Watershed Lab Connections

North Appalachian Experimental Watershed

Coshocton, Ohio

An outdoor laboratory for land and water management research

November 2008

Forestry Classes for Only $5 !!!

Tax law in Ohio has changed so that land owners are eligible for property-tax reductions if they meet qualifications and manage their woodlots. One requirement for land owners is to take classes on forestry topics. The NAEW has teamed up with the Ohio Department of Natural Resources (ODNR) - Division of Forestry, the Coshocton County Farm Bureau, the Coshocton County Soil and Water Conservation District, the Small Farm Institute, and The Ohio State University to conduct three classes in which land owners are eligible to enroll and learn more about forestry and property management.

Forestry class attendees observe instructor John Kehn at the NAEW.

The three classes are "Introduction to Forestry", "Timber-Stand Improvement", and "Timber Marketing". Thus far in 2008, 12 classes have been held at the NAEW conference room, with a total of 257 participants. Enrollees receive classroom instruction by John Kehn, local Service Forester with ODNR, and then visit different woodlots on the NAEW to learn first-hand about forestry. The cost of each class is only $5 (for lunch) with the Coshocton County Farm Bureau funding the other half of lunch.

The NAEW has about 400 acres of woodlots of the approximately 1050 acres that it manages that are a resource to the public. This resource provides an opportunity to Ohio and other land owners who want to learn how to manage their woodlots to maximize income by supplying timber to the booming furniture industry in the region.

Upcoming forestry courses through the rest of 2008 and early 2009 are shown to the right, and a list of courses for 2009 is available on the NAEW web site. If you want to enroll in a class or want to be put on a forestry-class mailing list, please call Cara Baumer at the NAEW at 740-545-6349 or send email to cara.baumer@ars.usda.gov Be sure to tell the Coshocton Farm Bureau "thanks" for the lunch! You can reach them by email at SBrinker@ofbf.org.

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Upcoming Forestry Classes……

Dec. 12-Introduction to Forestry

2009

Mar. 14- Timber Marketing

Apr. 17- Introduction to Forestry

May 8- Timber Stand Improvement

Call today to reserve your seat!!

740-545-6349

BRIEFLY-WHAT IS THE NAEW?

* A 1050-ac one-of-a-kind experimental outdoor laboratory to study how land management affects runoff and water quality from field-sized areas, located in East-Central Ohio near Coshocton, Ohio.
* **Facility built as a public-works project by CCC and WPA workers - *see next article.***
* **An infrastructure consisting of networks of small (1-2 ac) and large (40-300 ac) experimental watersheds to study land management impacts on the environment - *see article on out wintering.***
* Experimental watersheds are equipped with permanent flow-measuring devices, water samplers, and rain gauges.
* Other experimental infrastructure consists of lysimeters (isolated blocks of soil to study water movement from the land surface to ground water), soil temperature, weather instruments, spring flow, and other variables.
* We have over 70 years of runoff and precipitation data that document the impacts of many agricultural practices.
* **Education and outreach to community and schools - *see articles on forestry classes and high school soil judging.***
* Operated by the U.S. Dept. of Agriculture, Agricultural Research Service in collaboration with The Ohio State University/Ohio Agricultural and Research Development Center (Wooster, Ohio).
* We employ 13 Federal and 3 State persons in scientific and technical support positions in "Green Jobs".

The North Appalachian Experimental Watershed

A Public Works Project that Continues its Legacy of Addressing National Watershed Research Needs

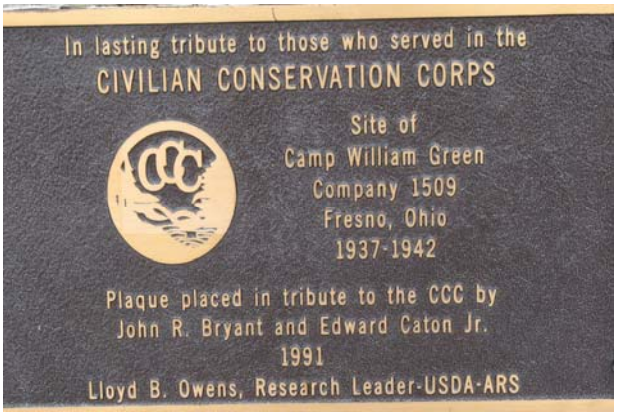
HISTORY...

Sustainable farmland for agricultural production was a major concern during the 1930's. The forces of wind and water eroded fertile topsoil across the Nation, exposed less productive soil for food and fiber production, and increased the likelihood of flooding. Recognizing these problems, the U.S. Congress enacted the *Soil Conservation Act of 1935*, establishing soil and water experimental stations to conduct research on methods to manage the land to minimize erosion and flooding. In 1935, one of the first experimental watershed research stations established in the U.S. was the North Appalachian Experimental Watershed (NAEW) in the uplands area of Coshocton County, Ohio. The mission of the NAEW was to study sustainability problems on the small watershed scale and to develop methods of conserving soil and water resources. The Coshocton site was selected for research because it represented land conditions prevalent in many states in this part of the nation, and because it was in the Muskingum Watershed Conservancy District (MWCD)-an area of active interest in large-scale flood control, recreation, and water management.

CCC and WPA workers constructing NAEW lysimeters in 1939

The USDA and Coshocton County collaborated in purchasing 1047 acres of land for the experimental watershed. Beginning in 1936, field research equipment was installed and buildings constructed to house offices and laboratories by an estimated 300 workers employed by two Federal programs: the **Works Progress Administration (WPA)** and **Civilian Conservation Corps (CCC)**. During World War II, the civilian Public Service Agency also supplied labor and technical help.

Thanks to **WPA and CCC workers,** by 1941 the NAEW was in full operation and soon thereafter scientists from all over the world came to view this "first of its kind" large-scale watershed hydrology research program in soil and water conservation. An infrastructure consisting of small gauged watersheds with flow-measuring devices and samplers, a network of rain gauges, and 11 "lysimeters" (large isolated blocks of undisturbed soil used t0 study water movement) is still in use today to address national priorities. (*Continued on Page 3)*



Plaque presented to the NAEW by the CCC in 1991. Inscription reads, "In lasting tribute to those who served in the Civilian Conservation Corps, Site of Camp William Green Company 1509, Fresno, Ohio, 1937-1942."

Continued from Page 2...

From 1948-1963, the USDA-Soil Conservation Service (SCS) operated a training center at the NAEW for their staff, serving 22 states in the Northeast and Cornbelt regions. About 3500 trainees attended these 3 and 4 week sessions during the 15-year period. In 1954, NAEW was transferred to today's Agricultural Research Service (ARS) of the USDA. Today, it is not uncommon to cross paths with professionals across the country who started their career at the NAEW after attending these conservation classes.

PUBLIC WORKS LEGACY AND PRESENT-DAY RESEARCH AT THE NAEW....

Early research at the NAEW addressed instrumentation for conducting research, conservation practices such as crop rotations, and the data contributed to runoff-estimation methods used today worldwide. In recent years, we have addressed how managing the land can affect *watershed water quality including sediment, nutrients, pesticides, and pathogens.* Early in our history, we teamed up with The Ohio State University, Ohio Agricultural Research and Development Center in Wooster, Ohio to conduct joint watershed-based agricultural research.

A high impact example is the first documentation of the environmental benefits of using the *no-till planting practice* that drastically reduces runoff and erosion, uses less energy by the farmer, and increases carbon storage in the soil. This practice is encouraged nationwide in *billion-dollar conservation programs* managed by the USDA. Other land management practices evaluated include various methods of conservation tillage, grazing, and coal mining.

Today's environmental problems are more complex and new technologies require investigation, while collaborating with industry and government. The *70-year NAEW data base, monitoring infrastructure and our offsite research* enables the NAEW to address many of these problems, many of which were never imagined when the facility opened 70 years ago. For example, the NAEW is addressing these national problems:

- **Effects of increasing imperviousness due to urbanization on flooding and water quality**
- **Climate change**
- **Allowable application of paper-mill byproducts to surface mines**
- **Conservation implications of using biofuels**
- **Effects of land management on carbon stored in soil ("carbon sequestration")**
- **Management-intensive grazing**
- **Application of manure to frozen soil**
- **Control of pesticides from conservation-tillage fields**
- **Computer simulation of precipitation**
- **Investigation of simple tools for evaluating impacts of land management**

Flood runoff being measured with a dropbox weir in an urbanized watershed after rain storm in August

The legacy continues today of the visionaries who established the outdoor NAEW laboratory to develop the science and engineering methods needed to protect the Nation's water and soil resources. The Nation is also indebted to the **WPA and CCC workers** who in the 1930s helped transform the soil and water research vision to the present-day experimental outdoor laboratory infrastructure and 70-yr data base that are used widely today. The NAEW continues to address new national research needs never originally imagined, and we continue to have national and international impacts.

150 High School Students Visit NAEW for Soil Judging Competition

On September 25 the NAEW hosted a soil judging competition for 150 high school students from high schools in southeast Ohio. The purpose of the program is to familiarize the students with the properties of soil and how variations in these properties affect the suitability of soil for purposes such as crop production, building sites, and waste disposal.

After going over the rules and viewing a practice soil pit, the students described the soil and the landscape in the vicinity of three competition pits. The contest was conducted in collaboration with the USDA-Natural Resources Conservation Service, the Coshocton Soil and Water Conservation District, and vocational agricultural teachers from the participating institutions.

High school students actively participating in soil judging at the NAEW

Rotational Out-Wintering of Beef Cows Is Better Environmentally Than Continuous Out-Wintering

Cow grazing during winter months

Winter weather increases the challenges of livestock management, especially if the livestock are not confined. For out-wintering of grazing animals, winter feeding requires different management than at other times of the year. Much feed, usually hay, needs to be brought to the livestock and at a time when the weather causes grazing areas to be much more vulnerable to loss of vegetation, compaction, increased surface runoff, and increased soil loss. Although research on the environmental aspects of grazing has addressed a number of concerns, there are few investigations of the environmental impacts of different systems for out-wintering livestock. Grazing research with beef cattle has been conducted at the North Appalachian Experimental Watershed for several years. During these studies, cattle have been kept continuously in one area for the winter and had hay brought to them in one system.

In another system the cattle were rotated through fields to eat fall regrowth and then rotated through the same fields again to eat the hay that had been made in them during the summer. Vegetative cover in the continuous wintering area frequently decreased to less than 50% by late winter/early spring, whereas there was minimal decrease in per cent vegetative cover in the rotational wintering system. Annual surface runoff was 3 times greater from the continuous wintering than from the rotational wintering, organic nitrogen loss was 4 times greater, and soil loss was 11 times greater from the continuous wintering than the rotational wintering. April had the highest average monthly runoff and erosion.

The animal occupancy rate was greater with the continuous wintering than with the rotational wintering, i.e. cattle were on the continuous wintering area longer. So, even though the rotational wintering system was more environmentally sustainable than the continuous wintering system, more land area per cow was necessary.

Meet the Scientists Behind the Research

Dr. Lloyd Owens

Dr. Lloyd Owens graduated from Purdue University with a Bachelor's degree in Chemistry Education and a Master's degree in Soil Science. He went on to study Agriculture at the University of Rhodesia. In 1976, he completed his PhD in Soil Science at Purdue University. Lloyd has been employed with the NAEW for 32 years. His research interests include studying the processes of nitrogen movement in surface runoff, on sediment, through the soil profile, and in subsurface flow; investigating factors which influence these processes; and bringing the different parts together in context of a watershed system.

Dr. James Bonta

Dr. James Bonta graduated from Utah State University with a Bachelor's degree in Watershed Science. He continued his education at The Ohio State University where he earned a Master's degree in Civil Engineering with emphases in hydrology and hydraulics. After earning his Master's degree, Jim began his research career at the NAEW and subsequently earned his PhD in Civil Engineering from Purdue University. He has been conducting research at the NAEW for 33 years on topics related to general hydrology and water quality. His research interests include urban hydrology and water quality, stochastic storm simulation, developing methods for quantifying hydrology and water quality for practical use, precipitation analyses, surface mining, and hydrological instrumentation development.

Dr. Martin Shipitalo

Dr. Martin Shipitalo graduated from The Ohio State University with a Bachelor's degree in Agronomy and a Master's degree in Soil Science. He continued his education at the University of Guelph in Canada where he earned a PhD in Soil Science. Coming to the NAEW in 1986 as a post-doctoral researcher and then obtaining a permanent position as a soil scientist in 1989, Martin has been with ARS for 22 years. His research interests include the effects of conservation tillage on soil and water quality. He is also interested in how biological activity affects soil structure and the movement of contaminants through soils. His interests also include how industrial and agricultural byproducts can be beneficially used to enhance soil quality and improve the quality of surface runoff. He currently serves on the editorial board of *Applied Soil Ecology*.

Have a research need?

The NAEW wants to maximize its utility to stakeholders (industry, and private and public sectors), and we are always interested in learning about research needs that you may have. Please contact Dr. Jim Bonta by phone (740-545-6349 x 208)or by email (jim.bonta@ars.usda.gov) if you want to discuss a research need.

North Appalachian Experimental Watershed

Coshocton, Ohio

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Website: www.ars.usda.gov/mwa/coshocton

Meet Our Staff...

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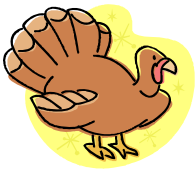

Happy Thanksgiving from all of us at the NAEW!!!

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