variability in temperature and precipitation, increasing incidences of storm events and droughts, and higher temperatures. In the Chesapeake Bay region, understanding the implications of climate change on water availability and water quality is critical to sustaining agricultural production and protecting vital resources. We anticipate that the LTAR network should be able to help landowners develop resilient agricultural systems that allow producers to avoid and even benefit from various elements of climate change.

- *Improving decision making across spatial and temporal scales*.
  Uncertainties in the interaction of management and biogeochemical processes across spatial and temporal scales persistently interfere with efforts to balance agricultural production and environmental priorities. All tools used to support strategic decision making are restricted in the scales that they represent. In the Chesapeake Bay region, these uncertainties have produced discordant findings in management assessments and recommendations delivered by USDA (CEAP) and USEPA (Bay Program) watershed models. Coordinated research across the LTAR should help to address such inconsistencies.

1. Productivity

The Pasture Systems and Watershed Management Research Unit is internationally recognized for its research in grassland biodiversity and ecology, watershed science and water quality, nutrient management and whole farm modeling. Over the past ten years, thirteen PSWMRU scientists have published over 371 peer reviewed publications. Scientists have a strong track record for obtaining competitive funds, with over $9.5 million in grants obtained in the last five years alone with their partners. Key examples of the PSWMRU impact include leadership in developing the Phosphorus Index, now adopted by 47 US states, leadership of grazinglands CEAP, international recognition for pasture ecology and grazing behavior management research, production of models that are applied worldwide (Integrated Farm System Model and whole farm carbon footprint modeling), and certification of three new technologies as “next generation” nutrient management practices by the U.S. Environmental Protection Agency.

2. Infrastructure capacity

Overall, excellent physical and human resources are available at University Park, PA to support activities associated with the LTAR network. The three CRIS projects at University Park include 12 PhD scientists and 20 technicians and support scientists (BS and MS trained). The University Park facility includes offices, laboratory and greenhouse infrastructure with all communication and data management equipment required of a modern research program. Analytical equipment include 2 flow injection analyzers for colorimetry/ion chromatography, 1 inductively coupled plasma optical emission spectrometer (with hydride generator), 1 tandem mass spec with gas chromatography and high performance liquid chromatography capability, 1 dedicated gas chromatograph, spectrophotometers, and ion-specific electrodes. The location has four state-of-the-art growth chambers with sub-zero temperature capability. A sample of the physiological and ecological data acquisition devices include, four eddy covariance systems for monitoring ecosystem carbon and water vapor flux, an INNOVA photoacoustic gas measurement system capable of monitoring ammonia emissions, and all agriculturally important greenhouse gases including carbon dioxide, nitrous oxide, and methane, a LI6400 photosynthesis measurement system, a minirhizotron camera system for monitoring root growth, and numerous weather stations with components for measuring rainfall, wind velocity, radiation, soil and air temperature, photosynthetically active radiation, and soil moisture.

The field station at Klingerstown, PA (Mahantango Creek watershed) is equipped with office space for five technicians, as well as a woodworking and metal workshop. We maintain, modify or build heavy equipment components (fertilizer/manure applicators, manure injection equipment, tractors). We fabricate most of the specialty equipment needed for our research: channel flumes and weirs; lysimeters; runoff splitters; tipping buckets; soil boxes for indoor simulations; rainfall simulators; gas chambers; laboratory shakers. Also available are global positioning units, hydraulic well packers, weather stations, flow gauging flumes, automatic water samplers, and all-terrain soil-core and lysimeter sampling equipment. We have land lease agreements that enable long-term continuity in our Mahantango Creek watershed research, and an infrastructure of automatic sampling equipment at all experimental sites. Water flow and water quality research in the Mahantango Creek watershed are organized in a nested fashion, from the 420-km^2 Mahantango Creek watershed to the 7.3-km^2 WE-38 sub-watershed, to the FD-36 and Mattern sub-watersheds of WE-38 and their numerous in-channel, hillslope, field and groundwater monitoring networks.

Two of the micrometeorological systems (eddy covariance) have been continuously monitoring water vapor, carbon dioxide and energy flux from two grazed pastures in the Spring Creek watershed since May 2002. Data from the systems have been used to document the inability of lands that have had permanent perennial vegetation cover for several decades to sequester additional carbon. Data have also been used to parameterize and evaluate photosynthetic and respiratory components of the Integrated Farm System Model, and to explore the potential for using satellite-based NDVI data to estimate pasture-scale photosynthetic inputs when the management unit of interest is smaller than the satellite image pixel size. The systems are currently being used to evaluate the effect of N fertilization on C sequestration. Carbon and water vapor flux has also been monitored from a switchgrass bioenergy crop.

3. Data richness

As a foundation, data from the PSWMRU offer a rare, comprehensive view of watershed and grazing lands science spanning more than half a century of research. The Mahantango Creek experimental watershed represents the PSWMRU's longest running commitment to long-term agroecosystem monitoring. At WE-38, a 7.3-km^2 subwatershed of Mahantango Creek, long-term daily stream flow discharge data have been collected at the outlet continuously since 1968. Long-term daily precipitation data are available from three sites within the watershed, two of which were initiated in 1968, and the third in 1979. From 1983 onward, stream chemistry, including major cations, anions, and nutrients, has been measured three days per week in WE-38 outflow. In addition, high-resolution (0.5 m) LiDAR data were collected across the entire WE-38 watershed in the spring of 2007 and again in 2011. A number of different types of hydrologic and water quality research studies have been conducted in the WE-38 watershed since its inception as an outdoor laboratory for agroecosystem science. These studies have largely focused on improving our understanding of nutrient transport to better guide nutrient management planning in the Chesapeake Bay and throughout the United States. They provide insight into physical characteristics and landscape processes that control hydrology, streamflow, and nutrient export from the watershed. Major modeling efforts describe surface and ground water flow pathways, the consequences of alternative management strategies at watershed, landscape and whole farm scales.

The PSWMRU conducts research across an array of spatial scales, from point (pedon), to field to landscape to watershed to region. Representation of processes across scales is critical to extrapolating findings. Rainfall simulations at varying scales (2-10 m flow path lengths), monitoring of overland and subsurface flow by landscape unit, and unit source watersheds (0.1 ha) elucidate the role of individual pathways of nutrient loss and transformation and offer insight into water and nutrient balances at multiple scales. Findings from multiple scales have been used to improve understanding of the processes represented by different inference methods (e.g., small plot rainfall simulations vs. field monitoring), and have been used to significantly improve routines within major fate-and-transport models (e.g., IFSM's and SWAT's phosphorus cycling routines).

The PSWMRU has an on-going GRACEnet site, where greenhouse gas emissions and C sequestration have been monitored for four production systems; a business-as-usual, corn-soybean-alfalfa rotation typical of northeastern US crop management practices, and switchgrass, reed canarygrass, and pasture systems designed to maximize C sequestration and minimize total greenhouse gas emissions. Data have been collected at the site since 2004.

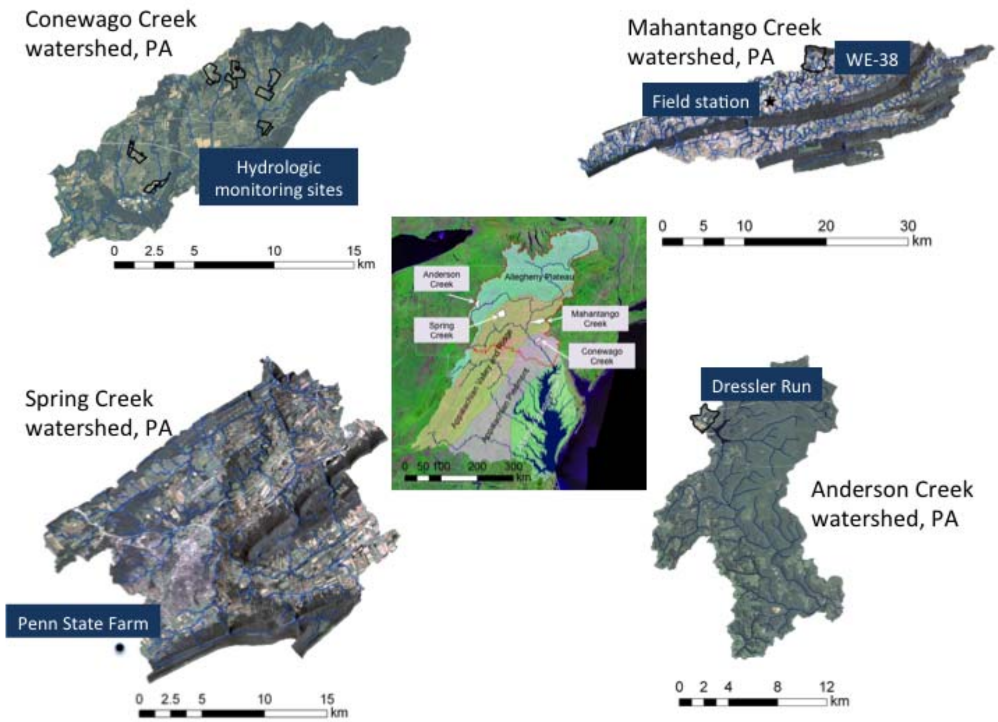
Standardized monitoring of grazing farms throughout the northeastern United States has been conducted since 1998. Vegetation, soils, and management information were collected, and the Pasture Condition Score monitoring protocol was added in 2001. These farms were grazing primarily dairy or beef, but sheep and goat operations were also included. Some farms were visited once, while others were sampled annually for up to eight years. Five of these farms were selected for more intensive sampling, and were visited three times each growing season for three years to assess seasonal variability. These multiscale (quadrat: field: farm: landscape: region) data are being used to understand the role of pasture plant communities within the farming system, and to better quantify the landscape-scale effects of field-scale management decisions. Many of these farms are within the proposed Upper Chesapeake Bay/ Susquehanna River component of the LTAR network, including three of the five intensively-sampled sites, offering a unique regional dataset on pasture composition and management. These data have been stored in a relational database, and can be used in collaborative research following the establishment of formal agreements that address confidentiality concerns. The data cannot be made openly accessible to the public due to confidentiality issues with identifiable farm information.

4. Data accessibility

We envision that LTAR will offer a framework for systematic collection of data, addressing overarching research themes and providing a centralized database that can be used to query and test hypotheses under these research themes. The PSWMRU has been active in contributing to larger databases that will undoubtedly support the LTAR mission. Notably, the Mahantango Creek watershed monitoring data from WE-38 are available on the STEWARDS web accessed database, providing opportunities for scientists to contribute to the existing body of knowledge within the watershed and expand the utility of these data through comparative studies across multiple watersheds. Mahantango Creek watershed data reports are intended to facilitate use and interpretation of archived databases in STEWARDS by documenting methods and describing data characteristics. The four types of basic data that were collected within the WE-38 watershed are discussed in a series of data reports. An overview of the watershed physiography and history, as well as details on geospatial data availability can be found in Bryant et al. (2011). Collection details and a discussion of precipitation are provided by Buda et al. (2011b). Detailed descriptions of the outlet weir, instrumentation, chronology of measurement, discharge data, and examples of data use are described by Buda et al. (2011a). Methods for sample collection and water quality analysis, a discussion of concentrations and loads, and implications for management effects on nonpoint sources of contaminants are presented by Church et al. (2011). Data from the GRACEnet site are being incorporated into the national GRACEnet database that is currently under development.

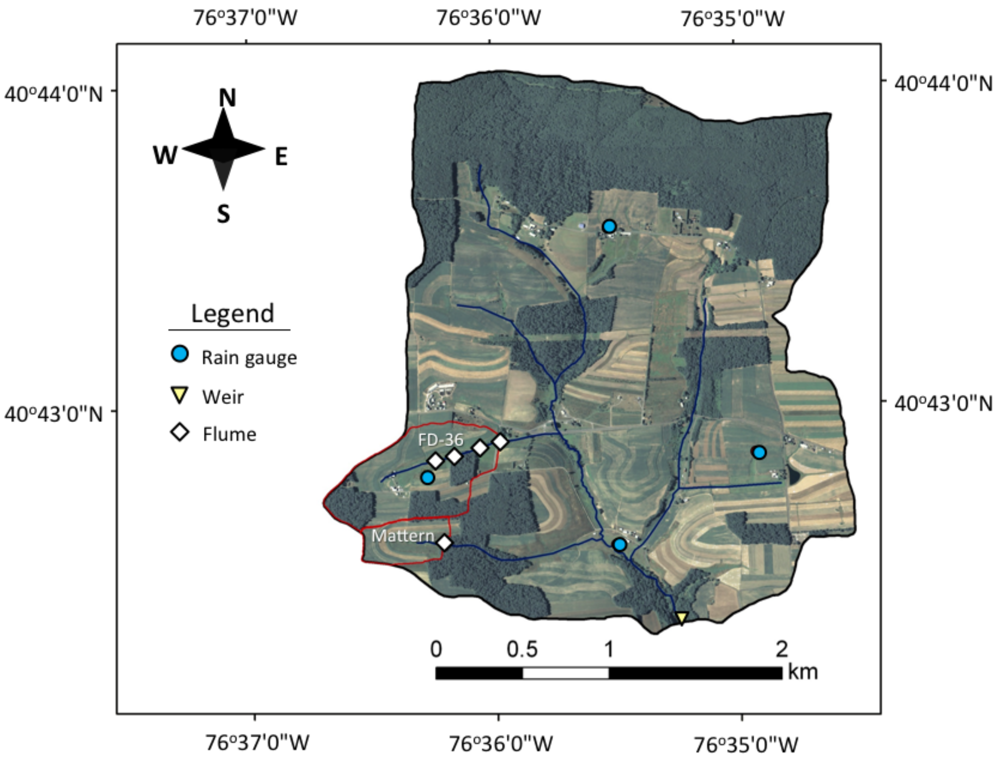
5. Geographic coverage of the Upper Chesapeake Bay/ Susquehanna River LTAR component

The Upper Chesapeake/ Susquehanna River component of the LTAR network would fall within USDA’s Northeast farm production region, the Mid-Atlantic HUC 2 region, and NEON’s Northeast and Mid-Atlantic domains. Because the Upper Chesapeake/ Susquehanna River region spans three of the four major physiographic regions of the Chesapeake Bay Watershed (Appalachian Piedmont, Appalachian Valley and Ridge, Allegheny Plateau), it offers comparable physiographic and management conditions to other zones of the Appalachian mountains and Allegheny Plateau, and includes species characteristic of biomes to the north and south of the region. Again, due to the varied physiographic and biotic zones of the region, multiple watershed locations of intensive research focus offer the best means of representing the diversity of agricultural conditions within the region. It is also important to note that ARS’s University Park location conducts research across all the major physiographic regions, including the Atlantic Coastal Plain, and ARS's Beltsville location also conducts research in the Atlantic Coastal Plain, so it is anticipated that these units would also contribute to a lower Chesapeake LTAR focused on the coastal plain, or that a single Chesapeake LTAR will ultimately be formed.



Primary research watersheds of LTAR's Upper Chesapeake Bay/ Susquehanna River component representing the major physiographic provinces of the upper Bay watershed.

Appalachian Piedmont (Conewago Creek watershed, PA). The 135-km^2 Conewago Creek watershed, a two-hour drive from University Park, PA, has been designated a USDA-NRCS "Chesapeake Showcase Watershed." Typical of conditions in the Lancaster region of PA, the watershed is dominated by small farms with a diverse mixture of crops and pasture. Diabase ridges extend into the valley floor, which is underlain by folded strata of sedimentary and metamorphic rocks. Water residence times are among the shortest in the entire Chesapeake Bay region, making this an excellent location to investigate surface runoff processes and related management impacts. To carry out research in this watershed, we are partnered with USDA-NRCS and Penn State University, with which we have several specific cooperative agreements. Through these collaborations and local conservation districts we are establishing hydrologic monitoring activities on six farms to refine our understanding of soil saturation patterns and surface runoff generation in this province.



The WE-38 sub-watershed of the Mahantango Creek watershed possesses the longest running data sets of the proposed Upper Chesapeake Bay/ Susquehanna River LTAR component. WE-38 illustrates the array of monitoring conducted by the PSWMRU at its various research locations.

Appalachian Valley and Ridge Province – acid shale and sandstone (Mahantango Creek watershed, PA). Located 100 km north of Harrisburg, PA, the Mahantango Creek watershed contains lesser livestock densities than does the Conewago watershed, making fertilizer management of greater priority. Facilities at the Mahantango Creek watershed include the WE-38 watershed (7.3 km^2) and a field station with office space for five technicians, fabrication shop, laboratories, and equipment. WE-38 has been the primary site for our watershed research since 1967 (Bryant et al., 2011) and we recently compiled and uploaded 40 years of monitoring data into ARS's STEWARDS database for web-based distribution. Our data collection network provides climate, ground water, stream flow and land use data for specific experiments.

Basic hydrology and water quality data are available from WE-38, as well as FD-36 and Mattern, two small subcatchments that have been the focus of research on runoff generation, nutrient fate and transport and plant species selection for riparian areas/marginal lands since the late 1990s. Supporting data have also been collected in WE-38, including land use, fertilizer, manure, and pesticide application; cropping patterns; and tillage. In addition, USDA NRCS has operated a Soil Climate Analysis Network (SCAN) site at the Klingerstown Field Station since 1999, providing long-term information on soil moisture and temperature, as well as climatic conditions. Altogether, the Mahantango Creek watershed site offers key insight into the interaction of management, hydrology and site conditions on water quality, and is our central location for investigating scale-related processes.

Appalachian Valley and Ridge Province - karst (Spring Creek watershed, PA). The Valley and Ridge Province can be divided into two distinct valley types, those that are underlain by shale and sandstone and those that are underlain by carbonate rocks. The 371-km^2, mixed land use, Spring Creek watershed is underlain by highly soluble limestone and dolomite bedrock, representing one of the most fertile geomorphic settings in PA, WV and VA. Our research unit is located within this watershed, on the campus of Penn State University. We possess numerous specific cooperative agreeements with Penn State, serve as graduate faculty, and have strong collaborative ties with a variety of departments. Much of the applied management research in the Valley and Ridge province will take place in the Spring Creek watershed, extending historical activities under the GRACEnet and CEAP grassland projects, as well as ongoing research at the Penn State Research Farm. The Spring Creek watershed features a number of long-term monitoring initiatives, including three USGS stream gages on the main-stem (record lengths spanning from 27 to 71 years) and nine dedicated monitoring stations that were initiated by the ClearWater Conservancy Water Resources Monitoring Project (WRMP) in 1997 to measure continuous stream discharge and water quality conditions on Spring Creek and its major tributaries. Intensive experimental and monitoring infrastructures also exist on the research farm, including those in operation by ARS, as well as atmospheric deposition and air quality monitoring sites operated by the National Atmospheric Deposition Program (NADP) and the US EPA Clean Air Status and Trends Network (CASTNET) and soil and climate monitoring by NRCS SCAN. These initiatives allow us to focus on management interactions with field, landscape (hillslope), and atmospheric processes. We also conduct research on commercial farms, taking advantage of our long-standing relationship with the local agricultural community.

Allegheny Plateau Province (Anderson Creek watershed, PA). Dominated by forests, the 201-km^2 Anderson Creek watershed is typical of the Plateau, with sparse, 100+-ha dairy farms representing the dominant form of agriculture. Today, the gas extraction from the Marcellus shale formation presents the primary economic and environmental concern within the Allegheny Plateau. The horizontally bedded shales and sandstones of the region underlie shallow, stony soils, many highly prone to surface runoff. For nearly one decade, we have worked in the 2.6-km^2 Dressler Run sub-watershed, one tributary to the drinking water reservoir for the city of Dubois, PA. Research in this watershed has addressed the selection of switchgrass cultivars for biofuel production on marginal soils and the testing of innovative best management practices for water quality protection. The watershed is 1.5 hours from University Park.

6. Partnerships

The PSWMRU collaborates with a broad network of partnerships, from individual farmers and landowners to action agencies to major governmental and research institutions that provide opportunity, resources and capacity for research that would take place under the LTAR network. As described above, we have strong ties to farmers and landowners in each of the sub-watersheds that are proposed as major nodes of the Upper Chesapeake Bay/ Susquehanna River LTAR component. In many cases, these are long-term ties, established through decades of research cooperation and with land rental agreements. We work closely with action agencies, including USDA-NRCS (national, state and local offices, and plant material centers), local conservation districts and Cooperative Extension, in a variety of capacities. These range from gaining access to farms, to actively conducting cooperative research to providing these agencies with information that can be used to support decisions related to their own programs. At a regional level, we have ties to U.S. Environmental Protection Agency's Region III, including the Chesapeake Bay Program, the Canaan Valley Institute, and the Susquehanna River Basin Commission, via research and monitoring activities. We also have worked with USDA-ARS in Beltsville as part of cooperative projects on the use of LiDAR remote sensing to identify landscape and stream bank erosion in upland watersheds, as well as to identify regions of saturation potentially associated with wetland soils on the Atlantic Coastal Plain.

We have close partnerships with the major land grant institutions in the Chesapeake Bay Region, including Cornell University, University of Delaware, University of Maryland Eastern Shore, University of Maryland, and Virginia Tech University. In addition, we work closely with other universities in the northeast region (University of Maine, University of New Hampshire, University of Massachusetts, University of Vermont), leveraging collaborative research in the broader region to applications in the Chesapeake Bay watershed. Because of our location on Penn State's campus in University Park, PA, we collaborate with faculty from a variety of university departments on a wide range of research topics throughout the Chesapeake Bay watershed. Examples of our collaborations include: grazing research to elucidate the effects of biodiversity and species selection on pasture productivity and resilience to changing environmental conditions (in cooperation with Department of Crop and Soil Science); understanding the link between urea fate and transport in the Manokin River system and harmful algal blooms in the Chesapeake Bay (in cooperation with School of Forest Resources); identifying and mapping pedologic controls on hillslope hydrologic processes and nutrient transport (in cooperation with Department of Crop and Soil Sciences); understanding the biogeochemical cycling of agricultural nutrients in soils and near-stream zones (in cooperation with Departments of Civil Engineering and Crop and Soil Sciences); use of biochar to reduce greenhouse gas emissions from bioenergy crops (in cooperation with Departments of Horticulture and Crop and Soil Sciences); building web-based decision support tools to benefit farmers and producers (in cooperation Center for Environmental Informatics); developing and refining the Phosphorus Index (in cooperation with Departments of Agricultural and Biological Engineering, Crop and Soil Sciences).

In addition to close collaboration with Penn State colleagues, we also have developed multi-institutional partnerships to address research needs across the Bay watershed. One such partnership involves testing the applicability of subsurface manure and poultry litter injection on minimum-tillage crop production systems at multiple sites and quantifying the subsequent effects on crop response, nutrient loss, and atmospheric emissions. The project team includes scientists from the PSWMRU, Penn State University, Cornell University, University of Delaware, University of Maryland Eastern Shore, University of Maryland, Virginia Tech University, and ARS's Dale Bumpers Small Farm Research Center in Booneville, AR. As a testimony to the success of this partnership, the PSWMRU was recently honored by the Federal Laboratory Consortium for Technology Transfer with the 2011 Mid-Atlantic Regional Educational Institution and Federal Laboratory Partnership Award.

7. Commitment of University Park, PA to the LTAR mission

Long term research has been a hallmark of efforts at University Park, PA, highlighted by the maintenance of the Mahantango Creek Watershed for over 40 years and by our participation in programs aimed at establishing baseline observations for long-term assessment (e.g., GRACEnet). Support for University Park, PA participation extends from the level of North Atlantic Area leadership (see letter from North Atlantic Area Director) to the PSWMRU staff. The location contains three CRIS projects that have strong collaborative ties, highlighted by recent visits by ARS national program leaders to the unit and by collaborative research described in existing and proposed CRIS research plans under NP 211 (13000-011), NP 212 (21000-007) and NP 215 (11130-002). The five major research themes identified above reflect the location's collective vision for opportunities under LTAR where existing collaboration between the three CRIS projects could immediately contribute to LTAR, or where additional collaboration between the three projects could be catalyzed by LTAR.

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Letter from North Atlantic Area Director in Support of PSWMRU participation in LTAR

United States Department of Agriculture

Research, Education and Economics
Agricultural Research Service

November 10, 2011

SUBJECT: Long Term Agro-Ecosystem Research (LTAR) Network for the Pasture Systems and Watershed Management Research Unit's Upper Chesapeake Bay Component

TO: Steven R. Shafer, Deputy Administrator, Office of National Programs

FROM: Dariusz Swietlik, Area Director 11/10/11

The Director's Office of the North Atlantic Area supports the application from the Pasture Systems and Watershed Management Research Unit (PSWMRU), University Park, PA, to participate as a research watershed in the Long Term Agro-Ecosystem Research (LTAR) Network. Despite federal budget constraints that preclude financial commitments for longer than one year, the PSWMRU has a 40+ year record of excellence for conducting research in the Mahantango Creek Watershed. We expect that as long as annual budgets permit and SY interests remain, PSWMRU will make the LTAR research a priority program. Their proposal reflects the collaborative research among all scientists at the location and draws on current research priorities, including: the three CRIS projects, GRACEnet, Cropland CEAP, and Grazingland CEAP. Their recent research throughout the Upper Chesapeake Bay Watershed, network of collaborators, historical experience, and their location, among many other reasons, makes this Unit ideally suited for the LTAR Network.

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