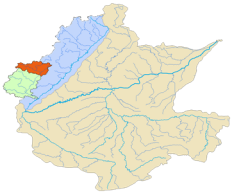

National Soil Erosion Research Laboratory
275 S., Russell St., West Lafayette, IN 47907-2077
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CEAP in the Cedar Creek Watershed

Inaugural Issue

Inside this issue:

Contact Information

Field project coordinator

Stan Livingston (USDA-ARS)
Cell 765-427-2303
Office 765-494-2946
Stan.livingston@ars.usda.gov

Local field support

Kyle Holden (DeKalb SWCD)
Cell 765-404-4642
Office 260-925-5620 x 3
KHolden@co.dekalb.in.us

Save the Date

When: February 21, 2018, 6:00 PM

Where: To be announced

What: Meet our two newest scientists, Drs. Chad Penn and Mark Williams, and learn what is in store for the watershed over the next five years. Please RSVP to Dekalb SWCD 260-925-5620 x 3

You've probably seen one of these, a field water quality sampling station and on-line weather station.

Welcome to the inaugural issue of the *CEAP in the Cedar Creek Watershed* report! This publication is designed to keep cooperators, producers, and stakeholders up to date regarding the Conservation Effects Assessment Project (CEAP) taking place in the upper Cedar Creek Watershed. You may ask, what in the world is CEAP? Well, here it goes…

CEAP is a national multi-agency (USDA-ARS, NRCS, FSA, NASS, NIFA, USGS, BLM, and many others) effort to quantify the environmental effects of conservation practices and develop the science base for managing the agricultural landscape for environmental quality. Findings from this project are used to guide USDA conservation policy and program development and help conservationists, producers/farmers and ranchers make more informed conservation decisions. CEAP research utilizes voluntary methods including education, technical assistance and, if possible, financial support for BMP adoption.

In the St. Joseph River Watershed, USDA-Agricultural Research Service (ARS) research scientists are working with numerous agencies and individuals. These stakeholders include NRCS, NASA, IDEM, Indiana Ag, Purdue University, Purdue-Fort Wayne, land owners and producers. This cooperation has resulted in nearly 15 years of high quality research on nutrient, pesticide, and sediment loads from the field to watershed scale.

In order for CEAP to be successful, continued cooperation from local entities is essential. Since 2002, the project has grown significantly. We started with 5 water samplers located on 3 ditches and in 2018 we will be monitoring 6 ditch locations and surface runoff and tile drainage from 6 edge-of-field sites. There also 14 real-time web-accessible weather stations providing weather, soil, and flow conditions, 10 of which are co-located with the water monitoring instrumentation. There is a also fully equipped laboratory located within the watershed to handle sample processing and preservation.

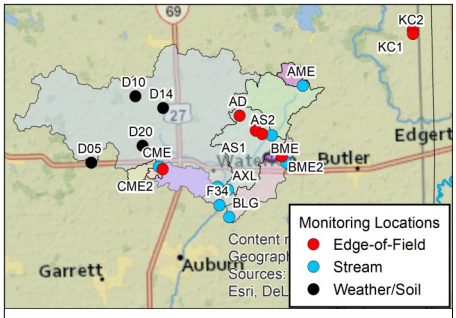
More information on CEAP can be found at the following link: https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/nra/ceap/. Access to the real-time weather stations can be found at: http://amarillo.nserl.purdue.edu

Why Cedar Creek?

In 2002, USDA-ARS was asked by congress to begin a study looking at the effects of conservation programs on the quality of water in the streams feeding the Ft. Wayne drinking water system as part of the Source Water Protection Initiative (SWPI). Cedar Creek is the largest tributary to the St Joseph River, and the upper portion of the watershed had producers that were conservation minded and willing to allow research to occur on their land.

Two years into the study, the SWPI project transitioned into a new project called the Conservation Effects Assessment Project (CEAP). From 2004 through 2010, the CEAP gained substantial momentum and continued to grow.

Between 2010 and 2014, the National Soil Erosion Lab lost a significant number of staff. Hiring was frozen for a time and we were unable to recruit replacements. Data continued to be collected, but staff reductions made analyzing and publishing the data difficult. In 2016, two new scientists were hired and the CEAP in Cedar Creek is gaining momentum once again. Several new projects were implemented in 2017 and more are planned for 2018.



Study locations as of January 2018

Agricultural Research Service
USDA

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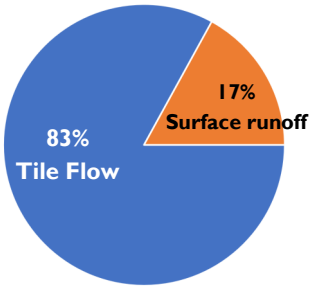
Research Feature: Storm Events and Nutrient Transport

Nutrients such as nitrogen and phosphorus are often applied to farm fields to meet crop needs. These nutrients can lead to water quality problems if they are lost from the fields where they are applied. For example, algal blooms in Lake Erie are the result of too much nutrient loss from fields. Knowing when and how nutrients are lost from farm fields is needed in order to improve water quality. Researchers from Indiana and Ohio collected water samples from 40 fields in the Western Lake Erie Basin (WLEB) over 5 years to learn more about when and how nutrients were lost from fields.

How frequently does surface runoff and tile flow occur in the WLEB?

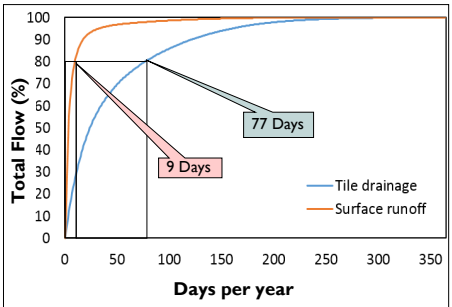
In the WLEB, there are two main ways water can leave a field: surface runoff and tile drainage. Surface runoff is when water flows over the top of the ground to a nearby stream or ditch. Tile drainage is when water flows down through the soil to a series of pipes that are connected underground and allow water to flow to a nearby stream or ditch. During the 5-year study, researchers found that the tile drains from the farm fields flowed for about 240 days per year. Surface runoff occurred less often on about 41 days per year. When the total amount of water from surface runoff and tile drainage was combined, tile drainage was the main pathway for water loss. Tile drain flow made up 83% of the total amount of water lost from the fields.



Amount of total water lost from farm fields in the WLEB from surface runoff and tile drainage.

When does water and nutrient loss occur from fields?

The research study showed that most water lost from fields in the WLEB took place after a heavy rain. Even though tile drains flow for about 240 days per year, on many days only a small amount of water flows from the tile drain compared to the large amount of water that flows after a heavy rain. As a result, most of the water lost from a field each year takes place over many fewer days. Of the total tile drained water lost from a field each year from tile drains, 80% of this water loss occurs over 77 days per year. For total water lost in surface runoff, 80% of this water loss occurs over 9 days per year. This means that large flows after heavy rains do not occur very often, but they make up a large amount of water lost from fields each year.



Amount of water flow that takes place during the year. For example, 80% of water flow from tile drains occurs on an average of 77 days each year.

When water leaves the field from either surface runoff or tile drains, nutrients such as nitrogen and phosphorus also leave with the water. How much nutrient leaves the field is based on both the amount of water leaving the field and the amount of nutrients in the water. Results from this study and others done across the U.S. Midwest have shown that there are often more nutrients in the water after heavy rains. High flows combined with higher amounts of nutrients in the water lead to large nutrient losses after heavy rains in the WLEB.

What can be done to reduce nutrient loss from fields in the Western Lake Erie Basin?

Researchers suggest a 3-part plan that uses a number of conservation practices will be needed to reduce nutrient losses to Lake Erie:

I. Nutrient use on fields:

Apply the right source of fertilizer, at the right rate, right time, and right place to farm fields in order to reduce the risk of large nutrient losses after heavy rains.

II. Water loss from fields:

Increase how well soil can hold water to help keep more water in the field and limit the amount of water leaving the field. The amount of water a soil can hold can be improved by increasing the amount of organic matter in the soil.

III. Field conservation practices:

There are many conservation practices that can be used at the edge of the field to reduce nutrient loss in surface runoff or from tile drains. These field conservation practices include woodchip bioreactors, buffer strips, blind inlets, drainage water management control structures, and phosphorus removal structures.

For more details about this research study or how to reduce nutrient loss from farm fields, contact the National Soil Erosion Research Lab.