

SUGAR CREEK SCOOP



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Hydrology and Its Impacts to Water Quality

Hydrology is the scientific study of the properties, distribution, use, and circulation of the water on earth and in the atmosphere in all of its forms. Hydrologic features of a watershed include both surface water (streams, lakes, wetlands, floodplains, etc.) and groundwater (aquifers, wells, etc.). The properties, distribution, and circulation of water and the relief features of the earth's surface help give environments their character.

The quantity and timing of discharge influences many watershed parameters. Loss of topsoil has implications for agricultural production, and moving sediment can cause sedimentation in streams and can carry chemicals for long distances. Low water flows define the smallest area available to stream ecosystems during the year, and high flows shape stream channels, wash out silt and debris and cause flooding within a watershed.

Erosion can have significant effects on ecosystem condition. Wind and water erode soils naturally, changing the character of the landscape. Human activities such as development, road construction, and agricultural practices that disturb the soil surface or remove vegetation increase the potential for erosion. Soil loss not only reduces soil quantity and quality, but can also degrade water quality by carrying nutrients, pesticides, and other contaminants downstream. Sedimentation can raise costs to maintain reservoirs and channels and can degrade habitat for aquatic organisms. All of these conditions have an affect on the overall water quality of the watershed.

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The articles, *Wetlands within the Sugar Creek Watershed* and *Sugar Creek Regulatory Floodplain*, on pages 2 and 3 discuss two of the hydrologic features in the Sugar Creek Watershed. The Watershed Management Plan will include information on these, and other hydrologic features found within the watershed.

More information on Hydrology and its impacts to Water Quality can be found at:

<http://ga.water.usgs.gov/edu/hydrology.html>

Upcoming Scoop Newsletters

Previous Scoop newsletters have focused on the background information and basic concepts used in the development of a Watershed Plan. These articles have covered topics from the goals of a plan, to the water quality monitoring and macroinvertebrate sampling. An understanding of this background information is essential in the development of the Sugar Creek Watershed Management Plan.

Beginning with this issue, Scoop articles will focus on specific Sugar Creek Watershed information and monitoring results that aided in the development of the Watershed Management Plan.

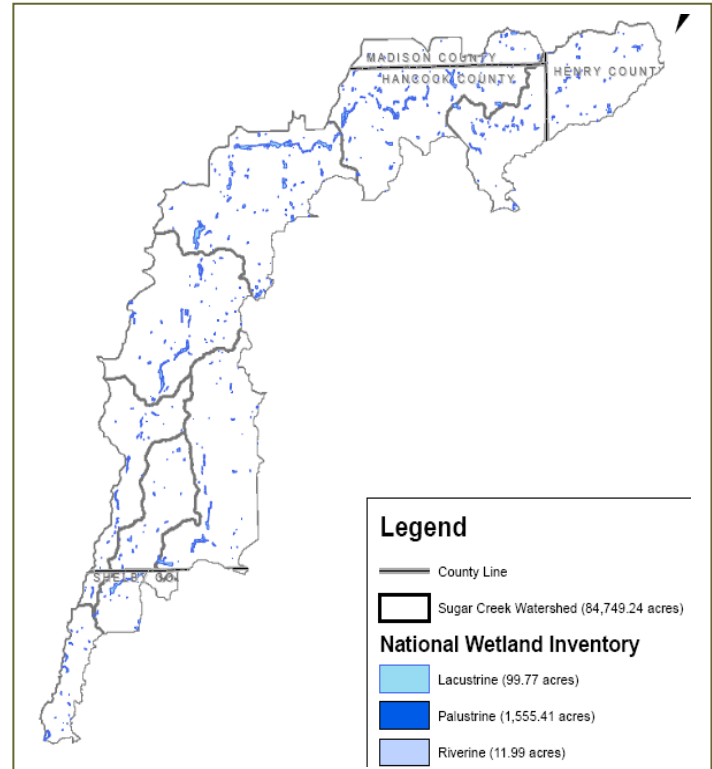
Wetlands within the Sugar Creek Watershed

Wetlands provide numerous valuable functions that are necessary for the health of the watershed. They play a critical role in protecting and moderating water quality. Water quality is improved through a combination of filtering and stabilizing processes. Wetland vegetation adjacent to waterways helps to stabilize slopes, thus reducing the sediment load within the river system. An unprotected streambank can easily erode, which results in an increase of sediment and nutrients entering the water. Additionally, wetland vegetation removes pollutants through the natural filtration that occurs, or by absorption and assimilation. This effective treatment of nutrients and physical stabilization leads to an increase in overall water quality to downstream reaches.

In addition, wetlands have the ability to increase storm water detention capacity, increase storm water attenuation, and moderate low flows. These benefits help to reduce flooding and reduce erosion. Wetlands also facilitate groundwater recharge by allowing water to seep slowly into the ground, thus replenishing underlying aquifers. This groundwater recharge is also valuable to



Example of a typical wetland area



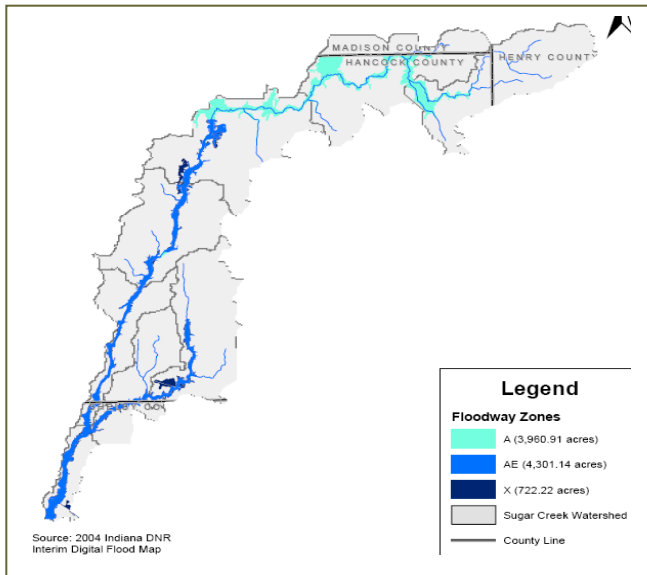
National Wetland Inventory Map for the Sugar Creek Watershed

wildlife during the summer months when precipitation is low and the base flow of the river draws on the surrounding groundwater table.

Although wetlands occupy a small percentage of the surrounding landscape, these areas typically contain large percentages of wildlife and produce more flora and fauna per acre than any other ecosystem. As a result of this high diversity, wetlands provide many recreational opportunities, such as fishing, hunting, boating, hiking and bird watching. Many of these recreational activities are available in the wetland areas within the Sugar Creek Watershed.

Of the approximately 84,750 acres of land within the Sugar Creek Watershed, approximately 1,667 acres (2%) of wetlands are scattered throughout.

Sugar Creek Regulatory Floodplain



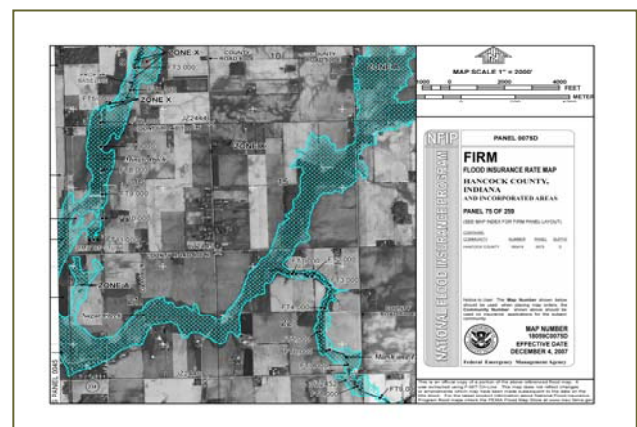
Sugar Creek Regulatory Floodplain

Flooding is one of the most common hazards in the United States. Floods can occur on a local level, or can affect entire river basins. The Federal Emergency Management Agency (FEMA) has developed Flood Insurance Rate Maps (FIRMs) for many parts of the country in order for individuals and governments to assess the risk of flooding in specific areas.

There are three flood hazard areas identified within the Sugar Creek watershed, Zone A, Zone AE, and Zone X. Zone A is defined as an area inundated by 100-year flooding for which no base flood elevations (BFEs) have been established. In this zone, there is a 1% chance of annual flooding. Zone AE is defined as an area inundated by 100-year flooding for which BFEs have been determined. Chance of flooding in Zone AE is the same as in Zone A, however, Zone A floodplain boundaries are based off of approximate methods, while Zone AE floodplain boundaries are based off of detailed hydrologic and hydraulic analyses. Zone X is defined as an area that is determined to be outside the 100-year floodplain but within the 500-year floodplain. These areas are considered to have a moderate or minimal risk of flooding, and the

purchase of flood insurance is available but not required. Of the approximately 84,750 acres of land within the Sugar Creek Watershed, approximately 9.75% (8,262 acres) lies within the 100-year floodplain and 0.85% (722 acres) lies within the 500-year floodplain.

Identifying the location of floodplain areas within the Sugar Creek Watershed allows for targeted areas of floodplain management. Floodplain management is the operation of a community program of corrective and preventative measures for reducing flood damage. These measures take a variety of forms and generally include requirements for zoning, and special-purpose floodplain ordinances. Flooding also negatively affects water quality, as large volumes of water transport contaminants into water bodies through runoff and also overload storm and wastewater systems. Nonpoint source (NPS) pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. NPS pollution is caused by rainfall or snowmelt moving over and through the ground and ultimately increases during periods of flooding. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, and streams.



Typical FEMA FIRM Panel

Upcoming Sugar Creek Meeting Dates

Upcoming meetings for the watershed planning groups are listed below.

November 7, 2008: Steering Committee Meeting
4:30–7:00pm, Hancock County SWCD, 1101 W Main St, Greenfield, IN 46140

December 11, 2008: Steering Committee Meeting
3:30pm–5:30pm – Hancock County SWCD, 1101 W Main St, Greenfield, IN 46140

January 15, 2009:

Steering Committee Meeting 4:00–6:00pm

Public Meeting 7:00–9:00pm

Greenfield Public Library, 900 West McKenzie, Greenfield, IN 46140, Phone: 317–462–5141

February 12, 2009: Steering Committee Meeting
6:00–8:30pm, Mohawk United Methodist Church, 2045 W 400 N, Greenfield, IN 46140

March 12, 2009: Steering Committee Meeting 6:00–8:30pm, New Palestine Town Hall, 42 E Main St, New Palestine, IN 46163, Phone: 317–861–4727

In the Next Issue...

Nonpoint Source Pollution Modeling

Critical Area Identification

Sugar Creek Cleanup Day

Don't forget, the Sugar Creek Cleanup Day is

Saturday November 8, 2008!!

Cleanup will be held from 8:00 am– 1:00 pm. Meet at the Hancock County SWCD, 1101 W Main St, Greenfield, IN 46140 **at 7:45 a.m.!!**

Volunteers Needed!!

Bring your work gloves!!!



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